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HZS C²BRNE DIARY

Dedicated to Global First Responders

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➲ **Arabic in the cover says: "Remember Beirut!"**

International CBRNE Institute

CBRNE-Terrorism Newsletter

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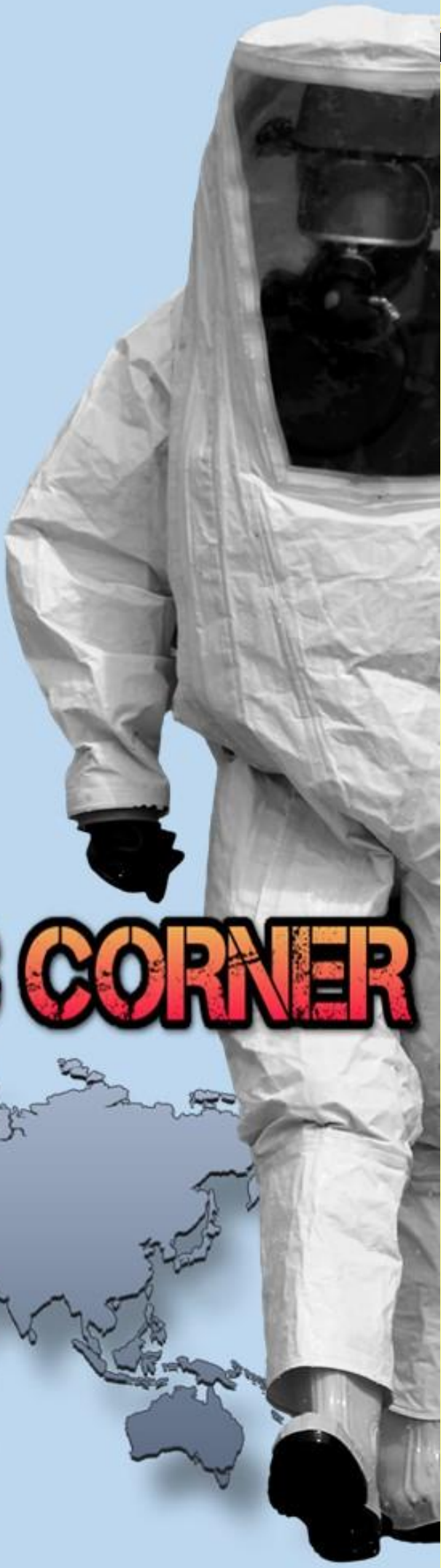

EDITOR'S CORNER

Editorial

Brig Gen (ret.) Ioannis Galatas, MD, MSc, MC (Army)

Editor-in-Chief
HZS C²BRNE Diary

Dear Colleagues,

In the news of September, two issues were monopolized our interest: schools opening and covid 19 vaccines. Schools (all grades) ignited a debate between parents and authorities mainly due to the mask issue. Both sides "know better" than the other and it remains to see if an ordinary mother or father without any scientific/medical/physics background knows better than epidemiologists or infectious diseases experts although some of their decisions are irrational – e.g. close night clubs at midnight because after that time the virus enjoys nightlife. Somewhere in between are the politics that – as always – do not know whom to support in order to secure their chairs. By the end of this month (today is Sept 13) we will have a more clear picture of who won the jackpot – silly comparison when health is at stake, but we are only humans! We will also compare the methods of two coaches: Greek (with masks) vs. Italian (without masks) and see which is the better (sic) team.

Then the vaccine issue arose again in the form of debate; this time between the two superpowers and a former empire. Russia took the lead; the Oxford vaccine had one (?) case of transverse myelitis and the US vaccines are still on the way. All of us who "belong to the West" we will buy the good vaccine that of course cannot be Russian. Let the rest of the world try the Sputnik V. A silly intellectual debate but again we are only humans and we have the governors we deserve.

I will make no comment about anti-maskers, anti-vaxxers, covidiots, and alike mainly because I will have to write about democracy, human rights and other things that might lead me to inappropriate paths. It is only a pitty, that a magnificent tool like the Internet is confused with the main principle of democracy that is freedom of speech that is trillion miles apart from freedom of idiotia[1]. We still do not know much about the novel virus and from time to time there are new announcements about its effects on the human body. By the way, when thinking about the pathogenesis of this disease I always come to the same conclusion: there should be a brain hidden within the virus itself; a brain that defends and attacks in an unorthodox/asymmetric way in order to bypass all our defenses and available pharmaceutical spectrum. This "brain hypothesis" might explain why we are always one or two steps behind. It is something like terrorism; also at least one step behind and although we know why, we still do not take the appropriate actions to win the war; only a few battles, here and there. Let us all hope that human resources and capabilities will surpass this pandemic as we did in certain cases in the past; I am not sure about terrorism.

Beirut's port giga-explosion was forgotten by the media but not from the Lebanese – the final (?) count: 190 dead – 6500 injured; 300,000 homeless; 8 bill USD (World Bank estimate) damages; 50,000 homes damaged; 9 major hospitals and 178 schools suffered severe damages. A recent fire burned what was left intact. Beirut will not be the same as before. The only "good" thing is that all the people (both civilians and military) and their families and relatives I know in the country were safe and all together are trying to bring the capital back to life in the midst of a pandemic.

This issue is not almost entirely about the coronavirus since we witnessed this strange incident with the Russian politician Alexei Navalny that was "poisoned" with a "cholinesterase inhibitor". He was med-evacuated to Charité – Universitätsmedizin hospital in Berlin and his exams showed exposure to a Novichok class nerve agent. One might say, well just another assassination with a

[1] From Greek "ιδιώτης" (idiot – person so mentally deficient as to be incapable of ordinary reasoning)

novel agent; Russians do that! Well, despite a history of incidents that were attributed to Russian gov, this time there are many things missing like the detailed clinical picture, the medical history while at the Russian hospital, the laboratory findings and treatment provided in both hospitals, the way of exposure, etc. Until we have them on hand, it would be wise to be careful about our conclusions and hypotheses made.

I was watching the American political drama television series "*Madame Secretary*" and in that episode, the President of the United States, following an incident in one of the country's embassies abroad (Bulgaria) compatible with an acoustic weapon attack (remember the US Embassy in Cuba incident?), wanted to retaliate within 24 hours by attacking all the Russian satelites and most probably start the WWIII. The thing was that this decision was not compatible with his overall character, behavior and the way he was responding to crises. So, Madame Secretary and many from his Cabinet persuaded him to have a CT scan that revealed that there was a benign brain tumor pushing on his frontal lobe that was altering his behavior and made him too aggressive and irrational. The President submitted to surgery and everybody lived happily ever after. Immediately, the case of Turkey's President came to my mind; could this be the case for his hostile rhetoric against Greece, Cyprus, France, EU – just to name a few? He thinks that he is the superhero of a super empire with unlimited military and financial (latest ranking from Moody's: B2 from B1) capabilities that allow him to bully everybody. I am only grateful that he has no nuclear weapons (for the time being) to his possession and that his Pakistani allies will not give them one or two because I am confident, that if he had them, he would not hesitate to push the button … it is so annoying, to have so many problems with a progressing pandemic and at the same time to have to face and offensive neighbor along with a chronic illegal immigration situation without the support of your own (you know those we belong together to the West). After all, it is only a CT scan!

Let us all hope that simple logic will prevail in all aspects of our global mess and that the following months will be close to our previous normal (?) lives. In the meantime, be alert CBRN First Responders! You are living in a period that almost all aspects of CBRNE are materializing one way or the other. The big one – whatever this is – might be in the next corner!

The Editor-in-Chief

What Foreign Islamic State Women Think About Guilt and Responsibility

By Vera Mironova

Source: https://www.lawfareblog.com/what-foreign-islamic-state-women-think-about-guilt-and-responsibility

Aug 19 – After the March 2019 fall of Baghuz, the last stronghold of the Islamic State (ISIS) in Syria, more than 20,000 non-Iraqi or Syrian members of the group surrendered to coalition forces. Males were separated from their family members and imprisoned, while females and young children were moved to camps for displaced people. Although both groups have been in custody for more than a year, many home governments of foreign fighters still have not decided their fate.

There is a lot of discussion in media, policy circles and government regarding what to do about these so-called fighters and their affiliates, but the opinion of the fighters themselves is often absent from this discussion. And although the Islamic State members themselves could be perpetrators of one crime or another, their opinions and the rationale behind them should not be ignored. Keeping the grievances and opinions of these people in mind is important particularly if policymakers are looking further into the future, focusing not just on near-term counterterrorism trials but also on deradicalization and preventing the group from remerging.

Surprisingly, the opinions of fighters and their affiliates are as diverse as those of experts and policymakers. Some Islamic State affiliates think "all males who still support ISIS should be executed" while others argue that the "majority should be pardoned."

While some affiliates think that only men should be held accountable for what the group did, others think that it is in fact females who should be punished more. And while some approach such crimes as Yazidi enslavement from the more Western legal system and think that everyone involved in it should be held culpable, others still think that the enslavement was acceptable because it is allowed by Sharia law.

So, to understand their positions, and the reasoning behind them, I conducted interviews with a focus group of western Islamic State women who are in a camp in Northern Syria and whose husbands are incarcerated.

The focus group members are not a representative sample. The group excludes those who still support the Islamic State and do not want to return to their home countries. Those who still fervently support the group either did not agree to be interviewed or did not have informative responses. According to this group, the Islamic State was following Sharia law and, as a result, was just and legitimate. These adherents also claimed that their fellow Islamic State members would ultimately break them out of custody, and the women made threats to prison authorities and western governments.

I've had a lot of experience trying to understand the perspectives of women in the Islamic State. Over the past year I have been in contact with several dozens of foreign Islamic State women in camps in Northern Syria, and I selected this particular group of women for interviews because they represent different western countries where the debate about prosecution is the most acute and because they had varied reasons for not continuing to support the Islamic State. Some of the women became disappointed with the group because they thought it was not fair to its members, and some women withdrew their support because of the crimes the group committed against local civilians who argued that the Islamic State acted contrary to Islam.
All interviews were conducted by phone either in English (three of the women speak English fluently) or in Russian, in which case I translated them. What follows is an introduction of the women and direct quotes from their interviews with light modifications for clarity.

Who Are the Women?
Kimberly is an American and Canadian dual citizen who converted to Islam. She came to Syria with her Somali husband who was a recruiter and member of Amni (Islamic State internal security). She came to Syria to work as a nurse and worked in the hospital in Raqqa. In her account, her husband lured her to Syria saying that she would be free to leave any time, but it was not true. She tried to escape 11 times, and when she got caught, the group imprisoned her. She finally escaped the group in January 2019. She is currently in Roj camp, and her husband is in prison in Hasakah.
Umm David is a Russian whose die-hard Islamic State supporter husband from Azerbaijan was also a member of Amnia. He has been missing since the battle in Baghuz (he sent her a voice message on the last day of the battle, indicating that he was still alive, so there is a high chance that he is in prison in Hasakah). She was also an avid supporter of the group and wanted to stay with it until death, but her husband forced her and their children to surrender to the Syrian Democratic Forces, who now operate the camps and the prisons in Northern Syria. She reports growing disillusioned with the Islamic State while in al-Hol camp. According to her, there she realized that the Islamic State did not follow Sharia law and its leadership are not true Muslims, which she thought was the main reason why the Islamic State lost the war.
Umm Abdallah is a Belgian citizen of Moroccan origin who came to Syria alone. She married her French husband of Tunisian origin in Raqqa. They report growing disappointed in the Islamic State after seeing that it was not fair to its members and did not respect their rights. For example, when her husband stopped working for the group, it tried to evict the couple from their house. They attempted to escape several times but were not successful because of a lack of money. After stopping his work for the group to support the family, her husband was selling food in the market in Raqqa. She is currently in Roj camp in Syria. Her husband was transferred from prison to Iraq and sentenced to death, one of 11 French male fighters who met the same fate in a series of trials that sparked widespread criticism directed at the French government.
Umm Sa'ad came to Syria from the Netherlands. She explained that she became disappointed in the Islamic State soon after arriving in Syria when she saw how the group treats its members. In particular, she was disgusted with the group's approach to women—in the caliphate, women basically had no rights—and with the group's human rights abuses of local populations (such as the Yazidi genocide). She tried to escape but was not successful. She is also in Roj camp, and her husband is in prison in Hasakah.
Here are excerpts from my interviews with the women.

Who Is to Blame for ISIS Actions and Crimes?
Kimberly: I think the fingers should be pointed in many directions regarding blame. The better question is, "Why was ISIS allowed to flourish?" The West has a huge amount of power. They could have stopped them. The loss of human life would have been epic … but it was anyways, just drawn out for years.
Also, inside the group I am inclined to say that anyone who did not resist ISIS, who was not thrown in [ISIS] prison, who willingly or eagerly took positions in ISIS that harmed others (like leadership and Amnia), need to be looked at carefully.
Umm Abdallah: I am not a judge but I know that some men really did not do anything bad. Of course, some fought and some worked in Hisbah [ISIS religious police], but the fighting that ISIS did was accepted to countries—when they left and when they came to fight [Syrian President] Bashar [al-Assad]. It was a good thing for them that foreign fighters came here. Turkey also accepted that ISIS fought the Kurds. I understand now why ISIS propaganda was not forbidden on [the] internet and [anti ISIS] coalition countries let ISIS take so much territory. I do not defend anyone, but I think that we were a little blind to not understand what was happening here.
Umm Sa'ad: In addition to what the group did to civilians, it is important to think that they did the same for its members. For example they forced men to be fighters, imprisoned people on false accusations of being "spy" or "takfiri" [considering Islamic State members to be non-Muslims]. They also kept women and children under siege as human shields and did not let them leave the group safely. It was the case in Mosul, Tal Afar and other areas.

Umm David: Top leadership is guilty for what ISIS did and so are all those idiots who came because they loved violence and money (such as ex-drug addicts, former inmates and criminals) and thought that in Syria they could loot and kill openly. There were people who just wanted to kill no matter whom.

How Should Male Islamic State Members Be Punished?

Umm Abdallah: They are already in prison, and those prisons are worse than all other prisons, so should they be more punished? None deserves to be in prison with such bad conditions and be tortured.

When I think about all the torture and bad treatment that they go through, I can never say they must go back to prison for 10 years, for example. They are already punished, and they are already destroyed. I think after all this bad treatment, they could be free. [The] majority already paid for what they did. They are humans who deserve a second chance.

Kimberly: I think that many men did [bad] stuff, but I also feel that many wanted but could not get out. Members of Amnia should be punished for certain. With fighters they should be careful—case by case. Fighting when there is a war—it is kind of kill or be killed. It does not mean every fighter wanted to fight or even really had a choice.

There are many different stories, and each one needs to be reviewed individually by the government of the foreign fighter's home country. I think every single person in ISIS needs to be questioned a lot. Home countries should be looking for people who are perfectly comfortable harming others and worked actively doing so.

And [the fighters] should serve their sentence in their home countries. Some of us believe in teaching, not torture [as is common in Iraq]. And a prison in the West is still very much a loss of personal freedom. It just allows for humanity and education. [The] Netherlands gives like 6 years for joining ISIS. I think it makes more sense. It is harsh but 6 years is doable, especially since years have already been done here by many.

Umm David: Do you imprison everyone participating in all wars? No, so what is the difference here? You have to divide those who are pro-ISIS and those who are against ISIS.

Those who do not support ISIS anymore could go to prison for a short time. No more than 3 years, because the longer they are in prison, the angrier they would be after they get out. They understand that ISIS is garbage and there was no point in coming here. So, they are not dangerous.

Those men who still support the group should be killed. They are dangerous. It is also important what exactly the person did while in ISIS. If he was in Amni, he is also dangerous. So you have to have very good psychologists working with the fighters. In fact, good psychologists have to work with all of them. Maybe all ex-ISIS should actually go through a psychiatric hospital instead of prison.

Umm Sa'ad: The ones who committed genocide, killings, rape and so on should get the highest prison sentence that exists in the country they are from, or consistent with international law. There is no death sentence in Europe, so the sentence should be life in prison.

Amnia killed many innocent people. If it is proven that a particular member of Amnia killed people, he should be punished. Fighters on the battlefield are a different case because not all of them killed people. Some of them were Syrians who were fighting against Bashar [al-Assad].

On the other side, there should be clear exceptions. For example, some people who came here from Holland had a medical file before they left [indicating that] they were mentally unstable. Some others were forced to come here and so on.

Also, in general, it is better if regular members get into rehabilitation than prison. I believe that most of us who came to ISIS were running away from something back home. Punishing them is useless. Teaching them and giving an alternative is better.

ISIS Foreign Female Members

Umm Abdallah: Some women just followed their husbands, some came to change their lives because they believed in ISIS propaganda. If the [home] country gives them the chance to explain everything, [the country] will know what to do with them. [Home countries] need to understand why some people came here and why some people really regret doing so. Maybe some [women] did bad things, but personally I have never seen women fight.

There were Amnia members who tortured people and that is very bad. And if you were a good person, you would not accept what they were doing and [would have chosen to] just leave [Amnia]. But all depends on why a particular person was there and what was his goal. I could not give you a general answer and every case is different.

Kimberly: Definitely not all females should be free. It should be decided case by case. For example, members of Amnia should be punished, those who openly recruited, and those who still openly support ISIS. Also, those who stayed till the end [with the group in Baghuz] need to be looked at very carefully. They need to be questioned a lot. Reputations of fighters within ISIS were known [to other ISIS members and governments]. I think the countries know who they should be concerned about. Who did what, who was known and

why, and who is still pro ISIS. On the other side, I think being a wife [of an ISIS member] does not make you bad. In ISIS, most wives were like prisoners too.
Umm Sa'ad: Almost all the women I know were housewives. Some were teachers, but what I heard is that they taught from regular books such as Nuur al Bayaan, which is commonly taught in the Arab world. Other women were nurses. I hear that in Raqqa there was a female Hisbah [religious police] department, but I do not know anyone there.
But if a particular female was a member of Hisbah or Amnia and harmed or killed people, she should be charged with a crime. Amnia who killed should be locked up behind bars for a very long time. But if they were only telling women to cover their eyes [the Islamic State considered it unacceptable for a woman to have her eyes visible to men], then they [should] not be punished for more than being just a member of ISIS, being on their payroll.
Umm David: I think women are more dangerous than men. Women who still support ISIS should go to prison for around 8 years [longer than men]. … [T]hey are still dangerous, and if [they are] not in prison they will feel no accountability and will continue [their behavior]. I feel like all this ISIS propaganda of killing and hate gets deeper into women's brains than into men's brains. In particular, those who were members of Amnia and those who were fighting themselves (if they survived) should be isolated.
Also, their children should be taken from them. Even older boys who are now actively supporting ISIS would stop doing so if not under the influence of their ISIS-supporting mothers, who teach them to hate and kill.

Yazidi Genocide

Umm Abdallah: If you read about slavery in Islam, you will feel something different from what you heard in ISIS. In Islam, slaves have many rights and nothing can be forced on them. They eat the same food as the owner, have good clothes and are treated well. The goal of the slavery is to invite them to become Muslim and not to hate Islam. In ISIS, it was not like that with slaves. And of course, women who did bad things to slaves should be punished because [that conduct] is a crime.
Kimberly: I feel like many women in ISIS were treated as slaves. ISIS women were often treated the same, day to day or even worse in some cases. Many wives in ISIS were abused, some horrifically. I still see images of those women when I close my eyes. Abuse happens everywhere … just in ISIS the women had nowhere to go. But Yazidis went through genocide and they need justice. We need to send a message that human slavery in not okay. And ISIS women have to realize that too.
Each case about Yazidi should be looked at separately. For example, my second husband could not stand it. When he heard about it, he got upset. But my first husband talked about lots of gatherings where Saudis offered them [Yazidi slaves] to him.
Umm David: Those who participated in capturing Yazidi slaves should not be punished because if an Amir gave an order they had to follow it. There was no way for them to refuse and still be alive.
Those who bought and owned slaves should not be punished since it is allowed by Sharia law. And it is a mistake to assume that sabayas [Yazidi slaves] were mistreated. In many families, they were really taken care of very well. But of course those who mistreated them should be punished.
Umm Sa'ad: Those who were involved in enslaving Yazidis should be punished. Those who bought them should be also punished. I think they should be punished [the] same way as people who are involved in human trafficking.
When we first heard about slaves, we did not believe it and thought that it was only anti-Muslim propaganda, but then some people said that they saw them. It was terrible.

How Dangerous Are Islamic State Members?

Umm Abdallah: People become radical because they are in very bad conditions. They do not see any perspective, and they have nothing to lose. And maybe some need medical help.
I am not worried about those people being free, only if they are dangerous because they have psychological problems.
Kimberly: I think members of Amnia are the most dangerous. It is something that in the future would be a warning for me. If someone was Amnia in ISIS, I feel they are some of the worst. I think they have to eventually be released but be extensively monitored.
In fact, I think everyone in ISIS needs to be monitored including me. I am scared when I think of how my ex-husband manipulated me so thoroughly. I wish they [authorities] had known before to step in and help me. I was really vulnerable and needed help.
Umm Sa'ad: If women are die-hard ISIS supporters, they could be dangerous. But bringing them home and helping them is the first step to proving to them that [the] ISIS narrative is incorrect. Bringing all women home under the radar is the safest option. How dangerous can someone be with an ankle bracelet and/or house arrest or being in prison? In Europe I am sure that the intelligence services would be on top of it.
Umm David: Those who still support ISIS are dangerous. and I would be worried if they are walking free near my children. Those females who support ISIS should never be returned home. [For Islamic State-supporting women], if there was an attractive ISIS guy who told them to kill themselves, they

would do so. They are very dangerous. And I do not know what to do with them. They should probably be very carefully checked by psychologists.
I also think they would be spreading their ideology. In particular, it would be a problem not in towns but in small villages (where the majority of them actually come from). There they could soon radicalize the whole village.

Justice and the Future
Kimberly: Everyone should go back to the countries they came from. Except for Egypt, Saudi Arabia, [and other countries with limited due process protections] because [receiving the] death penalty for just coming to ISIS is not okay.
Most of the sentencing against ISIS members won't be fair. The reason is the fear factor, the lack of legal precedent and the political ramifications involved. Like Iraq, for example, is hardly reasonable [in their sentencing]. And [Iraq's] really long sentences just breed extremism.
You cannot stop the new ISIS. It is still here, still strong, and Western European countries' treatment of Muslims, [with] hijab bans and so on, fuel this. But the treatment of ISIS prisoners now is also not helping. It is proving that "the kuffar [non-Muslims] hate you."
But foreign countries can at least repatriate us. Let the children have a normal life. When you can work, be part of the society, feel values, I think you are less likely to leave the society or deattach from it [join anti-society groups].
Umm Sa'ad: Everyone should be returned home because there are neither human rights nor prisoner rights [at the camps and prisons in Iraq and Syria]. ISIS members did their crimes not only on locals but on muhajireen [foreign ISIS members] as well. [Foreign fighters] could be sentenced here, but then in prison they would be subjected to human rights violations and physical and mental torture. How is it better than ISIS? So a possible solution is to get [tried and] sentenced here but serve [the prison sentence] in their home countries.
Everyone deserves a second chance, and that is all we ask for. We made a big mistake [coming here], and we have realized that. We have been through hell and back to try to get out of ISIS. We survived both the coalition airstrikes and escaping from ISIS security forces.
Umm David: I was born in Russia and am a Russian citizen. And to be honest, I do not know any other reasons for them to take us [other than that we are citizens]. We did not do any crimes in Syria and Iraq. We made a mistake and ask to be taken back, and those who still support ISIS and did not accept that they made a mistake should remain.
Umm Abdallah: Home countries should take us back because, first, it is our right (even if I feel that we have no rights). Not everyone in ISIS burned their passports and supported attacks in the home country. And second, they must take us back because if they let people remain here it would make it worse. It would increase terrorism and lead to new attacks. And the situation in Iraq and Syria is already not stable. Just think, where was Abu Bakr Baghdadi before becoming a caliph? Prison in Iraq.
And conditions in prisons here are not acceptable. And that is the reason why the home government let them be here. There [in home-country prisons] fighters would have their own room with a toilet, water, food and good treatment. So according to foreign countries, [European prisons are] not punishment. Also if they would be judged and sentenced at home, one day they would be out and countries do not want that.
Some women have been here for 3 years, and they have arrest warrants back home. Their counties found them [here], but they prefer to let them become more radical in the camp. It is not a solution at all. The best is to take everyone to their own countries and show that they are better than ISIS …. But until now [European countries have] just shown that they are worse than ISIS … even in ISIS you deserve [a] "second chance." I saw in my country the pedophile who killed children get a second chance.

Conclusion
Female Islamic State members have diverse opinions about what should be done with their brothers and sisters in arms currently in Syrian Democratic Forces or Iraqi custody. While some women think that those linked with the group already paid the price of joining the group and could be safely released, others think that those affiliated with the Islamic State should be imprisoned and get psychological treatment.
At the same time, all four women I interviewed agreed that they are particularly concerned about group members who worked in Amni, the Islamic State's internal security. According to the women, those people should be punished for what they did to the civilian population and other members of the group who did not agree with Islamic State policies. In addition, the women cautioned that former Amni members should be watched closely by Western governments because they could be dangerous in the future.

Dr. Vera Mironova *is a visiting Fellow at Harvard University. Vera conducted fieldwork in numerous active conflict zones and post-conflict regions all over the world, and from 2016 to 2017, she was embedded with Iraqi Special Operations Forces during the Mosul*

Operation and before that, with ultra right Ukrainian armed groups in Donbas. She is an author of the book "From Freedom Fighters to Jihadists. Human Resources of Non-State Armed Groups" published by Oxford University Press. Her scholarship has been featured in numerous publications including The New York Times, Foreign Affairs, Foreign Policy, BBC, and The Boston Globe. She has also served as a commentator for a number of major media outlets, including The New York Times, the Associated Press, Washington Post, and Vice News.

The Looming Influx of Foreign Fighters in Sub-Saharan Africa

By Austin C. Doctor

Source: https://warontherocks.com/2020/08/the-looming-influx-of-foreign-fighters-in-sub-saharan-africa/

Aug 18 – On June 22, the Islamic State's affiliate in its "Central Africa Province" killed a U.N. peacekeeper in the Democratic Republic of the Congo. The militant group is ramping up its attacks by exploiting security lapses caused by the COVID-19 crisis. It is also expanding its recruitment to fighters living outside its primary areas of operation. In one April 2020 recruitment video posted via WhatsApp, a group member states:

My appeal to you all that are in countries headed by Infidels is that you should come and join us because the medicine for that virus is here with us. All you have to do is emigrate from infidel-led countries to this Islamic State here such that you can fight to save Islam.

Across sub-Saharan Africa, armed conflicts are escalating. In Somalia, al-Shabaab maintains an aggressive operational tempo and is expanding into northern Kenya. The long-simmering Islamist conflict in Mozambique is rising to a low boil. In the Western Sahel (i.e., Mauritania, Mali, Burkina Faso, Niger, and Chad), an insurgent movement is marked by increased inter-militant competition and intensified violence. Propelled by the West African affiliate of the Islamic State, the conflict in the Lake Chad area is continuing to bleed across state borders and threatens to compound with other regional conflicts. Militant violence in eastern Democratic Republic of the Congo continues.

Armed conflict in sub-Saharan Africa is not just accelerating — it is taking a new form. This change is instigated by three factors: the steady propagation of Islamist insurgency, escalating inter-militant competition, and fallout from the pandemic. Combined, they open the door to an increased influx of foreign fighters in sub-Saharan Africa. While they present their share of organizational challenges, foreign fighters tend to make insurgent organizations more resilient to military defeat, expand the range of tactics available to local insurgents, and increase the severity of targeted violence against civilians. Of particular concern is the risk that conflicts in the region will attract veteran "career foreign fighters" who present a greater security threat than one-off foreign fighters. This carries important implications for regional security and, by extension, for global actors with active interests on the continent.

Foreign Fighters in Sub-Saharan Africa

Foreign fighters (i.e., non-citizens of conflict states who join insurgencies during civil wars) are a familiar presence in conflicts in sub-Saharan Africa. Since the end of World War II, Africa has featured the largest proportion of insurgencies with foreign fighters relative to other regions. Nearly half of the African insurgent groups active in this period have recruited foreign nationals into their ranks.

Given the typical policy discussion around these actors, it is important to clarify that a foreign fighter may arrive to an African militant group from any foreign state, regional or otherwise. The term "foreign fighter" may refer to a combatant, for example, traveling from Chad into the Central African Republic, the United Kingdom into Somalia, or the Levant to Burkina Faso.

If foreign fighters are already common in sub-Saharan Africa, why does an influx of more foreign fighters' matter? With notable exceptions, the recruitment of foreign fighters by African militant organizations has been characterized by two features: Foreigners tend to arrive in small numbers, and most come from neighboring African countries.

First, while African militant groups are more likely to recruit foreign nationals, they also tend to mobilize them in relatively small numbers. (To be sure, reliable data on foreign fighter movements are notoriously difficult to obtain, complicated by the fog of war. But the data that do exist can help inform our understanding of regional security dynamics.) In Mozambique, from May 2017 to March 2018, the government prosecuted 370 individuals associated with the militant group al-Shabaab (not to be confused with the group of the same name in Somalia) active in the northern part of the country. Of that total, 314 were Mozambican, 52 were Tanzanian, three were Ugandan, and one was Somalian. In 2012, "hundreds" of fighters from nearby countries traveled to join the ranks of an al-Qaeda affiliated group in Mali. In Somalia, al-Shabaab has perhaps recruited more foreign fighters than any other militant group in the region. Even in this case, estimates for the number of foreign recruits range from 450 to 2,000 fighters. By comparison, an estimated 10,000 to 35,000 foreign nationals joined the anti-Soviet struggle in Afghanistan during the 1980s. In an extreme case, at least 40,000 foreigners joined the Islamic State of Iraq and the Levant between 2013 and 2018.

Second, when African militants recruit foreign nationals they tend to draw primarily from neighboring African countries. David Malet, who directs the Foreign Fighters Project, distinguishes between "regional" and "beyond neighboring" foreign fighters (i.e., those who arrive from contiguous states or those who arrive from distant states). Fighters from Chad and Sudan, for example, routinely staff the ranks of rebels in the Central African Republic. Boko Haram, which has generally avoided selling "its message to a global audience of foreign fighters," is increasing its recruitment efforts in the greater Lake Chad region, especially in Cameroon.

We are likely to see a shift in both of these trends. Specifically, a larger number of fighters from both regional and extra-regional nations are likely to travel to join local insurgencies in various hotspots in sub-Saharan Africa within the next year.

The Stage Is Set for an Influx of Foreign Fighters

Over the next year, sub-Saharan Africa will likely experience a surge in foreign fighter activity due to unfolding changes in the nature of regional conflicts and the ongoing ripple effects of the COVID-19 pandemic. Armed conflicts and crises tend to generate opportunities. By identifying the structural factors which connect the initial stages of the foreign-fighter lifecycle (i.e., "pre-departure" and "in theater"), we can craft reasonable expectations about the movement of foreign fighters into conflict theaters.

First, sub-Saharan Africa will attract foreign fighters because it is a swiftly expanding front in the transnational jihadist effort. Islamist extremism is ramping up in the region, marked by increased activity in the Sahel, the Lake Chad region, the Horn, and Central Africa. One on hand, the origins and impetus of African Islamist insurgencies are deeply local — and this should not be ignored. On the other hand, many African Islamist groups have continued to establish stronger linkages with transnational extremist networks. The Salafi-jihadi "ecosystem" in the Sahel, in particular, is strengthening rapidly. In the 2019 *Worldwide Threat Assessment*, the U.S. intelligence community emphasized that "jihadist groups in parts of Africa … have expanded their abilities to strike local U.S. interests, stoke insurgencies, and foster like-minded networks in neighboring countries." To this point, the number of violent events (e.g., armed attacks and battles) related to militant Islamist group activity in Africa increased from roughly 500 in 2010 to approximately 3,500 in 2019.

While al-Qaeda currently boasts a stronger position in a number of sub-Saharan African hotspots, the Islamic State is gaining ground. It is restructuring its regional approach by consolidating decision-making across the organization's multiple areas of operation. In 2018, over 4,000 Islamic State fighters were active in sub-Saharan Africa, mainly in the Lake Chad region. Since then, recognized and unofficial affiliates of the organization have continued to recruit. A new affiliate of the Islamic State has emerged in its so-called Central Africa Province. A recent letter from the United Nations Security Council estimates that the Islamic State's Central Africa Province membership consists of 2,000 personnel and includes foreign fighters from Chad, the Democratic Republic of the Congo, Kenya, and other nations. From April through June, the Islamic State's Central Africa Province claimed 25 attacks inside the Democratic Republic of the Congo.

Second, growing competition between transnational jihadist militant organizations will lead to more foreign fighters. With over a dozen Islamist militant organizations active in the region, the threat from Islamist extremism in sub-Saharan Africa is hardly monolithic. Indeed, inter-militant competition is occurring on a systematic scale through sub-Saharan Africa, especially among jihadist insurgents. Where al-Qaeda exists, the Islamic State works to prop up its own affiliate, and vice-versa. At this time, al-Qaeda and the Islamic State each have official chapters in Somalia and across the Sahel. And the number of violent interactions between the affiliates of these organizations is on the rise.

In West Africa, competition between affiliates of the Islamic State (Islamic State in the Greater Sahara) and al-Qaeda (*Jama'at Nusrat al-Islam wal-Muslimin*) is turning violent. While the organizations have cooperated intermittently in the recent past, recent events suggest relations between the organizations are souring. In June, for example, Islamic State in the Greater Sahara fighters detonated a truck bomb aimed at members of *Jama'at Nusrat al-Islam wal-Muslimin*, killing several. In Somalia, al-Shabaab became an official affiliate of al-Qaeda in 2012 and has significantly increased its hold over the region since that time. In October 2015, a former ranking member of al-Shabaab broke away to form a new faction and pledged allegiance to the Islamic State soon after. Following global and regional trends, violence between the two factions has been on the rise.

Violent competition between local rivals produces an incentive for insurgent factions to seek out foreign support. Malet and Victor Asal, for instance, have argued that insurgent groups in rivalry with other insurgent groups, regardless of their ideological positions, are more likely to attract foreign recruits. Adding fuel to the fire, competition between groups nested within a broader network (e.g., Salafi jihadists) increases the strategic and symbolic importance of a conflict theater, which may appeal to potential foreign recruits aligned with each side of the divide.

Islamist militancy is not a new phenomenon in sub-Saharan Africa. Neither is the foreign fighter problem. Gen. (ret.) William E. Ward, former commander of U.S. Africa Command, stated 10 years ago that "the foreign fighter phenomenon is a measurable threat to global peace and security … and, like many places, Africa is vulnerable." To be sure, jihadists are hardly the only militant organizations that recruit and deploy foreign fighters in Africa. However, the rapid propagation of Salafi jihadism throughout the region and the rising competition between these organizations should be of special interest to the global supply of fighters connected to these networks. As such, it is within regional jihadist groups that we should expect to see the greatest increase in foreign fighter recruitment in sub-Saharan Africa over the next year.

Finally, the COVID-19 crisis has hit sub-Saharan Africa hard. Fallout from the outbreak has threatened state capacity and legitimacy across the region and, thus, the resources available to monitor border security. This will make it easier for foreign fighters to enter and travel within African conflict theaters, thereby connecting demand to supply.

While the novel coronavirus appeared to reach Africa later than other parts of the world, it quickly made up for lost time. The pandemic is crippling many of the region's economies. Nearly half of working Africans could lose their jobs. As many as 58 million people in the region may fall into extreme poverty. The World Bank anticipates a region-wide recession, the brunt of which may be experienced by the region's economic leaders, including Nigeria, Angola, and South Africa. Recovery is expected to be slow.

Under conditions of weaker state capacity, as well as the pressing need to invest in public health initiatives, African leaders may struggle to provide sufficient funding to their militaries and security forces. As a result, their ability to monitor and enforce behavior within their own borders will be severely diminished. Border security shapes local insurgents' ability to bring foreign recruits into the conflict theater. Not all would-be foreign fighters successfully arrive to their intended destination. Some are intercepted by security officials en route.

The outbreak has a number of ripple effects for conflicts and foreign fighters. One is that those interested in entering and moving about in the region — and under the radar — will face fewer obstacles in doing so. This is especially salient to the issue of foreign fighters when one considers the robust industry of clandestine migration already present in the region, with which many extremist militant groups are already directly involved.

Local militants are already working to take advantage of these political and economic lapses. In the initial phase of the pandemic, from mid-March to early May, violent extremist events increased by 28.5 percent in sub-Saharan Africa, according to the Armed Conflict Location and Event Dataset. In

recent testimony delivered to the U.S. House Permanent Select Committee on Intelligence regarding the effects of COVID-19 in Africa, Judd Devermont emphasized that "African extremist groups are outmaneuvering distracted and overstretched domestic and foreign security forces."

In short, while the pandemic is unlikely to influence the demand for foreign recruits, it has unquestionably weakened state capacity and border security throughout the region. For militant leaders and potential recruits, this will affect their assessment of the risks involved in transporting foreign nationals to African conflict theaters. As a result, the latent regional and global supply of foreign fighters will find it easier to meet any increases in demand throughout the sub-Saharan African region.

Surge in Foreign Fighters Will Make the Militant Challenge Even More Difficult

The influx of foreign fighters to African militant groups makes insurgent organizations more resilient to full-on defeat, introduces new tactics to local insurgencies, and generally increases the level of violence inflicted against civilians.

First, foreign fighters tend to offer a net benefit to local militant organizations by reducing the probability that they experience outright military defeat. This is not to suggest that foreign fighters do not sometimes hinder, rather than help, insurgencies. The arrival of foreign fighters may invite unwanted attention from counter-terrorist forces or the international community, for example. The managerial challenges prompted by these actors may also be formidable. The case of al-Shabaab offers ample evidence of the challenge of integrating foreign fighters into a local insurgency. While the group's foreign fighter cadre initially served as an important part of its fighting force and mid-tier leadership, non-Somali contingents later clashed with al-Shabaab's leadership. This led to the killing of many of the group's foreign recruits, including Omar Shafik Hammami. According to scholars Tricia Bacon and Daisy Muibi, foreign fighters' influence on the al-Shabaab insurgency has been "limited" and "relatively short-lived."

More studies are needed to tease out the conditions under which foreign fighters are assets to local insurgent commanders and those under which they are a liability. On the whole, foreign recruits appear to tip the scales, extending the duration of conflict periods and protecting militant actors from complete strategic defeat.

Second, foreign fighters serve as conduits of organizational learning. By expanding the set of violent tools available to the armed groups they join, foreign fighters can enhance insurgents' mode of warfare at the operational and tactical levels. While many foreign fighters are greenhorns, others are battle-hardened combat veterans of conflicts in the Levant, West Africa, Somalia, Afghanistan, or Yemen. For instance, foreign fighters who returned from Iraq to fight alongside al-Qaeda in the Islamic Maghreb "brought back new terrorist techniques that had not been used previously in the Maghreb, effectively broadening the scope of al-Qaeda in the Islamic Maghreb's capabilities in terms of casualty rate, lethality, and the execution of multiple, coordinated attacks." Al-Shabaab now uses improvised explosive devices (including vehicle-borne systems) frequently and to great effect. This skill was originally brought over from veterans of the al-Qaeda campaign in Afghanistan. Foreign recruits also significantly improved al-Shabaab's sniper operations as well as their anti-tank countermeasures. A Syrian insurgent made a similar point about the arrival of foreigners to his unit:

The [foreign] fighters have brought in rocket propelled grenades and boxes of homemade explosives. And wherever you find improvised bombs, you're likely to find foreign fighters. They brought a lot of bomb making experience from the insurgency in Iraq. With their help, our bombs have [a] 3–7 kilometer detonation range. Now, we can even set them off by mobile phone.

Tactical innovation does not always translate to changes at the strategic level. However, militant organizations that employ multiple approaches to violence are "more likely to stretch state defenses, achieve tactical success, and threaten state security." A number of armed technologies (e.g., the adoption of armed drone attacks) which were introduced and refined in other recent conflict theaters, such as those in the Levant and Yemen, may begin to find their way to armed conflicts in sub-Saharan Africa. While groups like Boko Haram have used drones for intelligence, surveillance, and reconnaissance purposes, none have yet conducted armed drone-based attacks. The flow of veteran foreign fighters from regional and extra-regional theaters to other conflicts in sub-Saharan Africa may introduce new technologies to old and new battlefields.

Finally, militant groups with foreign fighters tend to inflict more violence against civilians than insurgent groups without foreign recruits. John Willingham and I, for instance, demonstrate that foreign fighters significantly increase the expected count of rebel-inflicted civilian casualties. This especially true when foreign fighters join militant organizations with more centralized systems of command and control.

Looking Ahead

Recent shifts in the security environment in sub-Saharan Africa — such as the expansion of Islamist militancy in the region, growing hostility between local rival groups, and the fallout from a debilitating pandemic — point to an increased risk that an influx of regional and extra-regional fighters will travel to join the ranks of militant groups in the region. Some of these fighters will likely be combat veterans

of conflicts in Iraq, Syria, Yemen, or Libya. The subsequent introduction of new techniques and innovations to battlefields in Africa threaten to make the regional security situation even worse.
Understanding the nature and extent of foreign combatants' influence on insurgencies can help to shape more effective counter-insurgency strategies. This involves identifying where foreign fighters are likely to emerge in the first place, the conditions which motivate and enable militant organizations to recruit regional and extra-regional foreigners into the rank and file, and the conditions which may limit their willingness or ability to do so. Research on how to limit recruitment is scarce. This presents an opportunity for scholars and analysts to identify actionable countermeasures to stem the flow of foreign fighters to the region.

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ISIS Magazine Calls on Supporters to 'Race' to Emulate Charlie Hebdo Attack

By Bridget Johnson
Source: https://www.hstoday.us/subject-matter-areas/counterterrorism/isis-magazine-calls-on-supporters-to-race-to-emulate-charlie-hebdo-attack/

Aug 25 – The new edition of an English-language monthly magazine produced by ISIS supporters urges followers to "race" to emulate the 2015 attack on the Paris headquarters of newspaper *Charlie Hebdo*, arguing that governments aren't doing enough to punish those viewed by the terror group as blasphemers.

The **seventh issue of "The Voice of Hind,"** released online by ISIS supporters in India, tells Muslims that "the governments you live under are providing full support and protection to every person who attacks our beloved prophet, under the pretext of freedom of expression."
They highlighted the case of Asia Bibi, a Pakistani Christian woman who was sentenced to death for blasphemy — charges stemming from an argument with neighbors — in 2010, prompting global outcry and her eventual acquittal by the country's supreme court in 2018. Multiple countries offered her asylum, and she settled in Canada the following year.
The "Voice of Hind" writers said the case was "not shrouded from anyone" and that "the agencies of Pakistan provided for her a safe exit from Pakistan and hindered the path of muwahidin who were fuming with anger."
The magazine then hailed the July murder of Tahir Naseem, an American citizen from Illinois who was detained on Pakistan's blasphemy laws in 2018 and shot six times in a Peshawar courtroom two years later; the "outraged" State Department said he was lured to the country and entrapped, and called on Pakistan to "immediately reform its often abused blasphemy laws and its court system, which allow such abuses to occur, and to ensure that the suspect is prosecuted to the full extent of the law."
The ISIS writers said the Pakistan government "shamelessly imprisoned" the gunman.
The article then called the *Charlie Hebdo* attack, in which brothers Chérif and Saïd Kouachi killed 12 people, an operation "with Faith and riffles [sp]" to "wreak havoc in the broad daylight to avenge the Messenger (PBUH) for being abused by this newspaper."
The Kouachis and "all those brothers who come out" to attack accused blasphemers are "leaving a clear path for others to follow," the magazine states. "Yes, my dear brothers; this is the way to defend the Messenger (PBUH), there is no other way! We cannot expect the disbelieving and apostate governments to carry out the punishment for the blasphemy prescribed by Islam."
That punishment, the article continues, is "nothing but death," and followers should "race to one another to carry out this obligation."
"If we do not become forceful, then the assaults on our religion… will continue," the text states, calling on supporters to "take revenge on each and every one who has insulted our beloved Messenger (PBUH)."

Last month's issue of "The Voice of Hind" insisted that territorial losses were a tactical decision by the Islamic State, and called for loyalists to be broken out of prisons around the world including in the United States.
The authors mentioned "beloved sister" Aafia Siddiqui, aka "Lady al-Qaeda," while discussing ISIS prison break operations, as well as the ISIS wives still being held by the Syrian Democratic Forces. "There are still thousands of sisters imprisoned by the apostate SDF in al Houl Camp and they are living in extreme difficult conditions," the article stated, noting "many others who are still in the prisons of America, Europe and the rest of the world."
The magazine threatened one European country — "we still consider Spain ours and its revenge is inevitable" — and vowed to "never forsake our brothers who are in the prisons of America, Russia, Iran, India, Pakistan, Afghanistan, China, Saudi Arabia, Libya, Tunisia, Algeria, Africa and others."
The issue added that territory reclaimed from ISIS is only "a temporary transition and it is only a matter of time that Islamic State takes them back, this time more strongly though."
Between its fourth and fifth editions, the creators released a "lockdown special" edition of the magazine encouraging steps to "annihilate the disbelievers" including stabbing people with scissors and expending "less effort" by spreading deadly coronavirus. The issue tried to goad followers into spreading the virus, calling it "a weapon far greater than stones" and adding, "What better chance can you get to kill the disbelievers in multitudes than COVID 19?"

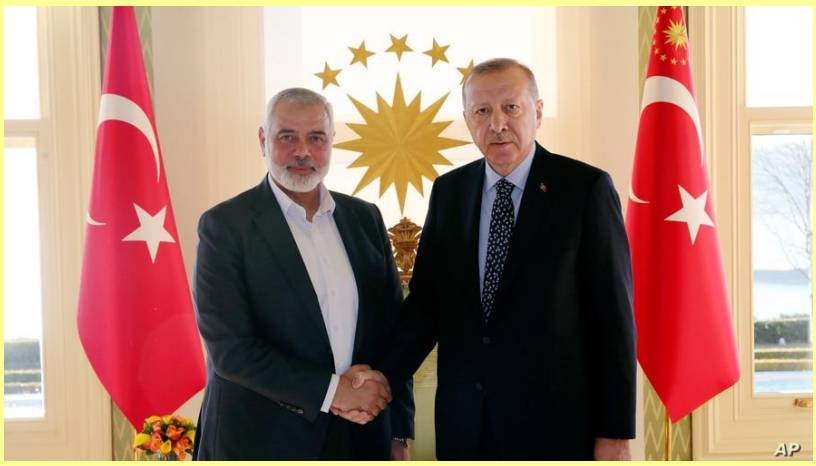
***Bridget Johnson** is the Managing Editor for Homeland Security Today. A veteran journalist whose news articles and analyses have run in dozens of news outlets across the globe, Bridget first came to Washington to be online editor and a foreign policy writer at The Hill.*

Michel Gurfinkiel on the Reverse Colonization of France

Source: https://www.meforum.org/61415/gurfinkiel-on-the-reverse-colonization-of-france

US Criticizes Turkey for Hosting Hamas Leaders

Source: https://www.voanews.com/usa/us-criticizes-turkey-hosting-hamas-leaders



Turkey's President Recep Tayyip Erdogan, right, shakes hands with Hamas movement chief Ismail Haniyeh, prior to their meeting in Istanbul, Feb. 1, 2020.

Aug 26 – The Trump administration says it strongly objects to Turkey's recent hosting of two leaders of Hamas, which the United States regards as a terrorist group.
"President Erdogan's continued outreach to this terrorist organization only serves to isolate Turkey from the international community, harms the interests of the Palestinian people, and undercuts global efforts to prevent terrorist attacks launched from Gaza," a State Department statement said Tuesday.
It pointed out that one of the Hamas members who was in Istanbul is alleged to have been involved in multiple terrorist attacks, hijackings, and kidnappings.
"We continue to raise our concerns about the Turkish government's relationship with Hamas at the highest levels," it adds.
Turkey is dismissing the U.S. criticism.
"Declaring the legitimate representative of Hamas, who came to power after winning democratic elections in Gaza and is an important reality of the region, as a terrorist will not be of any contribution to efforts for peace and stability in the region," its foreign ministry said. This is the second time since February Turkey has played host to Hamas leaders, the United States says. Hamas

rules Palestinian Gaza and has fought three wars with Israel. Palestinian militants occasionally launch rockets into Israel from Gaza, sparking a harsh response from Israel.

EDITOR'S COMMENT: Once upon a time there was a mighty supper power dominating the Western World. Well, not anymore!

Little Sparta's Big Ambitions: The Emirati Military Comes of Age

By Christian H. Heller

Source:https://www.realcleardefense.com/articles/2019/09/17/little_spartas_big_ambitions_the_emirati_military_comes_of_age_114748.html

The United Arab Emirates provides a 21st century case-study in how to build a national defense capability. Boasting a population of just under 10 million, the Emirates fields an air force, navy, and army composed of over 60,000 uniformed members with a higher per-capita service rate than the United States. Its leaders' study at prestigious academies around the world and foreign advisors provide advice, counseling, and technical knowledge. Dubbed "Little Sparta" by former Secretary of Defense Jim Mattis, its growing military presence in the Middle East and Africa are the result of years of dedicated investment and demonstrate ambitions surpassing the federation's short history.

▶▶ **Read the rest of this informative article at source's URL.**

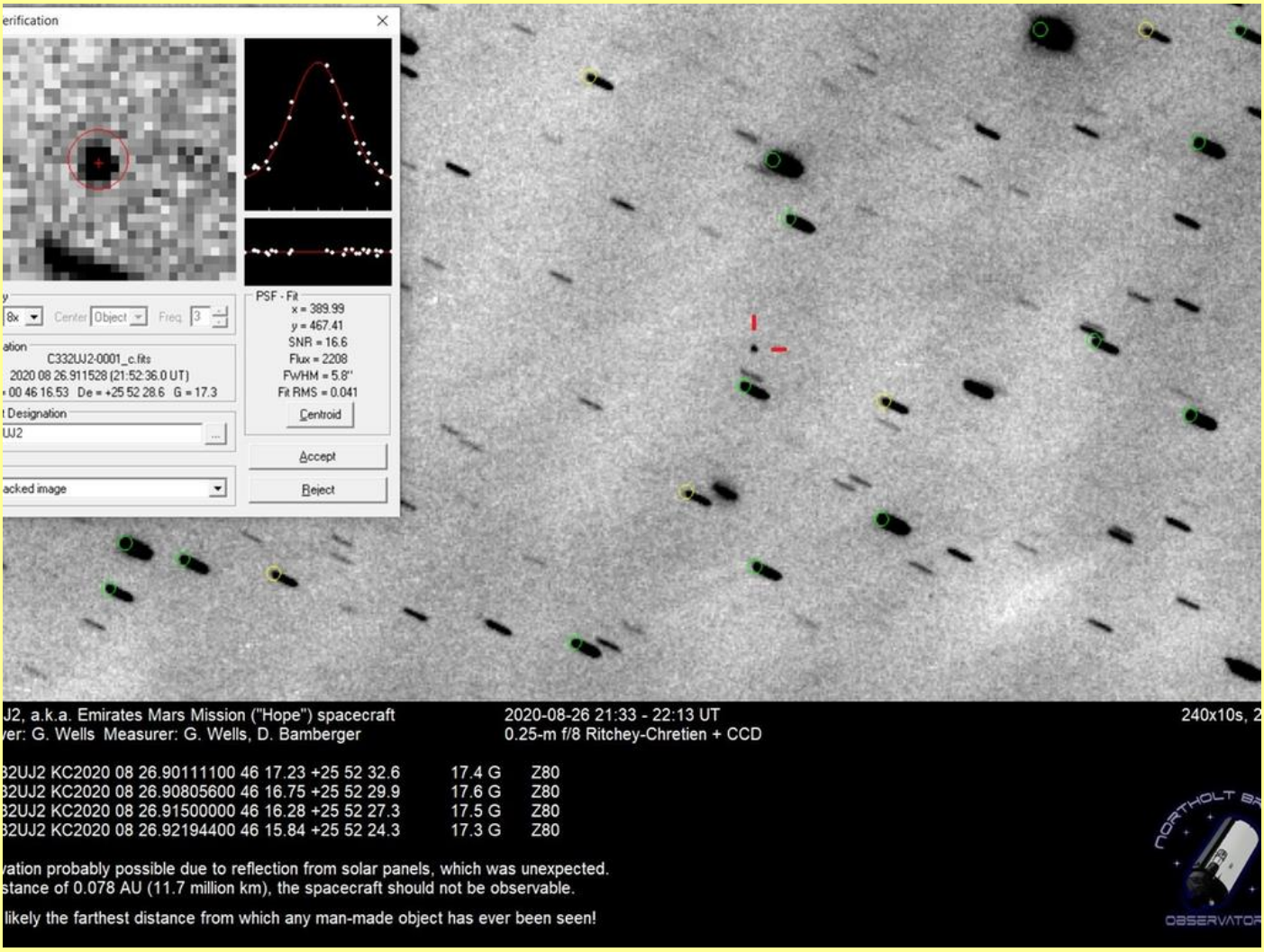
Christian Heller *is an officer in the United States Marine Corps. The views expressed in this article are the author's alone and do not represent those of the United States Marine Corps, the Department of Defense, or the United States Government.*

The Chief of Staff of the United Arab Emirates Armed Forces Lieutenant General Hamad Mohammed Thani Al Rumaithi was the first foreign counterpart to be met by the new Chief of Staff of the Hellenic Armed Forces, General Costas Floros, at his office (Jan 2020).

US space lab mistakes UAE's Hope probe as 'large near-Earth asteroid'

Source: https://www.thenational.ae/uae/science/us-space-lab-mistakes-uae-s-hope-probe-as-large-near-earth-asteroid-1.1069818

Aug 29 – A Nasa-funded space lab misidentified UAE's Hope spacecraft as a near-Earth object, after sunlight reflections on the probe's solar panels caused it to appear brighter than usual.
The sighting was recorded on August 26 by space observers at the Catalina Sky Survey (CSS) at University of Arizona's Lunar and Planetary Laboratory.



Possible light reflections on Hope probe's solar panels made it observable to the telescope used to detect near-Earth objects. Courtesy: Northolt Branch Observatories

Their telescope captured the Mars-bound probe, even though it is already 11.8 million kilometres from Earth since its launch on July 20 – a distance that should not have made the spacecraft observable.
"Our 1.5-metre telescope detected six new near-Earth object candidates that did not correspond to any known asteroid," Eric Christensen, CSS director, told *The National*.
"We did not realise it at the time, but one of these objects, which we designated C332UJ2, was actually UAE's Hope mission, on its way to Mars. To our telescope, it appeared identical to a large near-Earth asteroid in orbit around the sun."
Near-Earth objects, commonly known as 'NEOs', could be anything from asteroids to comets and are monitored to spot any potential threats from space.

Mr Christensen said they reported their sighting to the Minor Planet Centre – a global organisation founded in 1947 that collects asteroid and comet data – and the "asteroid" was provisionally designated as C332UJ2.
He said that most spacecraft can be readily distinguished from asteroids by their orbit, as satellites move much faster than asteroids and trace a more curved path as seen from the ground.
"But in the case of Hope, it is already quite distant from Earth and orbiting the Sun, so its motion was perfectly consistent with an asteroid, and not easily identified as a spacecraft," Mr Christensen said.
"I find it interesting that the predicted brightness of Hope would have been far too faint for our telescopes to see. It appeared many times brighter than predicted, probably because sunlight is glinting off some surface of the spacecraft, making it more easily visible from Earth, at least temporarily."
The Minor Planet Centre removed C332UJ2 from its listing after a day once it was matched as the Hope spacecraft.
As spacecrafts orbit around the sun, they could be mistaken for asteroids until further, detailed observations are made.
An amateur astronomer in 2002 recorded a sighting of an unknown asteroid, formerly designated as J002E3, but it turned out to be leftover parts of an Apollo rocket.
Space observers have described the recent sighting of Hope as a possible "distance record for optical observation of a spacecraft".
The Hope probe has completed 20 per cent of its journey and cruised more than 105.79 million kilometres.
With about 388 million kilometres remaining, the spacecraft is expected to arrive to the Marian orbit in February.

EDITOR'S COMMENT: In my August's editorial, I made a reference that our planet was suffering not only from the pandemic and the mega Lebanese explosion but also an asteroid was heading to Earth – well, no asteroid according to the article above! No problem; our world is still a mess and an asteroid would make not much difference! 😊

ISIS spreading in Africa, seizes a city in Mozambique

By Seth J. Frantzman
Source: https://www.jpost.com/international/isis-spreading-in-africa-seizes-a-city-in-mozambique-640373

Aug 29 – Three years after ISIS appeared to be on its last legs in Iraq and Syria it has seized a city in Mozambique. The city is called **Mocimboa da Praia** and now there are fears it may have a foothold that is growing in the country.
This slow process of ISIS radicalization has taken place for a year or more. However, it was largely dismissed as fear mongering. Now the group has infiltrated and some are concerned that it may be on the cusp of a larger offensive. Much like in the ISIS offensive in Iraq in the summer of 2014 the attacks in southeast Africa have displaced hundreds of thousands. There are questions about how the port city might be re-taken by security forces.

The port now affects the whole of Cabo Delgado province. This is in northern Mozambique. The International Committee of the Red Cross has warned of a humanitarian crisis that may grow. While some still argue that ISIS is not actually causing or driving the war here, but it is instead just inequality and poverty, the kinds of images from Mozambique look like the same Islamist insurgencies in Nigeria or Somalia or other areas.
While the international community is distracted by COVID-19 and major powers like the US no longer play a role in coordinating efforts like concentrating on these kinds of emergencies, ISIS can thrive in the margins. It has done the same in the Philippines and across the Sahel in Africa. It preys on weak states and ungoverned areas. South Africa is the major regional state that could intervene and turn the tide. It is unclear if it or Tanzania or Kenya will do more.

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Is Turkey Moving into Northern Lebanon?

By Jonathan Spyer
Source: https://www.meforum.org/61435/is-turkey-moving-into-northern-lebanon

Aug 27 – According to a report on the pro-Saudi Al Arabiya website published on August 19, officials in Lebanon are concerned at increased indications of Turkish efforts to build strength and influence in the country.

▶▶ Read the full article at source's URL.

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Of special note:

- Illicit Trade and Terrorism
  By Louise I. Shelley
- Breaking Hezbollah's 'Golden Rule': An Inside Look at the Modus Operandi of Hezbollah's Islamic Jihad Organization
  By Matthew Levitt
- Bibliography: Terrorism and Organized Crime in Latin America
  Compiled and selected by David Teiner
- Counterterrorism Bookshelf: 28 Books on Terrorism & Counter-Terrorism-Related Subjects
  Reviewed by Joshua Sinai
- Bibliography: Islamic State (IS, ISIS, ISIL, Daesh)
  Compiled and selected by Judith Tinnes

Turkify Turkey's Names? Really?

By Burak Bekdil
Source: https://www.meforum.org/61446/turkifying-turkey

Aug 29 – While Turkish Islamists celebrate the conversion of Hagia Sophia cathedral into a mosque, their ambition to erase Asia Minor's non-Islamic past is paralleled by calls to "Turkify" proper names borrowed from other languages, especially Greek.
In July, former **Turkish admiral Cihat Yaycı** proposed that the name of the Aegean Sea (Ege Denizi in Turkish) be changed because the Turkish word "Ege" comes from the Greek "Aegeo." He suggested that the Aegean should be called the "Sea of Islands" or "Northern Mediterranean Sea."

If the admiral's proposal to Turkify geographical names should be accepted, it will need to be applied to hundreds of locations in the country. It is already unacceptable in Turkey to refer to Istanbul as "Konstantinoupolis," its original Greek name. But few Turks know that the "Turkish" name of the city is in fact a cognate of the Greek "Eis tin Polin," meaning "to the city."

Atatürk was born in Thessaloniki (in today's Greece), which is "Selanik" in Turkish. Turkey's capital, Ankara, comes from the Greek "Ancyra." President Recep Tayyip Erdoğan is from Potamia ("rivers" in Greek) in "Rize," (the Greek "Rhizos"). His predecessor, Abdullah Gül, is from Kayseri (the Greek "Caesarea"). Before Gül, the three Turkish presidents came from, chronologically, Afyon (the Greek "Akroenos"), Isparta (the Greek "Sparta"), and Malatya (the Arabic "Maldiye").

Turkey owes its independence largely to its military success at "Gelibolu" (the Greek "Gallipoli"). Turkey's third-biggest city is Izmir (the "Greek "Smyrni"). Other big cities include Antalya (the Greek "Attalios"), Bursa (the Greek "Prousa"), Trabzon (the Greek "Trapezounda"), and Amasya (the Greek "Amaseia").

If the Turkification extends to human names, more than half the Turkish population will be nameless. The admiral apparently does not know that 42.9% of female names in Turkey are Arabic versus only 22.7% that are Turkish, and 49.7% of male names are Arabic with only 35.8% of them Turkish. Even the president's name, Tayyip, is Arabic ("Tayeb"). The name of the founder of Turkey was Arabic (Mustafa Kemal).

Symbolism is a colossal part of Turkish ideology. It often reflects the overall level of education of the country (on average, Turks are educated up to school year 6.5). But ideological symbolism is not limited to those who lack an education. The admiral who wants to give a Turkish name to the Aegean Sea is not a seventh-grade dropout.

***Burak Bekdil** is an Ankara-based political analyst and a fellow at the Middle East Forum.*

Why Americans Are Buying More Guns Than Ever

By Aimee Huff and Michelle Barnhart

Source: http://www.homelandsecuritynewswire.com/dr20200831-why-americans-are-buying-more-guns-than-ever

Aug 31 – Americans have been on a record gun-buying spree in recent months. Amid the COVID-19 pandemic and protests for racial justice, the gun industry's trade association, the National Shooting Sports Foundation, estimates that gun sales from March through July were 8.5 million. This is 94% higher the same period in 2019.

Firearms industry consultants estimate July sales alone were 2.0 million units, an increase of 136% over July 2019.

These estimates are based on the number of background checks conducted by the National Instant Criminal Background Check System. The FBI reported that eight of the weeks in this period are in the top 10 highest weeks since the agency began collecting data in 1998.

Gun sales typically have seasonal cycles, with more guns being sold in winter months, and increase in presidential election years and after high-profile mass shootings. However, the 2020 pandemic spurred a record-setting surge in demand for firearms.

Gun sales first spiked in March, when lockdown orders began in the U.S. The figures jumped again in June following nationwide protests over the killing of George Floyd.

Our research examines American gun culture and offers insights into the complex relationship between Americans and guns. We believe there are three general reasons why people are purchasing firearms now.

1. Independence and Security

A study we presented in 2019 shows that Americans feel buying a gun is a way of asserting and maintaining independence. Independence is threatened

during the pandemic, when a concern for public health may curtail some individual freedoms, including the freedom to travel, operate some businesses, assemble in large groups or visit the elderly.
Gun ownership can be motivated by the belief that having guns helps to ensure freedom to do and live as one chooses, particularly for individuals concerned with protection and defense.
The National Shooting Sports Foundation estimates that 40% of recent gun buyers are doing so for the first time, partly driven by citizens' perceived need to protect themselves in a period of uncertainty and civil unrest, as well as calls to defund the police.
This idea is supported by data showing that more than 99% of recent sales are handguns, which are typically used for self-defense, and by research showing that buying a gun for self-defense can be motivated by feelings that the world is generally dangerous.
Gun owners also find comfort and security in routines. This means existing gun owners may purchase additional guns in an effort to maintain a sense of normalcy.

2. Market Signals and Forces
Another reason relates to market conditions. Governors chose to include gun retailers as "essential businesses," allowing them to remain open during many statewide closures in March and April.
This reinforced the legitimacy of guns and gun retailers in the U.S., by strengthening perceptions of gun purchases as appropriate and necessary.
Meanwhile, gun retailers have struggled to keep firearms, ammunition and accessories in stock. When consumers face scarcity, they may experience a sense of urgency to purchase, and they may be willing to travel further, pay more or purchase a different item than they had initially sought.

3. Social Connection and Recreation
Finally, guns can provide a tangible basis for social connection. Social bonding through consumption is a well-established phenomenon in consumer research.
Retailers facilitate this by serving as a social hub and providing expertise on specific products. Visiting a firearms retailer and buying a gun can also enable consumers to feel socially connected to like-minded others.
According to our research, going to shooting ranges and hunting are lower-risk activities in terms of accidental shootings. We speculate that because these activities can be done outdoors, while wearing masks and with distance between people, they may also involve lower risk for COVID-19 transmission.
Americans who haven't joined the buying frenzy may question the use of a gun against a virus or rioters in faraway cities. During a time of crisis, citizens want to feel connected, secure and independent. For some Americans, buying guns may help them do so.

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Michelle Barnhart *is Associate Professor, Marketing, Oregon State University.*

Violence erupts in Swedish town of Malmo after anti-Islam actions, police say

Source: https://www.reuters.com/article/us-sweden-riot/violence-erupts-in-swedish-town-of-malmo-after-anti-islam-actions-police-say-idUSKBN25O31H

Aug 28 – A riot broke out on Friday in the southern Swedish town of Malmo, where at least 300 people had gathered to protest against anti-Islam activities, police said.
Protesters were throwing objects at police officers and car tyres had been set on fire, a police spokesman said. Earlier in the day, a copy of the Quran had been burned in Malmo by right-wing extremists.
"We don't have this under control but we are working actively to take control," the spokesman said.
"We see a connection between what is happening now and what happened earlier today," he said.
The demonstrations had escalated in the same place where the Quran had been burned, the spokesman said.

Daily Aftonbladet said several anti-Islam activities had taken place in Malmo on Friday, including three men kicking a copy of the Quran between them in a public square.
The anti-Islam protests occurred after Rasmus Paludan, leader of Danish far-right political party Hard Line, had been denied permission to have a meeting in Malmo and was stopped at the Swedish border, according to the newspaper.

EDITOR'S COMMENT: In Greece we have this saying "*he who sows winds reaps storms*"! This is what is happening right now in Sweden but the storm is yet to appear.

In an Era of Coronavirus, Do Not Forget Security

By Andrew Roszak
Source: https://www.domesticpreparedness.com/resilience/in-an-era-of-coronavirus-do-not-forget-security/

Sept 02 – The United States is currently facing historic challenges. Against the backdrop of a global pandemic, the United States is experiencing an historic rise in gun violence and civil unrest. Social issues, such as a dramatic increase in unemployment, a rise in domestic violence, an increase in substance abuse, social isolation, mental health issues, and uncertainty surrounding when the pandemic will end are leading to increased anxiety and frustration. In an era of coronavirus, do not forget that reopening plans need to focus on security, as well as health and safety.
As a concrete example, the State of Virginia has reported a 76% increase in domestic violence cases since the pandemic began. Further, a recent *NBC News/Wall Street Journal* poll captured the sentiment of the nation, with 80% of respondents saying that things are out of control in the United States.

New Threat with Common Dangers
The nation is currently focused on reopening facilities and continuing the battle against the coronavirus. However, do not lose sight of other dangers, such as active shooter events and attacks. Society is facing extreme dangers as depression and anxiety increase throughout the population. Gun sales have skyrocketed while many are facing mental health issues due to job loss, domestic violence issues, loss of income, solitary lifestyle, and loss of routine and structure. Alarmingly, historical records show that a high rate of

attacks occur after a break in routine. In fact, as many as 41% of all school attacks have occurred within one week of returning after a break.
When thinking about safety and security in a post-pandemic era, several significant changes in society since the COVID-19 coronavirus pandemic began need to be accounted for:
A high rate of attacks occurs after a break in routine. COVID-19 is the ultimate disruptor for schools, businesses, childcare programs, and houses of worship.

- Both gun and ammunition sales have skyrocketed since February 2020.
- In June 2020, the Federal Bureau of Investigation (FBI) conducted more than 3.9 million background checks – the highest month on record since the agency began record keeping in 1998. This follows the previous record, which was 3.7 million checks in March 2020.
- On 16 March 2020, three days after President Trump declared a national emergency for coronavirus, over 176,000 guns were sold.
- After the Minneapolis police station was burned on 28 May 2020, gun sales topped 150,000 per day in early June.
- Numerous cities across the country have reduced funding for law enforcement and some have removed law enforcement officials and school resource officers from public school buildings, leaving them largely unprotected in case of attack.

Recognizing and taking into account these new societal trends – along with current events and the overall mood of the country – are vital for developing new coronavirus protection procedures and reopening plans.

Beware of Flashpoints
In addition to the normal confrontations, coronavirus adds new rules and regulations that may cause additional flashpoints. Visitors, parents, or customers may object to or resist wearing masks, adhering to new drop-off protocols at schools or childcare programs, or take issue with newly established health safety guidelines. Unfortunately, this has already transpired in restaurants and grocery stores throughout the country – including a murder in Los Angeles after a dispute over wearing of a mask.
For children, the coronavirus has caused a dramatic rise in the use of online education. With many turning to online education, the occurrences of cyberbullying have also increased. These confrontations can increase in frequency, especially as children are left largely unmonitored by adults to attend remote schooling. The Marjory Stoneman Douglas High School shooting is a painful reminder of how bullying can lead to tragedy.
Now more than ever is the time to remain vigilant. In the battle against the coronavirus, it is important not to forget security while focusing on health and safety. Schools, businesses, childcare programs, and houses of worship should take advantage of the downtime from temporary closures to receive training on these critical topics and ensure security is included as part of all health and safety reopening plans.

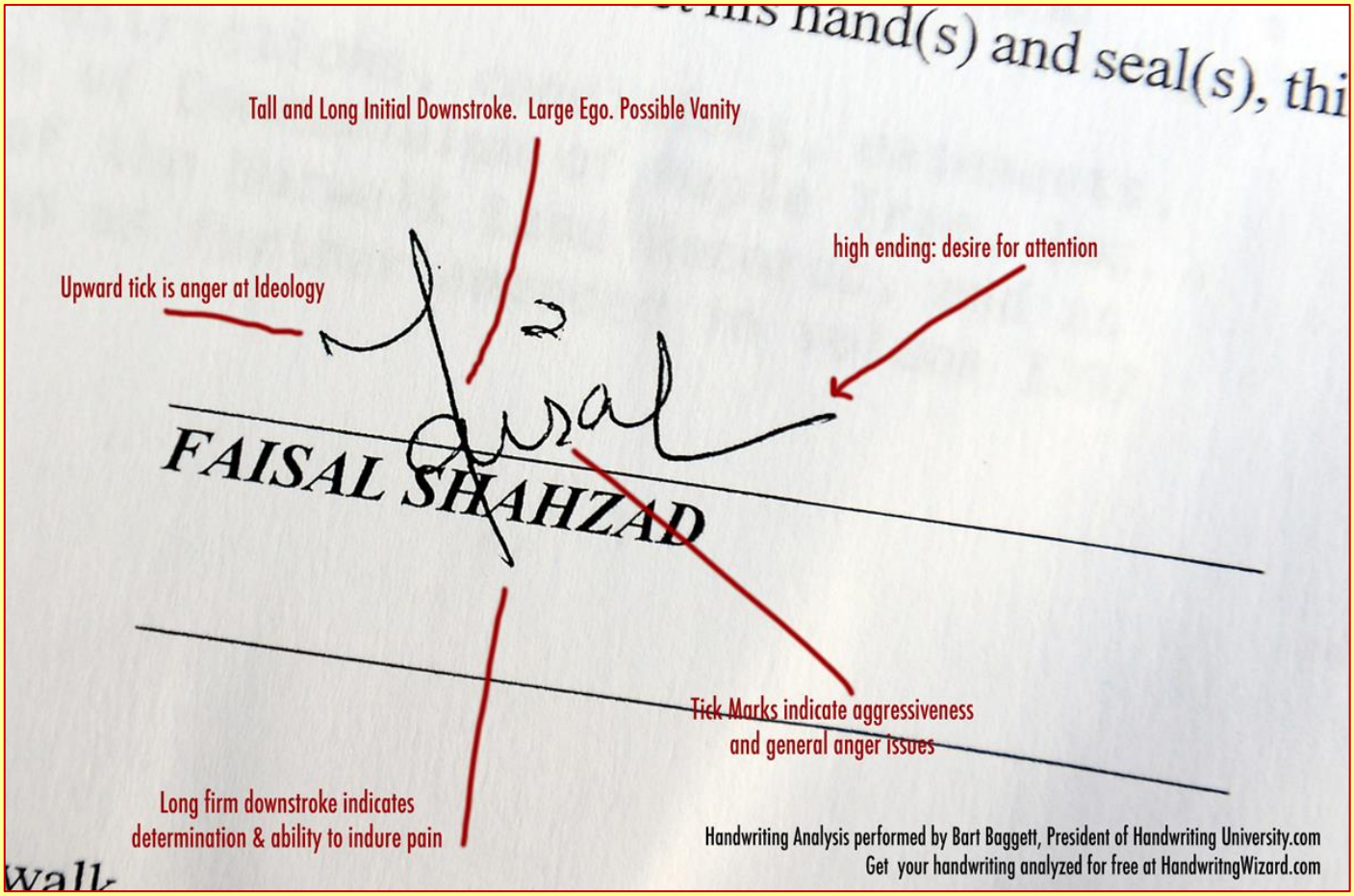
***Andrew Roszak, JD, MPA, EMT-P**, serves as the executive director for the Institute for Childhood Preparedness and as an advisor for the Domestic Preparedness Journal. He is the author of the Preparing for the Unexpected Series of books, which includes "Preschool Preparedness for an Active Shooter". Andrew has spent over 20 years working on emergency preparedness, response, and recovery issues. He is admitted to the Illinois and District of Columbia Bars and is admitted to the Bar of the U.S. Supreme Court.*

Handwritten materials can expose rapists, terrorists – Ezeohagwu

Source: https://www.sunnewsonline.com/handwritten-materials-can-expose-rapists-terrorists-ezeohagwu/

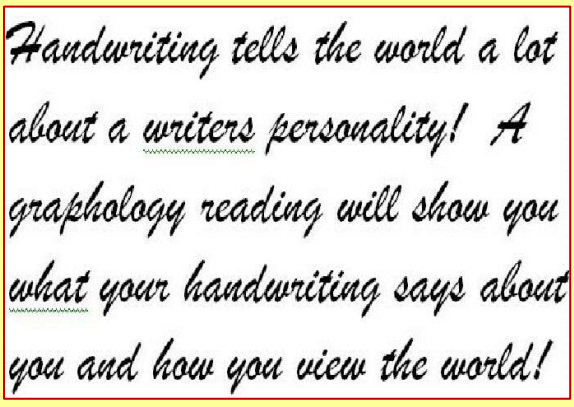
Sept 02 – Professor of Graphology, Ben Ezeohagwu has said that graphology which is a science that studies handwritten documents is capable of revealing people with rape, terrorism and other social personality traits.
According to Ezeohagwu who is the chancellor, African American University, Porto-Novo, Republic of Benin, graphology would help to understand the mannerism of employers, employees, spouse and colleagues before engaging or going into any form of relationship with them.
He told Daily Sun that, "The act of handwriting is the result of definite cerebral areas of the brain which combine processes that are related to movement, the intellectual, thoughts generated by the intellect- cerebrum part of the brain and the emotional – thoughts blended with strong feelings.

"Each thought generated by an individual affects his or her behaviour. Thoughts become material and concrete, and handwriting proves and reflects it. It is a result of what occurs in the brain and movements are then controlled in posture and balance by the cerebellum, back brain or intuition.



Time Square's Terrorist Handwriting Revealed – Faisal Shahzad

"Thoughts that are nurtured by human beings cause certain chemical substances that provoke feelings and emotions to be generated. However, each thought provokes a chemical reaction that corresponds to an emotion in the human body."



"In this complex line of connections, millions of brain cells are activated and work together. The impulses that activate the brain cells are electrochemical and convey the information that gets to the hand, with the order of handwriting movement on graphical space."

In essence, Ezeohagwu said that each human personality trait is represented by a neurological brain pattern; each neurological brain pattern produces a unique neuromuscular movement that is similar to every person who has that particular personality trait.

"When a human being nurtures pure and noble thoughts of happiness, optimism, peacefulness, patience, diligence, generosity, resourcefulness, goodwill, intelligence, joy and vitality, among other similar virtuous traits…. the human brain awakens and produces certain chemicals (endorfines, dopamine, etc) which cause similar virtuous traits to emerge and be effected in the handwriting and lead to the development of such virtues in the writer."

Such he said, applies in the reverse, which leads "to feelings of anger, violence, hatred, murder, rape, envy, lust, avarice, jealousy and many other kindred human evil traits/vices and when such becomes

habitual in a human being, such a human being becomes rapist, terrorist, racist, bomber, kidnapper and assassin."
Specifically explaining how to identity rapists through their handwritten documents, he said.

Daniel Pipes on Turkey's "Reconquests" in the Eastern Mediterranean and Beyond

Eastern Mediterranean Policy Note

September 2020

Interview with Middle East Forum President Daniel Pipes, conducted by Andreas Karyos, University of Nicosia. Published by the Cyprus Center for European and International Affairs.

Source: https://www.meforum.org/61459/daniel-pipes-on-turkeys-reconquests

To what extent do you think that historical background affects tensions between Greece and Turkey?

Historical memory deeply affects Greek-Turkish relations, as it does most international conflicts. In this case, the tensions began on a specific date – Aug. 26, 1071 A.D., at the Battle of Manzikert, when Turks started to invade and conquer most Hellenic lands. Then came Constantinople 1453. In modern times, Smyrna 1922, Istanbul 1955, and Cyprus 1974 maintained this trend. Now, nearly a millennium after Manzikert, the 2019 Turkish-Libyan agreement "on delimitation of the maritime jurisdiction areas in the Mediterranean" continues it by ignoring the normal maritime rights of Greek islands. So too does Erdoğan's "reconquest" of Hagia Sophia last month. Greeks should worry that, fueled by jihadi motives, Turks seek to conquer all of Hellas and Cyprus.

The remote Greek island of Kastelorizo, including the renovated eighteenth-century mosque

What does it mean that tension between Turkey and Greece has escalated over the issue of Kastelorizo, a small and isolated island far to the east of the rest of Greece?

That could be Turkey's next "reconquest." In 2012, I wrote an article titled "Kastelorizo - Mediterranean Flashpoint?" and eight years later I worry that the crisis may finally be approaching, perhaps as President Erdoğan seeks popular support in the lead-up to Turkey's 2023 presidential elections. In particular, I worry about Jack Dulgarian's scenario of the Erdoğan government invading Kastelorizo, swiftly conquering it, and daring the world to do something. The Hellenic Armed Forces on their own cannot do much. NATO is a paper tiger. Israel will not go to war with Turkey over a remote Greek island with a population of under 500. But if Kastelorizo becomes Turkish at little cost to Ankara, expect the Aegean islands of Greece to be next in its sights. The trouble is, I don't see how to deter Erdoğan given European weakness and President Trump's fondness for the Turkish dictator.

What is the impact of the new round of Greek-Turkish disputes on the southern flank of NATO?

Turkey's problems with Greece are just a small part of its disputes with other members of NATO, especially Bulgaria, France, Germany, and the United States. This means that, unlike decades past when Athens stood alone against Ankara, Greece is now part of a large, if not fully developed or determined grouping. As for the southern flank of NATO, it has hardly existed beyond U.S. forces, given general European self-disarmament.

What happens if Erdoğan pushes Syrian and other illegal migrants to Greece?

In 2015-16, Greece served as a transit zone for Germany, Sweden, and other countries. That situation has ended, and Greece has generally become a final destination. As symbolized by the "living hell" at Camp Moria on Lesbos, it has made itself an undesirable destination. News

travels fast and migrants currently in Turkey will less eagerly leave for Greece. This might prompt the Turkish government to pressure them by making their circumstances worse or by forcing them out.

On the other hand, I worry greatly about the Republic of Cyprus, situated just 160 km from Syria and sharing an effectively open border with the Turkish-occupied north of Cyprus. Until recently, the governments of Syria and Turkey have mysteriously not targeted Cyprus but that may be changing. Asylum applications increased over four times between 2016 and 2019, from 2,936 to 13,200, with most migrants arriving through the Turkish-occupied north.

What are the prospects of tripartite partnerships in the Eastern Mediterranean (Greece-Cyprus-Israel, Greece-Cyprus-Egypt)?

The prospects are excellent for both. Plus, the eastern Mediterranean's only three democracies share economic interests, especially gas, and security concerns. (By the way, I like Dmitri Shufutinsky's charming notion of calling the Greece-Cyprus-Israel partnership an "Axis of Antiquity.") The Eastern Mediterranean Gas Forum is probably even more important. In all, these new groupings graphically show Ankara the price of acting like a rogue state.

Is Ankara doing something about its exclusion?

It toys with the idea of improving relations with Jerusalem but that too much contradicts its Islamist ideology to get far; further, the Israelis have finally grown skeptical. More importantly, Ankara seeks to build alternate partnerships elsewhere, such as with Spain, Italy, various Balkan states, Libya, Qatar, Iran, the Turkic republics, Russia, and China.

How will the agreement between Turkey and Libya play out?

The agreement has great importance for Libya and beyond. It offers Turks, for the first time in over a century, a direct role in North Africa. One little-noticed aspect of the agreement concerns Fayez al-Sarraj, the head of the GNA faction supported by Ankara, who claims to be of Kuloğlu, or ethnic Turkish heritage; beyond him, the roughly 20 percent of Libyans who share this ethnicity mostly support the Turkish-backed GNA. If this

Turkic-oriented approach succeeds in Libya, expect Erdoğan to depend on it more also in the Balkans and maybe also in European countries to which Turks have emigrated (e.g. Germany).

As Trial Begins in Paris for Charlie Hebdo Attack, the Magazine Republishes Cartoons of Mohammed

Source: http://www.homelandsecuritynewswire.com/dr20200903-as-trial-begins-in-paris-for-charlie-hebdo-attack-the-magazine-republishes-cartoons-of-mohammed

Sept 03 – Yesterday (Wednesday, 2 September 2020), the trial of fourteen people, accused of participating in the plot to attack the editorial offices of the French satirical magazine *Charlie Hebdo* on 7 January 2015, begins in a Paris court. The fourteen men are charged with involvement in a series of deadly terrorist attacks in the city, which began in the offices of the magazine and ended at a kosher supermarket two days later.

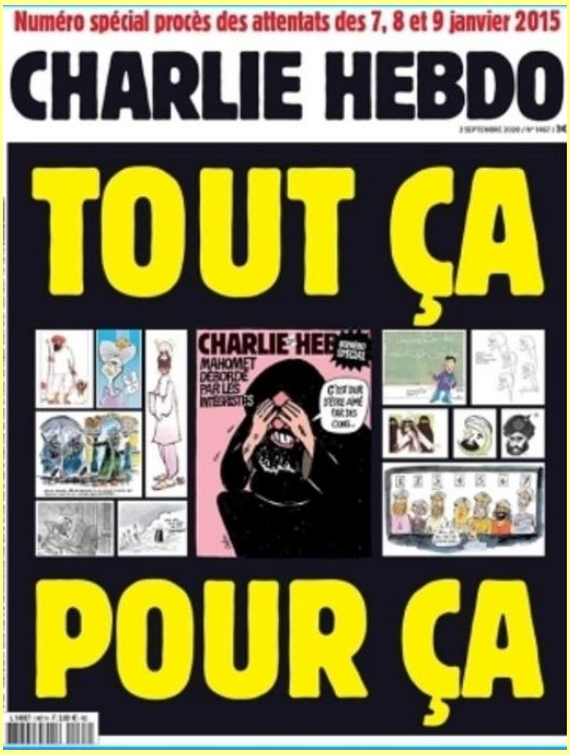
Seventeen people were killed in the attacks.

The suspects are accused of having provided logistical support to the perpetrators — brothers Said and Chérif Kouachi, and their accomplice Amedy Coulibaly.

Eleven of the suspects will appear in court — 10 of them from behind bulletproof glass. Three others, who traveled to Syria in the days before the attacks began, will be tried in absentia.

The trial, which is being held amid tight security at Paris' Criminal Court, is expected to last nearly two months, with 144 witnesses called to give evidence.

As the trial of the January 2015 attacks on the satirical magazine Charlie Hebdo and the Jewish grocery store Hypercacher opens today, *Charlie Hebdo* is reposting the cartoons of the Prophet Muhammad who had made the satirical weekly a target of jihadists.



"We'll never go to bed. We will never give up,"says Laurent ("Riss") Sourisseau, the editor of *Charlie Hebdo*, in this week's issue — on the newsstands today; also available online — which includes the cartoons of Mohammed printed five years ago. The Islamist terrorists who broke into the magazine's office in January 2015 and killed twelve of its staff, left messages that they saw these cartoons as insulting to their Prophet, and that their attack was their revenge for that blasphemy.

"The hatred that struck us is still there and, since 2015, it has taken the time to adapt and change its appearance, to go unnoticed and to quietly continue its ruthless crusade," said Riss.

The eleven cartoons, or drawings, of Mohammed which *Charlie Hebdo* published in January 2015 were originally published in 2005 in the Danish daily *Jyllands-Posten* in 2005, then republished by *Charlie Hebdo* in 2006. One of the drawings showed the Prophet carrying a bomb on his head instead of a turban. Another cartoon shows the Prophet as a menacing figure armed with a knife and flanked by two veiled women veiled in black hijabs.

In addition to the eleven original Danish caricatures, the cover of this week's *Charlie Hebdo*, under the heading **"*Tout ça pour ça*"** (All that for this), includes a caricature of the Prophet signed by the cartoonist Cabu, who was killed in the attack of 7 January 2015, and which was not published in the January 2015 issue of the magazine.

The editors explain that they wanted this week's issue to have twelve caricatures, to mark the fact that twelve staff members were killed in the attack in January 2015.

The magazine's editorial continues:

> We have been asked many times since January 2015 to produce more caricatures of Muhammad. We have always refused to do so, not because it is prohibited — the law allows us to do so — but because there was a need for a good reason to do it, a reason that makes sense and brings something to the debate. Reproducing these cartoons this week of the opening [of the trial] of the January 2015 terrorist attacks seemed essential to us.

Charlie Hebdo's decision to republish the cartoons on the day that the trial opens is not without its critics.

These cartoons, when published in Denmark in 2005, triggered violent demonstrations in several Muslim countries. When the French weekly, in 2015, decided to republish them, it immediately became a target of Islamist extremists.
The first reaction from a Muslim country to the French magazine's decision to republish the caricatures came from Pakistan. On Tuesday evening, Pakistan condemned the republication in "the strongest terms possible": "Such a deliberate act aimed at offending the feelings of billions of Muslims cannot be justified as an exercise of the freedom of the press or of the freedom of expression," the spokesman of Pakistan's Ministry of Foreign Affairs said on Twitter. "Such acts undermine global aspirations for peaceful coexistence as well as social and interfaith harmony," he added.

The last caricature of Muhammad published by the magazine appeared on the front page of the issue following the 2015 massacre. It showed the Prophet carrying a sign "*Je suis Charlie*" (I am Charlie) and titled "*Tout est pardonné*" (All is forgiven).
Mohammed Moussaoui, the president of the French Council of Muslim Worship called on Tuesday to "ignore" the cartoons of Mohammed republished in *Charlie Hebdo*. "The freedom to caricature is guaranteed for all; the freedom to like or not to like [these caricatures] is equally [guaranteed]. Nothing can justify violence," he said.
He called for focusing on "the trial which begins" on Wednesday and which "must remind us of the victims of terrorism." "This terrorism which struck in the name of our religion is our enemy," Moussaoui said.
President Emmanuel Macron, who is in Lebanon on a state visit, was asked about the magazine's decision. "A President of the Republic in France never has to qualify an editorial choice made by a journalist or an editorial staff, ever. Because there is a freedom of the press," he said.
"In our country, since the beginning of the Third Republic (…), there is also in France a freedom to blaspheme, which is attached to the freedom of conscience. And so, from where I stand, I am there to protect all these freedoms." He also said he wanted to remind the French people of "the duty not to engage in hate speech," but he was quick to add: "The cartoon is not hate speech."

How Do Terrorists Make Decisions?

Source: http://www.homelandsecuritynewswire.com/dr20200903-how-do-terrorists-make-decisions

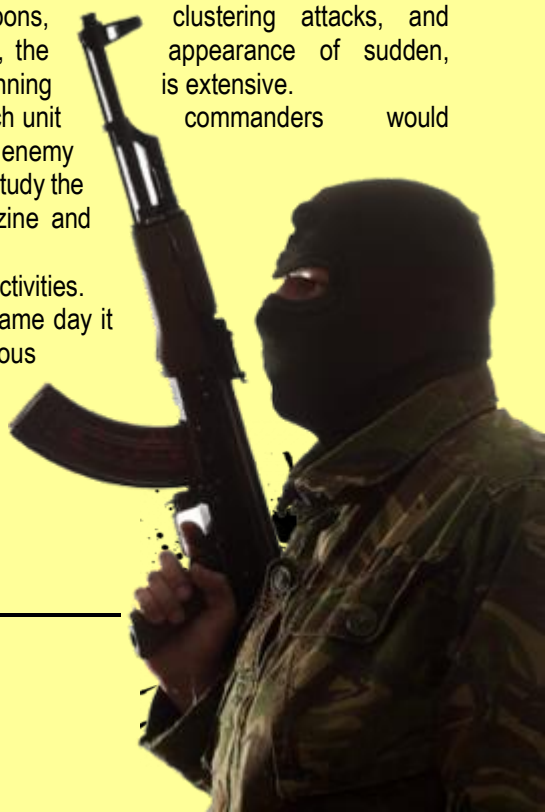
Sep 03 – A new guide, released by CREST, focuses on the insights criminology can provide into terrorist decision-making. It looks at what terrorists do and how they do it. The guide addresses the following questions: How do men and women decide to commit an act of terrorism? Do they plan wisely? How do they choose their targets? How do they evaluate the risk of a single operation? How is decision-making affected by the emotions felt during planning and operational phases? Can law enforcement be usefully informed by what we know about the behaviors of those who commit other kinds of crimes?

Planning

Terrorist actions are rational. Deliberate choices are made regarding target, weapons, clustering attacks, and potential victims. The level of planning may depend on the complexity of the attack, the appearance of sudden, unanticipated opportunity, or perceptions of law enforcement. Sometimes planning is extensive.

> "The priority should be to develop and plan … [and collect] the information which unit commanders would need to mount successful operations against enemy personnel or to sabotage enemy installations … I issued instructions to Intelligence Officers (IO) that they should study the daily and local newspapers carefully, and indeed read every serious magazine and periodical they could lay their hands on …" (Member of the Provisional IRA).

Sometimes attacks are spontaneous and 'planning' develops only in the course of daily activities. A Weathermen Underground attack on a United Fruit warehouse was planned on the same day it took place because one of the groups passed "it lots of times". Over the course of the previous couple of days, he had "been checking it out" in more detail for the purpose of an attack, observing it "deserted after six o'clock at night".
A member of the Provisional IRA recalled an open-back British Army jeep driving unaccompanied into their stronghold.



> "At this time the British Army would never come in unless heavily armed and in armoured cars. This particular day we weren't expecting anything like this … Here was something that just came out of the blue … We were so confident and in such control of the area at that time that instinct took over: 'There's a target' and 'Hit it.'"

Similar variance is found for other kinds of crimes. Sometimes planning is extensive, especially for more complicated crimes (e.g. bank robberies are planned more often than muggings). Other times crimes are more spontaneous and the same criminal may sometimes plan and sometimes not.

Choice of Target

The types of targets attracting terrorist attention are typically highly guarded.

Anders Breivik considered assassinating a member of government but decided not to because such individuals are often well protected. From an operational perspective, he saw Utøya Island as ideal because it was "isolated" and "police would have problems" accessing the site.

Whether or not to attack sometimes depends on perceptions of the effectiveness of security. Eric Rudolph described the security in the Atlanta Olympics Park:

> *"Hundreds of security guards and cops patrolled the park. They eyeballed me going through the entrances. But there were no metal detectors, and bags were searched selectively. After sundown the crowds grew enormous … Security at the park became overwhelmed. They stopped searching bags altogether, and the entrances flew wide open. I knew then that I could smuggle in a bomb."*

Although variable, other criminals report assessing informal/natural surveillance, formal surveillance, CCTVs and alarm systems. They also may be more affected by how the security is deployed than whether or not is it present. Third parties not involved in the actual crime sometimes spot opportunities and pass this information to an eventual offender. This has been noted for captive takers, burglars, robbers, and drug dealers.

Risk assessment

What distinguishes terrorism from other criminal acts is that it is deployed for its impact not just on the victims of an attack but on the general public; it is considered an effective political strategy. Public impact therefore is part of the cost/benefit analysis. According to Ann Hansen, of Direct Action, there was ambivalence about whether or not to attack the Cheekye-Dunsmuir electrical line in Canada.

> *"We did not want to sabotage the project after it went on-line, because we wanted to avoid causing power blackouts to residential areas. Ordinary people would feel the brunt of the action if hospitals, traffic lights, or other essential services were shut down, and we didn't want that."*

Perceived consequences matter, and perceptions that there is greater risk sometimes leads to both reconnaissance (which increases vulnerability) and attempting larger attacks. Multiple targets may be considered.

Ann Hansen of Direct Action noted that the group "decided to keep the actions small and simple so that people could get involved without having to fear serious prison time as a consequence."

The Atlantic City bomber, Eric Rudolph, said, *"I had spent a week earlier that month casing [the target] … There was no hideout near the target, no place of concealment where I could sit and scope it out, so I did my scouting on the move. After parking a mile away, I made three pass… each day. I strolled past it at different times of the day, approaching from a different angle and wearing a slightly different disguise on each pass."*

An IRA member reported that *"operations were becoming increasingly difficult and dangerous, with … forensics, surveillance, ubiquitous helicopters, the security forces' more sophisticated understanding of IRA methods, quicker reaction by police and army, fewer opportunities because of better field craft by the security forces. There[fore], while operations became less frequent, they tended to become larger set-pieces …"*

A member of the Weather Underground reported that *"we agreed to investigate other targets as well … One team went to each of the possible sites to do reconnaissance … [once completed] … The conversation focused on which of the targets we had investigated were feasible. Then we discussed the logistical details required for each action."*

Cost-benefit analyses also differ among other criminals. For example, inexperienced commercial robbers pay more attention to potential benefits at the expense of focusing upon risks. There may be a general unawareness or blindness to risk amongst some offenders due to intoxication or because

co-offenders actively downplay the risk. Previous successes lead to downplaying immediate situational risks. Sometimes risk is accepted and circumvented by predetermined plans to display an illusion of normalcy.

Does Fear Deter?

In their own words, men and women who have committed acts of terrorism report fear and anxiety:

> *"For days beforehand, the nerves would burn the inside of your stomach. There would be plenty of sleepless nights spent tossing and turning as you went over and over what was going to happen."*
>
> *"There was nothing to show I had been rumbled, but some inborn sense of danger was whispering warnings in my ear. I forced myself to go on, repeating silently to myself 'Don't panic!'"*

Fear sometimes is ameliorated by drugs. Upon being apprehended, Breivik announced that he had taken a combination of ephedrine, caffeine, and aspirin in order to enhance his performance.

Feelings of fear, nerves, stress, tension, worries, apprehension, anxiety, physical sickness and uncertainty are also reported among various kinds of criminals, including street robbers, first-time sex offenders, card fraudsters, thieves, muggers, and armed robbers. These individuals also self-report substance abuse during the crime commission in order to help overcome fear and nervousness.

Implications for Law Enforcement

The successful conduct of a terrorist attack requires not only a motivated offender, but also a lack of capable guardianship and the presence of an appropriate victim. In other words, it needs opportunity. As can be seen, terrorists make cost-benefit decisions in much the same way as other criminals. The field of crime prevention evaluation shows that we should focus on the settings in which offences take place rather than underlying motivation or criminal disposition of the individual actor. Reducing the opportunities for terrorism via environmental design is therefore a valid and worthwhile pursuit.

Each type of terrorist attack, be it a vehicular assault or a bombing, depends on a crystallisation of multiple opportunities. In turn, each specific attack type offers its own set of particular opportunities that can be manipulated with the intention of impacting the terrorist cost-benefit calculus. Such endeavours are target hardening, controlling access to facilities, and controlling access to the necessary weapons. Such actions include extending guardianship, assisting with natural surveillance, reducing anonymity, utilising place management, strengthening formal surveillance, and concealing or removing potential targets.

- ✓ Fear is a factor in all phases of a terrorist attack, just as it is a factor in other kinds of crimes. Interventions that aim to increase such fear therefore should be beneficial.
- ✓ The sources of fear include fear of detection by police/security and fear of detection by conscientious bystanders. Making these more obvious should increase this fear.

Interventions that hide the security details from the general public should increase uncertainty and either lead to full disruption or the planner taking ever greater risks to minimise their uncertainty. Fear of the 'unknown' is also paramount. Such feelings can be multiplied if the would-be offender believes the ability of security to detect suspicious behaviour is high. Interventions that highlight, embellish and evidence the ability of security, staff, and/or bystanders to detect suspicious behaviour should have a positive net benefit.

Read more:

- ❖ Gill, P., Marchment, Z., Corner, E. and Bouhana, N. (2020). "Terrorist decision making in the context of risk, attack planning, and attack commission." *Studies in Conflict & Terrorism*, 43(2), 145–160.
- ❖ Marchment, Z. and Gill, P. (2019). "Modelling the spatial decision making of terrorists: The discrete choice approach." *Applied geography*, 104, 21–31.
- ❖ Gill, P., Corner, E., McKee, A., Hitchen, P. and Betley, P. (2019). "What do closed source data tell us about lone actor terrorist behavior? A research note." *Terrorism and Political Violence*, 1–18.
- ❖ Robinson, A., Marchment, Z. and Gill, P. (2019). "Domestic extremist criminal damage events: behaving like criminals or terrorists?" *Security Journal*, 32(2), 153–167.
- ❖ Marchment, Z. and Gill, P. (2020). "Spatial Decision Making of Terrorist Target Selection: Introducing the TRACK Framework." *Studies in Conflict & Terrorism*, 1–19

Georgia Tech researchers redesign face mask, Comfortable and stays in place

Source: http://outbreaknewstoday.com/georgia-tech-researchers-redesign-face-mask-comfortable-and-stays-in-place-25901/

Sep 03 – Imagine a reusable face mask that protects wearers and those around them from SARS-CoV-2, is comfortable enough to wear all day, and stays in place without frequent adjustment. Based on decades of experience with filtration and textile materials, Georgia Institute of Technology researchers have designed a new mask intended to do just that — and are providing the plans so individuals and manufacturers can make it.

Image/Christopher Moore, Georgia Tech

The modular Georgia Tech mask combines a barrier filtration material with a stretchable fabric to hold it in place. Prototypes made for testing use hook and eye fasteners on the back of the head to keep the masks on, and include a pocket for an optional filter to increase protection. After 20 washings, the prototypes have not shrunk or lost their shape.

"If we want to reopen the economy and ask people to go back to work, we need a mask that is both comfortable and effective," said Sundaresan Jayaraman, the Kolon Professor in Georgia Tech's School of Materials Science and Engineering. "We have taken a science-based approach to designing a better mask, and we are very passionate about getting this out so people can use it to help protect themselves and others from harm."

The fundamental flaw in existing reusable cloth masks is that they — unlike N95 respirators, which are fitted for individual users — leak air around the edges, bypassing their filtration mechanism. That potentially allows virus particles, both large droplets and smaller aerosols, to enter the air breathed in by users, and allows particles from infected persons to exit the mask.

The leakage problem shows up in complaints about eyeglasses fogging up as exhaled breath leaks around the nose, making people less likely to wear them. The fit problem can also be seen in constant adjustments made by wearers, who could potentially contaminate themselves whenever they touch the masks after touching other surfaces.

To address the **leakage challenge**, Jayaraman and principal research scientist Sungmee Park created a two-part mask that fastens behind the head like many N95 respirators. The front part — the barrier component — contains the filtration material and is contoured to fit tightly while allowing space ahead of the nose and mouth to avoid breathing restrictions and permit unrestricted speech. Made from the kind of moisture-wicking material used in athletic clothing, it includes a pocket into which a filter can be inserted to increase the filtration efficiency and thereby increase protection. The washable fabric filter is made of a blend of Spandex and polyester.

The second part of the mask is fashioned from stretchable material. The stretchable part, which has holes for the ears to help position the mask, holds the front portion in place and fastens with conventional hook and eyelet hardware, a mechanism that has been used in clothing for centuries.

"We want people to be able to get the mask in the right place every time," Jayaraman said. "If you don't position it correctly and easily, you are going to have to keep fiddling with it. We see that all the time on television with people adjusting their masks and letting them drop below their noses."

Beyond controlling air leakage, designing a better mask involves a tradeoff between filtration effectiveness and how well users can breathe. If a mask makes breathing too difficult, users will simply not use it, reducing compliance with masking requirements.

Many existing mask designs attempt to increase filtration effectiveness by boosting the number of layers, but that may not be as helpful as it might seem, Park said. "We tested 16 layers of handkerchief material, and as we increased the layers, we measured increased breathing resistance," she said. "While the breathing resistance went up, the filtration did not improve as much as we would have expected."

"Good filtration efficiency is not enough by itself," said Jayaraman. "The combination of fit, filtration efficiency, and staying in the right place make for a good mask."

The stretchable part of the mask is made from knitted fabric — a Spandex/Lyocell blend — to allow for stretching around the head and under the chin. The researchers used a woven elastic band sewn with pleats to cover the top of the nose.
The researchers made their mask prototypes from synthetic materials instead of cotton. Though cotton is a natural material, it absorbs moisture and holds it on the face, reducing breathability, and potentially creating a "petri dish" for the growth of microbes.
"Masks have become an essential accessory in our wardrobe and add a social dimension to how we feel about wearing them," Park said. So, the materials chosen for the mask come in a variety of colors and designs. "Integrating form and function is key to having a mask that protects individuals while making them look good and feel less self-conscious," Jayaraman said.
The work of Jayaraman and Park didn't begin with the Covid-19 pandemic. They received funding 10 years ago from the Centers for Disease Control and Prevention to study face masks during the avian influenza outbreak. Since then Jayaraman has been part of several National Academy of Medicine initiatives to develop recommendations for improved respiratory protection.
Covid-19 dramatically increased the importance of using face masks because of the role played by asymptomatic and pre-symptomatic exposure from persons who don't know they are infected, Jayaraman said. While the proportion of aerosol contributions to transmission is still under study, they likely increase the importance of formfitting masks that don't leak.
Jayaraman and Park have published their recommendations in *The Journal of The Textile Institute,* and will make the specifications and patterns for their mask available to individuals and manufacturers. The necessary materials can be obtained from retail fabric stores, and the instructions describe how to measure for customizing the masks.
"There is so much misinformation about what face masks can do and cannot do," Jayaraman said. "Being scientists and engineers, we want to put out information backed by science that can help our community reduce the harm from SARS-CoV-2."

Syrian city lays foundation for replica of Hagia Sophia cathedral

Source: https://en.armradio.am/2020/09/06/syrian-city-lays-foundation-for-replica-of-hagia-sophia-cathedral/

Sep 06 – The first stone for the symbolic Hagia Sophia Church was laid in the city of Al-Sqaylabiyeh in western Hama. The church will be a replica of the mother cathedral of Hagia Sophia in Turkey, *Al-Masdar News* reports.
The groundbreaking ceremony was held the presence of Syrian and Russian officials, in addition to religious figures from the people of the region.

It was written on the foundation stone of the symbolic church:
"*During the reign of President Bashar Hafez Al-Assad, President of the Syrian Arab Republic, the blessing of the Bishop of Hama and its subordinates Nikolaos Ba'albaki and the blessing of the Russian Federation represented by the commander of the Russian forces operating in the Syrian Arab Republic, General Alexander Yuryevich Chaiko, laying the foundation stone of the Hagia Sophia Church, introduction From Nabel Shafiq Al-Abdullah, on the authority of the martyrs of Sqaylabiyeh, Syria, and its allies, and a tribute to the Great Hagia Sophia.*
This step was supported and blessed by the Orthodox Christian religious leaders in both Syria and Russia, and they considered it a step of solidarity with the mother Church of Hagia Sophia, and an assurance that the Turkish President will not be able to obliterate the features of this global impact on the list of UNESCO, which played a central role in Christian history over the course of 1500 years old."
Last July, in a move that sparked international religious and political criticism, the Supreme Administrative Court in Turkey annulled the government decree issued by the modern Turkish state in 1934 to convert Hagia Sophia from a mosque to a museum, based on what was described by historical documents confirming the purchase by Sultan Mehmed the Conqueror of the Hagia Sophia building before it was converted into a mosque.

COVID-19 Has Killed More Police Officers This Year Than All Other Causes Combined, Data Shows

Source: https://www.hstoday.us/subject-matter-areas/law-enforcement-and-public-safety/covid-19-has-killed-more-police-officers-this-year-than-all-other-causes-combined-data-shows/

Sep 03 – In a speech this week in Pittsburgh, Joe Biden linked the Trump administration's mismanagement of the coronavirus to its handling of protests and riots with a surprising statistic: "More cops have died from covid this year than have been killed on patrol," he said.
The Democratic presidential nominee's claim is true, according to data compiled by the Officer Down Memorial Page and the National Law Enforcement Officers Memorial Fund, two nonprofits that have tracked law enforcement fatalities for decades.
As of Sept. 2, on-the-job coronavirus infections were responsible for at least 100 officer deaths, more than gun violence, car accidents and all other causes combined, according to the Officer Down group. NLEOMF reported a nearly identical number of covid-related law enforcement deaths.

Pyroterrorism, pandemic and illegal immigration

By the C2BRNE Diary Editor

Sep 10 – Ingredients to produce havoc: (1) matches or lighters; (2) flammable materials; (3) strong winds; and (4) a plan (aka a silly excuse) and guidance – the latter can be optional. All these very cheap and readily available ingredients were available at the hot spot of Moria, Lesvos Island, Greece – the biggest in Europe now that the Calais Migrant Camp was greatly dismantled. And the

worst-case scenario was very easy to be executed. It all started when a number of illegal immigrants were tested positive for Covid 19 and were asked (together with their contacts) to be isolated in a nearby warehouse for a certain period of time. They did not want to go there but the rest of the 13,000 immigrants did not want them to be there with them. There was a local dispute leading to some small fires that the strong winds transferred them inside the main hot spot installation. In parallel, two forest fires were started in another part of the island and the Fire Service was busy to contain them. When firemen arrived in Moria they were attacked by the illegal immigrants that were self-evacuating the premising to all possible directions mainly to the nearby mountains trying to approach the capital of the island. The next day, additional fires burned the rest of the infrastructure (tents, containers, offices, healthcare

facility, toilets, etc.). You can only imagine the rest of the story! 13,000 people on the loose everywhere in the island with no place to sleep, no food and water, etc. And if you consider the background of these people ranging from real Syrian refugees (mainly families) to ISIS terrorists and war criminals you can say out loud "Greece we have a problem!". Who is going to pay for the damages caused? Not them of course! Who will reassure that those already affected by Covid 19 will not transfer the virus to others of their own or to locals – e.g. when they will go shopping to super markets? How will these people be recorded again and have their cases (asylum seekers) re-examined? Who will immediately provide shelter, food, water, and sanitary installations? There are also non-escorted children that are mainly used as a shield in many cases and for many reasons. What a fine environment for Turkey to accelerate illegal immigration from its nearby coastline? What a favorable environment for ISIS supporters or members to materialize the advice to use arsons as a weapon? Pyroterrorism (an ancient *modus operandi*), is the easiest form of terrorism and perhaps the one with the best cost to benefit ratio!

In every disaster or unfortunate situation there supposed to be someone to blame for not doing things to prevent what was followed. Well, in this case, I think we have to blame the Greeks themselves! During the last few years, we confronted the illegal immigration problem as a situation that could be resolved via international laws and humanitarian actions. We thought that the problem was European but Europeans thought that it was a Greek problem and they closed their borders offering money to Turkey (and Greece) to take care of the problem on their behalf. This the usual approach when a situation is not desirable to the central and north European countries. Spain, Italy, and Malta know this very well when dealing with African illegal immigrants. In Greece, apart from Asian illegal immigrants, we had also the so-called Syrian refugees; a very wide overtitle including real refugees, ISIS foreign (European) fighters, criminals, foreign agents, smugglers, traffickers that were trying to approach "relatives" in EU countries. All these people including families do not have identification papers but at the same time they have the latest model of Apple iPhone and it did not cross their mind to take a snap-shot of their passports of ID before leaving home or country (the moment that in most of the Asian countries, IDs are very advanced documents with electronic chips and everything). In addition, all these people and especially young immigrants do not appear to have any skills or even professions to practice, and practically they cannot contribute and be integrated in the host nation (and this makes you wonder why they left their countries where they covered their needs without doing anything in order to move to another continent where working skills and expertise is highly appreciated and pursued? Sick-minded people will say "benefits"! Really, it did not cross my mind!

This short commentary is only a superficial approach of an iceberg and *the C²BRNE Diary* is not the right forum to analyze it. Of course, there are solutions based on logic and common sense – e.g. my favorite: "*Greece First*!" (please do not confuse this with, let's say, "*Deutschland über alles''*).

U.S. Revokes Visas of 1,000 Chinese Students Considered "High Risk"

Source: http://www.homelandsecuritynewswire.com/dr20200910-u-s-revokes-visas-of-1-000-chinese-students-considered-high-risk

Sep 10 – The U.S. says it has revoked the visas of more than 1,000 Chinese citizens considered "high risk" to U.S. security because of alleged ties with the Chinese military.

A statement issued Wednesday by the State Department said the revocation of the visas was authorized by a proclamation signed by President Donald Trump on May 29. The proclamation was aimed at students who had previously studied at colleges and universities in China that have ties to the People's Liberation Army.

The Trump administration has charged that Chinese students have come to the United States to steal intellectual property to advance China's economic and military sectors.

A State Department spokeswoman said the 1,000-plus "high-risk graduate students and researchers" whose visas have been cancelled since June 1 make up just a "small subset" of the more than 360,000 Chinese nationals currently studying in the United States.

"We continue to welcome legitimate students and scholars from China who do not further the Chinese Communist Party's goals of military dominance," the spokeswoman said.

China Thursday accused Washington of "political persecution and racial discrimination."

The visa cancellations are among many back-and-forth retaliatory actions that represent worsening relations between the world's two largest economies.

The two sides have clashed over issues such as trade, technology, Beijing's harsh, new national security law imposed on Hong Kong and its increasingly aggressive behavior toward a self-ruled Taiwan, and the COVID-19 pandemic, which was first detected late last year in the central Chinese city of Wuhan.

Al Qaeda's Leader Is Old, Bumbling—and a Terrorist Mastermind

By Colin P. Clarke, and Asfandyar Mir

Source: https://foreignpolicy.com/2020/09/10/zawahiri-bin-laden-al-qaedas-leader-terrorist-mastermind/

Sep 10 – Nineteen years after 9/11, al Qaeda chief Ayman al-Zawahiri has yet to achieve the household notoriety evoked by that of his immediate predecessor, Osama bin Laden. In part that's because the United States hasn't cared enough to focus attention on him. Aside from massive financial overtures for intelligence on his whereabouts—there's currently a $25 million bounty offered for his head, higher than the reward for any other terrorist in the world—the U.S. government has been relatively blasé about al Qaeda since Zawahiri took over in 2011. Some terrorism analysts even claim a living Zawahiri has done more harm to al Qaeda than a dead one ever could.

But that conclusion doesn't square with the recent trajectory of the group. While al Qaeda has not been able to replicate an assault like 9/11, that's also a naive metric of success. Al Qaeda maintains affiliates in regions across Africa, the Middle East, and South Asia. And though he's conjured less of a personality cult, al Qaeda's current leader is just as dangerous to the United States as its old one.

Osama bin Laden with then-advisor Ayman al-Zawahiri during a November 2001 interview at an undisclosed location in Afghanistan. Visual News/Getty Images

Al Qaeda's current leader is just as dangerous to the United States as its old one.

The basic facts are indisputable, if not especially flattering: Zawahiri is old and repeats himself in long-winded and meandering speeches. Compared to bin Laden, Zawahiri is restrained in his operational strategy and sclerotic in his management style. He has advocated a steadier, less flashy role for al Qaeda: preservation of the jihadi vanguard through unity and careful politics—an approach that remains particularly unappealing to younger cohorts of would-be jihadis. Critics pinpoint the fissure between al Qaeda and its once-major affiliate in Syria, the Nusra Front, as emblematic of Zawahiri's ineptitude at leadership. In the time since bin Laden's death, the Islamic State has emerged and been able to assert itself as the leader of the global jihad, the new kid on the block outpacing its forefathers. That's due not just to Zawahiri's management missteps, but also to his failures in developing jihadi ideology that could match the Islamic State's focus on a territorial state and extreme violence.

But Zawahiri's ostensible weaknesses have ultimately aided al Qaeda's cause, especially in a world fixated on the Islamic State. Zawahiri, for example, is averse to state-building—a stance that shielded al Qaeda and provided the group with relative respite as the Islamic State became a more immediate target of U.S counterterrorism efforts. As U.S. strikes against the Islamic State intensified, the cohesion of al Qaeda's affiliates and its allies improved. Although the group had initially come under enormous stress due to defections and splintering, its leadership was able to recognize the strategic opportunity to focus on internal politics and local issues. Most notably, perhaps, Zawahiri prevented the defection of al Qaeda senior leaders, including Saif al-Adel and Abu Mohammed al-Masri. Adel's continued obedience to Zawahiri is especially remarkable, as he was relatively independent-minded and even critical of bin Laden's decision-making.

Zawahiri's ostensible weaknesses have ultimately aided al Qaeda's cause.
Zawahiri's call for unity and his general lack of interest in outbidding violence enabled al Qaeda to portray itself to its supporters and potential recruits as the more reliable jihadi front opposite the Islamic State. Rather than be consumed by his rival, Zawahiri focused on using the Islamic State's takfiri tendencies—declaring other Muslims to be nonbelievers—and obsession with grotesque violence to reframe al Qaeda's brand. Incredibly, the group responsible for the attacks of 9/11 was able to position itself as a moderate entity in the Sunni jihadi milieu.

Colin P. Clarke *is a senior research fellow at the Soufan Center and an assistant teaching professor in the Institute for Politics & Strategy at Carnegie Mellon University.*
Asfandyar Mir *is a postdoctoral fellow at the Center for International Security and Cooperation at Stanford University.*

Three lessons from 9/11 — for now and into the future

By William Danvers
Source: https://thehill.com/opinion/national-security/515456-three-lessons-from-9-11-for-now-and-into-the-future

Sep 11 – It has been 19 years since the 9/11 attacks on the World Trade Center and Pentagon. We are now confronting another crisis of great magnitude with the pandemic, which certainly will change the world in profound ways just as the terrorist attacks did. While there are a number of lessons to be learned from how the U.S. and international community responded to 9/11, there are three key takeaways that can help frame the approach to the pandemic and other international crises now and into the future.
The first is the importance of making sure all resources are used effectively. The 9/11 Commission and Capitol Hill investigations emphasized the need for better cooperation among government agencies, as well with foreign governments and international organizations. The creation of the Office of the Director of National Intelligence (ODNI) and the Department of Homeland Security (DHS) are two examples of efforts to respond more effectively to attacks.

While neither government agency is without problems, they have been part of the successful effort to eliminate "stove piping," or the lack of sharing information on counterterrorism strategy. The ultimate success of having better coordination is the absence of the kind of attacks the U.S. endured 19 years ago in New York and Washington. In addition, there has been a willingness in the U.S. to put sufficient resources into the intelligence community so it can do its essential work in keeping Americans and their friends and allies safe. Without intelligence — the important work done by the CIA and other members of the intelligence community — there would not be the success the U.S. has had in combating the terrorism threat.

The U.S. government in general, and the intelligence community in particular, should be prepared to respond to crises. Resources are especially tight at the moment, but investing in key government agencies and programs that can address ongoing issues and predict unforeseen problems continues to be wise.

A second valuable lesson is to ensure that in the pursuit of dealing with one crisis, as the U.S. did during 9/11, other national security concerns are not ignored. During the initial years after 9/11, the sometimes singular focus on fighting al Qaeda meant putting less resources toward efforts that didn't connect directly to counterterrorism. For example, expertise in Russian and Chinese relations did not get the kind of attention that would be helpful in responding to the current emphasis on great power politics.

While it is understandable that there is now an emphasis by policymakers on front-burner issues such as great power politics, we must continue to pay attention to combating terrorism and other national security concerns. For example, in a report released this year, the United Nations points out that the threat of terrorism is alive and well, particularly in the developing world. The U.S. and its allies must be able to deal with a range of existing issues, as well as anticipate problems that are just over the horizon.

The third lesson is to make certain that resources being used internationally are strategically focused. How assistance is allocated to nations in crisis is as important as amounts. The World Bank (WB) has taken the lead on making sure that its approach to development is strategic, sustained and resilient. The first WB strategy on fragility, conflict and violence (FCV) approaches development with the understanding that these three elements — fragility, conflict and violence — must be the focus of development policy. Specifically, "The objective of the FCV Strategy is to enhance the World Bank Group's effectiveness to support countries in addressing the drivers and impacts of FCV and strengthening their resilience, especially for the most vulnerable and marginalized populations."

This is a model for dealing with ongoing crises such as the coronavirus pandemic. Policymakers must be smart and targeted in their use of resources, as well as driven by a strategy such as that of the WB's FCV approach. The terrorism threat is not the result of poverty and poor governance or corruption, but these are among the elements that give rise to successful efforts by terrorist groups to recruit. Development strategies such as the WB's FCV will not eliminate crises such as the pandemic or climate change any more than they could end the threat of terrorism, but they can mitigate their negative impact if used effectively.

Learning the lessons from how the U.S. and other nations reacted to 9/11 would be the best acknowledgement of the resiliency of the U.S. and its allies in dealing with crises. It can provide hope at a time when it is in short supply. Making sure there is good coordination and effective use of resources; not having a singular focus on problems at the expense of ignoring other present and potential crises; and developing targeted strategies that respond effectively to problems, present and future, are lessons worth learning and remembering.

William C. Danvers *most recently was a World Bank Group Special Representative for International Relations. He previously worked on national security issues for nearly four decades in the executive branch, on Capitol Hill, for international organizations and the private sector.*

9/11 attacks: What's happened to al-Qaeda?

Source: https://tinyg.info/9-11-attacks-whats-happened-to-al-qaeda/

On the 19th anniversary of the 9/11 attacks in the US, the perpetrator – the then-Afghan based jihadist group al-Qaeda – is in a state of disarray.

Its branch in Syria was silenced in June by a rival force; in Yemen it suffered a defeat at the hands of rebels shortly after losing its leader in a US drone strike; and the leader of its North Africa branch was killed in a French raid in Mali in June and is yet to name a successor.

Meanwhile, al-Qaeda's leader, Ayman al-Zawahiri, has been uncharacteristically absent for months, prompting speculation that he might be dead or incapacitated.

But al-Qaeda's Africa branches, in Somalia and Mali, remain a potent force.

Ideologically, al-Qaeda faces a familiar dilemma for the jihadist movement: to modernise and show flexibility in order to win over ordinary Muslims, and basically survive; or stick to strict jihadist principles and risk alienating Muslims.
Each path has its risks.
The first could jeopardise the group's jihadist credentials and lead to splits and defections by hardliners, while the second could significantly limit operational capacity, even to the point of the group's demise.

Recent setbacks

In Syria, al-Qaeda – represented by its unannounced branch Hurras al-Din – has failed to make inroads. This is partly the result of jihadist rivalries on the one hand, and the eagle-eyed surveillance of al-Qaeda officials by the US-led coalition on the other.
The group is also not popular on the ground as Syrians see the al-Qaeda brand as a threat and a magnet for government and international action.
Hurras al-Din has been inactive for over two months now following a crackdown by a more powerful jihadist group and the targeting of some of its top officials in suspected US air strikes.
The group's branch in Yemen – al-Qaeda in the Arabian Peninsula (AQAP) – was once the most feared of all al-Qaeda chapters, but it has suffered a number of blows this year and is currently one of the organisation's least active branches.
AQAP lost its leader in a US drone strike in late January, and recently lost its stronghold in the central Bayda province at the hands of the Houthi rebels.
For years spies appear to have infiltrated the group and facilitated the accurate targeting of its leadership figures.
It is also beset by internal divisions.
But one event this year showed that AQAP was still playing the role for which it was previously most feared: orchestrating lone wolf attacks in the West.
In February, the group said it was behind the deadly shooting last December at the Pensacola naval base in Florida that was carried out by Saudi military trainee Mohammed Alshamrani – a link the US later confirmed.
Al-Qaeda in the Islamic Maghreb (AQIM), one of the franchise's least active branches, lost its Algerian leader in a French raid in Mali in early June. Three months on, the group has yet to name a successor.
It is not clear why, but – whatever the reason – a vacant leadership post does not reflect well on the group.
Algeria and North Africa more broadly remain tough for al-Qaeda to make inroads into, given the infamous legacy of jihadists in the 1990s represented by the ultra-extremist Armed Islamic Group (GIA), which was responsible for the deaths of many Algerian civilians.
The Mali-focused Jamaat Nusrat al-Islam wal-Muslimin (JNIM), which also operates in Burkina Faso and occasionally in Niger, was set up in March 2017.
After al-Shabab – an al-Qaeda affiliate in Somalia – JNIM is the second most active al-Qaeda branch.
JNIM attacks are largely focused on local troops and foreign forces, mostly French, in the Sahel.
But in recent months, it appears to have been side-tracked by battles against the Islamic State (IS) group.
In February, JNIM showed readiness to engage in talks with the government of Mali, but with the overthrow of the government in August and the arrival of a new one through a coup, JNIM's fortunes and next steps are unclear.

Focus on Jerusalem

Al-Shabab is undoubtedly al-Qaeda's strongest and largest threat at the moment.
The group holds territory and exercises a form of governance across most rural areas in central and southern Somalia.
In addition, al-Shabab claims daily attacks and frequent high-profile operations inside Somalia and occasionally in neighbouring Kenya.
Among its big operations this year is the January attack on the US Manda Bay military base in Kenya, which left three Americans dead and destroyed several planes. More recently, in August, al-Shabab stormed a seaside hotel frequented by government officials in Mogadishu, killing more than a dozen people.
Capitalising on big attacks by al-Shabab and JNIM, al-Qaeda launched in 2019 its global Jerusalem-focused military and propaganda campaign, reiterated in 2020, which cites the liberation of Palestine as its purported end goal and situates the US as its ongoing number one enemy.

Message for the US

Al-Qaeda leader Ayman al-Zawahiri has made only one appearance this year, in a video in May.

A month before that, supporters of IS speculated that al-Zawahiri was either dead or had suffered a stroke and become incapacitated. They based this on his failure to appear in new videos or personally comment on key events.
Several of al-Qaeda's central command officials had already died in the Afghanistan-Pakistan region over the past years or were killed in US drone strikes in Syria.
The US-Taliban peace deal signed in February, which stipulates that the militant group will not shelter any global jihadist organisation, could make it trickier for al-Qaeda officials to find a safe haven there.
Al-Qaeda, meanwhile, has attempted to exploit the worldwide health crisis and race protests in the US to win support for its anti-US government message.
The group addressed Western publics in general and those in the US in particular to tell them that their governments had failed to support them during the pandemic and that the racist treatment of African Americans in the US could only be reversed through armed struggle.
But it is doubtful that such messaging from a group responsible for the largest terror attack on US soil will resonate with the American public, if it reaches them at all.

A future European partner

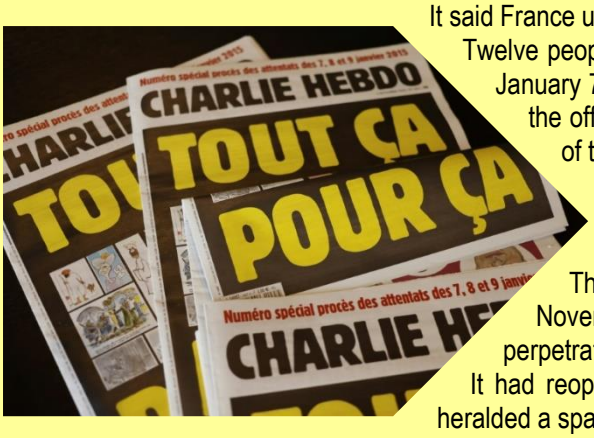
September 2020

Al-Qaeda threatens Charlie Hebdo for republishing Mohammed cartoons: SITE

Source: https://www.bangkokpost.com/world/1984115/al-qaeda-threatens-charlie-hebdo-for-republishing-mohammed-cartoons-site

Sep 12 – Al-Qaeda has threatened French satirical weekly Charlie Hebdo with a repeat of a 2015 massacre of its staff, after it republished controversial cartoons of the Prophet Mohammed, the SITE observatory said on Friday.
Al-Qaeda in its publication One Ummah had warned that Charlie Hebdo would be mistaken if it believed the 2015 attack was a "one off", after the magazine printed the "contemptible caricatures" in a defiant issue that marked the start of the trial in Paris of suspected accomplices in the attack.
The comments came in an English edition of the Al-Qaeda publication that purported to mark the anniversary of the September 11, 2001 attacks on the United States carried out by the terror network.

It said it had the "same message" for the France of President Emmanuel Macron as it did for his predecessor Francois Hollande who was president at the time of the 2015 attacks.



It said France under Macron "gave a green light" to the republication of the cartoons.

Twelve people, including some of France's most celebrated cartoonists, were killed on January 7, 2015, when brothers Said and Cherif Kouachi went on a gun rampage at the offices of Charlie Hebdo, whose no-taboo style, including publishing cartoons of the prophet, had divided the country.

"All of this, just for that" (cartoons)

The trial, which began on September 2 and is expected to continue until November, sees 14 suspected accomplices face justice even though all the perpetrators were killed in the wake of the attacks.

It had reopened one of the post painful chapters in France's modern history which heralded a spate of jihadist attacks on its territory that have claimed more than 250 lives.

Charlie Hebdo's director Laurent Sourisseau, known as "Riss" and who was himself badly wounded in the shoulder in the attack, told the court this week that there was nothing to regret in publishing the cartoons.

"What I regret is to see how little people fight to defend freedom. If we don't fight for our freedom, we live like a slave and we promote a deadly ideology," he said.

Charlie Hebdo's republication of the cartoons drew new condemnation from states including Iran, Pakistan and Turkey.

But Sourisseau, who now lives under round the clock protection, said it had to republish them.

"If we had given up the right to publish these cartoons, that would mean that we were wrong to do so" in the first place, he said.

Afghan Rivals Gather in Qatar for Historic US-Backed Peace Talks

Representatives of Afghanistan's warring factions have gathered in Qatar for historic U.S.-brokered peace negotiations starting Saturday that aim to find a political settlement to the South Asian country's long war. ...

The Evolution of Terror: 6 Critical Threats 19 Years After 9/11

By Bridget Johnson

Source: https://www.hstoday.us/subject-matter-areas/infrastructure-security/the-evolution-of-terror-6-critical-threats-19-years-after-9-11/

Sep 11 – When the planes hit the Twin Towers, the Pentagon and a field in Shanksville, Pa., 19 years ago, it wasn't the beginning of the war on terror but the advent of a more public-facing chapter in the global terror fight. After all, al-Qaeda left its calling card on the World Trade Center in 1993, killing seven and injuring more than a thousand people with a bomb in the underground parking garage. It wasn't until 2001, though, that the terror group tried to take down the towers again — with an evolved and expanded plan that, over three locations, took 2,977 lives and injured thousands more.

In terrorist circles that now reach into every corner of the world via mountains of online propaganda and open-source tactic tutorials, the 9/11 attacks are still hailed as a gold standard of sorts — even ISIS propaganda periodically invokes al-Qaeda's handiwork that day with 9/11 imagery while promising to similarly attack the United States. But as tactics evolved from the first World Trade Center bombing to the second, so have terror groups, independent cells, and lone extremists grown and evolved through mixing psychological and physical warfare, drawing from a diverse recruitment pool, moving operations including training into the virtual realm, picking softer targets and simple weapons that may inflict lower casualty counts but produce attacks that are harder to detect in the planning stages and cheaper to conduct, focusing on cyber operations and offering tech support to followers communicating online, and disseminating an endless stream of online materials that inspire, recruit, incite, and teach would-be attackers how to accomplish their mission.

What does the terror landscape look like on Sept. 11, 2020? There are some familiar faces as well as new threats keeping counter-extremism on its toes.

Al-Qaeda's Latest Attack on the United States

Between the 18th and 19th anniversaries of the 9/11 attacks, there was another al-Qaeda attack on America — the perpetrator even visited the 9/11 Memorial in New York City on Thanksgiving weekend before the Dec. 6, 2019, attack.

Second Lieutenant Mohammed Saeed Alshamrani, a member of the Royal Saudi Air Force, was training at Pensacola Naval Air Station when he entered a building on the base, killed three and wounded eight. Alshamrani was killed about eight minutes after he started shooting; he was armed with a semi-automatic handgun with an extended magazine, several ammunition magazines, and about 180 rounds of ammunition. He legally purchased the gun months earlier under an exception that allows nonimmigrant visa holders to purchase weapons if they have a valid state hunting license. He posted a message on Sept. 11 stating that the countdown had begun.

In February, al-Qaeda in the Arabian Peninsula leader Qasim al-Raymi said the terror group directed Alshamrani to conduct the attack. U.S. officials later confirmed that the shooter had communicated with al-Qaeda multiple times before the attack, in which he discussed carrying out a "special operation" for the group. FBI Director Christopher Wray said that Alshamrani's communications and coordination confirmed he was "more than inspired" by AQAP.

Nathan Sales, the State Department's coordinator for counterterrorism, said last year that al-Qaeda "has been strategic and patient over the past several years" and is "as strong as it has ever been." Former DHS officials said in the new Future of DHS Project report from the Atlantic Council's Scowcroft Center for Strategy and Security that "the international terrorist threat from the Islamic State of Iraq and Syria (ISIS) and al-Qaeda has not gone away, and DHS needs to use the next two to three years to get ready for what is coming next." AQAP's *Inspire* magazine, still easily available online, remains a key reference for terrorists of all stripes because of its easy-to-follow instructions for attack preparation and execution.

The recruitment well is also deeper. While an al-Qaeda job application recovered from Osama bin Laden's Abbottabad compound included screening questions about the would-be jihadist's history, health and hobbies, today the terror group welcomes connected operatives with access to critical infrastructure and key targets — IT experts, scientists, security guards, military, etc. — and at the same time understands they can still use lower-skill "open-source jihad" operatives to carry out simple attacks with less intense planning and fewer opportunities for authorities to intervene. "Jihad is with all, pious and immoral," al-Raymi said in 2017, telling would-be jihadists to not stress so much about what they do and don't have to bring to the table but to just "take it easy" and attack.

In line with the terror group's focus on economic attacks, al-Qaeda recently declared the need to recruit and train for "e-jihad" — even taking advantage of Amazon's broadband expansion project — in order to "ruthlessly" target infrastructure and financial systems like never before. Al-Qaeda even used the death of George Floyd and subsequent police-reform protests to try to recruit Christians as supporters.

(Taliban training video, 2019)

The Taliban and Their Future Impact on Terror

It would have been hard to imagine that, 19 years after the most devastating attack on U.S. soil, America would be facilitating a deal with the al-Qaeda allies who gave safe haven to Osama bin Laden and hosted al-Qaeda training camps. It may have also been hard to imagine that this group that kept Afghanistan in the dark ages now embraces the internet to disseminate their propaganda articles, statements, videos, magazines, and Twitter feeds. In a video last year, the Taliban showed video of United Airlines Flight 175 striking the World Trade Center while stating that "this heavy slap on their dark faces was the consequence of their interventionist policies and not our doing." Heading into Doha talks this week, President Trump told reporters that "we're getting along very, very well with the Taliban."

And that relationship with al-Qaeda seems as cozy as ever. Helmand province officials reported in July that al-Qaeda was training Taliban fighters, while a report from the United Nation's Analytical Support and Sanctions Monitoring Team found that al-Qaeda and the Taliban had held a series of meetings on "cooperation related to operational planning, training and the provision by the Taliban of safe havens for al-Qaeda members inside Afghanistan," with al-Qaeda covertly active in 12 provinces as "the Taliban appear to have strengthened their relationship with al-Qaeda rather than the opposite."

Since inking a deal with the United States in a Doha ceremony on Feb. 29, the Taliban have touted the agreement "ending the occupation," as the pact is described in their propaganda, as a victory for not just their jihadists but all who have fought in the name of Islam. A crucial currency in terrorist recruitment and retention is motivation – look past the grisly graphics, and you have a collection of breakroom-meme posters encouraging jihadists to bring their A-game and never give up. The struggle is real, they're told, and for every step back (like major territorial losses) they'll take two steps forward, even if it takes time and persistence. Taliban propaganda — which doesn't attract the attention of online extremism censors like ISIS does — has long boasted that they would eventually bring "to their knees" American "crusaders," and as their headlines scream that they essentially accomplished their goal it can serve as a shot in the arm to other terror groups operating with the same aims.

They're also able to fuel terror narratives with the perceived lack of consequences for their actions, as the Taliban continued attacks during talks and didn't lose their place at the negotiating table. Jane's Terrorism and Insurgency Centre reported in February that the Taliban drove up the overall terror death toll in 2019 even as global terror attacks were on the decline. Taliban attacks increased by almost 90 percent with their fatalities up by more than 60 percent (more deaths than the next nine deadliest terror groups combined) as they surpassed ISIS to become the world's deadliest non-state armed group. Yet, as they self-identified as a jihad-centered political entity, they traded a promise for U.S. withdrawal for a promise to behave. Terrorists no longer live, communicate, or recruit in silos: a victory against a common enemy is viewed at its core a victory for all, and that can feed the ever-growing and accessible ideological marketplace of terrorist ideas, methods and inspiration.

(Atomwaffen Division video)

Rapid Growth of Domestic Extremism

Anti-Semitic and white supremacist terrorism is increasingly becoming a transnational threat that helps put the United States "at the doorstep of another 9/11," but stopping the threat requires education and training for vulnerable communities and clear authorities to go after extremists and their online recruitment, DHS and FBI officials told Congress earlier this year. "Domestic terrorism by white supremacists and other 'homegrown' causes also needs more DHS attention and resources," former DHS Assistant Secretary for Infrastructure Protection Caitlin Durkovich and former DHS Deputy Assistant Secretary for Counterterrorism Policy Thomas Warrick wrote in the Atlantic Council's Future of DHS Project report, warning that "terrorist threats to the United States have changed from what they were immediately after 9/11 — and have further evolved from what they were as recently as 2016."

Accelerationist movements, which can include white supremacists, neo-Nazis and other movements and seek to collapse society through violence and start anew, have been growing with increasingly global reach. We've recently seen accelerationists at play: Two professed members of the extremist Boogaloo Bois who claimed membership in a sub-group called the "Boojahideen" allegedly offered themselves as mercenaries to Hamas and delivered gun accessories to an undercover FBI employee they believed was a senior member of the terror group. The accused gunman in the slaying of a Federal Protective Service officer in Oakland in June is linked to the Boogaloo and was an active-duty staff sergeant stationed at Travis Air Force Base. Authorities said Steven Carrillo wrote "BOOG" and other phrases in his blood on the hood of a vehicle he later carjacked.

Propaganda and recruitment efforts are also up, as seen when a neo-Nazi group claiming their recent actions were spurred by "violent left-wing" protests posted flyers across the Arizona State University campus declaring "Hitler was right," among other anti-Semitic messages. In a February update tracking of white supremacist propaganda, the ADL said there were 2,713 cases of racist, anti-Semitic and anti-LGBTQ fliers, stickers, banners and posters distributed or posted on or off campuses in 2019 — double the number of incidents in 2018 and the highest level of activity recorded by the organization. About a fourth of incidents in 2019 occurred on college campuses; this trend has risen since white supremacist groups increased their targeting of campuses with recruitment flyers beginning in 2016.

Islamist extremist propaganda and white supremacist propaganda reflect similar themes and memes in the ways they recruit and incite, contributing to the internet's ample open-source library of D.I.Y. extremist training and incitement – from posters to videos, from social media to magazines – that bridges group allegiances and ideologies. At times they mimic each other's memes, promote

ideological dominion, urge copycats to emulate infamous attacks, threaten the social media companies that try to rein in their propaganda, praise and promote attacks that have recently occurred, circulate machismo-saturated training camp videos, and heavily traffic in anti-Semitism.

One key shared characteristic of recruitment is how Islamist extremists and white supremacists both try to appeal to grievances, hoping that potential recruits who might not otherwise join their movements could be pushed over the edge with targeted psychological messaging. Similarly, both groups seize on current events to promote core anti-government and retribution themes, trying to appeal to would-be recruits as if they're soldiers in a cultural or kinetic war – as one recruitment propaganda poster from the neo-Nazi Feuerkrieg Division put it, "Turn your sadness into rage." Islamist extremists and white supremacists hope to seize on the energy of current events whether it's white supremacists using debates over Confederate monuments or Islamist terror groups using Western military operations – and both ideological movements trying to use the coronavirus pandemic to their advantage – to steer some of that fury into their movements to stoke anger and gain new recruits.

An ISIS member sets a brush fire in Iraq. (ISIS video)

How ISIS Lives on

In terms of propaganda, ISIS has tried to make the best — they "had to tactically retreat from some areas" and defeats were only only "a temporary transition," claimed one article — out of a caliphate-less situation. And that's been made easier by design: as much as they boasted about having an Islamic State straddling Syria and Iraq, ISIS was molded to be a virtual organization at its core that could recruit, inspire, and instruct through an internet connection. Eliminating recruiter boots on the ground in every neighborhood and the need to travel to far-flung training camps served as a force multiplier for their movement and drew a broad swath of homegrown recruits beyond perhaps even Abu Bakr al-Baghdadi's expectations.

The Defense Intelligence Agency and U.S. Central Command told the Defense Department's inspector general months ago that "following the death of ISIS leader Abu Bakr al-Baghdadi, the group's capabilities in Syria remained the same… ISIS remained cohesive, with an intact command and control structure, urban clandestine networks" and operating as an insurgency. In the online sphere, the terror group has an army of keyboard jihadists supporting official ISIS media operations, creating and disseminating everything from posters encouraging attack tactics or targets to video and English-language magazines. A "lockdown special" edition of *The Voice of Hind* magazine published by ISIS supporters in India encouraged steps to "annihilate the disbelievers" including stabbing people

with scissors and expending "less effort" by spreading COVID-19. A new 24-page cybersecurity magazine for ISIS supporters walks jihadists through step-by-step security for smartphones — while encouraging them to use a computer instead for more secure terror-related business — and warns of "nightmare" Windows collecting user data from geolocation to browsing history. And a recent video from the Islamic State's media wing tells followers that arson is the highest-rated of the low-skill terror tactics and encourages fire attacks with the devastation and death toll of the 2018 Camp Fire in California highlighted as an example.

ISIS has not been defeated but has evolved out of necessity and in line with its original goal of becoming a global, insidious terror outfit. ISIS provinces are still active, particularly through attacks in West Africa and Afghanistan. But they've laid down a framework of borderless jihad and a blueprint for growing a terror movement both on the dark web and the open internet that is impossible to rein in.

(ISIS West Africa video)

The Next Front in Africa

In January, al-Qaeda exhorted adherents to follow the "brilliant" example of Al-Shabaab terrorists who killed three Americans in a raid on a Kenyan base. The surprise attack by a team of militants, which AFRICOM said breached the perimeter and involved mortar and small-arms fire, resulted in an hourlong gunbattle; several airplanes, fuel tankers and vehicles were destroyed or damaged. U.S. Army Specialist Heny Mayfield Jr., 23, of Hazel Crest, Ill., was killed in the pre-dawn attack on the Manda Bay Airfield on Jan. 5, along with L3Harris Technologies contractor pilots Dustin Harrison, 47, and Bruce Triplett, 64. A third contractor was wounded. Al-Shabaab is "a dangerous enemy that presents a threat to Somalia, its neighbors, and the United States," AFRICOM said last month.

In Burkina Faso, Mali and Niger, deaths resulting from terrorist attacks leaped fivefold from 2016 to 2019. Terror thrives and grows where the world neglects to pay proper attention to extremists taking advantage of weaker security situations to set up shop. "ISIS and Al Qaeda are on the march in West Africa. They're having success and the international efforts are not," U.S. Africa Command leader Gen. Stephen Townsend told the House Armed Services Committee in March.

A common enemy can also sometimes make bedfellows out of entities we might not predict — like the ISIS and al-Qaeda alliance in West Africa. "Al-Qaeda and ISIS cooperate with one another; I can't really explain that," Townsend said, musing that it might be because some of these terrorists grew up together. He noted that "if ISIS can carve out a new caliphate or al-Qaeda can, they will do it and they will attempt to do it in West Africa." If the threat continues to grow at its current pace – a fivefold increase in terror activity since last year in the Sahel alone – he said, "unchecked, this threat becomes a threat beyond the region."

A piece of the American Airlines airplane that crashed into the Pentagon on 9/11. "Truthers" deny that a plane hit the building. (FBI photo)

When Conspiracy Theory Extremism Turns Violent

The 9/11 attacks bred their own conspiracy theory: the 9/11 "truthers," who allege that the attacks were an "inside job." Nineteen years after al-Qaeda struck, extremism generated by conspiracy theories constitutes its own threat. In December 2016, Edgar Maddison Welch drove to the Forest Hills neighborhood of Washington and entered Comet Ping Pong, a family pizza shop and venue for local bands, with a .38 caliber handgun and an AR-15, firing rounds from the rifle before surrendering to police. He claimed he was investigating the "Pizzagate" conspiracy theory that alleged Democratic Party officials ran a child sex ring out of various restaurants, and the gunman vowed to rescue non-existent captive children from the restaurant's non-existent basement. In December, Ryan Jaselskis of California pleaded guilty to setting a fire inside of Comet Ping Pong — again, luckily no one was injured. A Pizzagate video was posted on his parents' YouTube account an hour before the arson. And this spring, threats

against the pizza parlor and its employees ramped up again, with the owner speculating that "it's part of a disruptive movement," a "purposely designed, something-backed movement."

Threats posed by COVID-19 were detailed in an April Joint Intelligence Bulletin from DHS, the FBI, and National Counterterrorism Center warning law enforcement that domestic extremists were "extremely likely" to continue attacks linked to the pandemic. White supremacist Timothy Wilson, killed in March in an FBI shootout as his alleged plan to bomb a Missouri hospital was disrupted, linked the plot to the pandemic, stating that "if he contracts COVID-19, he would conduct a 'lone wolf attack' and 'try to take out as many as I can during that time, but I don't want to sit in a hospital bed and die, doing nothing.'" Wilson wanted to "attack high value targets if the government issued martial law and quarantine orders as a result of COVID-19." At the end of March, Edward Moreno, a train engineer who shared conspiracy theories about nefarious pandemic "segregating" intent of the Navy's hospital ship in the Port of Los Angeles derailed the train with the intent of striking the USNS Mercy, according to prosecutors

Conspiracy theories around coronavirus have led to other criminal acts. Dozens of communications towers in the UK have been targeted by arsonists and telecom employees harassed as a result of a conspiracy theory alleging that 5G technology is connected to the spread of the coronavirus. The latest 5g/COVID conspiracy theory alleges that the nose bridge of surgical masks contains 5G antennas that are being used to track people. A recent DHS Cybersecurity and Infrastructure Security Agency memo to industry partners warned that "while the U.S. has not seen similar levels of attacks against 5G infrastructure linked to the pandemic, the tactics used in Western Europe [have] begun to migrate to the U.S."

Believers of QAnon, described by extremism researchers at the Anti-Defamation League as "first and foremost an online trolling and disinformation movement" that began in 2017 on the 4chan message board, have been involved in incidents including threats and attacks. Forrest Clark, accused of setting a destructive wildfire in Orange County, Calif., in 2018, posted QAnon links on his Facebook page. Jeffrey Gardner Boyd, arrested in Pennsylvania in 2018 and charged with threatening to kill the president and his family, "had become convinced that a Pennsylvania woman who posts about QAnon on Twitter was being held hostage by shadowy forces" and thought Trump was under CIA mind control. Anthony Comello, the suspect in last year's shooting of alleged Gambino family boss Francesco "Frank" Cali, believes in QAnon and thought Cali "was a prominent member of the deep state, and, accordingly, an appropriate target for a citizen's arrest," Comello's attorney wrote in court documents. Jessica Prim of Illinois, who shared QAnon theories online, was arrested in New York this spring with a stash of knives after posting on her Facebook page, "Hillary Clinton and her assistant, Joe Biden and Tony Podesta need to be taken out in the name of Babylon! I can't be set free without them gone. Wake me up!!!!!" Matthew Wright pleaded guilty to blocking a bridge at the Hoover Dam in 2018 with an armored truck, holding up a sign referring to a prominent QAnon demand; behind bars, he would sign a letter with the common QAnon phrase "where we go one, we go all."

A May 2019 intelligence bulletin from the FBI's Phoenix Field Office warned that "anti-government, identity based, and fringe political conspiracy theories very likely motivate some domestic extremists," and some theories "very likely encourage the targeting of specific people places and organizations" while some narratives "tacitly support or legitimize violent action." The FBI "assumes some, but not all individuals or domestic extremists who hold such beliefs will act on them" but notes that the spread of conspiracy theories in the "modern information marketplace" could be mitigated by social media companies regulating potentially harmful content.

"Promoters of conspiracy theories, claiming to act as 'researchers' or 'investigators,' single out people, businesses, or groups which they falsely accuse of being involved in the imagined scheme," the bulletin continues. "These targets are then subjected to harassment campaigns and threats by supporters of the theory, and become vulnerable to violence or other dangerous acts."

***Bridget Johnson** is the Managing Editor for Homeland Security Today.*

19 Years after 9/11, Americans Continue to Fear Foreign Extremists and Underplay the Dangers of Domestic Terrorism

By Jeff Gruenewald, Joshua D. Freilich, Steven Chermak, and William Parkin

Source: http://www.homelandsecuritynewswire.com/dr20200911-19-years-after-9-11-americans-continue-to-fear-foreign-extremists-and-underplay-the-dangers-of-domestic-terrorism

Sep 11 – Nineteen years after the 9/11 attacks, Americans' ideas of what terrorism is, remain tied to that morning. But focusing solely on Islamist extremism groups like al-Qaeda when investigating, researching and developing counterterrorism policies does not necessarily align with what the numbers tell us. Homegrown far-right extremism also poses a persistent and lethal threat to the lives and well-being

of Americans. This risk is often underestimated because of the devastating impact of the 9/11 terrorist attacks. It is imperative to support policies, programs and research aimed at countering all forms of violent extremism.

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US State Department announces regional security training center with Cyprus aptly named CYCLOPS

Source: https://greekcitytimes.com/2020/09/13/us-state-department-announces-regional-security-training-center-with-cyprus-aptly-named-cyclops/

Sep 13 – The Republic of Cyprus and the United States have expanded relations through the creation of a joint security training centre that has the abbreviated name of CYCLOPS.

"To expand this cooperation and to support capacity-building in nations where in-country training is impossible, our two countries have agreed to construct a regional border security training hub in the Republic of Cyprus — the Cyprus Center for Land, Open-seas, and Port Security (CYCLOPS)," the US Department of State said in a press release yesterday.

"CYCLOPS will allow the United States and our partners to provide technical assistance in more areas related to security and safety, including customs and exports control, port and maritime security, and cybersecurity," the statement added.

"The training facility will include a number of different hands-on training platforms, including a mock land border crossing, passenger screening area, and a mobile cyber security training lab, which will enable regional partners to learn best practices for securing critical infrastructure and to engage in cross border, counterproliferation cyber investigations," the statement continued, adding that "CYCLOPS will support our efforts to curb the proliferation risks posed by malign regional actors and violent extremist organizations."

The US Department of State emphasized that Washington's support for CYCLOPS "is a true partnership" with Cyprus.

"The United States will provide equipment, trainers, and other capacity-building support, while the Republic of Cyprus will contribute land, facilitate travel, and provide trainers. Construction of the training facility is expected to begin later this year," the statement concluded.

This announcement came off the back of US Secretary of State Mike Pompeo visiting Cyprus yesterday.

Pompeo yesterday expressed his concern about Turkey's provocations in the East Mediterranean.

"Countries in the region need to resolve disagreements including on security and energy resource and maritime issues diplomatically and peacefully," Pompeo said in his meeting with Cypriot President Nicos Anastasiades that lasted an hour and a half.

"Increased military tensions help no one but adversaries who would like to see division in transatlantic unity," he said.

In Greek mythology, the Cyclops was a one-eyed monster species, and surely this fact was not overlooked by American and Cypriot officials when they were naming CYCLOPS.

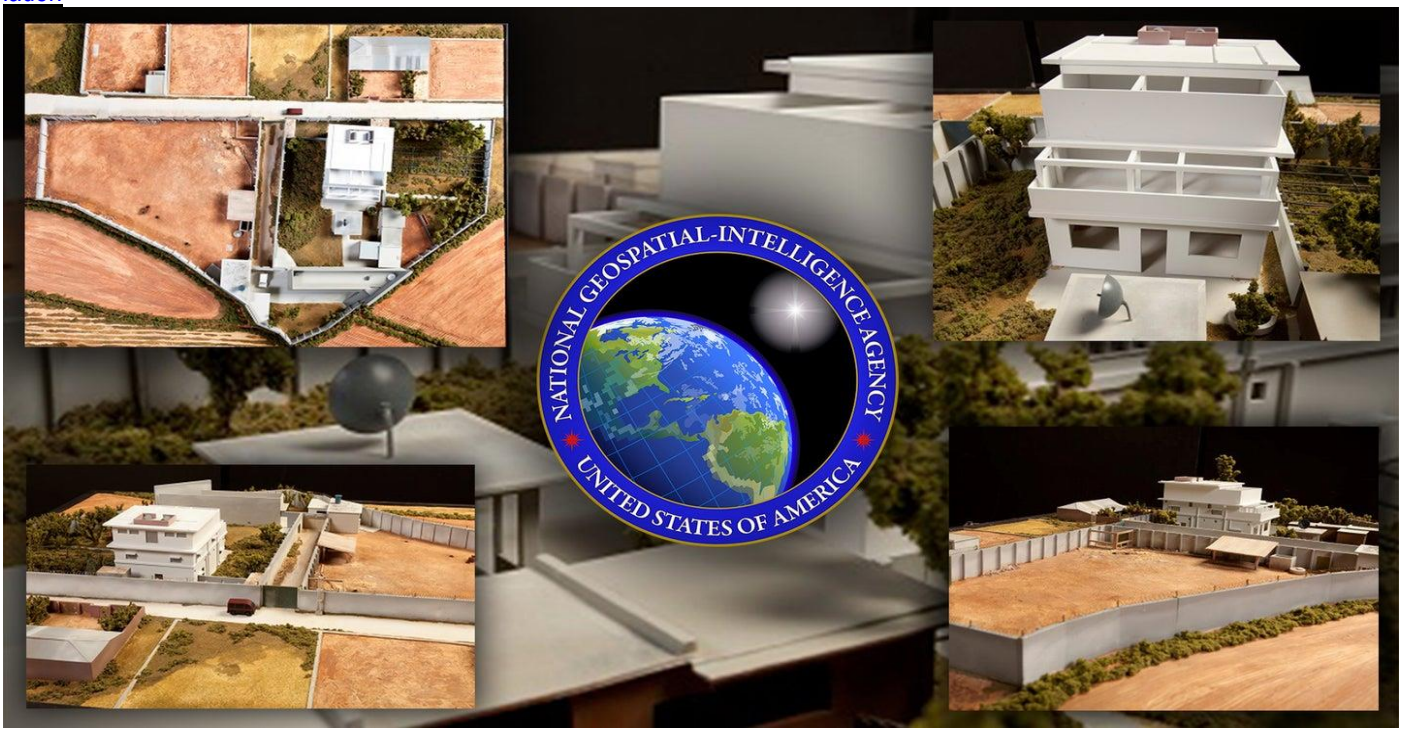
In July, the United States has announced its intention to provide International Military Education and Training (IMET) to the Cypriot Army beginning in 2021. This is based on the State Department's strategy for the Eastern Mediterranean, as reported by *Greek City Times*.

The Twitter account of the US Embassy in Cyprus Twitter posted: "We're strengthening our security partnership with the Republic of Cyprus by providing International Military Education and Training. The IMET program promotes regional stability & defense capabilities through professional military education and training."

"The IMET program is a key component of U.S. security assistance, promoting regional stability and defense capabilities through professional military education and training. Through professional and technical courses, and with specialized instruction, IMET provides students from allied and friendly nations valuable training and education on U.S. military practices and standards," the US embassy said in a statement in July.

The Little Model Shop That Played A Big Role In Killing Osama Bin Laden

Source: https://www.thedrive.com/the-war-zone/36368/meet-the-little-model-shop-that-played-an-big-role-in-killing-osama-bin-laden



Get a rare glimpse inside the National Geospatial-Intelligence Agency's 3-D Model Shop that makes big history with small models.

Hezbollah's Links with Irish Terror Group Exposed

(Arab News)

Hezbollah provided the New IRA with finances and shipments of weapons, according to an undercover agent who infiltrated the Irish terror group.
Former British secret service operative Denis McFadden made the assessment after spying on the New IRA from within for more than 20 years.
Irish and British security services suspect that the New IRA's links with Iran-backed Hezbollah may have led to the import of arms including mortars and assault rifles.
MI5 agent McFadden is now in witness protection after his work led to the arrest of 10 people in Northern Ireland on terrorism-related charges.

Will Turkey and Greece Clash over a Tiny Island?

By Daniel Pipes

Source: https://www.meforum.org/61540/will-turkey-and-greece-clash-over-a-tiny-island

The residents of Kastelorizo, an island lying a mile off the Turkish mainland, may be few but they are patriotic Greeks.

Sep 16 – An obscure Mediterranean flashpoint may soon come to a crisis; that would be the minuscule and remote Greek island of Kastelorizo (or Megisti; Meis in Turkish). Like many other Greek islands, it lies much closer to the Turkish than the Greek mainland (1 mile vs. 357 miles). Unlike other small Greek islands, its location between Rhodes and Cyprus bestows outsized military and economic importance on it.

Were Kastelorizo, with a population of under 500, to enjoy the full rights bestowed on it by the 1982 UN Convention on the Law of the Sea, Greece can claim a 200-nautical mile exclusive economic zone (EEZ) that leaves Turkey with a cramped EEZ along its shores; take away Kastelorizo and the Turkish EEZ more than doubles in size. The discovery of large gas and oil deposits in the Mediterranean Sea makes that of especially great potential significance.

The Republic of Turkey under President Recep Tayyip Erdoğan adamantly rejects Kastelorizo enjoying such privileges. He recently condemned "the plans of those who try to confine a country of 780,000 square kilometers to its shores using an island of 10 square kilometers." He went on, referring to the 1923 Treaty of Lausanne and other agreements that delineated the borders of Turkey: "Turkey has the political, economic and military power to tear up immoral maps and documents imposed on itself." Then, alluding to long-ago military victories over the Greeks, he added: "A century ago, we either buried them in the ground or threw them into the sea. I hope they do not pay the same price now."

In response, Greek President Katerina Sakellaropoulou visited Kastelorizo on Sep. 13, where she replied with remarks so bafflingly mild they actually could invite aggression: "We are going through a difficult and dangerous period. The Turkish leadership is intensifying the pressure on our country, leading to aggressive statements" which undermine "the good neighborly relations and peaceful coexistence that have been built over so many decades by Greeks and Turks, who view the sea that separates them not as an impenetrable border, but as a channel of communication." That Turkey's defense minister one day earlier just happened to visit the Turkish town closest to Kastelorizo sent an ominous message.

Recent months have seen Erdoğan at his most aggressive in the Mediterranean: sending exploratory ships into Greek and Cypriot waters, with a substantial naval escort, to search for hydrocarbons and signing an agreement with a Libyan faction that has the two countries share a maritime border (Greece and Egypt then responded in like manner).

A crisis could be imminent. As Turkey's economy, led by a weak currency, goes south, a confrontation on Kastelorizo would serve ideally to drum up nationalist emotions with an eye to the 2023 presidential elections. The analyst Jack Dulgarian has proposed a plausible scenario: Turkish troops either invade Kastelorizo or take it hostage and (in a repeat of Cyprus in 1974) challenge the world to do something about it.

On their own, the Hellenic Armed Forces cannot retake the island. Neither Israel nor Egypt will battle Turkey for Kastelorizo. NATO's Article 5, the one that promises protection against aggression, will surely prove inoperative when both combatants are members of that organization. Led by Germany, most of Europe (with Emmanuel Macron the honorable exception) quivers at the prospect of Turkey unleashing its weapon of illegal migrants and prefers to appease Ankara. Russia's Vladimir Putin is wooing Erdoğan from NATO and will not antagonize him. China's Xi Jinping welcomes Turkey's economic weakness as a way to turn it – like Iran – into an economic colony.

Should Kastelorizo (like one-third of Cyprus) come under Turkish control at minimal cost to Ankara, the consequences will be far-reaching. Enjoying adulation within Turkey, Erdoğan will likely ramp up the aggressive oil and gas exploration and he might turn to the Aegean islands belonging to Greece as his next target. More: Islamist and jihadi that he is, Erdoğan just conceivably could attempt to conquer all of Cyprus and even all of Greece. He has already invaded Iraq, Syria, and Libya; Kastelorizo would be the next step toward a rampage that could extend through any and all parts of the Ottoman Empire at its peak five centuries ago.

Who will stop him? All the key leaders – U.S., German, Russian, and Chinese – smile at Erdoğan, making it hard to see how this long underestimated, highly determined foe will be deterred.

***Daniel Pipes** is president of the Middle East Forum.*

EDITOR'S COMMENT: The author missed an important issue: Turkey will fight for gas and profits; Greece will fight for honor and pride. Ancient Spartans never asked who the enemy was; just how many they are! Besides, if Kastelorizo is attacked, there are other targets that are of great importance!

Is It Wildfire Terrorism? What Extremists Say About Arson Ambitions

By Bridget Johnson

Source: https://www.hstoday.us/subject-matter-areas/counterterrorism/is-it-wildfire-terrorism-what-extremists-say-about-arson-ambitions/

Sep 18 – From Jan. 1 through Sept. 17, 42,512 wildfires have burned 6,927,327 acres across the United States, according to the National Interagency Fire Center. While Americans view these numbers with alarm – there were 37,274 wildfires over the same period last year – terrorists have turned blazes into incitement propaganda and recruitment pitches, spotlighting wildfires' devastating effects to their followers and encouraging lone operators to spark their own infernos.

From 2015 to 2019, 88 percent of wildfires were caused by humans, according to a Sept. 1 Congressional Research Service report, though lightning caused bigger blazes on average. Manmade does not mean all of those were arson: humans can accidentally start wildfires – from things like campfires, discarded cigarettes, power lines, controlled debris burns, sparks from equipment, fireworks in parched terrain, etc. – or intentionally set blazes. The California Department of Forestry and Fire Protection estimated 7 percent of the Golden State's wildfires have been set by arsonists, who are rarely caught, often spark multiple fires, and may even have a background in firefighting.

If someone is setting a fire for a cause – the definition of terrorism being acts committed to further an ideological agenda – they're going to want someone to know about it. Terror tutorials have emphasized that the arsonist not get caught so they can go on to set more fires, but they've also been adamant about the arsonist leaving some sort of identifier to pin it on the terror group. If ISIS were to set a wildland blaze, one could expect – like they have done in Iraq – the release of footage or photos of their deeds, and a claim that, if the arsonist has not yet been arrested, does not identify their operative. This evidence to back up a claim could also depend on whether there are one or multiple individuals involved in the crime: a lone attacker, depending on his or her experience with firesetting or familiarity with the area, may be quick to bail from the scene in order to avoid detection or injury and may not stick around to capture the visuals craved by ISIS propaganda producers.

ISIS members set a brush fire in Iraq (ISIS video)

A terror group reporting on an event to its members, lauding it or otherwise telling followers to emulate it is not the same as claiming credit, which usually occurs with overt and unambiguous wording. ISIS initially claimed credit – without offering any evidence – for the 2017 mass shooting in Las Vegas, but after no links were discovered between the shooter and religious or political extremism ISIS continued to lift up the attack as something the group's followers should try. Sometimes they highlight natural

disasters that can cause regional instability or vulnerable infrastructure. Similarly, ISIS doesn't include reports about wildfire damage in its weekly *al-Naba* newsletter because readers are interested in forest management: the inclusion of the news is intended to impress upon followers that all of this damage can be caused with low-tech firesetting.

Terror groups are attracted to the tactic of wildland arson for multiple reasons. They see the damage that the larges blazes inflict, and that falls into line particularly with al-Qaeda's stated goal of aiming for actions that have a crippling economic impact on the West. They see the potential for substantial casualty counts in either blazes ignited near residential areas or more rural conflagrations that whip up into fast-spreading, out-of-control monsters. And utilizing simpler terror tactics – without constructing complicated explosive devices or buying firearms, or needing a partner or cell – means they can recruit from a larger, low-skill pool of potential recruits. This fits into the trend of recruiting would-be terrorists where they live and having them conduct attacks in the backyards they know well instead of sending an unfamiliar operative into the region or needlessly pulling the recruit to a foreign training camp. Simple tools, solo operation, virtual training and open-source online tutorials also lessen the chance that a recruit would be detected in the planning stages. And terror tutorials have also offered pointers on terrain and weather conditions to help arsonists become armchair meteorologists and pick the best time and location to start blazes.

The fire season was already in full swing at the end of July when ISIS' official Al-Hayat Media Center released a 4-minute video titled "Incite the Believers" in both English and Arabic. "Consider which you can use easily and without drawing attention to yourself and making the result be death, destruction and heavy losses to the enemies," the narrator stated. "Yes, my brother, it is that weapon which is within reach of every hand and even children are proficient using it, and people have used it since ancient times to harm their enemies — yes, it is fire." A graphic displayed rating for different types of terror tactics and gave firesetting five stars.

"To become more convinced of this option try looking for the losses caused by fires in the lands of the crusaders every year — fires in forests and fields, cities and villages completely destroyed, people displaced, armies of firefighters and civil defense personnel working continuous days to no avail," the narrator continued, noting that death tolls in major blazes sometimes "exceed the number of those lost in major strikes by the mujahideen in which they used guns and explosives." Examples of death tolls were displayed for wildfires in Australia, Greece and California – specifically, the death toll of the 2018 Camp Fire that destroyed most of the town of Paradise. That blaze was sparked by a faulty power transmission line.

Tactically, the video advised would-be jihadists to "monitor well for a place where you can set a fire without drawing attention" and "consider that the fire will be so great that efforts made to extinguish it will cost your enemies greatly and perhaps they will not be able to put it out" before it spreads out of control. The video showed animation of a hand marking a spot on a map between San Francisco and Sacramento. The graphic then lit on fire, burning through the California map. The video also urged arson jihadists to "safely dispose" of evidence after fleeing the scene of their attacks.

(Al Hayat Media Center/ISIS video)

Like most open-source materials published by terror groups, "Incite the Believers" can still easily be found on the internet and is among the tutorial materials and calls to action that are available for extremists of any ideology to reference and use.

Has ISIS set wildfires? Yes. They've boasted about it, shot video in the act, and turned it into a propaganda film. The targets have been crop-fields in Iraq and Syria, with the intention to terrorize the landowners, inflict economic losses and potentially casualties while keeping a community on edge about where the surreptitious firesetting might happen next. ISIS claimed in May 2019 that the terror group was behind a series of wildfires: In the ISIS newsletter *al-Naba* article "Roll Up Your Sleeves and Begin the Harvest – May Allah Bless What You Reap," ISIS reminded "soldiers of the caliphate" that they "have before you millions of acres… their plantations, fields and homes, as well as their economic foundation" to burn. A 49-minute video released this May by the terror group, "Strike Their Necks," featured ISIS-shot nighttime footage of a small group of terrorists setting brush fires. Some Iraqi farmers have reported that these were complex attacks: If they tried to go out and extinguish the flames in their fields, they could be attacked by terrorists lying in wait.

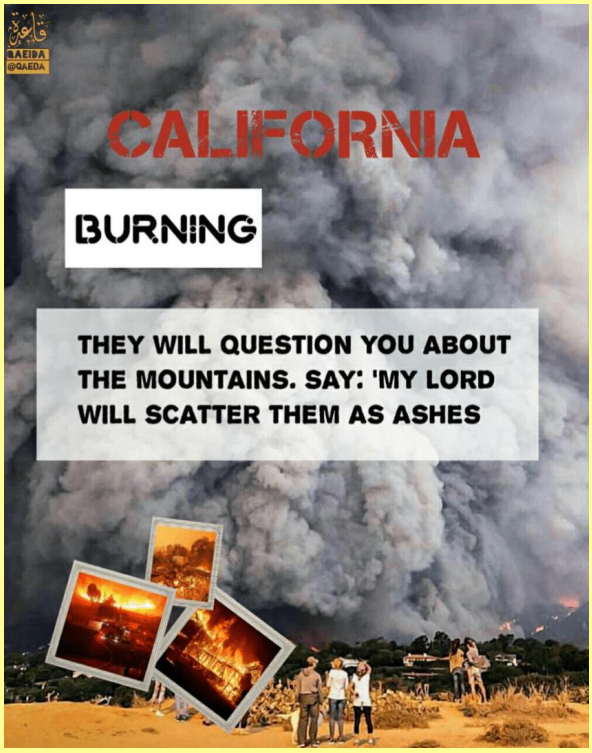
And ISIS seizes upon current events to nudge would-be jihadists into their own independent attacks while the story is hot. As France was hit by wildfires last summer, a propaganda poster depicting emergency vehicles racing toward a burning hillside circulated among ISIS supporters, urging

followers to "light fires in forests and fields and in houses and we are speaking more particularly to those who live in Europe and America. It will hurt them."

(ISIS supporters' image)

Al-Qaeda has done the same. During the 2018 fire season, days after the deadly Camp Fire began and after the Woolsey Fire caused the evacuation of Malibu, supporters of the terror group circulated a "California Burning" image with a Quranic verse. This was distributed shortly after Al-Ansar Media, an ISIS-supporting media group, released a photo of a burning building and labeled it "kalifornia," adding the text, "O america, This is the punishment of bombing Muslims in Syria. This is Allah's punishment for you. And in shaa Allah, you will see more fires." ISIS did not claim starting the California fires; nor did al-Qaeda.

(Al-Qaeda image)



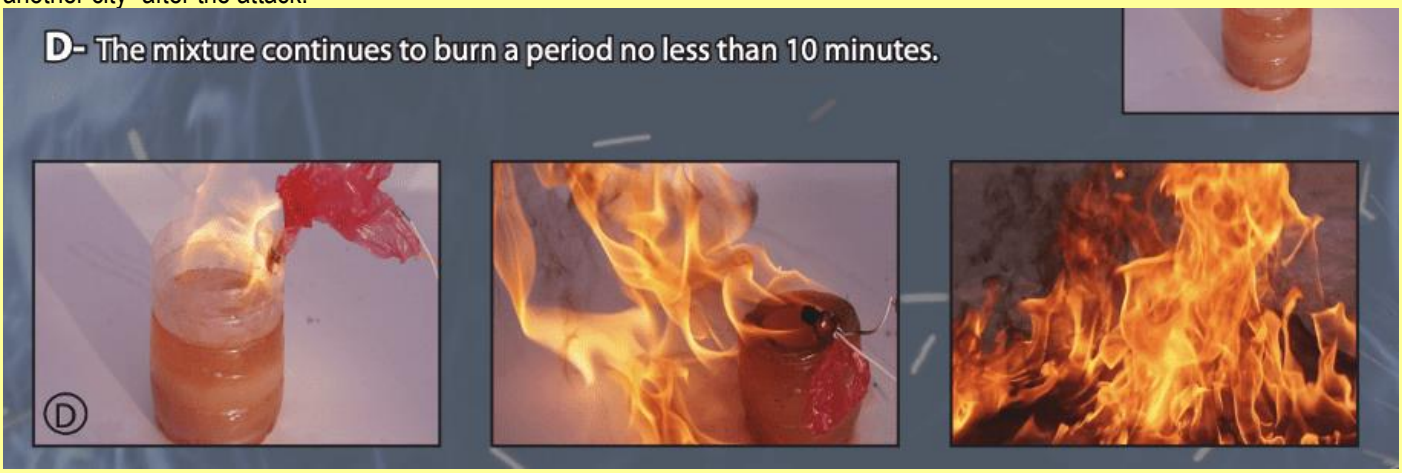
When it comes to writing the manual on wildfire arson terrorism, though, al-Qaeda penned a magazine tutorial, complete with step-by-step how-to photos, that is easily accessible on the internet today for use by any genre of extremist.

In a 62-page issue of al-Qaeda in the Arabian Peninsula's *Inspire* magazine published in 2012, "The AQ Chef" – pen name also bylining the pressure-cooker bomb recipe in the 2010 "Make a bomb in the kitchen of your Mom" tutorial put to use in the Boston Marathon and Chelsea bombings – declared "It is of your freedom to ignite a firebomb." Seven pages detail target selection, prime wildfire conditions, and how to construct an "ember bomb" to ignite once the arsonist is at a safe distance.

"In America, there are more houses built in the country sides than in the cities. It is difficult to choose a better place other than in the valleys of Montana where the population increases rapidly. In the year 2000, a fire that is considered to be the biggest in the American history flared up in one of those valleys. It spread in a space equal to that of London. The fire burnt down 70 houses as well as a hundred car. On July of the same year and in the same place, a thunderstorm lighted 78 massive blazes in just one day, most of them were deadly firestorms," the article said, proceeding to cite other wildfires. "We mention such examples only to show the magnitude of the destructive impact that fires or firebombs make, to then ask the question: Is it possible for us to cause a similar destructive impact using a similar weapon? The answer is: Yes, it is possible. Even in a shorter time and with much bigger destructive impact." The 2009 wildfires in California were offered as an example of the potential for steep economic impact.

What's especially dangerous about the al-Qaeda tutorials geared toward a Western audience – which live in perpetuity on the internet, and even lived on Barnes & Noble's website for years after being uploaded by the terror group or a supporter – is that they go beyond simply encouraging terrorists to act but give them practical D.I.Y. training to do the job. In the wildfire article, weather and geographical conditions and types of forest fires are discussed at length in order to make the blaze "difficult to handle." Would-be arson terrorists

should go into an attack having studied meteorological conditions in the area, al-Qaeda said, and map out the location to ensure structures are endangered "in an effort to cause casualties." The terror group suggested that arsonists make "more than 30" of their "ember bomb" recipe and details strategic points to place the incendiary devices within a forest. If an arsonist followed the al-Qaeda blueprint they would definitely leave a footprint for investigators; the article suggests the arson terrorist should be "retreating to another city" after the attack.

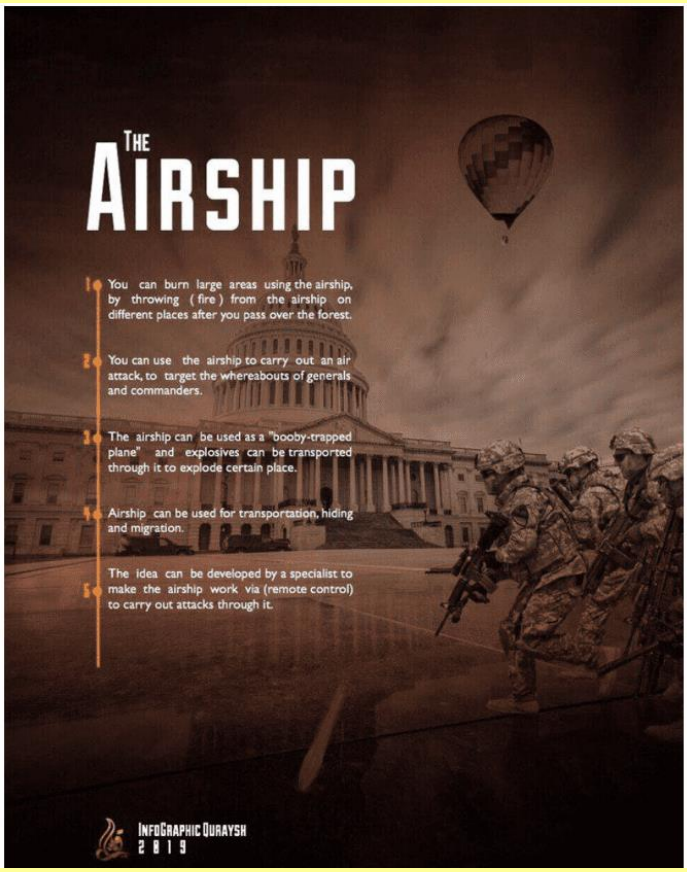


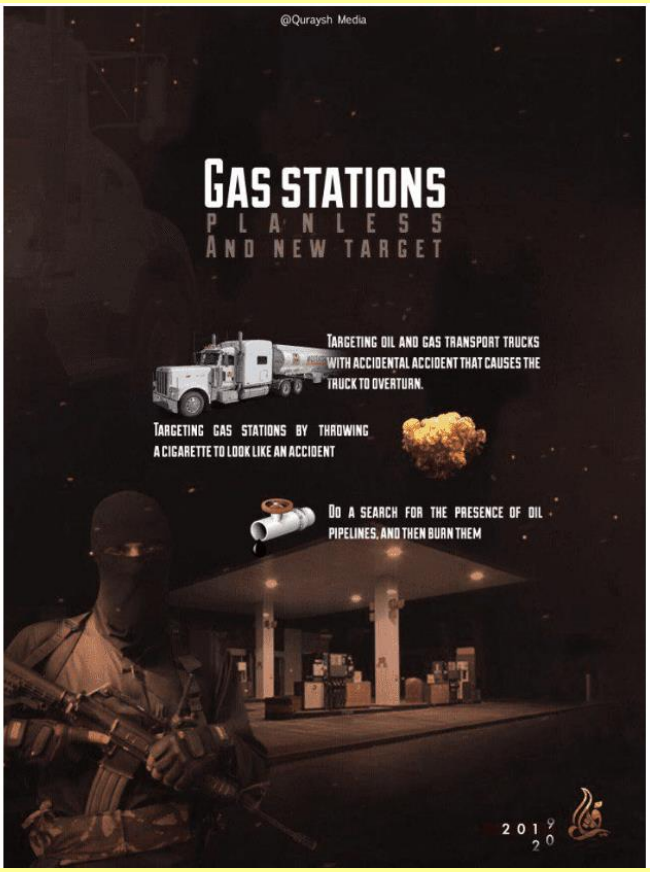
(Al-Qaeda in the Arabian Peninsula's Inspire magazine)

"The most important damaging result… is the spreading of terror among the targeted community," al-Qaeda said.
In January 2017, ISIS' now-defunct *Rumiyah* magazine told would-be jihadists that "incendiary attacks have played a significant role in modern and guerrilla warfare, as well as in 'lone wolf' terrorism." The magazine suggested targets for arson jihad to "include houses and apartment buildings, forest areas adjacent to residential areas, factories that produce cars, furniture, clothing, flammable substances, etc., gas stations, hospitals, bars, dance clubs, night clubs, banks, car showrooms, schools, universities, as well as churches, Rafidi [Shiite] temples, and so forth. The options are vast, leaving no excuse for delay."
Jihadists were advised to time arson attacks "preferably in the later part of night to the early hours of morning when people are generally asleep," and were instructed how to block off exits in an effort to increase casualties. In setting forest fires, ISIS cautioned jihadists to do so "from a safe distance" and, remedially, to look for dry brush "as fire cannot endure in damp or wet environments."
The terror group also pressed would-be jihadists to leave a mark of credit somewhere nearby, "writing there with some words on a wall or on the ground near the target declaring that the attack was carried out by a soldier of the Islamic State."

(ISIS' Rumiyah magazine)

"Arson attacks should in no way be belittled. They cause great economic destruction and emotional havoc and can be repeated very easily. Even if such attacks do not always result in the killing of the enemies, Allah has promised to reward the mujahid for simply harming and enraging them," the ISIS article said, stressing that "ideally, one should strive to maximize the just terror he inflicts, by executing multiple, simultaneous attacks, while following the same guidelines." The ISIS catchphrase for lone jihad is "just terror."
More recently, ISIS propaganda has called on jihadists to strike incendiary targets that could spark blazes: "Targeting oil and gas transport trucks with accidental accident that causes the truck to overturn," directed one poster last year from ISIS-supporting Quraysh Media. "Targeting gas stations by throwing a cigarette to look like an accident. Do a search for the presence of oil pipelines, and then burn them." Another suggested tactic was floated in a propaganda poster from an ISIS-supporting media group: a hot-air terror balloon. In a poster titled "The Airship," the Quraysh Media infographic suggests that operatives can "burn large areas using the airship, by throwing (fire) from the airship on different places after you pass over the forest."





(ISIS supporters' images)

To be terrorism, the arsonist would not just ascribe to a certain ideology but would be committing the crime in the furtherance of that ideology. In August 2018, the Holy Fire ripped through more than 23,000 acres in California's Orange and Riverside counties; the suspect arrested and charged, Forrest Gordon Clark, reportedly had been involved in the sovereign citizen movement and posted anti-government and QAnon conspiracy theories on his social media. Yet he also reportedly had numerous run-ins with neighbors and the local volunteer fire chief that allegedly involved threats.

Neo-Nazi and white supremacist online propaganda

Islamist extremists are far from alone in circulating threats of arson terrorism. White supremacists and neo-Nazis have called for arson against symbolic targets, with fiery imagery in much of their propaganda that evokes the accelerationist underpinnings of some adherents: the belief that they must commit violent acts to hasten societal collapse so the country can start anew under their ideological system. The neo-Nazi Feuerkrieg Division, for example, means "fire war" in German, and a teenage member arrested last fall in the UK was accused of plotting an arson spree targeting synagogues as he vowed to journal his activities "from now all the way to the inevitable race war." The accelerationist leanings could make an arsonist expand from traditional targets, such as synagogues called out in propaganda, and opt for a larger, more chaotic, more destructive yet

indiscriminate attack like a wildfire – while likely not targeting areas in which they live or train. If such an extremist also lacked access to firearms, he or she could embrace fire as a simple and accessible tactic. Experts testifying before the House Homeland Security Subcommittee on Intelligence and Counterterrorism in July expressed concern that the accelerationist mindset in conjunction with current events and a tsunami of conspiracy theories have increased the risk of a mass-casualty attack from groups such as the Boogaloo, white supremacists, or militia extremists.

Afghan illegal immigrant starting the bushfire around refugee camp in Moria, Lesvos Island, Greece that actually burned to ashes the entire camp of 13,000 people (Sept 2020); 6 of them arrested by Hellenic Police together with Central Intelligence Agency.

Militia extremists have heretofore left their mark on federal lands in other ways: The U.S. Fish and Wildlife Service estimated that the 41-day occupation of the Malheur National Wildlife Refuge in Oregon in 2016 caused nearly $2 million in torn-up land and damage to buildings, personal property, and Native American cultural sites.

For terror groups and movements that are perpetually looking for low-cost, efficient, low-skill means of attack that can result in widespread devastation, wildfire arson gives them a route to inflict casualties and economic losses. Arson lends itself to long-distance inspiration of lone actors who need only find simple encouragement online, incendiary materials and a vulnerable target. Arson is attractive to terrorists looking to hit soft targets such as a forest, where no one is guarding the perimeter. Arson may be chosen by the terrorist who doesn't want to arouse suspicion by purchasing a firearm or who doesn't have the know-how to build a complex explosive device (though as a white supremacist in Britain who tried to torch a synagogue found out, sometimes the arsonist sets himself on fire); they may even tell themselves that weather conditions favorable to fire spread constitute divine intervention for their extremist cause.

And if those weren't enough reasons to heighten defenses against arson terrorism, the symbolism of large swathes of land, landmarks or critical infrastructure going up in flames feeds the narrative of accelerationist terrorist philosophies across the spectrum of movements and ideologies seeking societal collapse with their new world order arising from the ashes. Imagery of extremist groups across the board uses flames to convey the power they believe they do or will hold, from KKK cross burnings to current neo-Nazi propaganda or ISIS' lengthy two-part P.R. film titled "Flames of War." The incitement and instructions circulating online can cross ideologies as well, posing a risk to our wildlands and communities nestled within.

Bridget Johnson *is the Managing Editor for Homeland Security Today.*

WHO Warns of Potential Ebola Spread

Ebola is spreading in a western province in the Democratic Republic of the Congo (DRC), raising fears that the disease could reach neighboring Republic of Congo and even the capital, Kinshasa, the World Health Organization (WHO) said. Read more>>

GAO: Medical Reserve Corps Present in Almost All States

The Pandemic and All-Hazards Preparedness and Advancing Innovation Act of 2019 included a provision for the Government Accountability Office (GAO) to review states' use of health care volunteers during public health emergencies. Read more>>

Russia approves first Covid-19 prescription drug for sale in pharmacies

Source: https://www.hindustantimes.com/world-news/russia-s-r-pharm-secures-approval-of-coronavir-for-outpatients/story-GoERJwz7ocJ5CsHzmTD5GI.html

Sep 18 – Russia has approved R-Pharm's Coronavir treatment for outpatients with mild to moderate Covid-19 infections and the antiviral drug could be rolled out to pharmacies in the country as soon as next week, the company said on Friday.
Coronavir's approval as a prescription drug follows the green light for another Russian Covid-19 drug, Avifavir, in May. Both are based on favipiravir, which was developed in Japan and is widely used there as the basis for viral treatments.
R-Pharm's announcement is another sign Russia is pushing hard to take a global lead in the race against the virus. It is already exporting its Covid-19 tests and has clinched several international deals for supplies of its Sputnik-V vaccine.
R-Pharm said it received approval for Coronavir after Phase III clinical trials involving 168 patients with Covid-19.
The drug was first approved for in-hospital use to treat Covid-19 in July, a government register showed.
Coronavir's trial was comparatively small. The European health regulator on Friday endorsed the use of the steroid dexamethasone in the treatment of Covid-19 patients after a study by UK researchers on several thousand patients.
R-Pharm has started talks with pharmacies about orders, the company's spokeswoman said, with Coronavir supplies expected to be rolled out in the near future, possibly as soon as next week.
Coronavir is made at R-Pharm's facility in Yaroslavl, about 300 km (186 miles) northeast of Moscow.
Avifavir has been available in hospitals since June but has yet to be supplied to pharmacies.
Both are based on the active ingredient favipiravir, which is also the key component in Fujifilm Holdings Corp's antiviral drug Avigan, approved in Japan as an emergency influenza treatment in 2014.
Trials to test it against Covid-19 are ongoing around the world. Results of a Japanese study in July were inconclusive.
It is produced by various Indian generic drugmakers including Lupin, Cipla and Dr Reddy's for use against Covid-19 in India

Wildfire Smoke Could Leave Lungs Vulnerable to COVID-19 And the Flu, Warn Scientists

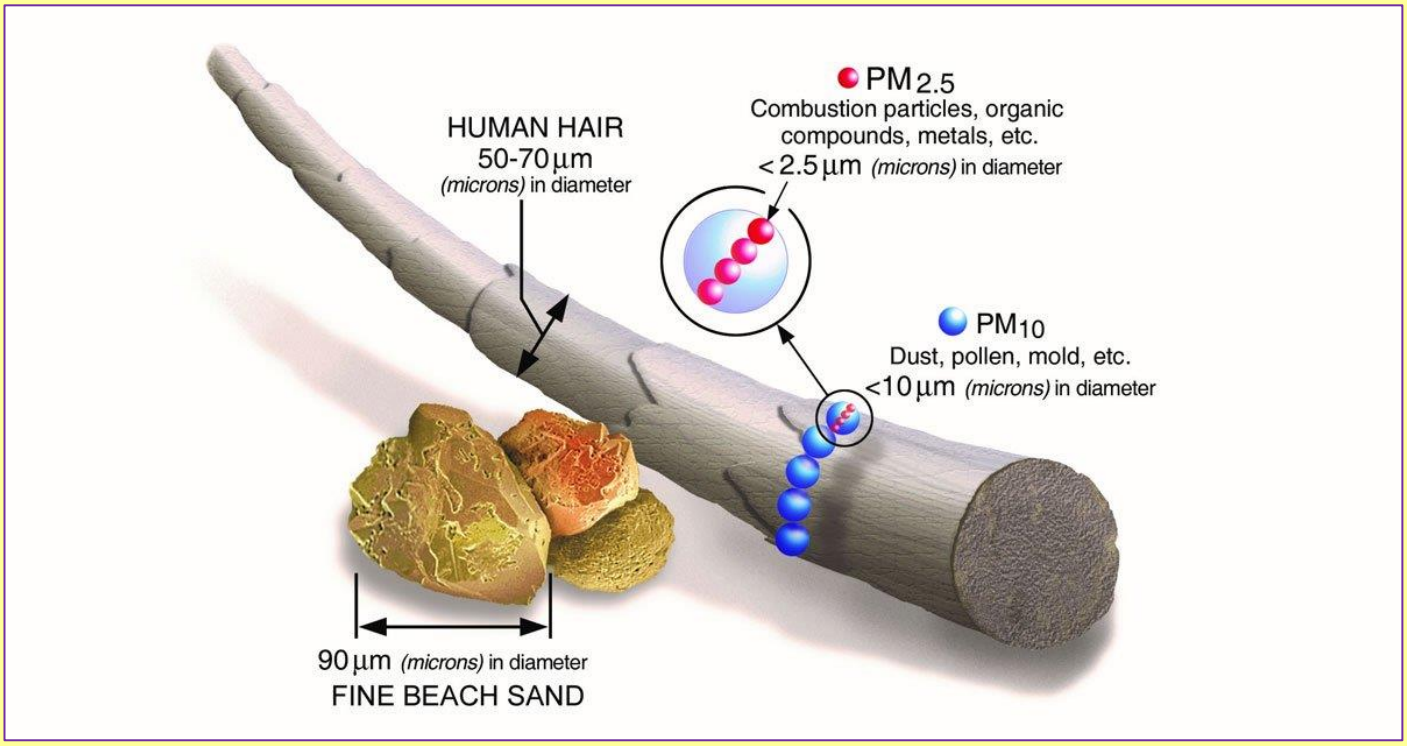
Source: https://www.sciencealert.com/all-this-wildfire-smoke-is-going-to-leave-lungs-vulnerable-to-the-flu-and-covid-19

Sep 19 – Unprecedented wildfires have been raging along the West Coast for more than a week.
Tens of thousands of people have fled their homes in Washington, Oregon, and California, and even those who don't live near a fire have been trapped inside for days due to hazardous air from the smoke blanketing the coast.
Pollution levels skyrocketed across all three states last week, making the air outside unsafe to breath and rivaling the most polluted cities in the world. Forecasts don't expect the air to clear significantly until later this week.
A growing body of research shows smoke can damage the lungs, blood vessels, and immune system, leaving people more vulnerable to respiratory illness. So when flu season arrives, the lingering effects of the poor air could exacerbate twin outbreaks of flu and COVID-19.

"That's something that we need to watch carefully," Perry Hystad, an environmental epidemiologist and associate professor at Oregon State University, told Business Insider. "Because there is this evidence in terms of air pollution suppressing the immune system and making individuals more susceptible to the flu and, of course, potentially coronavirus."

Wildfire smoke is terrible for your lungs

The most hazardous thing about wildfire smoke is the tiny particulate matter it carries - specifically, particles that measure no more than 2.5 micrometres across (that's about 30 times smaller than a human hair). These are known as PM2.5.



When humans inhale smoke, these particles can penetrate deep into the lungs and even the bloodstream. Research has connected PM2.5 pollution to an increased risk of heart attack, stroke, and premature death. In healthy people short-term, it can irritate the eyes and lungs and cause wheezing, coughs, or difficulty breathing.

"There's a lot of research on what wildfires can do, or what air pollution does, to the lungs," Stephanie Christenson, a pulmonary and critical care physician at the University of California, San Francisco, told Business Insider.

That research shows PM2.5 particles can damage the lining of the lungs and cause inflammation. The Centres for Disease Control and Prevention warns that it can "make you more prone to lung infections," since any breach in the lungs' lining offers more opportunities for a virus to infiltrate.
Smoke can also impact the heart and blood vessels: Many studies have linked wildfires to increases in heart attack, stroke, and heart failure. That's probably because when PM2.5 particles get into the blood, they can cause inflammation and clotting. Blood pressure can also rise just from the stress of living in an apocalyptic, sepia-toned haze (not to mention the difficulty of evacuating your home). One study looked at more than 670,000 ambulance dispatch calls during five wildfire seasons in British Columbia, Canada, and found an increase in respiratory and cardiovascular issues within just one hour of a rise in PM2.5 pollution.
"Around the time of wildfires, we actually get more patients going into the hospitals with severe respiratory complaints like pneumonias," Christenson said. "There's actually a higher mortality rate after wildfires that we think [is] due to health conditions, not just people perishing in wildfires."
PM2.5 particles can also impair the immune system, possibly by disabling immune cells in the lungs or by simply being overwhelming. "These particles can cross into the bloodstream and sort of reach everywhere in the body," Hystad said. "So your immune system is definitely under pressure."

Smoky air and COVID-19
It's still unclear how PM2.5 exposure will influence coronavirus infections, but odds are it won't be good.
"There's some research that's coming out to show that air pollution will increase susceptibility [to coronavirus], and we know that air pollution is robustly linked to increases in cardiovascular disease," Hystad said. "One of the biggest risk factors for COVID is a preexisting condition. So right off the bat there, we know that air pollution is putting people at more risk."
Researchers at the Harvard TH Chan School of Public Health found that people with COVID-19 were more likely to die if they lived in a county with high levels of PM2.5 air pollution. A few other studies have shown a similar connection.
"We're still kind of in our infancy of what wildfires in connection with COVID-19 do to the lungs, because we just don't have the data yet," Christenson said, adding, "I'm worried that if you are exposed to the wildfires and you have COVID-19, you could have more symptoms or worse disease."

Fires might make flu season worse, too
Some preliminary evidence indicates that bad wildfire seasons can prompt especially bad flu seasons.
A recent analysis of nine years of data from Montana revealed that months after prolonged wildfire smoke, communities had three to five times more flu cases than normal.
"In other words, our study showed cases of flu go up after bad fire seasons," Erin Landguth, an associate professor at the University of Montana who conducted the study, told Colorado Public Radio.
Two studies from China have also found associations between PM2.5 exposure and increased flu-like illness, though that research was not about wildfire smoke in particular.
To make matters worse, wildfires have been persisting later into the year over the last few decades as a warming climate lengthens the dry season. That raises the possibility that smoky conditions will overlap with flu season â€" fire season typically peaks in late September or early October, which is when flu season usually begins.
That could lead hospitals in the Pacific Northwest to see an influx of patients with flu, coronavirus, and conditions exacerbated by wildfire smoke all at the same time. Hystad does not think the smoke will tip the scales enough to overwhelm hospitals, but it might compound the effects of the flu-coronavirus overlap that many experts already fear.
"We've been kind of bracing for this, as lung doctors, for a while," Christenson said. Though the health effects of wildfire smoke develop slowly for many people, she added, "you just worry with the COVID-19 patients."

We face deadly threats that would make the coronavirus seem minor

By Judith Miller
Source: https://thehill.com/opinion/national-security/517272-we-face-deadly-threats-that-would-make-the-coronavirus-seem-minor

Sep 20 – Threats to national security and prosperity have risen, both at home and abroad, in the years since 9/11, the deadliest ever terrorist attacks on the United States. Although critics are reluctant to admit it, President Trump has addressed some of these well. Cracking down on China,

for instance, was long overdue. So was killing two jihadi leaders who were responsible for the deaths of hundreds of Americans in the Middle East.
Persuading the United Arab Emirates and Bahrain to recognize Israel was an important achievement, whether or not Saudi Arabia and other Arab states follow suit. Diplomacy in Afghanistan has resulted in serious talks between the government and the Taliban that may end over 40 years of conflict there. Yet the administration has failed to address some of the most ominous new threats, often for partisan reasons.

Biological weapons and pathogens
If the coronavirus pandemic has taught us anything, it is that pathogens can be highly contagious and cost effective killers. Over the 20th century alone, about 300 million people died from smallpox, the variola virus that had killed a third of those it infected before a vaccine was developed. Yet before the collapse in 1991, the former Soviet Union was alleged to have secretly produced and stockpiled 100 metric tons of variola a year.
Classical biological weapons have proven hard for terrorists to make or use. Given the recent advances in biotechnology, however, the ability to create genetically modified superbugs is increasingly cheaper and more widespread. After 9/11 and the ensuing anthrax attacks, President Bush increased spending on germ threats. But the coronavirus pandemic has revealed the utter mismanagement of our preparedness effort.
Americans have died for lack of testing, treatment, and protective gear, rather apart from the president who, knowing what he said was untrue, repeatedly assured us that the coronavirus was not as serious as the flu, could miraculously disappear or may respond to a series of questionable treatments, and that wearing masks was not necessary. While Trump has poured billions into research to find a vaccine and better treatments, he has largely spurned the international medical surveillance networks and collaboration needed to spot the emergence of lethal pathogens.

Climate change and environment
While previous administrations warned of the danger of climate change, President Obama tried to define it as a national security priority. However, political foes mocked his Pentagon roadmap on the issue that identified climate climate as an "urgent and growing threat to our national security" and noted how environmental issues as rising seas, eroding coastlines, worsening droughts, melting icecaps, and devastating wildfires would endanger our 7,000 military installations around the world.
Skeptics also belittled the United Nations summit in Paris in 2015, at which the United States and some 200 countries pledged to reduce greenhouse gas and carbon output "as soon as possible" to stabilize global warming to "well below 2 degrees centigrade." The decision from Trump to withdraw from that treaty on the earliest possible date, a day after the election this November, would leave the second largest emitter of greenhouse gases in the world as the only country to abandon this international effort. Despite the lack of an alternative strategy, Trump derided the Paris agreement as a "total disaster" that has harmed our competitiveness.
As deadly wildfires roared across the West Coast last week, consuming over 6 million acres of Oregon, California, and Washington, about double a typical season, West Coast residents endured toxic air, triple digit heat, and rolling blackouts. As a result, climate change has turned into a much more important election issue. "If you are in denial about climate change," said Governor Gavin Newsom, "come to California."
Severe weather damage to people and economies around the world has triggered destabilizing mass migrations on a scale that might ultimately deny. The effort by Trump to secure our national border with a wall or by any other means. A World Bank study found that worsening weather for Southeast Asia, home to nearly a fourth of the global population, forced over 8 million people to move toward Europe, the Middle East, and North America. About 17 million to 36 million more could be on the move, the World Bank projects, with similar migrations in the Americas.

Digital networks and cyberthreats
As in so many areas, our offense is more developed than our defense of air space, critical dams, power grids, digital networks, and our other essential infrastructure. Although plenty of this information remains classified, the Washington Post, based on the documents provided by National Security Agency leaker Edward Snowden, noted several years ago that intelligence agencies had conducted more than 200 offensive cyberoperations during 2011 alone, with most targeting foriegn adversaries as Iran, China, Russia, and North Korea, and such activities as nuclear proliferation.
By contrast, government reports and independent studies suggest that our critical infrastructure, most of it in private hands, remains appallingly vulnerable. In March, the Cyberspace Solarium Commission, founded by the late Senator John McCain, issued the report finding that most of our

digital networks which store, process, and analyze data have likely been compromised. "We are in a new permanent state of conflict, indeed, of war," said a Russian expert with access to defense information.
Given our inability to protect our digital and physical infrastructure, it is not a war that the country is positioned to win. Microsoft recently joined intelligence agencies with asserting that the Russian military intelligence unit that attacked the Democratic National Committee in 2016 continues to launch ever stealthier attacks on both political parties.
The warning came a day after the government whistleblower alleged the White House and Homeland Security Department suppressed intelligence about continued Russian hacking because it made Trump "look bad" and ordered analysts to focus on Iran and China. The White House denies that charge, but the reluctance to criticize Vladimir Putin reinforces notions about whether he hopes to benefit from Russian hacking.
The allegation from Microsoft that Russia is a more sophisticated hacker than China or Iran also contradicts the White House narrative that China poses the more serious cyberthreat. Moreover, the finding that China has mostly targeted the campaign of Joe Biden undermines the White House charge that China is interfering with the election to assist him.

Domestic insurrection and unrest

The United States has more guns than people. So, think about what right wing extremists might do if Trump is defeated in what they perceive to be a stolen election. Or, for that matter, what those anarchists and left-wing extremists have been doing in Seattle, Portland, Kenosha, Rochester, and other cities where peaceful protests have turned violent at night.
In a recent virtual meeting hosted by the Common Good, an organization that encourages dialogue and bipartisan policies, Jane Harman, a former Democratic lawmaker who now directs the Wilson Center in Washington, and Michael Chertoff, a former Homeland Security secretary, agreed that while jihadi terrorism still poses a grave threat, the growth of domestic terrorism, notably right wing extremists, concerns them more.
The Center for Strategic and International Studies found, based on reviews of nearly 900 terrorist plots and attacks in the United States between 1994 and 2020, that not only did right wing attacks and plots account for the majority of domestic incidents and rose "significantly, outpacing terrorism from other types of perpetrators, including those from far left networks and people inspired by the Islamic State and Al Qaeda." Right wing extremists perpetrated a majority of the plots and attacks in the country last year and over 90 percent this year.
Chertoff said that his "paramount" concern is that foreign or domestic interference with the voting process will undermine confidence and the legitimacy of our elections. Any protracted legal and political battle, he warned, would make the case of George Bush versus Al Gore "look like a kindergarten exercise." Thus, the lack of faith in our democratic system might be the greatest threat of all to our national security.

***Judith Miller** is a fellow at the Manhattan Institute, a former reporter with the New York Times, and the author of "The Story: A Reporter's Journey."*

New Book – Terrorism and Advanced Technologies in Psychological Warfare: New Risks, New Opportunities to Counter the Terrorist Threat

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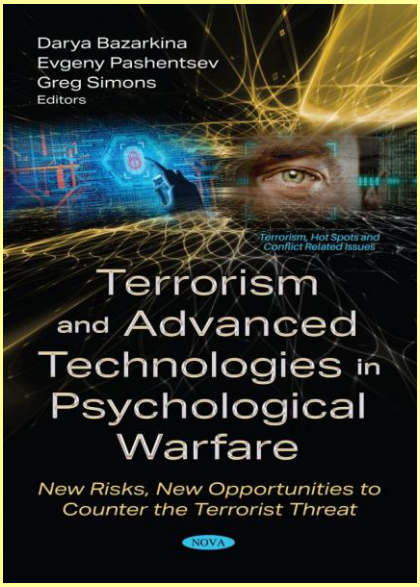
Source:https://novapublishers.com/shop/terrorism-and-advanced-technologies-in-psychological-warfare-new-risks-new-opportunities-to-counter-the-terrorist-threat/

Advanced technologies in the contemporary society enable many social problems to be resolved. However, due to the imperfect nature of social relations in human society, these technologies are very often used against human security and public interest. One of the most obvious and dangerous



expressions of such usage is the activity of terrorist organizations, which potentially threatens the very foundations of democracy and social security

This book is a first attempt to analyze the current practice and future risks of high-tech psychological warfare waged by terrorists on a national and cross-border basis. An international team of authors from eleven countries assesses the quantitative and qualitative development of the psychological impact of terrorists on their target audiences, taking into account the wider context of global social, economic and political shifts and acute geopolitical contradictions.

The book also presents new understandings on methods of countering the psychological impact of terrorists on modern society. These methods include a wide range of technical and social tools – from philosophical concepts and cultural theories to the use of artificial intelligence to prevent terrorism and ensure psychological security of society and its progressive democratic development. It should be clarified that the implementation of advanced technologies by terrorists in the broad sense of the word is based on the contradictory social role of these technologies today and in the foreseeable future.

UN and Partners Promote Sport as a Tool to Prevent Violent Extremism

Source: https://www.hstoday.us/subject-matter-areas/counterterrorism/un-and-partners-promote-sport-as-a-tool-to-prevent-violent-extremism/

Sep 20 – Ambassadors, senior UN officials, representatives of global sports organizations, and managers of some of the world's top athletes met virtually on Friday to underline the role that sport can play in combating violent extremism and radicalization.
Sport is synonymous with values such as tolerance, respect and team work, and aligns with the UN's founding goal of creating a better world for all, the head of the Organization's Office of Counter-Terrorism, Vladimir Voronkov, told participants.
This explains why terrorist groups seek to hijack sporting events, with incidents such as the March 2009 attack against Sri Lanka's cricket team, and the Boston Marathon bombing in the United States some four years later, serving as stark reminders.

A 'critical shelter' for youth

"In today's particularly volatile world, sport is a critical shelter for young and vulnerable people. Sport helps children and teenagers across the globe to build the psychological and emotional strength to be better, more tolerant and respectful citizens. Sport equips them with the right tools to resist terrorist propaganda," said Mr. Voronkov.

EDITOR'S COMMENT: Just another "brilliant" UN proposal from people living in another planet and have no idea about the strength and depth of down to Earth radicalization. Terrorists do not target sporting venues and sport teams because they want to stop population to become better people; they do that because there are thousands of people gathered in one site!

Lessons for life

Suad Galow from Somalia spoke of the lessons she learned playing basketball, helping her to thrive both on and off the court.
"Basketball became part of my life and it taught me valuable lifetime skills such as teamwork, discipline, and leadership", said Ms. Galow, President of the Somali Woman Foundation, and Chairperson of both the national Olympic Committee and Basketball Federation.
"Basketball gave me a huge opportunity to travel, to diversify, and to meet new people from Africa to the Middle East and beyond."
Fans also benefit from sport without breaking a sweat, according to Miguel Ángel Moratinos, High Representative of the UN Alliance of Civilizations.

"The power of sport rests in its ability to break down the walls between people whether they are players or spectators regardless of their faith, race or culture", he noted.

Sports and COVID-19 recovery

Friday's online event was held in the framework of a UN initiative, launched in February, that aims to safeguard major sporting events worldwide from terrorism-related threats. It will be followed by a technical-level expert meeting, to be held next week.

Future developments include a guide for policymakers, and a global campaign featuring renowned athletes and youth which the organizers believe will garner "significant exposure" during upcoming major sports events such as the 2021 Olympics in Tokyo and the World Cup in Qatar the following year.

Qatar's Ambassador to the UN, Alya Al-Thani, said the COVID-19 pandemic has shown that support must be given to sports and physical activity now more than ever.

"Sport must be included in recovery plans post COVID-19 and in national strategies for sustainable development. Sport is key to mitigate the impact of the pandemic on health and well-being and in building back better," she said, as her nation continues gearing up to host the 2022 FIFA World Cup football tournament.

The power to be better – Spurs coach

For the head coach of the Tottenham Hotspur football club, José Mourinho, sports have the power to transform us for the better. They also teach us that "incredible things" can be achieved by working together.

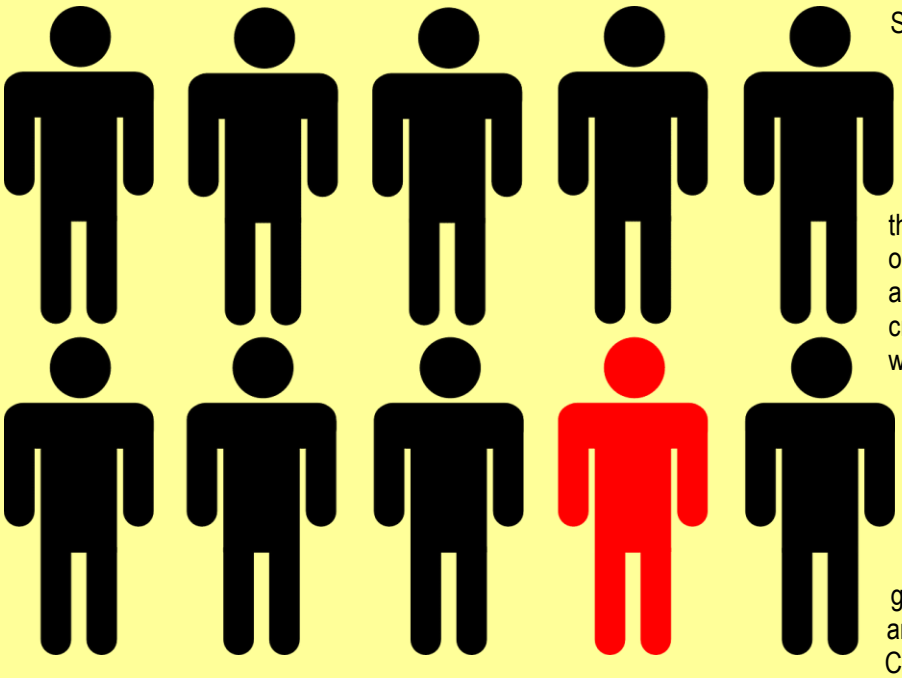
"Sport makes it clear that in this world, the languages you speak, the colour of your skin, your societal and economic background, your gender identity, sexual orientation, are totally irrelevant", he said.

"What matters in sport is who you are, how motivated you are, how hard you are willing to work to become a better version of yourself."

Insider Threat Awareness Month: Expect the Unexpected

By Kylie Bielby

Source: https://www.hstoday.us/subject-matter-areas/airport-aviation-security/insider-threat-awareness-month-expect-the-unexpected/



Sep 22 – Earlier this September, an unidentified photographer breached Joe Biden's Secret Service perimeter as the candidate boarded his charter plane at Johnstown-Cambria County Airport in Pennsylvania.

As Biden and his wife were on the staircase to the aircraft the man with a camera made his way onto the airport tarmac, around the plane's rear and under its left wing to join the group of credentialed press corps traveling with Biden who were watching the couple board. The plane was surrounded on all sides by Secret Service agents, a more than eight-car motorcade and other local law enforcement.

The man was intercepted by a Secret Service agent and physically removed. He resisted, declaring himself to be a photographer with granted access and showed a pass on a lanyard around his neck.

CBS News, who were present having covered the Democratic nominee's visit, said the airport's general manager told them that the man apparently either jumped a six-foot fence near the small terminal where a few dozen people gathered or entered the tarmac through an unauthorized pedestrian gate.

A Secret Service spokesperson told CBS News that "a member of the media who was credentialed for an event earlier in the day attempted to gain access to the airport tarmac for the departure of Presidential Candidate Biden".
While the man may not have had nefarious intentions, the event, on September 12, during Insider Threat Awareness month, highlighted the need for constant vigilance at airports and other transportation hubs. It also illustrates that threats may originate from unlikely sources and security planners must think outside the box. It is not enough for airports and airlines to consider their own immediate workforce (which is vast at just under 2 million in the U.S. alone) but also those who are given access to sensitive areas. During election campaigns, the traveling press corps often undergoes a security sweep each morning by Secret Service agents. Biden was granted full Secret Service protection in March after protestors rushed his stage and had to be forcefully removed by his wife and other campaign aides.
But often, media present at an airport are there to catch a comment or photo of a celebrity or sports star, and security is therefore minimal, relying largely on the individual celebrity's own team. It is an area that is often overlooked in terms of security, largely because airports expect media organizations to have run their own thorough background checks while others have their own in-house press, and also because of a lack of past incidents. But as anyone in the field of counterterrorism will tell you, just because it hasn't happened, doesn't mean it can't.
As recently as 2019 terrorists have sought to leverage insiders to conduct attacks on the transportation system. For example, In July 2019, a U.S. airline mechanic sabotaged a navigation system of a 737-800 aircraft at Miami International Airport. The mechanic admitted to investigators that he tampered with an exterior compartment of the aircraft and glued a piece of foam to the air data module. Security camera footage indicates that the suspect accessed the compartment in question during the incident. The same year, an individual linked to a terrorist group was arrested by Philippine authorities after he was found training to become a pilot, with probable nefarious intent.
And the insider threat is not restricted to terrorism and sabotage. There are several examples around the world of airline and airport workers operating as the "inside man" for drugs or contraband smuggling. An American Airlines mechanic at John F. Kennedy International Airport was arraigned this July on an indictment charging him with conspiracy to possess cocaine with intent to distribute, conspiracy to import cocaine and importation of cocaine. It is alleged that the mechanic concealed cocaine bricks behind an insulation blanket in an external mechanical compartment beneath the aircraft.
The Transportation Security Administration (TSA), airport operators, and air carriers share the responsibility to mitigate all insider threats at airports. From fiscal year 2017 through fiscal year 2019, there were an average of 138 insider threat referrals per month, with an average of 14 (again per month) requiring further investigation.
The Government Accountability Office (GAO) was asked to review TSA's and aviation stakeholders' efforts to mitigate insider threats at airports. GAO's February 2020 report said airports, airlines and the TSA have come a long way in recent years to secure their infrastructure and passengers against the insider threat but noted these strengths were weakened by the lack of a strategic plan.
TSA officials told the GAO review that it did not have an up-to-date strategic plan to counter insider threats due to turnover of key senior leadership. When the Insider Threat Program began in 2013, TSA initially developed a 2014-2016 Insider Threat Action Plan, which described TSA's vision of an integrated insider threat program at TSA, and it included strategic goals, each with a set of objectives. However, according to TSA officials, TSA did not fully implement this Action Plan, and TSA did not renew or revise the Action Plan after 2016 due to the departure of the key sponsoring senior leader.
The watchdog's report came as the TSA was in the early stages of developing a roadmap that could serve as a new strategic plan for the Insider Threat Program. TSA finalized this roadmap in May, which streamlines its insider threat activities.
The focus of the new roadmap is on maximizing innovation and technology. It lists Artificial Intelligence, probabilistic analytics and data mining among the required tools in the fight against the insider threat.
The roadmap recommends an agile insider threat posture and partnering with stakeholders. TSA said when launching the roadmap that it intends to pursue innovative models of public-private partnerships to drive collaboration and shared investment to establish the best route to unlocking a business case for an effective insider threat program. TSA is actively pursuing research, development, testing, and evaluation of technologies that identify and validate detection and mitigation solutions.
TSA announced at the time that it plans to also establish an Insider Threat Mitigation Hub to elevate insider threat to the enterprise level and enable multiple offices, agencies, and industry entities to share perspectives, expertise, and data to enhance threat detection, assessment, and response. A formal program review cycle will also be put in place to allow TSA to adjust to changing threats, assess performance, and establish what it calls a "virtuous refresh and investment cycle".
While the examples given here have focused on the insider threat at airports, other transportation modes must not be forgotten. Catastrophic damage could be caused by sabotaging the rail or road network, for example. Just as the insider threat may come from an unlikely actor, as highlighted with

the Joe Biden incident, the target too could be unexpected. It is therefore imperative that TSA and stakeholders take an industry-wide approach to the insider threat to transportation and do not put all its eggs in the aviation basket.

Kylie Bielby *has more than 20 years' experience in reporting and editing a wide range of security topics, covering geopolitical and policy analysis to international and country-specific trends and events. Before joining GTSC's Homeland Security Today staff, she was an editor and contributor for Jane's, and a columnist and managing editor for security and counter-terror publications.*

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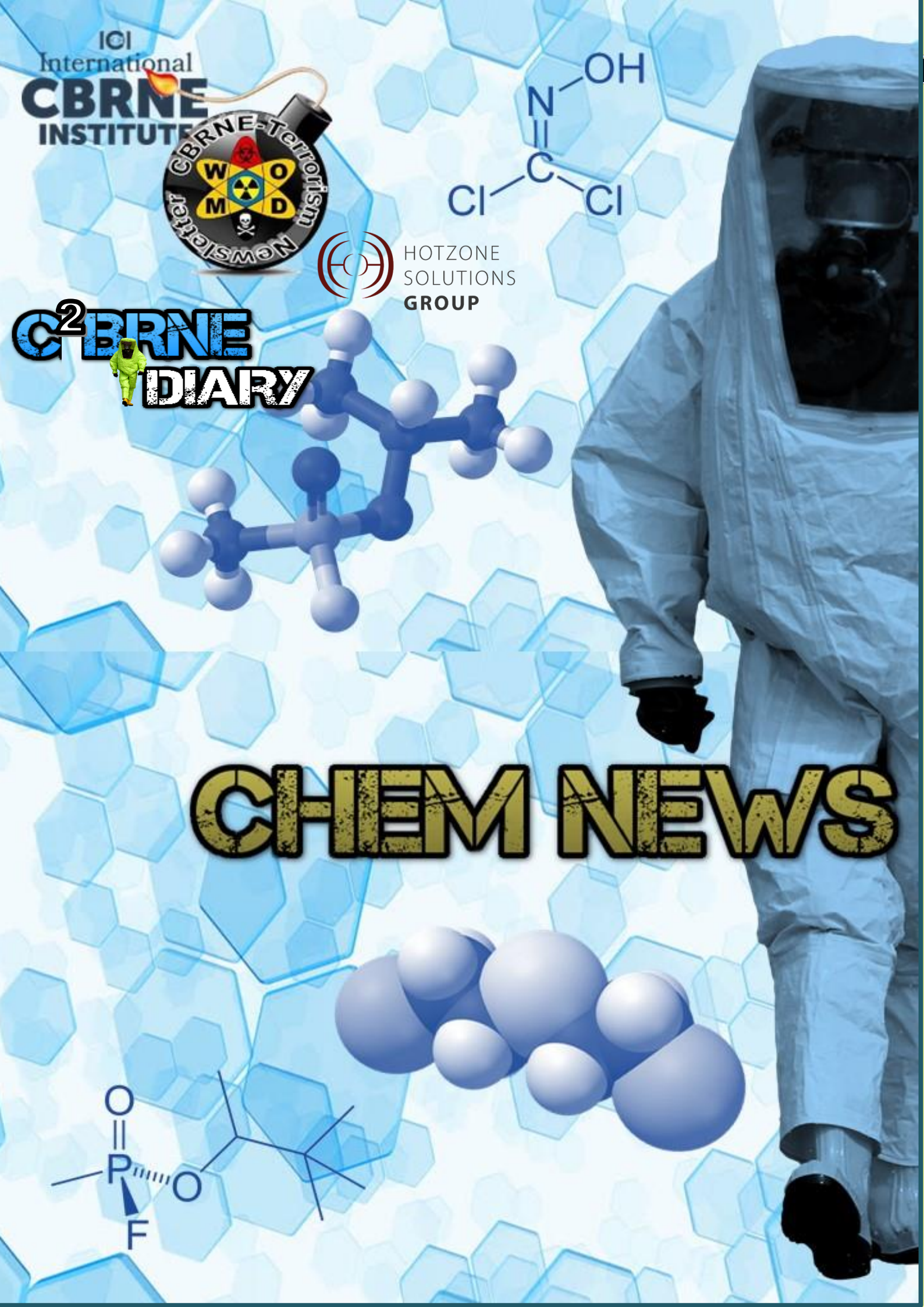
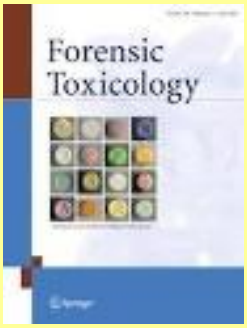


Fatal sarin poisoning in Syria 2013: forensic verification within an international laboratory network

By Harald John, Marcel J. van der Schans, Marianne Koller, et al.

Forensic Toxicology volume 36, pages61–71(2018)

Source: https://link.springer.com/article/10.1007/s11419-017-0376-7?code=91f84100-618d-44b7-a7bd-45860a6d84d5



D uring the United Nations fact-finding mission to investigate the alleged use of chemical warfare agents in the Syrian Arab Republic in 2013, numerous tissues from a deceased female victim, who had displayed symptoms of cholinergic crisis, were collected. The Organisation for the Prohibition of Chemical Weapons (OPCW) authorized two specialized laboratories in the Netherlands and Germany for forensic analysis of these samples. Diverse modern mass spectrometry (MS)-based procedures in combination with either liquid chromatography (LC) or gas chromatography (GC) separation were applied. A variety of biotransformation products of the nerve agent sarin was detected, including the hydrolysis product *O*-isopropyl methylphosphonic acid (IMPA) as well as covalent protein adducts with e.g., albumin and human butyrylcholinesterase (hBChE). IMPA was extracted after sample acidification by solid-phase extraction and directly analyzed by LC–tandem-MS with negative electrospray ionization (ESI). Protein adducts were found, either by fluoride-induced reactivation applying GC–MS techniques or by LC–MS-based detection after positive ESI for proteolyzed proteins yielding phosphonylated tyrosine residues or a specific phosphonylated hBChE-derived nonapeptide. These experimental results provided unambiguous evidence for a systemic intoxication and were the first proving the use of sarin in the ongoing bellicose conflict. This scenario underlines the requirement for qualified and specialized analytical laboratories to face repeated violation of the Chemical Weapons Convention.

EDITOR'S COMMENT: Given the recent news by the Berlin hospital Charité that AlexeiNavalny was poisoned with a cholinesterase inhibitor it might be intersting to know how to verify such exposure and identfy the used chemical – and this paper can provide the relative knowledge of available techniques and methodologies.

Name Your Poison: Some of the Exotic Toxins Which Fell Kremlin Foes

Source: http://www.homelandsecuritynewswire.com/dr20200825-name-your-poison-some-of-the-exotic-toxins-which-fell-kremlin-foes

Editor's note: *Two years ago, on 12 September 2018, Pyotr Verzilov, the then-31-year old husband of Pussy Riot member Nadezhda Tolokonnikova, suddenly fell severely ill after eating lunch at the cafeteria at the Moscow Basmanny Court, where he was interviewing two officials about the investigations into the July 2018 killing of 3 Russian journalists in the Central African Republic.*

*The Russian state media blamed local Islamist militants, but an independent investigation has later found that Yevgeny Prigozhin, "Putin's Chef" (he has big Kremlin catering contracts) and the owner of the mercenary militia Wagner Group, on Putin's orders, instructed Wagner soldiers to kill the three journalists (they were in the CAR to investigate human rights abuses by Wagner soldiers) (see "The CAR Murders: A Critical Cold Case in the New Cold War Points to "Putin's Chef." HSNW, 23 September 2019).**

Verzilov was flown to Berlin Charité hospital – where Alexey Navalny is now being treated – and after a series of tests his doctors announced that he was poisoned with an "anticholinergic agent," the same poison Kremlin operatives used in their attempt on Navalny's life.

on 4 March 2018, six months before FSB agents poisoned Verzilov, they poisoned Russian defector Sergei Skripal and his daughter in the picturesque British town of Salisbury. The Skripals were poisoned with Novichok, a nerve agent which belongs in the family of cholinesterase inhibitors. The posioning of Skripla father and daughter, Verizlov, and Navalny thus indicates that cholinesterase inhibitors have now become the FSB's poison of choice.

On 20 September 2018 we ran this article on the exotic toxins the Russian secret services have used over the years against regime critics.

Aug 25 – The suspected poisoning of anti-Kremlin activist Pyotr Verzilov in Moscow — just a few months after nerve-agent poisonings in Britain that led to one death and left three others severely ill — conjures up memories of other Kremlin foes who have fallen victim to toxic attacks in the Vladimir Putin era and previously.

Doctors in Berlin, where Russian-Canadian Verzilov was flown on September 15 after falling seriously ill days earlier, said it was "highly plausible" that he was poisoned.

A longtime opponent of Russian President Putin as a member of the punk protest band Pussy Riot and dissident art troupe Voina, Verzilov's doctors in Germany said on September 18 that something disrupted the nerves that regulate his internal organs.

Verzilov's case comes just months after former Russian double-agent Sergei Skripal and his daughter, Yulia, were found [on 4 March 2018] unconscious in a park in the English city of Salisbury.

A British public inquiry found that the Skripals had been poisoned with the deadly nerve agent Novichok and alleged that the attack was carried out by Russian state agents, later identified as two men traveling under the names Aleksandr Petrov and Ruslan Boshirov.

Less than four months later, Britons Charlie Rowley and Dawn Sturgess were taken to a hospital in Salisbury in critical condition and found to have also been poisoned by Novichok. Sturgess died on July 8.

Skripal, a 67-year-old former Russian Army colonel, and his adult daughter eventually recovered after months of intensive hospital treatment.

Skripal was convicted in 2006 by a Russian court for "high treason in the form of espionage" on charges that he had given the names of Russian agents in Europe to Britain's MI6 intelligence agents during the 1990s.

The attack on the Skripals expanded the list of cases in which Kremlin opponents or critics have fallen ill from poisoning over the years, sometimes fatally, in circumstances that have raised suspicions of KGB-style assassinations.

While the Skripals were hospitalized, London police assistant commissioner Mark Roley told BBC that authorities "have to be alive to the fact of state threats as illustrated by the [Aleksandr] Litvinenko case."

Litvinenko, a former Russian state security service agent who defected to Britain and became a sharp critic of the Kremlin, fell seriously ill in November 2006 and died three weeks later. He was found to have been poisoned with radioactive polonium.

Here's a closer look at poisons thought to have been used in prominent cases of both international and domestic toxic attacks involving Russians.

Fentanyl and Carfentanyl

Initial reports in British media said authorities suspected Skripal and his daughter were exposed to fentanyl, a synthetic opiate painkiller that is at least 50 times more powerful than morphine.

A related synthetic opioid, carfentanyl, is 100 times as potent as fentanyl and as much as 10,000 times as potent as morphine.

In addition to medical uses, and abuse as street drugs that often has deadly consequences, the chemicals have been weaponized as potentially lethal incapacitating agents.

Weaponized forms include guns that shoot felt pads soaked in the substances, paint-ball type projectiles, and an aerosol spray.

The chemicals can be ingested through skin contact or inhaled if they become airborne.

The U.S. Centers For Disease Control and Prevention (CDC) has warned that "first responder" emergency workers in cases of fentanyl and carfentanyl exposure can ingest the chemicals by touching the victim's skin.

Two police officers who initially responded to Skripal's case were treated and one remained hospitalized on March 6.

Moscow's 2002 theater hostage crisis

A report by British government scientists who tested clothing and urine samples from three survivors of the 2002 Moscow theater hostage crisis found that Russian special forces used carfentanyl to subdue Chechen separatists who were holding 800 people captive at the Dubrovka Theater.

The raid succeeded, but more than 120 hostages died from the effects of the chemical.

The same report noted that a Russian general who directed a military chemical institute had said that fentanyls were capable of delivering "a knock-out blow" to subjects within minutes.

Gelsemium – "Heartbreak Grass"

The most toxic source of Gelsemium poison is Gelsemium elegans, or "heartbreak grass," a rare variety of a plant that only grows in Asia. Lacing food with heartbreak grass is a known method of assassination by Russian and Chinese contract killers.

Aleksandr Perepilichny

A Russian oligarch and Kremlin critic who sought refuge in Britain in 2009, Aleksandr Perepilichny had been helping a Swiss investigation into a Russian money-laundering scheme by providing evidence against allegedly corrupt officials in Moscow. He also provided evidence against Russian officials linked to the 2009 death of anticorruption lawyer Sergei Magnitsky in a Moscow jail.

Shortly before he collapsed and died in November 2012 at the age of 44 while jogging outside his home in Surrey, Perepilichny told his colleagues that he had received death threats.

Although he was the fourth person linked to the Magnitsky case to die in strange circumstances, police in Surrey initially ruled that his death was not suspicious.

But on May 18, British authorities reopened an investigation into his 2012 death after new tests discovered traces in his stomach that could only come from the highly toxic Gelsemium plant.

The Surrey coroner's court was told the toxicology report raised "serious concerns" that Perepilichny may have been assassinated for helping expose a powerful Russian fraud syndicate.

The court also heard there was "historical animosity" between Perepilichny and Dmitry Kovtun, one of two Russians found in January 2016 by a British inquiry to have poisoned Litvinenko in London in 2006.

Polonium-210

Polonium is a rare and highly radioactive element that occurs in uranium ores. Polonium-210 is about 250,000 times more toxic than hydrogen cyanide, which is itself an extremely poisonous liquid that can kill quickly in a concentrated dose.

Aleksandr Litvinenko

A former officer of Russia's FSB security service, Litvinenko fled to London with his family in 2000 and was granted political asylum.

Litvinenko was poisoned in a London sushi bar in November 2006 and an autopsy revealed traces of polonium-210 in his body. British experts said he probably was the first person ever to die of the acute radiation effects of polonium-210.

A British inquiry in January 2016 concluded there was "strong circumstantial evidence of Russian state responsibility" and that Russian President Vladimir Putin and his spy chief at the time, Nikolai Patrushev, "probably approved" Litvinenko's poisoning.

The inquiry, led by a retired British judge, Sir Robert Owen, also concluded that a former KGB agent and ex-Kremlin bodyguard, Andrei Lugovoi, carried out the assassination along with Dmitry Kovtun by placing polonium-210 in a teapot that was served to Litvinenko at a London restaurant.

Before he died, Litvinenko wrote a letter accusing Putin of ordering his death. He had earlier accused the FSB of staging apartment-building bombings and other false-flag attacks in Russia in a bid to bring Putin into power — claims Russian authorities have denied.

Litvinenko had also accused Putin of ordering the killing of Russian investigative journalist Anna Politkovskaya, a Kremlin critic who was fatally shot less than two months before his own death.

Thallium

Thallium is a chemical element that is found in potassium-based ores, but also is a byproduct from refining heavy metal sulfide ores. Small, nontoxic amounts of the radioisotope thallium-201 are used in nuclear medicine scans.

Thallium salts are highly toxic and have been used in rat poisons and insecticides. Thallium poisoning results in hair loss. Because of its use as a murder weapon, it is sometimes referred to as the "poisoner's poison."

Nikolai Khokhlov

Nikolai Khokhlov was a Soviet KGB agent who defected to the United States in 1953 and testified about KGB operations. Khokhlov was treated for thallium poisoning in Frankfurt, Germany, in 1957 after a failed assassination attempt by the KGB — possibly the first radiological attack by KGB agents.

Former KGB officers have claimed that Khokhlov was poisoned by radioactive polonium, exactly as Litvinenko was in 2004, rather than thallium.

Litvinenko's poisoning by polonium-210 initially was misdiagnosed as thallium poisoning.

Yury Shchekochikhin

A Russian investigative journalist and lawmaker, Yury Shchekochikhin campaigned against corruption and the influence of organized crime in Russia.

Shchekochikhin died in July 2003 — just days before he planned to meet FBI investigators in the United States — after suffering from a mysterious illness and displaying symptoms of a severe allergic reaction.
Russian authorities declared that he died from Lyell's syndrome, but his medical treatment and autopsy records remain under the control of the FSB.
Some researchers say the symptoms of Shchekochikhin's illness were similar to the radioactive poisoning symptoms of Khokhlov and Litvinenko.

Tetrachlorodibenzodioxin (TCDD) – "Dioxin"

TCDD — commonly, though inaccurately, referred to as dioxin — is a colorless, odorless solid compound at room temperature. It is the main contaminant in Agent Orange, the defoliation substance that was used by the U.S. military in the Vietnam War. TCDD has been classified as a carcinogen for humans by the International Agency for Research on Cancer.

Viktor Yushchenko

A Ukrainian politician, Viktor Yushchenko was poisoned with hazardous amounts of TCDD in late 2004 while running for president against Russian-favored candidate Viktor Yanukovych.
Tests at the time showed he had the second-highest concentration of TCDD ever measured in a human.
As a result, his face was disfigured for many years by chloracne, but he has been slowly recovering.
Yushchenko, who favored European integration and Ukrainian membership in NATO, said that his poisoning "was not a private act" and accused Russian officials of hindering an investigation into who was responsible for poisoning him.
Official election results declaring Yanukovych as the winner of the vote led to the Orange Revolution protests. The Supreme Court ruled that there had been widespread fraud in Yanukovych's favor and ordered a new vote, which Yushchenko won.

Sarin and Other Nerve Agents

Sarin is a colorless, odorless liquid nerve agent that causes death by asphyxia because victims are unable to control the muscles involved in breathing. It is most dangerous when it is inhaled. The liquid easily turns into a gas and vapor concentrations can also penetrate the skin. Sarin has been classified by the United Nations as a weapon of mass destruction. The stockpiling of sarin is outlawed under the Chemical Weapons Convention.

Ibn al-Khattab

The FSB has said that its operatives killed Ibn al-Khattab, a Saudi-born militant who fought alongside Chechen militants in Russia's North Caucasus during the 1990s and early 2000s. He died in 2002.
Khattab's relatives and other Chechen sources say he was poisoned after handling a letter that had been laced with a "fast-acting nerve agent, possibly sarin or a derivative."
Russian press reports say the letter was delivered by a Daghestani double agent who was paid by the FSB.

Microengineered Ricin Pellets

The Soviet Union possessed a weaponized version of ricin poison during the Cold War, when the KGB was suspected in assassination attempts against at least three well-known Warsaw Pact defectors.
Ricin is produced naturally within the seeds of the plant Ricinus communis, which are crushed to produce castor oil.
The pulp from eight crushed seeds is considered a dangerous dose for adults. But deaths from eating castor plant seeds are rare because of the seed's indigestible shell and because the human body can digest the toxin.
Ricin is most toxic when it is inhaled, injected, or otherwise ingested into the bloodstream.
In the form of purified powder, a dose the size of a few grains of table salt is strong enough to kill an adult.

Georgi Markov

The most infamous case is the so-called umbrella assassination of Bulgarian dissident journalist Georgi Markov in London in September 1978. Markov, who worked for the BBC and Radio Free Europe, died four days after a microengineered pellet containing the poison ricin was injected into his leg. British investigators suspect the pellet was fired by an assassin who used a device hidden in the tip of an umbrella while Markov was catching a bus on London's Waterloo Bridge.

Vladimir Kostov

A similar assassination attempt had been made 10 days earlier against another Bulgarian defector who worked for Radio Free Europe, Vladimir Kostov. Kostov was shot in the back with the same type of ricin-laced pellet while walking in a Paris metro station in August 1978, but he only ingested a small portion of the ricin in his blood and survived.

Boris Korczak

In August 1981, an exposed CIA double agent, Boris Korczak, was struck in his kidney by a similar ricin pellet fired from an air gun while he was shopping for food in Virginia. Korczak also survived the attack and was convinced the KGB was responsible.

Unidentified Poisons

Hafizullah Amin

Hafizullah Amin was an Afghan politician during the Cold War who served as president for three months in 1979 after ordering the assassination of his pro-Soviet predecessor, Nur Muhammad Taraki.

Soviet officials alleged that Amin was an agent of the CIA.

A KGB agent who infiltrated the presidential palace and became the chef attempted to poison Amin on December 13, 1979.

But Amin suspected he was being poisoned and switched his food and drink with his son-in-law — who became ill and was sent to a hospital in Moscow.

Two weeks later, Amin was assassinated by Soviet forces who stormed Kabul's Tajbeg Palace. The Soviet Union then installed Babrak Karmal as Afghan president.

Anna Politkovskaya

Russian investigative journalist, human rights activist, and Kremlin critic Politkovskaya fell violently ill in September 2004 after drinking tea on an Aeroflot flight from Moscow to southern Russia during the Beslan school-hostage crisis.

Politkovskaya believed she was poisoned by the FSB, and media reports said her attackers used an unknown toxin prepared at a former Soviet secret-police poison facility.

Politkovskaya survived, but she was shot dead two years later in the elevator of her Moscow apartment building.

This article first published in HSNW on 20 September 2018, is published courtesy of Radio Free Europe/Radio Liberty.

** Prigozhin is also the owner of the St. Petersburg-based Internet Research Agency which was subcontracted by the GRU, Russia's military intelligence branch, to orchestrate, with the input and advise of Paul Manafort, Trump's campaign chairman, the broad and effective social media campaign to help Trump win the November 2016 election (Manafort became the campaign manager on 20 June, but was dismissed on 19 August after it was revealed that he had received $12.7 million to lobby for the pro-Putin Ukrainian president Viktor Yanukovych, and offer PR advice on how to improve the image of Yanukovych in the United States after a series of sweeping anti-democracy moves). On Monday, Prigozhin announced that* he *will use Russia's courts to destroy Alexei Navalny financially if the stricken opposition leader recovers. Last year, a corrupt Moscow court found Navalny's Anti-Corruption Foundation (FBK) guilty of defaming Moskovsky Shkolnik (Moscow Schoolboy), a catering company supplying food to school cafeterias in the Moscow region. Navalny's foundation aired an investigative TV report showing that the Kremlin-connected Moscow Schoolboy was supplying sub-standard food at inflated prices, and that their contract was renewed year after year owing to hefty kickbacks to Putin's cronies. Prigozhin bought the $1.2 million court-imposed fine from Moscow Schoolboy, and said on Monday that if Navalny does not "kick the bucket," than he, Prighozhin, was going to collect the court-ordered fine.*

The Next Major Battlefield Threat Facing US Troops May Be Undetectable

Source: https://www.military.com/daily-news/2020/09/02/covid-19-may-force-pentagon-pay-attention-major-weak-spot-bioweapons.html

Sep 02 – As the world contends with the COVID-19 pandemic, civilian and U.S. military experts alike are voicing worries that combat units are ill-equipped to detect powerful new bioweapons that are likely to become a reality on the future battlefield.

Since the pandemic struck, the active-duty military has fared far better than the general population, thanks in significant part to its youthful population. While Defense Department-connected coronavirus cases have now surpassed 50,000, only six U.S. troops have died from the disease.

Nonetheless, COVID-19 has illustrated the ability of a biological threat to sideline military assets and cripple readiness. Early in the pandemic, the aircraft carrier Theodore Roosevelt had to pause

deployed activities to contend with a massive outbreak that infected about 1,200 sailors; elsewhere, many combat training rotations were put on hold as units isolated for months to prevent spread of the disease.
The military has learned to adapt with new safety protocols, and operations are returning to a new normal. But experts say that COVID-19 was only a wakeup call: a harbinger for the next new threat that may not be a naturally occurring pandemic, but a sophisticated bioweapon that troops may not be able to detect or deter until it's too late.
Over the past decade, the joint force has focused its attention on the threat of cyberattacks from countries like Russia and China that can devastate communications, GPS and other battlefield tech. But the military's ability to operate on a chemical-biological battlefield is still calibrated for the last war, when the chemical weapons threat was the predominant focus.
"I am a lot more afraid of the biological threat than I am of the chemical threat," Dr. Peter Emanuel, senior research scientist for bioengineering at Army's Combat Capabilities Development Command's Chemical Biological Center, told Military.com. As the executive agent for the Defense Department, the Army is responsible for overseeing chemical and biological warfare defense programs for the services.

Members from the 374th Medical Group check each other's Mission Oriented Protective Posture (MOPP) gear to ensure proper protection is achieved after donning the equipment at Yokota Air Base, Japan, August 8, 2018. (U.S. Air Force)

"My job is to make sure that the U.S. warfighter is safe on the battlefield that is contested. … When I am faced with a chemical threat, I have a lot of tools in my toolbox to give to the senior leaders," Emanuel said. "But when I am faced with a biological threat, I have very few."
A new age of biological weapons is now far more likely with recent advances in synthetic biology, a scientific revolution that could be a Pandora's Box that gives rise to deadly new strains of pathogens that are easily duplicated, scientists say.
The Pentagon is playing a significant role in Operation Warp Speed, a massive effort by government and private organizations that involves synthetic biology to develop and deliver 300 million doses of a COVID-19 vaccine by January 2021.
"That's how a vaccine is being made; we are using synthetic biology, purposely engineered biology to make the vaccine that is going to save the world," said Emanuel, the Army's lead for synthetic biology. But he worries that "super weapons" can emerge as easily as life-saving cures, he said.
"The same technology that is going to save you with a vaccine when Operation Warp Speed is complete," Emanuel said, "is the same technology that can create the next threat."
And there are very few short-term solutions to countering this new threat that can be accelerated with more money from Congress, experts maintain. Despite the warnings, there is little evidence that the Army has launched any initiatives to assess its readiness for the future bio threat.

Warnings Before COVID-19

The last time warnings emerged of U.S. adversaries possessing deadly biological and chemical weapons was in the lead-up to the 2003 invasion of Iraq, but fears that then-Iraqi leader Saddam Hussein would release weapons of mass destruction were based on faulty intelligence.
To prepare for such an attack, soldiers and Marines crossed into Iraq wearing chemical-biological protective suits known as Mission Oriented Protective Posture (MOPP) gear. U.S. combat units, believing the threat was real, inoculated troops against known pathogens such as smallpox and anthrax. Experts say that troops were likely more prepared then because they were dealing with known threats.
When COVID-19 hit nearly two decades later, it educated the world about how effective a global pandemic can be at creating an atmosphere of terror and helplessness while wreaking economic havoc.

The threat landscape is shifting as it becomes more likely that synthetic biology will allow scientists to alter pathogens such as anthrax, making them more resistant to traditional vaccinations and detection, experts say.
Scientists have been warning that natural pathogens distributed through trade and transportation are only a few of the perils that go along with this new biological revolution.
"Bioweapons have been with us a long time, but because of the revolution in biology that is going on, we have the capacity to make new, more powerful bioweapons that could evade all of our capacity to diagnose them and to treat them," Tara O'Toole, executive vice president of the not-for-profit scientific investment organization In-Q-Tel, testified at a November 2019 hearing before the Senate Armed Services Committee's subcommittee on emerging threats and capabilities.
"And it is very unlikely, given the difficulty of gathering intel on these programs, that we will have advance tactical knowledge of what weapon we might be facing or even where it might come from," she added.
O'Toole, the former undersecretary of Homeland Security for Science and Technology from 2009 to 2013, told lawmakers that the threat of new bioweapons and bioterror exists because of the advances that have been made in the life sciences in the past 40 years, which are now more accessible across the Internet.
"More and more people are going to have access to this technology as it becomes a foundational technology of the 21st century economy," according to the transcript of O'Toole's testimony.
Emanuel calls this the "democratization of science," meaning that the "first time you do something in science, it's very difficult, and then it becomes substantially easier as people have seen how you can do it."
In synthetic biology, scientists are applying the principles of engineering to biology to turn bacteria microbes into biomanufacturing, he said.
"As biotechnology becomes more mature and synthetic biology becomes the new thing, the democratization of biology now presents us with a conundrum -- Pandora's Box is open," Emanuel said. "I think that one of the concerns that has been bounced around ... is now that people have seen the power of biology to seize control of the global economy; does that make biology a more attractive weapon? Could the people that are intent on ill purpose suddenly rethink their ill-will to employ this technology? And that is a pretty scary thought."
From 2009 to 2019, the Government Accountability Office identified challenges in America's ability to detect and respond to biological events, highlighting vulnerabilities in biodetection technologies, biological laboratory safety and security, and emerging infectious disease surveillance, according to a June 2019 report.

U.S. Soldiers, assigned to the 2nd Brigade, 1st Cavalry Division, carry a wounded soldier to a medical evacuation point, during Decisive Action Rotation 17-04 at the National Training Center in Fort Irwin, Calif., Feb 19, 2017. (U.S. Army/Spc. JD Sacharok)

In September 2018, the White House released the National Biodefense Strategy, which established a Biodefense Steering Committee including agencies such as the Defense Department, Department of Homeland Security, State Department and the Environmental Protection Agency.
But Dan Gerstein, a former Army officer and senior researcher at Rand Corp., says the U.S. is nowhere near ready to deal with future biological threats.
"I testified about a year and a half ago in front of the National Commission on Biodefense, and I followed a group of government guys. And the government guys were all happy to talk about how we coordinate and we share information and this and that," Gerstein, a former acting under secretary at DHS, told Military.com.
"I was the next one up, and I looked at the group and said, 'I hate to say this, but I'm like the turd in the punchbowl,' and I sort of laid into it. We are not ready. We don't have vaccines, we don't have protocols, we don't have [effective] biosurveillance."

Biodetection: the U.S. Military's Weak Link

Unlike a natural virus such as COVID-19, an effective biological weapon would cause exposed individuals to start showing signs of infection in hours, not weeks, said Gerstein, who holds a Ph.D in biodefense.

"If you had a properly prepared biological weapon -- think about a state-sponsored weapon -- it wouldn't act like a normal disease," he said. "You would have massive numbers of people who have received an overwhelming dose and ... you would actually see disease, in some cases, occur in hours."

When Gerstein was a signal brigade commander in the early 2000s, chemical-biological warfare training was always more focused on chemical weapons.

"The sensors are actually pretty good for chemical, and if you emplace them according to doctrine, you should get a warning," he said. "The problem with biological is, we are just not very good at detecting it, and so we have always worried."

One of the main bio-detection systems in the U.S. military's inventory is the Joint Biological Point Detection System, which is a box about the size of a dishwasher that fits inside combat vehicles like the Stryker Nuclear, Biological and Chemical Reconnaissance Vehicle.

It's designed to provide early warning and identification of aerosolized biological warfare agents. But the system is only somewhat effective against known agents, Thomas Spoehr, a retired Army lieutenant general and director of Heritage Foundation's Center for National Defense, told Military.com.

"They detect only a set number of biological agents; they detect anthrax, because that is a very powerful biological weapon, and they detect plague and some others," said Spoehr, who is a former commandant of the Army's Chemical, Biological, Radiological and Nuclear (CBRN) School at Fort Leonard Wood, Missouri.

"If somebody was to engineer something new that your [system] wasn't set up to detect, you wouldn't get a positive reading," he said.

So a new bioweapon could be created if an adversary, such as a state-sponsored terrorist group, had the scientific technical support to engineer a synthetic new strain of a deadly virus, Gerstein said.

"You have to be able to know what you are targeting and, with biology, you get strains that change … and that causes problems; it's much more difficult than it is for, say, a chemical warfare agent," he said. "One strain of anthrax will be found by the detector; another strain may not.

"A guy in a cave is not going to be able to do this now," he added. "What about state-sponsored bio-terrorists -- probably very easy."

The main weakness of current biodetection technology is that it has very little standoff capability, Emanuel said.

"For chemical detection, I can actually detect chemicals with discrimination at distance," he said. "That means that I don't have to walk right up to a chemical and touch it in order to be like, 'That is going to kill me.'

Current biodetection is tied to wet chemistry, or analysis of substances in the liquid phase, Emanuel said.

"The difference between a bacterium that is just going to live in your mouth and going to be fine ... and anthrax or plague or a virus like AIDS or COVID-19, is really just a couple of clicks of a molecule, and so it's very difficult for me to differentiate or discriminate a good bio from a bad bio," he said. "The state of technology is, you are linked to wet chemistry. I have to go over and stick a swab down your throat and then put it in a little tube and then run a machine. The further away I get [from] touching a bacteria or a virus, the less fidelity I get. From across the room, forget it."

Congressional language in the House Appropriations Committee's fiscal 2021defense appropriations bill shows lawmakers expressing encouragement for the Defense Threat Reduction Agency's (DTRA) effort to develop a prototype sensor providing real-time detection of aerosolized biological threat agents.

In reality, DTRA's prototype is still in the very early stages of development, Emanuel said.

"If the detector proves effective, it will take many years before it is validated, produced and fielded to the U.S. military," he explained. "The reality is that we are limited in what current equipment is capable of performing."

Military.com asked the Army if the service is taking any steps to assess and possibly improve its biological agent detection capabilities based on threats emerging in the post-COVID-19 world, and was referred to the Defense Department.

Spoehr believes that the Pentagon has its hands full dealing with the massive response to the pandemic.

"I think in terms of the DoD's response to this, they have adapted on the fly," Spoehr said. "In terms of long-term response, it's too early. My guess is they are taking the posture of, 'Hey, let's get through this and then we will do an after-action report and figure out whether we need to change anything.'

"Nothing long-term has changed yet; I suspect it's going to change … but we may not see that for months."

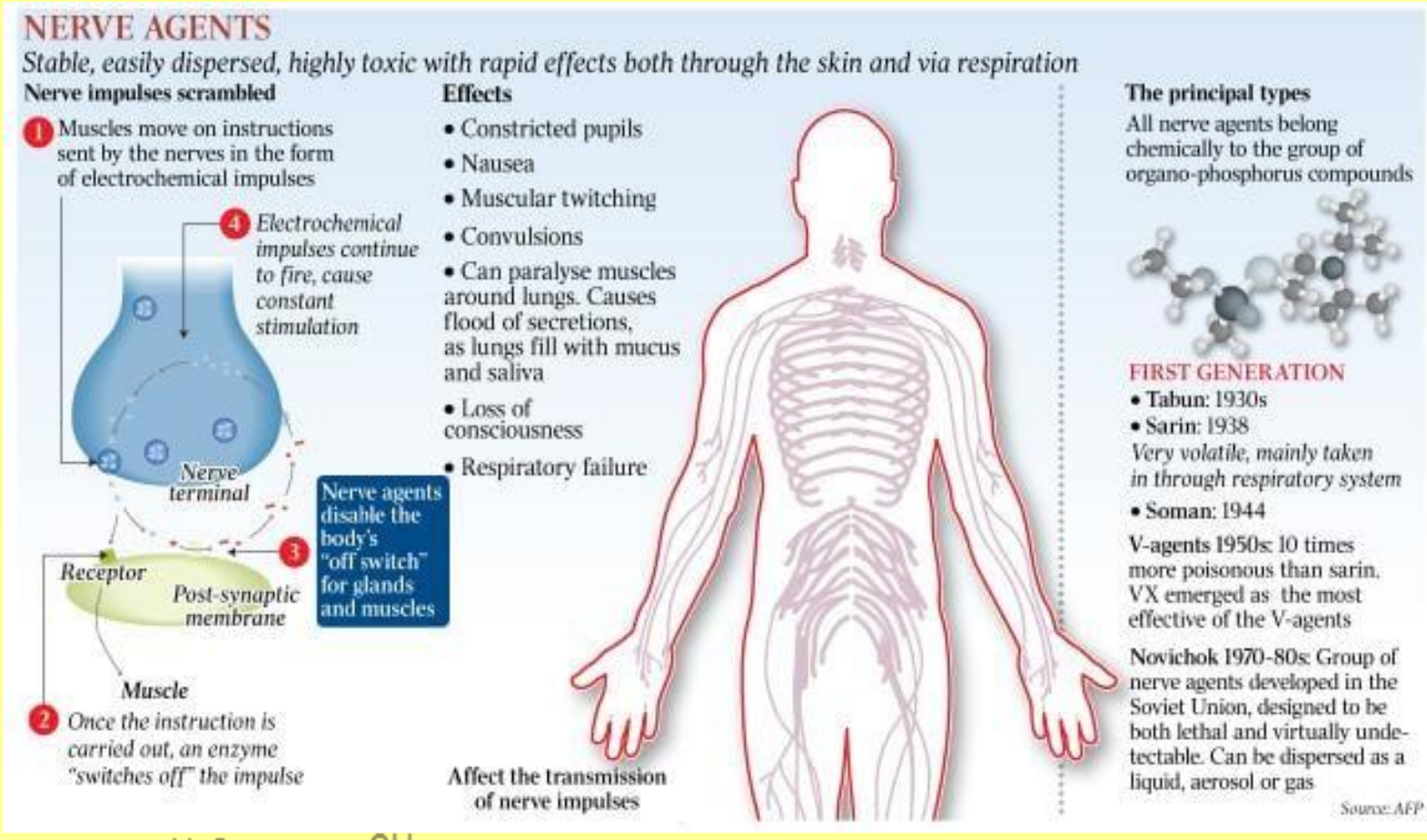
Another concern among experts is what will happen once America moves beyond the hold of COVID-19.

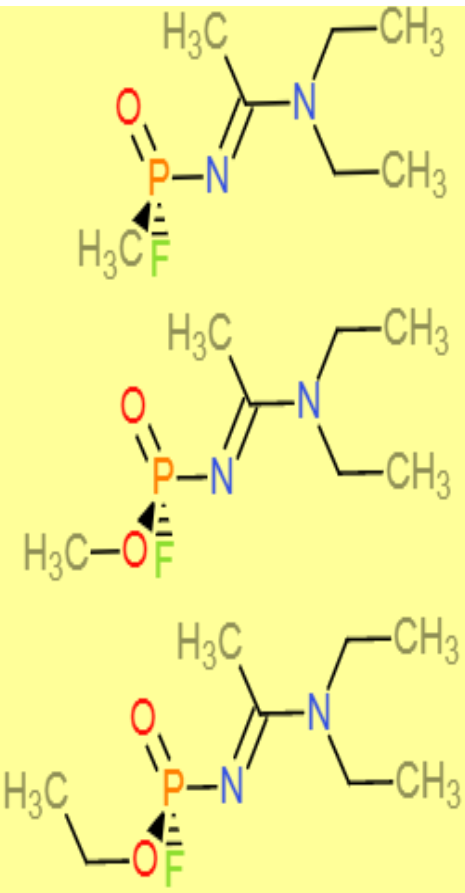
Julie Gerberding, co-chair of the Commission on Strengthening America's Health Security at the Center for Strategic and International Studies, touched on the problem when she testified, along with O'Toole, at the November 2019 Senate Armed Services hearing.
"When biothreats are recognized, policymakers do allocate emergency resources, but ... once the crisis fades and public attention subsides, urgency morphs into complacency, investments dry up, attentions shift and a false sense of security takes hold," she said in the transcript of the hearing.
It's not just about money, Emanuel said.
"You can't just throw money at this particular problem; it's a combination of three things," he said. "It's a combination of guided intent, money ... and science making some specific advances on fundamental problems."

Navalny Poisoned with Nerve Agent Novichok

Source: http://www.homelandsecuritynewswire.com/dr20200903-navalny-poisoned-with-nerve-agent-novichok

Sep 03 – Germany says scientists have "proven beyond doubt" that Russian opposition leader Alexei Navalny was poisoned with the chemical nerve agent novichok. Navalny was poisoned ten days ago by operatives of the GRU, Russia's military intelligence service, in the Siberian city of Omsk.
He is now being treated in a Berlin hospital.
Germany's defense minister Annegret Kramp-Karrenbauer said yesterday (Wednesday, 2 September 2020) that the results of the toxicological tests carried out by specialists at a military laboratory on samples taken from Navalny are "incontrovertible." The test had "proven beyond doubt" that he had been poisoned with a "chemical nerve agent of the novichok group," she said.
Novichok, a military-grade nerve agent developed by the Soviet Union, was also used by GRU agents in the 4 March 2018 Salisbury poisonings that targeted former Russian intelligence officer Sergei Skripal and his daughter Yulia.
On 12 September 2018, Russia agents used nocichock to poison Pyotr Verzilov, the husband of Pussy Riot member Nadezhda Tolokonnikova.
The German government said it "strongly condemned" the poisoning and demanded the Kremlin provide an explanation "as a matter of urgency."





Comparison of Foliant agents A-230, A-232, A-234, A-242, A-262 (from top to bottom, from left to right) according to Mirzayanov

The BBC notes that the poisoning of Navalny comes against a backdrop of worsening German-Russian relations. Last year Russian agents killed a Chechen rebel in a Berlin park, and the German intelligence services had released a report earlier this year with evidence that Russian government hackers, in a massive hack in 2015, managed to break into the Bundestag computer system and gain access to the most secret government documents for a period of months.

Navalny, Russia's leading anti-corruption activist and a critic of President Vladimir Putin, fell ill on 20 August on a flight from Siberia city of Tomsk, after drinking a cup of tea at the Tomsk airport. He was initially treated in the nearby city of Omsk after his plane made an emergency stopover there.

The hospital did not allow his personal physician or his wife to see him until late Saturday. Experts say that three days is typically the time it takes for traces of the poisons the Russian intelligence services use against Putin's critics to wash out of the victims' bodies.

The Russian doctors claimed that they found no traces of poison in his system, and diagnosed him with a metabolic disorder and acute pancreatitis. They also refused to let him travel for medical treatment abroad. The Kremlin finally relented, and on Sunday 23 August Navalny was flown to the Charité hospital in Berlin where he has been treated ever since.

Last week, after an initial series of toxicological tests, Charité announced that Navalny had been poisoned with a cholinesterase inhibitor and was being treated with the antidote atropine. Experts said that nerve agent such as novichok, sarin or VX are cholinesterase inhibitors.

▶▶ **Read also:** The Secret Folio - How the nerve agent "Novichok" was created and tested on human beings?

EDITOR'S COMMENT: Still not convinced. No clinical data; no clinical progress and treatment schedule plus the fact that the overall anti-Russian rhetoric could bias the truth.

North Korea's nuclear, chemical arsenals are growing: USArmy

Source: https://koreajoongangdaily.joins.com/2020/08/18/national/northKorea/US–Defense–Department–North–Korea–nuclear/20200818170800386.html

Aug 18 – North Korea has up to 60 nuclear weapons and is the third–largest possessor of chemical agents in the world with up to 5,000 tons of chemical weapons, according to a recent USDefense Department report. The July 24 report released by the USDepartment of the Army Headquarters, "North Korean Tactics," states that Pyongyang "possesses nuclear and chemical weapons, and it is highly likely that the country has also done research on biological weapons."

Tonnes of explosive material kept at Dakar port

Source: https://pulitzercenter.org/reporting/burkina-faso-us-troops-train-local-soldiers

Aug 21 – The port of Senegal's capital Dakar said it requested the removal of about 2,700 tonnes of highly explosive ammonium nitrate stored in its complex -almost the same volume of the chemical that caused Beirut's devastating blast this month. The unidentified owner of the stockpile has found a warehouse to store the industrial chemical outside the city, according to the general directorate of the port, which sits next to Dakar's densely populated downtown.

"Weapon of Terror": A Novichok Creator Tells How Navalny Case Differs from the Skripal Attack

By Mark Krutov

Source: http://www.homelandsecuritynewswire.com/dr20200907-weapon-of-terror-a-novichok-creator-tells-how-navalny-case-differs-from-the-skripal-attack

Sep 07 – Medical specialists in Germany have determined that Russian opposition politician Aleksei Navalny, who is being treated in a hospital in Berlin after falling ill on 20 August on a flight from Tomsk to Moscow, was poisoned with a form of the Soviet-developed nerve agent Novichok.

The toxin found in Navalny is from the same group of poisons as the one used in the March 2018 poisoning of former Soviet intelligence officer Sergei Skripal and his daughter, Yulia, in the English city of Salisbury. Both Skripals survived the attack and were released after spending weeks in the hospital.

RFE/RL Russian Service correspondent Mark Krutov spoke with Soviet and Russian chemist Vil Mirzayanov about the two incidents. Mirzayanov worked from 1965 until 1992 at the State Research Institute of Organic Chemistry and Technology, which was run by the military and the KGB. He was part of the team that developed the Novichok nerve agent in the early 1970s. When he left the institute in 1992, he was the first person to speak publicly of the Novichok group of toxins.

Mark Krutov: The Novichok that was used in Great Britain caused considerable environmental harm. We all remember seeing emergency workers in hazardous-materials gear working at the places where Sergei and Yulia Skripal had been. One resident of Salisbury died after coming into contact with a perfume bottle containing traces of Novichok. There was talk that whole buildings might have to be evacuated and destroyed. Why did nothing like this happen in Aleksei Navalny's case?

Vil Mirzayanov: The key was the method used. Sergei and Yulia Skripal were poisoned by coming into contact with Novichok through the skin…. In Navalny's case, most likely, the Novichok entered his system through the digestive tract. I believe that in this case, a different version of Novichok was

used, one with the code name A-261. Instead of a substance from the amidine group, they attached [crystalline] guanidine to the Novichok molecule. This was done by the creator of Novichok, Pyotr Kirpichev. For one thing, this enabled them to increase the toxicity of the agent by about 10 times compared to that of the substance used in Salisbury. Also, it is a solid substance. It can be mixed with sugar or added into a packet with tea. You only need a few milligrams to kill someone.

Krutov: Why didn't Navalny die?

Mirzayanov: It is always a question when the target doesn't die. Maybe he was given a nonlethal dose. Maybe the goal was not to kill him but to put him out of commission and leave him disabled.

Krutov: The doctors in Germany say the indications are that Navalny is slowly recovering. As we all know, the Skripals survived their poisoning. But you seem to think that the effects for Navalny could be permanent.

Mirzayanov: That is because I have not heard of any cases of complete recovery following poisoning by an organophosphate chemical-warfare agent. The people who came into contact with such substances during the Soviet period never returned to their previous work.

The doctors say that Navalny will recover. But I have my doubts. The [neurotransmitter] acetylcholine is responsible for the transmission of signals in the brain that control many functions — vision, the muscles, metabolism. As a result of this poisoning, these connections can be irreversibly harmed or destroyed.

Krutov: If we are indeed talking about a different form of Novichok, is it one that is less dangerous for bystanders?

Mirzayanov: Yes. If it is a solid substance, it has a virtually harmless level of vaporization. I would even say no vaporization. It could not even pass through a sheet of paper. It would also be harmless for the "operator," as the terrorist is usually called. He can carry it about and place it into someone's tea even with his bare hands. Kirpichev devised the solid form of Novichok and tested it at the Shikhany laboratory. It proved to be 10 times more lethal than the previously developed forms, A-230 and A-232.

I have never seen A-261, but apparently it can be produced in many forms. In this case, most likely it was a powder.

Krutov: When Navalny was still in the hospital in Omsk, people were saying that they were not letting him be transferred to Germany in order to allow time for the poison to be processed through the body. Does this make sense, or can Novichok be detected even after a period of weeks?

Mirzayanov: Of course, the human body tries to get rid of poison. From this point of view, the actions of the Russian authorities make sense. The longer they held him, the more of the poison would be processed. But we know from the example of the Skripals that once Novichok has entered the body, it does not quickly disappear. It can be detected even after a month.

Krutov: How do you think the German doctors were able to detect the Novichok in Navalny?

Mirzayanov: At the hospital in Omsk, they were most likely not able to do the necessary analysis. Most likely, they simply do not have the equipment and the qualified personnel necessary. It is very expensive equipment — a mass spectrometer alone costs hundreds of thousands of dollars. And the computers must have known versions of Novichok in their databases. I described these versions in my book, which was originally published in 2007. I imagine that, after it was published, all advanced countries synthesized small quantities and submitted them to mass spectrometry.

Krutov: The doctors in Omsk said Navalny's analyses were sent to Moscow and that the laboratory there found no evidence of poison. Could it be that Moscow did not have the necessary equipment?

Mirzayanov: Of course, Moscow has such equipment, which is required by its participation in the Chemical Weapons Convention (CWC). Within the CWC framework, inspections are carried out and analyses are performed. Of course, it is another matter whether they would want to announce the results of their analyses if they were even carried out. The security services would not allow that.

Krutov: There were reports that Germany asked England for assistance. And also, Bulgaria, where it is believed that arms dealer Emilian Gebrev was poisoned by Novichok in 2015. What do you make of this?

Mirzayanov: Well, the more information you have, the better. But I doubt that the Bulgarians would be able to help the Germans much in identifying the poison. The Germans and the English have very good equipment. Most likely, with the Bulgarians they were exchanging information on treatments.

Krutov: How did you feel personally when you found out that, just two years after the poisoning of the Skripals, Aleksei Navalny had also been poisoned by Novichok?

Mirzayanov: As someone who participated in the creation of Novichok, I always feel as if I have a certain amount of guilt in such cases. It always affects me quite negatively…. I never thought that the things that we developed and spent so much of our time and abilities on would someday become a weapon of terror. We always thought that it was necessary for the defense of the country. But later I understood that it is simply a weapon of mass murder that affects defenseless people. Not combatants, but civilians. Soldiers can always wear protective gear, and nothing would happen to them even if they were exposed to Novichok. But even after I understood this, I never thought things would reach such a shameful point.

Mark Krutov is a correspondent for RFE/RL's Russian Service.

Novichok: How Are Victims Surviving Poisoning?

By Robert Chilcott

Source: http://www.homelandsecuritynewswire.com/dr20200907-novichok-how-are-victims-surviving-poisoning

Sep 07 – Russian opposition leader Alexei Navalny is likely to survive a suspected poisoning with the nerve agent Novichok, according to the hospital treating him. There have now been at least six known cases of serious Novichok poisoning in the past two years. But only one victim tragically died from it.

Why is that? Is the substance less lethal than previously thought? Or could it be that the stockpile of the nerve agent is degrading?

Nerve agents were discovered through pesticide research. They belong to a group of substances known as organophosphorus chemicals, or "OPs" for short. There are literally thousands of OP substances, many of which can damage the body by inhibiting a family of enzymes known as "cholinesterases" that are critical to regulating the activity of the central nervous system in animals.

OP pesticides are much less toxic to humans than nerve agents because they have been designed to specifically inhibit insect cholinesterases. In contrast, nerve agents target human cholinesterases.

By disrupting the nervous system, Novichok and other nerve agents can kill people through asphyxiation or cardiac arrest. We know they are deadly. The nerve agent Sarin caused multiple casualties in 1995 when it was released in the Tokyo subway.

The nerve agent VX is thought to have killed Kim Jong-nam, the half brother of North Korea's leader Kim Jong-un, in just 20 minutes after it was allegedly smeared across his face. But all types of nerve agent poisoning can be treated with standard antidotes such as atropine and diazepam.

Little is known about the types of Novichok that have been synthesised or deployed in assassination attempts, other than that they tend to be liquids or powders.

The Dose Makes the Poison

One of the fundamental principles of toxicology was first proposed by a 16th century alchemist, known as Paracelsus, who is often credited with the statement "*sola dosis facit venenum*", or "the dose makes the poison". It means that all substances are capable of being toxic if administered in a sufficient dose. This applies to normally innocuous chemicals such as water, as well as highly toxic materials such as nerve agents.

So have the recent Novichok victims somehow got smaller doses than intended? In the case of the poisoning of Sergei and Yulia Skripal in Salisbury, UK, in 2018, it appears that the poison was initially applied to a door knob.

While the applied dose may have been quite large, possibly equating to several thousand lethal doses, the amount transferred to their skin would have been a fraction of that. The palm of the hand is also one of the least permeable areas of the human body, which would reduce the rate of absorption into the body.

Subsequent contact with other surfaces through normal daily activities would be expected to further reduce the dose on the victims' hands. This means that the net dose absorbed by the skin would have been relatively small in comparison to the original amount.

In the case of the Skripals, this was still sufficient to cause life-threatening toxicity after a delay of several hours. The fact that they were quickly given appropriate antidotes and supportive therapies was instrumental in their survival.

Two police officers were subsequently also poisoned with the substance when searching Skripals' home – and both survived. It is possible that they received an even lower dose of Novichok than the Skripals.

Soon after the incident, two more people were poisoned in nearby Amesbury. Tragically, one victim, Dawn Sturgess, died. She had unknowingly sprayed Novichok directly onto her wrist from a perfume bottle her partner had found nearby.

This would undoubtedly have resulted in a much higher dose than the Skripals received and was applied to a thinner, more permeable area of skin. The fact that the onset of poisoning was much faster (minutes) than in the case of the Skripals tends to support this idea. Sadly, prompt medical treatment was unable to prevent her death. Antidotes can be effective against several multiples of a lethal dose. For example, military antidotes are generally designed to allow survival from at least five lethal doses of a nerve agent. However, no antidote will be effective against a massive dose.

Strurgess' partner, Charlie Rowley, reportedly spilled some of the contents of the perfume bottle onto his hands, but immediately washed off the oily residue. Immediate decontamination is known to be a highly effective practice against nerve agents and is the recommended initial treatment strategy for

chemically contaminated casualties in the UK and USA. It is likely that this action saved the life of Rowley.
In the case of Navalny, it has been reported that he was poisoned through a contaminated cup of tea. As the amount added to the beverage is likely to have been multiples of a lethal dose, how did he survive?
The exact details of the incident are not available, but a variety of factors may have influenced the dose he absorbed. For example, he may just have had just a few sips rather than the whole cup. Initial reports indicate that Navalny also vomited. We also don't know if the Novichok was adequately dissolved in the tea. These factors may all have contributed to lowering the dose.
The inherent toxicity of nerve agents is a clear attraction to would-be assassins, as are other poisons such as arsenic, cyanide and ricin. However, the practical difficulties in disseminating any type of poison will introduce a wide margin of error in dosing.
Current information suggests that Novichok agents are chemically stable and are manufactured to high purity in specialist production facilities. Therefore, surviving exposure is unlikely to be due to "poor quality" Novichok. The substance is no doubt lethal and has resulted in the death of innocent people as well as the intended victims.

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My life inside deadly world of chemical warfare from seeing limbless kids die to holding nerve agent that could kill 1m

By Hamish de Bretton-Gordon, former commander of the Army's Chemical, Biological, Radiological and Nuclear Regiment
Source: https://www.thesun.co.uk/news/12605517/hamish-de-bretton-gordon-life-inside-world-chemical-weapons/

Sep 09 – When I heard about the Novichok poisoning of Russian opposition leader Alexei Navalny overseas last month, my blood ran cold. I was instantly transported back to Salisbury, Wiltshire, where, in March 2018, I'd advised the UK Government on the very same deadly nerve agent.

'Frozen like statues'
Back then, the lethal chemical had left former MI6 double agent Sergei Skripal and his daughter, Yulia, fighting for their lives in comas.
As my friend, in the intelligence world, chillingly told me at the time, "the doctors have never seen anything like it. They're frozen, like statues."
That terrifying attack, which resulted in the death of an innocent mother, was a wake-up call for the UK: chemical weapons are a very real threat.
But now, following the poisoning of Putin critic Navalny - who came out of his own coma this week - it's clear we haven't seen the last of them.
As a British expert in chemical and biological counter-terrorism, I've spent my life fighting against these terrible - and, often, invisible - weapons.
Formerly commander of the British Army's Chemical, Biological, Radiological and Nuclear (CBRN) Regiment, I've worked in war zones all over the globe and experienced some unimaginable horrors.
I've stood on the edge of mass graves in Iraq, watched helplessly as limbless children gasped their last breaths in Syria, and been chased through the streets of Afghanistan carrying a huge fertilizer bomb.
I've also faced off against ISIS - the blood-thirsty terror group known for massacres and beheading its victims on camera - and risked my life trying to smuggle chemical samples across borders.
During my 23-year Army career, I learned why chemical weapons are craved by dictators and despots worldwide: they can be hard to detect – sometimes odourless, colourless or easily concealed.
And if that isn't tempting enough, a tiny amount can be lethal.

Assassinated by an umbrella tip
In 1978, exiled Bulgarian writer Georgi Markov was killed on London Bridge by an umbrella tip laced with the deadly biological toxin Ricin.
Then, in 2006, former Russian spy Alexander Litvinenko was assassinated in the UK capital with a few drops of the radioactive isotope Polonium 210.

And three years ago, Kim Jong-nam - the half-brother of North Korean dictator Kim Jong-un - was killed in Kuala Lumpur, Malaysia, with a drop of nerve agent VX, in an alleged attack by the state's secret service.

'I held poison that could kill 1m

I once held a bottle of VX myself at a secret training facility.

The honey-coloured fluid in my hand looked fairly harmless, yet a scientist told me that, if correctly distributed, it could kill a million people.

Shocked, I quickly put the bottle down, my hands shaking somewhat.

Novichok is thought to be *even more* toxic than VX, and very persistent.

It's astonishing to think that it was probably less than a quarter of an egg cup-full that caused such havoc in Salisbury two and a half years ago.

The poison was hidden in a perfume bottle. It looked totally innocent.

Novichok 'smeared on underwear'

Though it remains unconfirmed how Navalny was poisoned in the latest attack, it has been alleged his cup of tea was spiked at a Siberian airport.

However, other claims have suggested the 44-year-old father's would-be assassins smeared the toxic substance on his underwear or socks.

Neither method would surprise me. Chemicals like Novichok are morbidly brilliant weapons – if you have no morals or scruples.

Of course, some of the worst chemical atrocities we have seen this century have been thousands of miles away from Britain and Russia - in Syria.

Some have stayed with me to this day.

The Syrian Regime and the Russians have regularly targeted hospitals to break the will of the people – something that is illegal under every rule of war. I've seen two children shredded by these indiscriminate attacks.
In 2014, I was training doctors in a hospital when a barrel bomb (a barrel-shaped container filled with explosives and metal fragments which is dispatched from an aircraft) was dropped on a nearby Aleppo playground.
Twenty-seven children arrived in a shocking state. All but one died.
As I tried to cross the border out of Syria that night, I found an ambulance trying to take a young girl to hospital for specialist treatment.
The poor child, no more than eight years old, had lost all of her limbs, and didn't have a single family member to comfort her.
Yet the guard wouldn't give the ambulance permission to cross - even when I jumped out of my truck and protested, "She's dying!".
For a split second, my eyes caught the little girl's. It was like a shot through my heart. Then I watched helplessly as she died right in front of me.
Today, we are in the ninth year of the shockingly violent conflict in Syria.
Attacks on civilians have predominantly been chlorine, a readily available industrial chemical, dropped as barrel bombs or fired in rockets.
I investigated a number of these attacks in 2014, and unequivocally found proof such weapons had been used and that the Regime was responsible.
Sadly, it has only continued since: an attack on the town of Douma in April 2018, confirmed by the Organisation for the Prohibition of Chemical Weapons (OPCW) to be chlorine, killed 43 people, mainly children.
Though Britain, the US and France subsequently launched more than 100 missiles - including against a scientific research centre in Damascus and a chemical weapons storage facility - the threat remains for Syrian families.
And those trying to highlight the atrocities are under threat, too.
Throughout the conflict, my efforts to collect evidence of chemical attacks have landed me in hot water several times.
On one occasion, I had to disguise myself as a Syrian doctor to avoid capture – not an experience I want to repeat in a hurry.

'I dressed as Syrian doctor to avoid ISIS'
Our car was stopped by an ISIS patrol and I only escaped thanks to my thick beard and fake ID claiming my name was 'Dr Mohammed'.
Another hairy moment was when I was hauled off a plane at London Heathrow Airport by counter-terrorism cops.
They thought I was carrying illegal substances from Syria, and raided my case, apparently looking for the nerve agent sarin.
I gave an impromptu lecture to the sheepish officers on what protective items they should be wearing to avoid contamination, as well as what they should be looking for. Thankfully I was released without charge.
My efforts have also attracted some enemies.
In 2016, I was warned through a number of intermediaries that my accusations that Syrian President Bashar al-Assad was using chemical weapons were not appreciated in Moscow.

'Warned off' by Putin
As I detail in my new book, Chemical Warrior, Russian President Vladimir Putin himself even got a message to me telling me "to stop accusing Assad of chemical attacks".
Although these threats worry me sometimes, the truth must out.
'The only thing necessary for the triumph of evil is for good men to do nothing', somebody much more learned than me once said.
I believe work like my own is vital to show the world what is happening.
In fact, these shocking instances have redoubled my efforts to help the civilians in Syria - who have been almost entirely let down and abandoned by the international community - and others at risk of chemical attacks.
Today, that could mean anyone.
The poisoning in Salisbury – near where I live with my wife and two kids - brought the threat of chemical weapons uncomfortably close to home.
While Sergei and Yulia fortunately survived the attack - and are now in hiding - a civilian, Dawn Sturgess, died after being exposed to Novichok.
The incident has made all of us here in the UK aware of the dangers of chemical weapons. But are we prepared for future attacks?
For me, one thing is clear: the terror threat must not be ignored.
Biological weapons are the ultimate terror accessory, and it is unimaginable, but perhaps possible, that jihadists might get their hands on them.

Something like Novichok would be unlikely: while microscopic amounts of deadly substances are favoured in state-sponsored executions, they are difficult to get hold of and hugely expensive.
But we know ISIS have already manufactured mustard agent and have easy access to many toxic chemicals.
In reality, the prospect of an 'I am Pilgrim' scenario (the novel where a terrorist tries to infect the US with a vaccine-resistant smallpox virus) is not that far-fetched.
Many of us remember the Amerithrax biological attack in 2001, where letters laced with Anthrax, a biological pathogen, were posted in the US.
Five people were killed and 17 injured.
The clean-up cost over $200m - which would be around $280m (£215m) today - and there have since been 69,000 copycat threats in the US alone.
And it isn't just the chemicals themselves that are lethal.
Two years ago, I researched the 200 most likely chemical and biological threats to US Mainland in a report for Department of Homeland Security.
Perhaps surprisingly, a Salisbury-style attack didn't feature.

Football stadiums 'under threat'
Instead, the most likely threat appeared to be a small amount of a toxic chemical like chlorine flown into a crowded sports stadium via drone.
The chlorine would only kill a few, but the panic would wipe out many.
Similarly, we have looked at chemical attacks on the London and New York undergrounds, and panic is the greatest danger.
The level of psychological terror these mysterious substances impart is exactly what extremist groups look for in a weapon.

'Britain must be prepared'
Now that we are alive to these chemical and biological threats, the UK can even less afford to be blindsided by an attack.
For those who want to do us evil, these weapons are as good as it gets.
A policy of doing nothing will not protect us.
But if we choose, every threat can be mitigated with preparation and planning to provide the resilience the British public deserve.
It's a choice many in Syria didn't get.
Yet while I witnessed plenty of suffering in the war-torn country, I also saw remarkable courage and human spirit.
Only last winter, I was training doctors again in Idlib province when I noticed a toddler, with no legs and one arm, sitting on a bench.
The youngster, aged around two, had been caught in a Russian airstrike two weeks earlier, and had wires and tubes coming out of his tiny body.
I had just received a call from my own doctor to say I had prostate cancer and was feeling a bit sorry for myself.
But when I looked at the boy, his face creased into a huge grin. Suddenly, I realised my troubles were small compared to his.
And as we looked at each other, his pure joy made me grin too.

"Soviet scientists who ingested novitjok never came back to work"

"Sovjetiska forskare som fick i sig novitjok kom aldrig tillbaka till jobbet"
Source: https://www.dn.se/varlden/sovjetiska-forskare-som-fick-i-sig-novitjok-kom-aldrig-tillbaka-till-jobbet/

Sep 11 – He did not think that the Russian security service would make the same mistake twice.
- But that is the criminal's way of working. You like to repeat yourself. I was still surprised when the news came that they had poisoned Navalny with novitiate, says chemist Vil Mirzajanov, who previously worked at the Soviet research institute Gosniiocht.
Vil Mirzajanov is the Soviet chemist who revealed to the West that the neurotoxin novitjok exists. For 27 years, from 1965 to 1992, he worked at the Soviet Research Institute State Scientific Research Institute for Organic Chemistry and Technology (GOSNIIOCHT) in Moscow. The work of the institute was secret. One of its great scientific achievements was to create the neurotoxin novitjok.
In contrast to Vladimir Uglev, whom DN has previously interviewed, Mirzajanov was not personally responsible for the scientific work with novitjok. His role was to lead counter-espionage against foreign intelligence services. He had access to secret material and was well acquainted with the work with the nerve agent.

- I also worked as a chemist and analyst. My aspirants developed methods and we did field experiments in Shichany, says Vil Mirzajanov in an interview with DN from his current home in Princeton. Shichany was the institute's secret laboratory for chemical weapons outside Saratov in southwestern Russia.

In 1992, Mirzajanov published an article in Moskovskie novosti accusing the Russian government of violating the Convention on the Prohibition of Chemical Weapons, as it continued to produce poisons belonging to the category of banned chemical weapons. Mirzajanov was brought to justice for revealing a state secret. He was acquitted for lack of evidence and emigrated to the United States in 1995. Today he lives in Princeton, New Jersey. In 2008, he was the first to reveal the formula for novitiate in the book "State secrets: an insider's chronicle of the Russian chemical weapons program".

Mirzajanov is frequently interviewed in independent Russian media about the poisoning of the Russian opposition politician Alexei Navalny. According to him, there is not the slightest doubt as to who is to blame for the poisoning of Navalny.

- Who makes this poison? There is no doubt about it. Russia has a monopoly. When it comes to toxins that fall outside of standard production, the work effort is so great that you really have to consider yourself needing the poison to invest those resources. Why would the Czech Republic or Germany need it? Making novitjok is not done in a few months, it requires years of scientific work.

When Sergei and Julia Skripal were poisoned in Salisbury in 2018, British police tracked down the culprits - agents from GRU, the Russian army's intelligence service. The Russian security service FSB poisoned Alexander Litvinenko with polonium in 2006. Mirzijanov believes that one of these organizations is also behind the attack on Navalny.

- I was surprised when the news came that it was novitiate. I did not think they would repeat themselves. But that in itself is not so strange. Criminals return to the crime scene. With Skripals you failed, the second time you think that now we have learned. That the Russian security service would use a poison that so clearly points out themselves seems strange. But Mirzajanov says the security service is reasoning in its own way.

- Such an extremely small amount of poison is needed and it is easy to use. Novitjok is also not particularly easy to track, it is not a standard product. After Skripals, of course, they knew that the poison could be traced, but since the amount needed is so small, it was probably thought that Navalny would not need to be kept in Russia for very long for the poison to disappear from the body. There they made a mistake. Of course, experiments have been done on rabbits on how quickly the poison disappears, but humans are something else.

Novitjok is not an individual poison but a collective name for a group of neurotoxins. Will Mirzajanov believes that in Navalny's case it was about A242 in powder form, which he got dissolved in liquid. This was also stated by Vladimir Uglev in an interview with the Russian newspaper The Insider.

- I guess they tried a different form of novitjok than the one used on Skripals, because they thought it would be harder to track. Skripals was poisoned through the skin, probably after the door handle had been sprayed with the poison.

According to Mirzajanov, Russia has large enough legal quantities of novitias to be sufficient for security operations.

- Russia has the right to produce up to 100 grams of poison per year for scientific purposes. Ten milligrams are enough to kill a human being.

Contrary to a German source in Die Zeit, Mirzajanov says the goal was not necessarily to kill Navalny.

- I think above all they wanted to make him a disabled person for life. Otherwise, it would have been easy to give a dose sufficient to kill a human being. Such things are carefully studied by scientists through animal experiments.

Mirzijanov says he is a "cautious optimist" about Navalny's chances of regaining health.

- Medical science has progressed. Since Sergei and Julia Skripal were poisoned in Britain, new knowledge has been gained. But it is difficult to say whether Navalny will be completely healthy. The scientists who were poisoned by mistake during the Soviet era did not return to work and they were never told how they had fared. It was a secret. All I know is that they became disabled.

The chemist Vil Mirzajanov was the one who revealed to the West that the neurotoxin novitjok exists. Photo: Alamy

Facts

Arrested twice

Born: March 9, 1935 (age 85) in Starokanysjevo, Bashkiria

Background: Mirzajanov, a Tatar, was born into a teaching family. He studied chemistry at the prestigious Lomonosov University of Chemical Technology and became a doctor in 1985. From 1965 to 1992 he worked at the Soviet Research Institute State Scientific Research Institute for Organic Chemistry and Technology (GOSNIIOCHT) in Moscow. In 1992, he and Lev

Fyodorov published an article in Moskovskie Novosti accusing the Russian government of violating the Chemical Weapons Convention. He was arrested twice and spent a few months in Lefortovo prison, accused of revealing a state secret. In 1995, he emigrated to the United States.

Germany: Two Independent Foreign Labs Confirm Navalny Poisoned with Novichok

Source: http://www.homelandsecuritynewswire.com/dr20200914-germany-two-independent-foreign-labs-confirm-navalny-poisoned-with-novichok

Sep 14 – **Germany says independent reviews by laboratories in France and Sweden have confirmed evidence that Kremlin critic Aleksei Navalny was poisoned with a nerve agent from the Novichok group.**

"Three laboratories have now independently provided evidence of a nerve agent from the Novichok group as the cause of Mr. Navalny's poisoning. We renew the call for Russia to explain what has happened. We are in close contact with our European partners on further steps," the German government said in a statement on 14 September in announcing the corroborative findings.

Navalny suddenly fell ill on a Russian domestic flight on 20 August and was medically evacuated to Germany on a request by his wife several days later.

German experts say the 44-year-old anti-corruption campaigner and Russian opposition leader was poisoned with a Soviet-style military nerve agent from the Novichok group, prompting international calls on Russia to swiftly investigate the case.

Russian authorities have refused to open a criminal investigation, saying that no hard evidence of poisoning has been found.

U.S. Secretary of State Mike Pompeo said on 9 September that there is a strong chance the poisoning was ordered by senior officials in Moscow.

Navalny's team, his relatives, and others also believe that Russian authorities are behind the poisoning. The Kremlin has vehemently denied the allegations.

History of Nerve Agent Assassinations

Source: http://www.homelandsecuritynewswire.com/dr20200914-history-of-nerve-agent-assassinations

Sep 14 – On 20 August, the Russian anti-corruption activist Alexei Navalny fell ill during a return flight to Moscow and was hospitalized in the Siberian town of Omsk after an emergency landing. Members of his travelling party immediately suspected poisoning, an impression hospital staff reinforced when they refused Navalny's personal physician access to his medical records.

Following his airlifting to Berlin for further examination and specialist treatment, the Charité hospital issued a statement on 24 August which preliminary findings indicated exposure to "a substance from the group of cholinesterase inhibitors." Even though the hospital could then not name the specific poison used, it added that multiple tests by independent laboratories had confirmed the effect of the poison. The hospital was also treating him with the antidote atropine.

J. P. Zabders writes in *The Trench* that the references to a cholinesterase inhibitor and atropine were the first strong indicators of a neurotoxicant, to which nerve agents like sarin, VX or the novichoks belong.

A week later, on 2 September, German Chancellor Angela Merkel confirmed the assassination attempt with a novichok agent at a press conference. She drew on the conclusions from biomedical analyses by the *Institut für Pharmakologie und Toxikologie der Bundeswehr* (Bundeswehr Institute of Pharmacology and Toxicology), one of the top laboratories designated by the Organization for the Prohibition of Chemical Weapons to investigate biomedical samples.

He adds:

> Poisoning political opponents or enemies is not new. In his almost 600 pages-long *Die Gifte in der Weltgeschichte* (1920) [The poisons in world history; re-issued 2010] the German pharmacologist Louis Lewin detailed chapter after chapter how besides criminals and spurned lovers, rulers, leaders, undercover agents and conspirators applied the most noxious substances in pursuing domestic political or international geopolitical objectives. Reviews of chemical and biological weapons (CBW) usage through the 20th century similarly list successful and attempted assassinations with mineral poisons or animal and plant toxins in and outside of war.
>
> Modern chemical weapons (CW) – typically human-made toxic compounds standardized for use on battlefields – have rarely been selected to target individuals. Observers and journalists reported first use of nerve agents by Iraq against Iran in 1983, almost five decades

after their initial discovery in Nazi Germany. In March 1995 the world learned of Aum Shinrikyo after its members had released the nerve agent sarin in the Tokyo underground. However, during the previous eight months the extremist cult had also resorted to both sarin and VX in attempts to assassinate judges about to rule against Aum Shinrikyo and individuals who posed a threat or had defected from the religious group. These were the first and for more than a decade and a half the only reports of neurotoxicants used to murder individuals.

North Korea's killing of Kim Jong-nam, half-brother with a binary form of VX in February 2017, and the March 2018 attempt by Kremlin agents to poison former KGB double agent Sergei Skripal in Salisbury, U.K. with a nerve agent "novichok" – and the attempt by Russian government operatives to use novichock to poison Navalny – indicate that battlefield nerve agents are being used more and more by authoritarian regimes to eliminate political opponents.

Neo-Nazi farmer, 58, kept grenades, mines and explosives in his country home and stored cyanide next to the ginger beer in his fridge, court hears

Source: https://www.dailymail.co.uk/news/article-8739859/Neo-Nazi-farmer-58-kept-grenades-mines-explosives-country-home.html

Sep 16 – A suspected neo-Nazi kept an arsenal of explosives at his country home and stored deadly cyanide poison next to the ginger beer and salad cream in his fridge, a court heard.

Counter-terrorism police found large stocks of poisons along with a cache of grenades, mines and explosives after raiding the rural home of Russell Wadge, 58, on Baglan Farm in Trimsaran, Carmarthenshire.

During their raid of the property, which has an estimated value of £250,000, officers also discovered the farmer's interest in Nazis and white supremacy.

Newport Crown Court heard that Wadge, 'proudly admitted' making hydrogen cyanide described as 'one of the most rapidly acting poisons known to man'.

Tom Little QC, prosecuting, said: **'Hydrogen cyanide was discovered in the freezer, and a pint-glass containing a liquid with a sticker indicating poison was found between the salad cream and ginger beer in the fridge.'**

When questioned by police, the married father said he did not believe in any extremism and had a 'keen interest' in chemistry.

However, Mr Little added: 'This is not a case about naive enthusiasm in chemistry - we say it is so much more. 'We need to consider the B-word - Brexit.

'There were those frustrated by the delays to the Brexit process who were agitating, but they did not have access to this range of chemicals.'

The substances inside Wadge's property included nickel cyanide, hydrogen cyanide, copper potassium cyanide, sodium cooper potassium cyanide and potassium cyanide.

The jury heard internet searches also showed significant interest in the white supremacist terror attack in New Zealand in 2019.

Suspicions were then raised when Wadge ordered an array of chemicals online to be delivered to his rundown small-holding tucked away in the countryside.

Wadge is alleged to have been planning to use the weapons 'at some time' in the future.

The jury heard that police also found books describing how to make improvised plastic explosives, three jars of gunpowder and the ingredients to make the 'very dangerous explosive' called triacetone triperoxide TATP - as used in the 2017 Manchester Arena bombing- at the property.

Boxes of grenades, mines and scale drawings of a KGB weapon to deploy hydrogen cyanide were also discovered.

The farmer allegedly told police: 'If it's dodgy or poison, I love it.'

Wadge denies 28 charges of possessing explosive devices and chemical weapons. He admitted five charges of unlawful possession of poisonous chemicals without a licence.

The trial at Newport Crown Court continues.

Australian stinging tree reveals entirely new family of neurotoxins

Source: https://newatlas.com/science/australian-stinging-tree-new-family-neurotoxins-uq/

Sep 16 – New research from the University of Queensland has solved the mystery behind the sting of one of the most venomous plants on the planet. The discovery of a previously unknown neurotoxin explains how Australian stinging trees cause excruciating pain that can last for extraordinarily long periods.

Australia is well-known for its broad assortment of venomous animals. From spiders and snakes, to scorpions and jellyfish, the country is so infamous for dangerous wild-life the notion "everything in Australia wants to kill you" has become an amusing meme.

Well, not only are the animals out to get you, but the plants are dangerous too. *Dendrocnide moroides*, commonly known as the Gympie-Gympie stinging tree, is one of the world's most venomous plants. The plant's toxin is unlikely to kill you, but stories abound describing the horrific pain its sting can cause.

The pain has been described by many as the worst kind of pain you could imagine. One researcher suggested being stung felt, "like being burnt with hot acid and electrocuted at the same time".

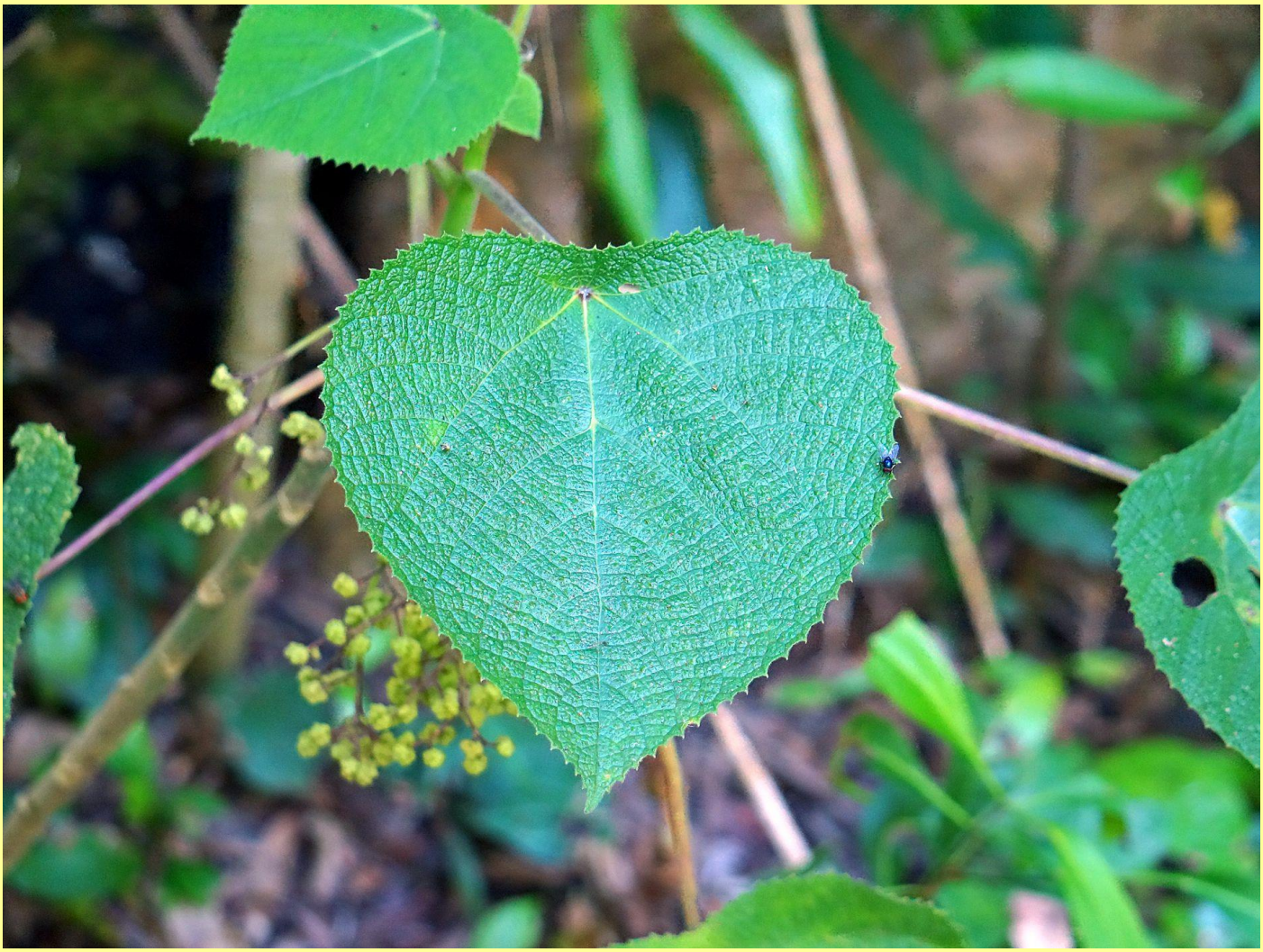
A close-up view of the needle-like trichomes on the Gympie-Gympie stinging tree (Institute for Molecular Bioscience, University of Queensland)

"Like other stinging plants such as nettles, the giant stinging tree is covered in needle-like appendages called trichomes that are around five millimeters in length – the trichomes look like fine hairs, but actually act like hypodermic needles that inject toxins when they make contact with skin," explains corresponding author on the new study, Irina Vetter.

Well, not only are the animals out to get you, but the plants are dangerous too.

The pain caused by this plant has, until now, been a mystery to researchers. Experiments with small-molecules known to be present in the plant have not been able to replicate the severe, and unusually long-lasting, pain caused by a sting. It was clear an undiscovered neurotoxin must be playing a major role.

A new study, from a team of researchers at the University of Queensland, describes the discovery of a previously unknown pain-inducing peptide responsible for the unique neurotoxic effect of the plant. The new class of miniproteins has been named gympietides, derived from gympie, the indigenous name of the plant.



"Although they come from a plant, the gympietides are similar to spider and cone snail toxins in the way they fold into their 3D molecular structures and target the same pain receptors--this arguably makes the Gympie-Gympie tree a truly "venomous" plant," explains Vetter.

Homing in on the mechanism at play, the researchers discovered these gympietides seem to trigger permanent changes to the sodium channels in sensory neurons. This action is thought to explain why people stung by the plant can experience recurring pain sensations for months, or even years, after the initial sting.

"By understanding how this toxin works, we hope to provide better treatment to those who have been stung by the plant, to ease or eliminate the pain," adds Vetter. "We can also potentially use the gympietides as scaffolds for new therapeutics for pain relief."

▶▶ **The new study was published in the journal** *Science Advances*.

Navalny poisoningNavalny's Team: Water Bottle with Novichok Traces Found in His Hotel Room in Tomsk

Source: https://www.svoboda.org/a/30843430.html

Sep 16 – Associates of Aleksei Navalny say traces of the nerve agent used to poison the Russian opposition politician were found on a water bottle in the hotel room he was staying in in the Russian city of Tomsk. When Navalny was flown to Germany for treatment, the bottle was sent along, and

German scientists found tracers of Novichock in the bottle. Traces of the toxic Novichock, a favorite poison of the Russian intelligence services against critics of the Putin regime, were also found in samples taken from Navalny's body.

A package containing the poison ricin and addressed to Trump intercepted by law enforcement

Source: https://edition.cnn.com/2020/09/19/politics/package-poison-ricin-addressed-to-trump-intercepted/index.html

Sep 20 – A package containing the poison ricin and addressed to President Donald Trump was intercepted by law enforcement earlier this week, according to two law enforcement officials.

Two tests were done to confirm the presence of ricin. All mail for the White House is sorted and screened at an offsite facility before reaching the White House.
A US law enforcement official told CNN that investigators are looking into the possibility the ricin package sent to Trump came from Canada.
The FBI and Secret Service are investigating the matter.
Ricin is a highly toxic compound extracted from castor beans that has been used in terror plots. It can be used in powder, pellet, mist or acid form. If ingested, it causes nausea, vomiting and internal bleeding of the stomach and intestines, followed by failure of the liver, spleen and kidneys, and death by collapse of the circulatory system.
"The FBI and our U.S. Secret Service and U.S. Postal Inspection Service partners are investigating a suspicious letter received at a U.S. government mail facility. At this time, there is no known threat to public safety," the FBI's Washington field office said in a statement to CNN.

UPDATE (Sep 20)

A woman suspected of sending a letter containing the poison ricin to President Donald Trump was arrested as she tried to enter the US from Canada at a border crossing in New York state, a US law enforcement official said. The woman was carrying a gun and arrested by US authorities, according to the law enforcement official.

EDITOR'S COMMENT: If the content of the parcel is what is shown in the picture above (the white one) the threat is negligible. Same if the parcel contained intact castor beans. The problem is with the oil of castor beans – this can be lethal. Two additional issues: (1) US elections are approaching; and (2) it was quite stupid but also convenient that the woman entered the United States from Canada shortly after the delivery of the parcel. Usually murderers return to the incident site after the murder not before. Hope that security authorities will manage to get more info from the person arrested.
➲ **UPDATE:** It seems that the arrested French-Canadian woman is just a disturbed (Trump) obsessive personality

MEDICAL INSIGHTS: Mad honey

Source: https://www.postandcourier.com/aikenstandard/lifestyle/medical-insights-mad-honey/article_d456b6fc-f6fc-11ea-bf70-0fdfb49284bc.html

Sep 20 – It just might be that the first type of chemical warfare occurred about 2,400 years ago. Would you believe the agent was honey? A Greek army was inadvertently poisoned because of eating local honey about 400 B.C. They eventually recovered but later around 69 B.C. honey was used to poison a Roman army and King Mithridates was able to repel the Roman attack.
A group of neurotoxins named after Asa Gray, the father of American botany, is known as **grayanotoxin**. This substance can be found in a group of plants in the family Ericaceae. If bees gather nectar and pollen from these plants and if the subsequent honey

contains a high concentration of grayanotoxin, those eating the honey have been known to become ill with multiple symptoms which are serious and sometimes life threatening.
The honey has been known as mad honey because of the symptoms and side effects it can cause. **The mechanism of action is related to a disturbance in the cell membrane of neurons, and this may cause overstimulation of the central nervous system.** The symptoms are dose dependent

and may arise within minutes to several hours after ingesting mad honey. Cardiovascular problems such as slow heart rate and low blood pressure are noted. Also, double vision, nausea and vomiting, paresthesias and excessive salivation are not uncommon symptoms. A low dose of the toxin is rarely fatal in humans.

Xenophon, Aristotle and Pliny the Elder documented the effects of mad honey. Animals eating the plants have died. Some species of bees that collect the toxic nectar will die soon afterwards.

The area of concern for mad honey centers on Nepal and northern Turkey.

It has been established that nearly all parts of the grayanotoxin-producing rhododendron plants are poisonous. This includes the stems, leaves, pollen and nectar.

The botanical **family Ericaceae** includes rhododendrons (previous page), azaleas and kalmia (left), or mountain laurel. All of these are potentially toxic if enough of the plant is eaten. Other names for mountain laurel include lambkill, sheep-kill, sheep-poison and even spoonwood. It seems that Native Americans used this wood to carve spoons so it is assumed that using the utensil for cooking or eating is not harmful.

These plants are abundant in this part of the U.S., but fortunately cases of mad honey intoxication are not frequently reported. Be aware of the possible problems that ingestion could cause. Don't let your pets eat the azaleas.

A good friend dropped off a nice limb of rhododendron from North Carolina the other day. But instead of carving a spoon, I am now thinking of maybe carving a small flower vase instead, and it's going to be sweet!

Lists of Chemical Warfare Agents and Precursors from International Nonproliferation Frameworks: Structural Annotation and Chemical Fingerprint Analysis

By Stefano Costanzi, Charlotte K. Slavick, Brent O. Hutcheson, Gregory D. Koblentz, and Richard T. Cupitt

J. Chem. Inf. Model. 2020

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Abstract

To support efforts to stem the proliferation of chemical weapons (CWs), we have curated and structurally annotated CW-control lists from three key international nonproliferation frameworks: the Chemical Weapons Convention (CWC), the Australia Group (AG), and the Wassenaar Arrangement. The curated lists are available as web tables at the Costanzi Research website (https://costanziresearch.com/cw-control-lists/). The annotations include manually curated 2D structural images, which provide a means to appreciate at a glance the similarities and differences between different entries, as well as downloadable 2D structures, in two different formats and three different structural identifiers, namely, simplified molecular-input line-entry system, standard InChI, and standard InChIKey, which are intended to provide a platform for cheminformatics analyses. The tables also include links to National Center for Biotechnology Information's PubChem and National Institute of Standards and Technology's Chemistry WebBook cards, hence providing prompt access to a wealth of physicochemical, analytical chemistry, and toxicological information. To showcase the importance of structural annotations, we discuss a discrepancy in a CW-control list covering the defoliant Agent Orange, which we identified through our curation process, and propose a solution to address it. Moreover, we present the results of chemical fingerprinting analyses, through which we clustered the entries of the three CW-control lists under study into structurally related groups and studied the overlaps between the three lists. As an application of this study, we examine the recent updates of CWC Schedule 1 and the AG precursors list, highlighting the relationships between the two amendments and proposing the possible addition of further chemicals. Our research is intended to facilitate the communication between scientific advisors and policymakers as well as the work of chemists and cheminformaticians involved in the CW nonproliferation field. Ultimately, we seek to provide tools to bolster the control of CWs and support the global efforts to rid the world of this category of weapons.

Reduce the Threat of Chemical Weapons with New Security Standards

By Richard Cupitt

Source: https://www.stimson.org/2020/reduce-the-threat-of-chemical-weapons-with-new-security-standards/

Sept 18 – Although some State Parties to the Chemical Weapons Convention have developed strong systems for chemical safety, few countries have a solid basis in policy and law for chemical security. The United States is in the position to reduce global vulnerability by strengthening both the chemical nonproliferation regime and the crumbling chemical weapons taboo.

Topline

Chemicals which can be used as precursors to chemical weapons are manufactured, stored, and transported around the world in nearly every country, but there are not clear international standards or legal obligations to ensure the security of these chemicals. Since 2015, terrorist organizations and others have used chemical weapons in dozens of attacks in more than a dozen countries, killing thousands and undermining international nonproliferation efforts. These events have caused thousands of casualties and undermined international nonproliferation efforts. The United States is in the position to reduce this global vulnerability and strengthen both the chemical nonproliferation regime and the crumbling chemical weapons taboo.

Problem

People in arguably every country produce, use, store or transport a wide range of toxic chemicals. Under the nearly universal Chemical Weapons Convention (CWC), States have obligations designed to eliminate and prevent development of State-held chemical weapons, but the CWC does little to reduce the risk of non-State actors acquiring chemicals of proliferation concern. Although some State Parties to the Chemical Weapons Convention have developed strong systems for chemical safety, few countries have a solid basis in policy and law for chemical security.

United Nations Security Council resolution 1540 (2004) does legally require all States to take measures to secure chemical weapons "related materials," including those items in private hands, but many States have been slow to implement these obligations. And while recent administrations took important steps to lessen the risk of nuclear terrorism by securing nuclear materials and dismantling State chemical weapons programs, relatively has been done to secure toxic chemicals, which exist in abundance in nearly every country in the world, all of which can constitute or serve as precursors for chemical weapons, depending on their use. [1]

At the same time, since 2004 terrorists have become increasingly willing to cause mass casualties and disruption and use chemical weapons to those ends, with attacks most notably in Iraq, Malaysia, Syria, and the United Kingdom. These events not only caused thousands of direct casualties, they often massively disrupted local communities and have undermined international efforts to prevent chemical weapons proliferation. The social media misinformation campaigns associated with some of the early attacks proved to be a harbinger of what we would see across the political world.

The United States, with one of the better, if still imperfect, domestic legal frameworks for chemical security and its robust chemical industry, is in a key position to reduce this global vulnerability and re-energize the chemical nonproliferation regime – and the crumbling chemical weapons taboo – by making chemical security a higher U.S. and international priority.

Background

Although many States and industries, based on international standards, have developed robust safety regimes for the many toxic industrial chemicals widely used in commerce, the need to develop international standards for chemical security – and the assistance many governments, industries and communities will need to implement them – has not been a focus of the international community. Reports by the UN Security Council's 1540 Committee document the relatively low levels of implementation of measures to prevent terrorists and other criminals from acquiring "dual-use" chemicals – those with both commercial and weapons applications. [2] With a tremendous range of stakeholders, e.g., governments, multiple industries, academia, and threatened communities, among others, building meaningful international or even regional standards for chemical security will require a significant effort by all involved. Such a significant global effort needs U.S. leadership.

The Department of Homeland Security (DHS) has developed arguably the most robust national chemical security regime with its Chemical Facility Anti-Terrorism Standards (CFATS). It has also lead efforts at the G7 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction and, with the Department of State, at the CWC and the Organization for the Prohibition of Chemical Weapons (OPCW). These good efforts create a platform on which the United States can build its leadership, including by strengthening instruments and

institutions now under threat, such as the CWC and the Organization for the Prevention of Chemical Weapons (OPCW).
Fortuitously, pursuing chemical security can also help the United States promote chemical safety and attack environmental crimes damaging our efforts to advance economic development in at risk States and protect the oceans, which would help the United States regain some of the trust and moral authority it has clearly lost on these issues. Most important, however, only the United States has the resources to improve chemical security and reduce the risk of chemical terrorism on the global scale.

President should:

- **Create an inter-agency policy committee on Chemical Security, with DHS as the lead implementing agency.** The committee would, at a minimum, conduct a review of federal and state chemical security laws, regulations, policies, and practices, to improve domestic security and identify funding to implement recommendations from the review.
- **Convene essential international stakeholders to set new standards.** The president should propose a High-Level meeting at the United Nations on chemical security and host a Ministerial-Level conference to facilitate the development of agreed international standards for chemical security.
- **Increase the resources available for chemical security implementation.** The president's budget should double U.S. international assistance for chemical security and, where necessary, seek Congressional authorities for agencies to work in more countries that need such assistance. As part of this effort, the administration should seek increased international assistance efforts for chemical security through the G7 Global Partnership.
- **Consider international legal and institutional improvements.** The administration should consider proposing a chemical security protocol for the CWC or a Global Initiative to Combat Chemical Terrorism. It should also increase support for OPCW's chemical security efforts and push the OPCW to integrate chemical security more centrally in its policies and practices.

Richard T. Cupitt *is a Senior Fellow and Director of the Partnerships in Proliferation Prevention program at Stimson. His areas of expertise include WMD nonproliferation, export controls, and foreign policy. Prior to joining Stimson, he served as the Special Coordinator for U.N. Security Council resolution 1540 in the Office of Counterproliferation Initiatives at the U.S. State Department from 2012 through 2016.*


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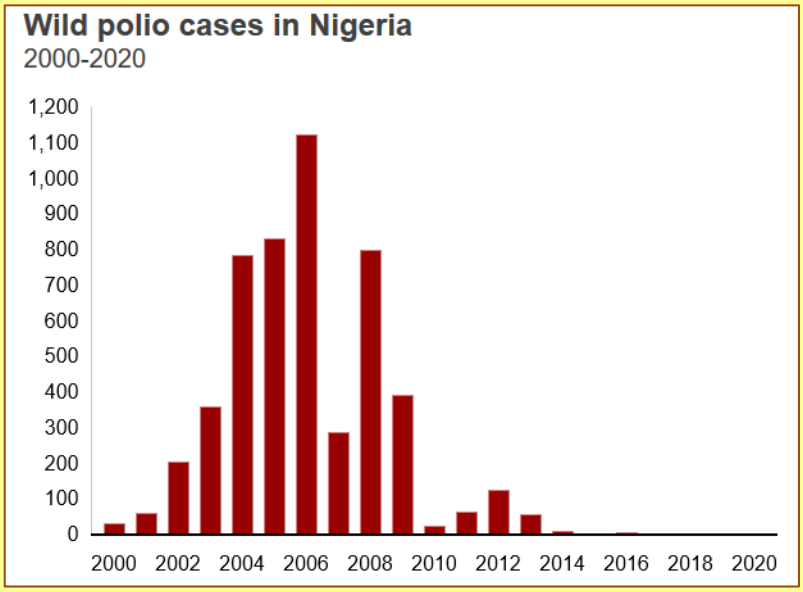
Africa declared free of wild polio in 'milestone'

Source: https://www.bbc.com/news/world-africa-53887947

Aug 25 – Africa has been declared free from wild polio by the independent body, the Africa Regional Certification Commission.
Polio usually affects children under five, sometimes leading to irreversible paralysis. Death can occur when breathing muscles are affected.
Twenty-five years ago, thousands of children in Africa were paralysed by the virus.
The disease is now only found in Afghanistan and Pakistan.
There is no cure but the polio vaccine protects children for life.
Nigeria is the last African country to be declared free from wild polio, having accounted for more than half of all global cases less than a decade ago.
The vaccination campaign in Nigeria involved a huge effort to reach remote and dangerous places under threat from militant violence and some health workers were killed in the process.

What is polio and has it now been eradicated in Africa?

Polio is a virus which spreads from person to person, usually through contaminated water. It can lead to paralysis by attacking the nervous system.
Two out of three strains of wild polio virus have been eradicated worldwide. On Tuesday, Africa has been declared free of the last remaining strain of wild poliovirus.
More than 95% of Africa's population has now been immunised. This was one of the conditions that the Africa Regional Certification Commission set before declaring the continent free from wild polio.
Now only the vaccine-derived polio virus remains in Africa with 177 cases being identified this year.
This is a rare form of the virus that mutates from the oral polio vaccine and can then spread to under-immunised communities.
The World Health Organization (WHO) has identified a number of these cases in Nigeria, the Democratic Republic of the Congo, Central African Republic and Angola.



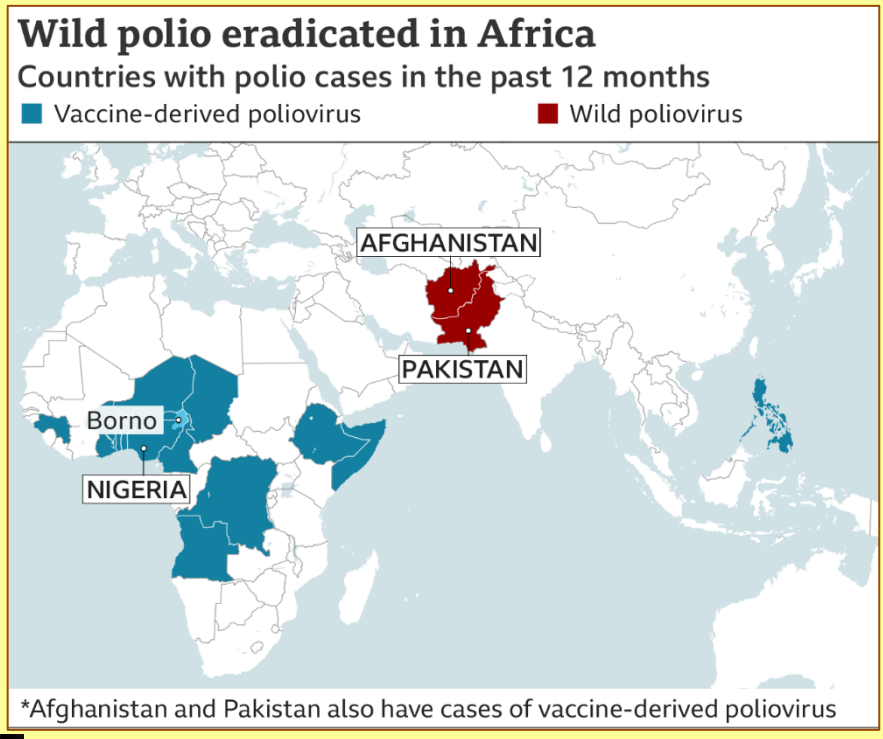
How did Africa eliminate wild polio?

Image copyright Getty Images Image caption A polio vaccine was developed in 1952
Without a cure a vaccine developed in 1952 by Dr Jonas Salk gave hope that children could be protected from the disease. In 1961, Albert Sabin pioneered the oral polio vaccine which has been used in most national immunisation programmes around the world.
In 1996 poliovirus paralysed more than 75,000 children across the continent - every country was affected.
That year Nelson Mandela launched the "Kick Polio Out of Africa" programme, mobilising millions of health workers who went village-to-village to hand-deliver vaccines.
It was backed by a coalition of groups including Rotary International which had spearheaded the polio vaccination drive from the 1980s.
Since 1996 billions of oral polio vaccines have been provided, averting an estimated 1.8 million cases of wild poliovirus.

What have the challenges been?

The last communities at risk of polio live in some of the most complicated places to deliver immunisation campaigns.
Nigeria is the last country in Africa to have reported a case of wild polio - in Borno state in Nigeria's remote north-east, and the epicentre of the Boko Haram insurrection, in 2016.
At the time it was a frustrating set-back as the country had made huge progress and had gone two years without any cases being identified.

Outside Nigeria, the last place to have seen a case of polio was in the Puntland region of Somalia in 2014.
Conflict with the Islamist militant group Boko Haram has made parts of Nigeria particularly difficult to reach, Borno state in particular. More than two million people have been displaced by the fighting. Frontline workers, 95% of whom were women, managed to navigate areas of conflict like Lake Chad by boat and deliver vaccines to remote communities.
Widespread rumours and misinformation about the vaccine have also slowed down immunisation efforts.
In 2003, Kano and a number of other northern states suspended immunisations following reports by Muslim religious leaders that the vaccine was contaminated with an anti-fertility agent as part of an American plot to make Muslim women infertile. Laboratory tests by Nigerian scientists dismissed the accusations.
Vaccine campaigns resumed the following year, but the rumours persisted. In 2013 nine female polio vaccinators were killed in two shootings thought to be carried out by Boko Haram at health centres in Kano.
It has taken decades to achieve eradication and overcome suspicion around the vaccine.



How polio survivors made a difference
Winning the trust of communities has been key. Misbahu Lawan Didi, president of the Nigerian Polio Survivors Association, says that the role of survivors has been crucial in persuading people to accept the campaign.
Image caption Misbahu Lawan Didi has worked hard to persuade sceptical parents to allow their children to have the vaccine
"Many rejected the polio vaccine, but they see how much we struggle to reach them, sometimes crawling large distances, to speak to them. We ask them: 'Don't you think it is important for you to protect you child not to be like us?'"

From polio survivors, to traditional and religious leaders, school teachers, parents, volunteers and health workers, a huge coalition developed to defeat polio. Working together they travelled to remote communities to immunise children.

How serious is polio?
Polio, or poliomyelitis, mainly affects children aged under five.
Initial symptoms include fever, fatigue, headache, vomiting, stiffness of the neck and pains in the limbs. It also invades the nervous system and can cause total paralysis in a matter of hours.
One in 200 infections leads to irreversible paralysis. Among those paralysed, 5% to 10% of people die when their breathing muscles become immobilised.

Could wild polio return?
Polio can be easily imported into a country that is polio free and from there it can spread rapidly among under-immunised populations. This happened in Angola, which despite decades of civil war, defeated polio in 2001. The country remained free from polio for four years until 2005 when a number of cases were thought to have been brought in from outside the country.
The WHO says that it is important countries remain vigilant and avoid complacency until there is global eradication.
If they let down their defence by failing to vaccinate, then wild polio could once again begin to spread quickly.

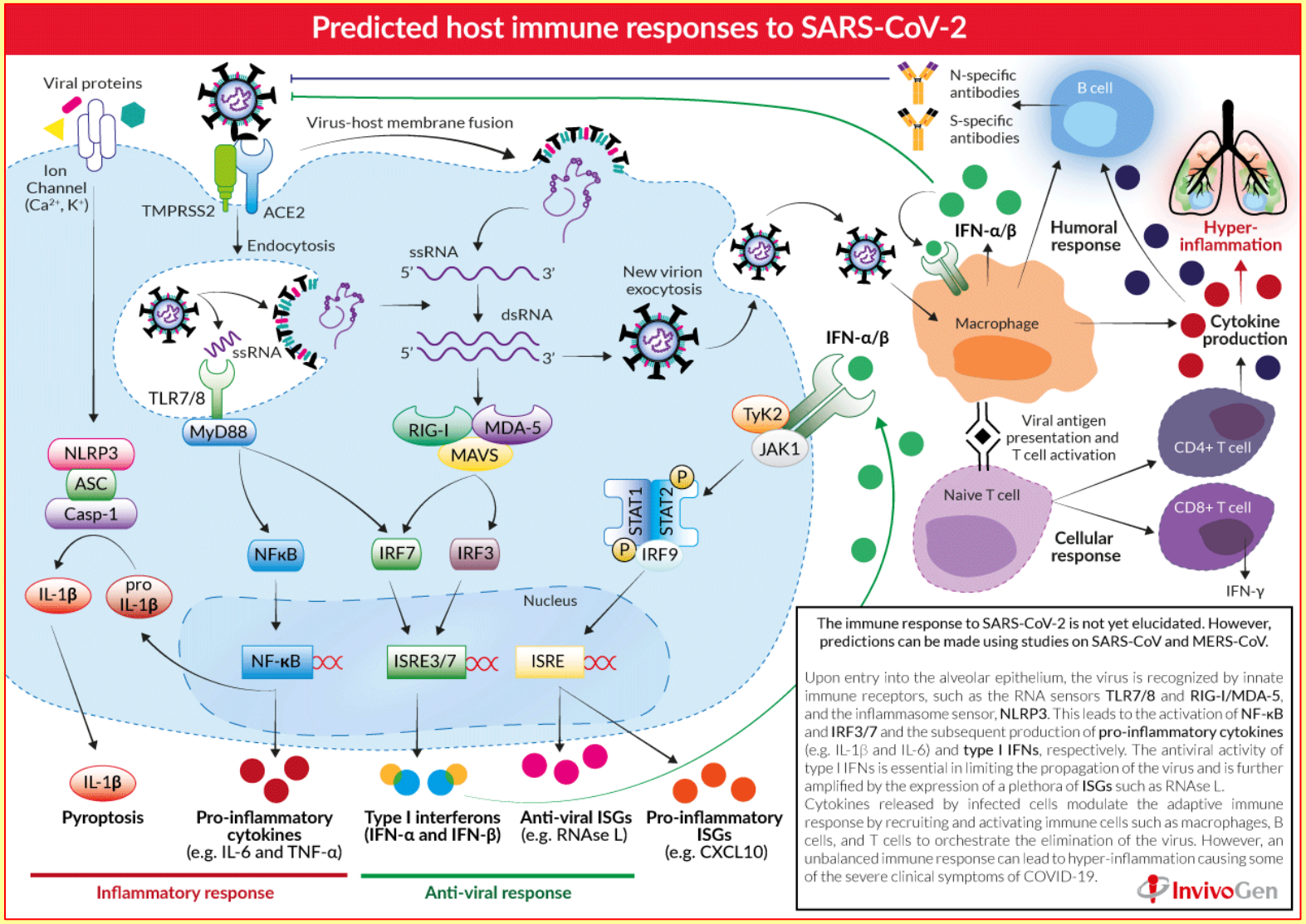
For all types of polio to be eliminated, including vaccine-derived polio, vaccination efforts will need to continue alongside surveillance, to protect children from being paralysed by the disease in the future.

COVID Immune Responses Explained

By Eric J. Topol, MD; Abraham Verghese, MD; Akiko Iwasaki, PhD

*August 21, 2020 (*This transcript has been edited for clarity).

Source: https://www.medscape.com/viewarticle/933621



Eric J. Topol, MD: Hello. I'm Eric Topol and I'm with Abraham Verghese for a new edition of *Medicine and the Machine*. Today it's a special treat to have a chance to talk with Akiko Iwasaki, professor of immunobiology at Yale. Welcome, Akiko. Great to have you with us.

Akiko Iwasaki, PhD: Thank you very much, Eric. I'm delighted to be here.

Topol: Akiko's background is quite fascinating. She came from Japan to Canada, finished her baccalaureate and PhD at the University of Toronto, was a post-doc at the US National Institutes of Health, and she's been at Yale for 20 years. She is a Howard Hughes Medical Institute scholar and National Academy of Sciences electee. She has become my go-to immunobiologist, through Twitter, her writings, and her videos. In fact, toward the end of July, she posted an Immunology 101 on YouTube that is a must-see.

Before COVID, the most precious talent-people were the data scientists. Now it's become the immunologists. Akiko, I know you spend a lot of effort on innate immunity and the interferons (IFNs),

but can you give us all a broad view of the two main components of the immune response to SARS-CoV-2?
Iwasaki: You are right. Immunology has become quite relevant with this pandemic. And I'm trying to not only do research on immunity to COVID, but also to communicate to and educate the public about the immune system and how it works.
Our immune system consists of two different layers. The first layer is the innate immune system, which acts within minutes of infection to provide kind of a rapid response. This doesn't require any specificity; it is engaged after any kind of infection. But this innate activation is important to triggering the second layer of the immune system, which is the adaptive immune system. In the adaptive immune system, the key players are B cells and T cells; they eventually acquire specificity and memory, which are the basis of the vaccinations. Having those T- and B lymphocytes that are specific to a particular pathogen and provide a memory response in the long term is very important.
Topol: One thing that came up recently was this kind of scare whereby some said that the antibody response that was tested in a few different series of patients who recovered from COVID seemed to be abating over time. That may have been a false alarm. Maybe you can put that in context.
Iwasaki: I don't blame people for becoming worried about this because the longevity of the immune response is what we are counting on for protection of the whole population. That's what vaccines are supposed to do. If you follow COVID-infected patients over time, their antibody levels do seem to wane to some degree within 2-3 months. But that is not a cause for alarm because that's what happens when you get infected or when you become immunized for the first time. The antibody levels peak within the first couple of weeks and then eventually come down over a few months. That's okay because you still have memory B cells specific to that antigen as well as a T-cell immune response to the viral antigen. So the second time you're exposed to the same virus, you can mount a rapid, specific, and robust immune response. It's likely that you won't feel anything the second time you're infected. It will be a pretty mild or asymptomatic infection.
I want to make that clear, that waning antibody levels alone is not a huge cause for concern. The second point I want to make is that with vaccines, we usually give booster vaccines, which stimulate a much more robust and long-lasting immunity. That immunity should be sustained for years. So again, having a waning antibody response to natural infection shouldn't be a huge concern for going forward with vaccination.
Topol: That's very reassuring. There are so many different dimensions where immunology comes into play here. One of the areas that's especially interesting — and it's somewhat related to your recent paper in *Nature* where you characterize the different responses in people with moderate vs severe disease — is this deficient IFN response in some people, and whether or not that can be boosted early with some type of IFN. It's complex, though, because there's not just one type of IFN, and the timing is kind of like Goldilocks — you have to get it just right. Where do we stand? I know several clinical trials are ongoing with type I IFN.
Iwasaki: As you say, type I IFN has to be delivered at the right time with the right dose and the right type. What's coming out, including from our own study, is that a prolonged level of type I IFN, especially late during disease, may be associated with a worse disease outcome. So giving COVID patients recombinant IFN late in disease is probably not going to be a good idea. Whereas using recombinant IFN as a prophylaxis against infection, or if you can catch the patients very early during the infection and give enough IFN to shut down viral replication, those strategies hold promise. I'm waiting to see what happens in the clinical trials. But I think the early timing and giving enough dose to block the virus replication is going to be key going forward.
Topol: A paper just came out in *Nature Reviews Immunology* that reviewed four small ongoing trials and that multicenter study from China. All of them look quite promising. If you were to predict the future, do you envision that we all could have an inhaler with an IFN that we would take at first diagnosis or exposure? Do you think that's a possibility?
Iwasaki: As long as we can give the right dose without toxicity, that may be the future, especially in a preventive setting. For example, if your family member was diagnosed with a viral infection, you could potentially treat the rest of the family members with prophylactic IFN, and healthcare workers or people who are exposed to high-dose virus on a daily basis. That's what happened in China; they gave an inhaled IFN to healthcare workers and none of them were infected. So this may be a good thing to do in the future.
Verghese: Akiko, you have a lovely way of explaining very complicated things in a simple fashion. I'm an infectious disease physician, but I must say, the way cytokines and the cytokine storm are described is so bewildering. Can you help make sense of what we should be paying attention to in all the various cytokines and why?
Iwasaki: I hate to add to this bewilderment, but the typical cytokine storm that has been reported includes IL-1, IL-6, tumor necrosis factor, these sort of acute innate cytokines. But in our recent report, we also found cytokines that belong to completely different kinds of immune responses also coming up, like those that are dedicated to fungal response or helminth response — type III and type II immune responses. So in severe cases, the immune system kind of looks confused and disoriented, generating all types of cytokines that are also causing some sort of storm. I think COVID disease may start with the typical cytokine storm but then extend to different types of tornados and hurricanes and all kinds of misdirected immune responses.

Topol: Everything gets dysregulated. It seems as though people, for the most part — unless they have other hits like a pulmonary embolism or something else — the cytokine storm is the principal cause of death in terms of the actual mechanism. So far, the only thing we have to block it is dexamethasone. But that's not having exceptional efficacy. We need to do better on that whole process. Another big topic right now is "long COVID." You've taken a systematic approach to the whole spectrum of the disease, from mild to very severe or critical; long COVID seems like the next chapter. Very little immunologic work has been published to date. But with the joint pains, profound fatigue, and many other signs and symptoms, it looks like an immunologic condition. What are your thoughts on this?

Iwasaki: I absolutely agree. Long COVID is quite mysterious in terms of what's driving such long-term disease. Also, the symptoms in these patients appear to shift during the course of post-exposure to COVID. I have three hypotheses to explain it, but it could also be a combination of these. The first hypothesis is that a reservoir of virus is hiding somewhere that's activating and reactivating periodically to cause these types of responses. The nasopharyngeal swabs that we currently use to test for the virus are unable to pick up those kinds of reservoirs.

The second hypothesis is related to this. Perhaps it is not reservoirs of infectious virus but bits and pieces of viral RNA or protein that are being retained somewhere in the body that are activating an immune response against the virus and causing these shifting and prolonged symptoms. The third hypothesis is that the infection generates an autoimmune disease. Perhaps the virus is mimicking self-antigens or virus infection, being so inflammatory in this case, and is eliciting autoreactive T and B cells. We are trying to understand which of these possibilities is true. But perhaps all of these things are happening at the same time.

Topol: The autoimmunity may not be so difficult to address, but how would you get at a virus reservoir or the bits of RNA that are somehow creating or sustaining the hit?

Iwasaki: Some of the insights are the result of autopsy reports of patients who've had COVID and passed away. We don't have a lot of insights from the "long-haulers" in terms of autopsies. But at least the investigation of those autopsies after acute infection is revealing infection in many places in the body, including the lung, obviously, but also the gut and many other places. Autopsy results will reveal whether remnants of virus or potentially infectious virus are hiding in these organs.

Topol: That is something we need to prevent. It seems to be not uncommon. To your point about the retention of virus, many of the cases I've reviewed remain PCR positive weeks and months later. So there's something that's consistent with that hypothesis for sure. Somewhat related is the multisystem inflammatory syndrome in children (MIS-C). It is obviously a variant of Kawasaki's, but it's different with respect to somewhat older kids, perhaps more heart and other organ involvement. And that does appear to be an inflammatory, autoimmune type story. What are your thoughts about that?

Iwasaki: In order to understand whether autoimmunity is involved, we need to identify autoantigens. I know that a lot of groups are working on it, but currently we don't really know the relationship between COVID exposure and the development of autoantibodies or even autoreactive T cells that may cause these types of inflammatory diseases. So identification of the culprit antigen is going to be key.

Verghese: You have an elegant paper on a mouse model for COVID, which would be a wonderful way to tease out the separate elements of this disease. Talk, if you would, about developing that model and what you see as its future applications.

Iwasaki: Thank you for bringing that up. The mouse model we've created is a very easy-to-use and versatile model where we transduced the mice with adeno-associated virus (AAV)-encoding human ACE2. Its versatility comes from the fact that you can use any kind of background animal, whether it's knockout, transgenic, or reporter mice. You simply have to transduce the mice with AAV for 14 days and until the expression ACE2 becomes fully developed. Then you can infect these animals with the human SARS-CoV-2.

That publication reflects the beginning of what we have done. We are looking at all kinds of immune response players, different cell types, different cytokines, and their relationship to protection against this virus, and also pathology that results from immune activation. In that first paper, we were able to examine the role of the type I IFNs, going back to Eric's question, and showed that, at least in the mouse model, type I IFN appears to be incompetent for blocking the virus replication. If you look at the viral titer of animals that are either wild type or IFN-receptor knockout, the titers are not very different on different days of infection. What is different is the pathology we see in the line. Type I IFN induces a lot of chemokines that attract leukocytes into the lung. Unfortunately, it's sort of fueling the fire by recruiting these leukocytes into the lung, and at the same time, not being very competent in blocking the replication of the virus.

This sort of mimics what we found in human patients, which was this long-term, smoldering type I IFN response being associated with mortality and length of hospital stay. In the animal, we're seeing the same thing: the endogenous IFN is not very competent to block the virus replication and instead it's leading to pathologic effects. This is the first insight we can see in parallel, from human to mouse and mouse back to human. Now

we're looking at other types of immune responses and whether they're also contributing to pathology vs protection.
Verghese: Do you think this is a problem with the level of IFN or is it a qualitative defect in IFN's ability to handle this particular virus?
Iwasaki: It is probably a mixture. We're probably not getting a robust IFN-induced response because SARS-CoV-2 encodes numerous evasion mechanisms to block the induction of IFN and even IFN receptor signaling altogether. That's why when we knock out the IFN receptor from the host, we don't see much of a difference in bioreplication. It speaks to the ability of this virus to evade and sort of suppress the IFN response. That's why having a recombinant IFN treatment early might make sense.
Topol: As long as it isn't overridden somehow by this very elusive, difficult virus.
One of the things you've been uniquely championing is that we're not paying enough attention to the mucosal immunity, the immunoglobulin A (IgA). Almost all of these 200 vaccine programs are working on spike protein shots or some component of the virus to provide the antibody and T-cell response. But there's a whole other path, which would be to get to mucosal immunity. Maybe you could tell us more about the IgA response and why you think that's not being given enough priority.
Iwasaki: Because of the nature of this pandemic, people are trying to develop a vaccine as soon as possible, which is important for us to return to regular society. So I think the first generations of vaccines will be the ones that elicit the most robust neutralizing antibody in circulation. That has a huge importance for preventing further spread of this virus. But given a little time and more effort, people are also starting to look at mucosal vaccines and potentially delivering the same kind of vaccine through the nose instead of into the muscle. When those vaccines are tested side by side, I believe we'll see a difference in providing a sterilizing immunity in the mucosa vs inhibiting disease after exposure. I'm not discouraged by the fact that these vaccine companies are developing a systemic vaccination. But in the future, I think we should be looking more into mucosal vaccines.
Topol: Do you think they would be complementary? The vaccines that are in rapid development, phase 3 trials, are not going to prevent the infection or achieve sterilization but will modulate the response, whereas the IgA antibodies could actually block the infection in the first place. Could they be paired at some point?
Iwasaki: I think so. But if the systemic vaccines are providing a robust blocking of disease, that would be a great first start. By the way, sterilizing immunity is not the goal of most vaccines.
Topol: Some of the vaccines in trials are claiming it in their papers, in non-human primate models. It doesn't need to be achieved. But it's interesting how it's being claimed right now.
The geneticist George Church recently took a mucosal vaccine via nasal spray. And it was criticized because it is like the Russian vaccine—there's no safety profile. But George is quite a pioneer. It would be interesting to get actual results from the crew of people who are testing that vaccine.
One of the controversial issues right now is what's been called effective herd immunity, a natural immunity that is being debated. Most experts agree that you need to get 70% or 80% of the people to be immune to establish herd immunity. But recently we have seen cases in the United States — particularly in states that were hard hit, such as Texas, Arizona, and Florida — where, for some peculiar reason, it looks like their infection numbers are going down, and not just because there's less testing, which is another confounding issue. That has led to some people theorizing that maybe this 20% of people who are infected is providing a lower amount of spread. What is your sense about this? Is it an explanation for reduction in cases?
Iwasaki: First, I have to say that I'm not a mathematical modeler. I can only provide my insights as an immunologist. It's a little dangerous to rely on herd immunity at this point to open up society because herd immunity requires a significant proportion of the population to be immune to the virus. Even if there is a community in which 20% of the people have immunity, we don't know how long this lasts because they acquired it through a natural infection. We just don't know enough about the protective level of antibodies and T cells in people who recover from this infection to know how long such a protective immunity will last. Also, every individual may be slightly different. I believe it's premature and dangerous to depend on those numbers without a vaccine that can be distributed throughout the population.
Verghese: You know, before we leave innate immunity, I have what may seem like a naive question, but I know you're an expert in mucosal immunity. Early on, some kitchen-sink wisdom suggested gargling and using nasal rinses as a preventive, because if the virus is going to attach, that's the first step. Is there any logic to that? Might that be a strategy before we actually have immunity at a local level? The strategy would be to somehow block virus attachment to receptors in the nasopharynx.
Iwasaki: I'm not sure how much virus saline nasal rinses would actually get rid of. However, I am a proponent of humidity. We've published a mouse model looking at the role of humidity in our respiratory tract and immunity to influenza virus. We saw that a 40%-60% relative humidity helped the animal to be able to remove the virus from the respiratory tract through mucociliary movement. Whereas if you kept the mice in 20% humidity, which you will find indoors during the winter months, those animals did poorly because they were not able to clear the virus. So there is a natural mechanism for removing the virus, which we can take advantage of, by maintaining the relative humidity at certain levels.

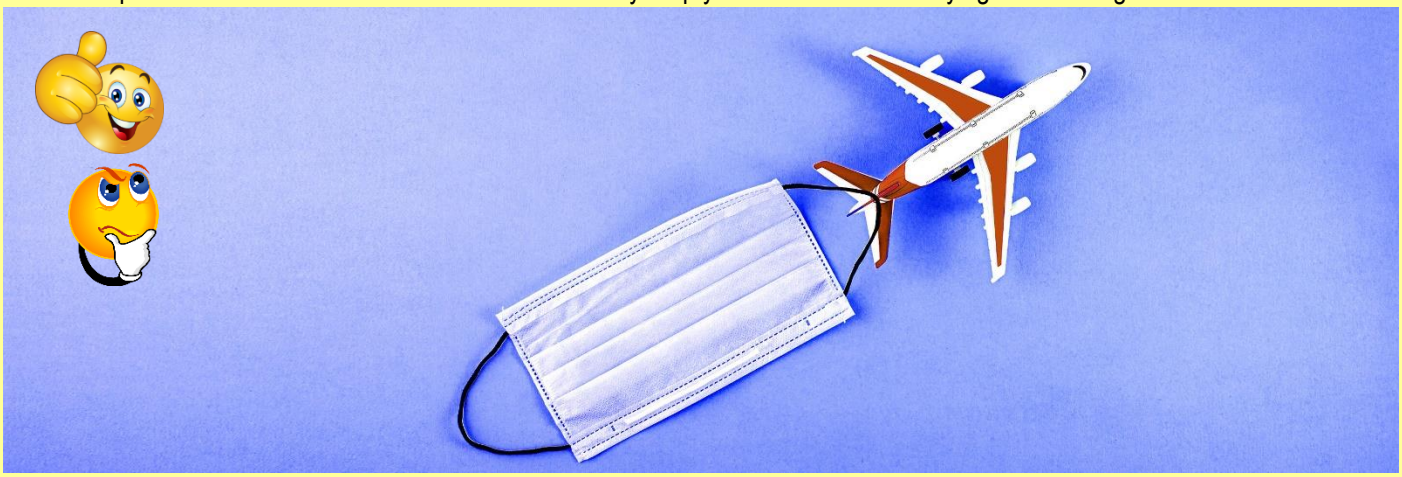
Topol: Getting back to the vaccine front, there's been a lot of consternation about what the goal should be. Some vaccine candidates produce relatively little T-cell response, particularly CD8 T cells, whereas others do. What would you envision as the ideal response, if you were to look at a vaccine and try to project that it's going to achieve a durable protection? What's your sense about that?
Iwasaki: If a vaccine can elicit very high levels of neutralizing antibody, that would pretty much block the spread of the virus in the person. T-cell immunity may not be needed at all, meaning CD8 T cells. Of course, to achieve that kind of antibody level, you needed to have CD4 T-cell help. So by default, such a vaccine would have elicited very good T–helper cell immunity. But whether you need robust CD8 responses *and* neutralizing antibodies to confer protection is an open question. I'm not sure we need both of them. If you only saw the CD8 T-cell response, you would not achieve a very rapid clearance of the virus because antibodies are needed to really block the spread of the virus. CD8 T cells are great at picking off the virus-producing factories, but they're not going to prevent the infection altogether. In terms of importance, it's the high neutralizing antibody titer, and if there is a robust CD8 response, that's sort of icing on the cake.
Topol: Most of the vaccine candidates have quite a good profile for neutralizing antibody response, so that's encouraging. Can you make any inferences from the SARS epidemic and what worked then, since there's a similar structure? Certain people who had SARS apparently still have signs of immunity to SARS now.
Iwasaki: Several vaccines were studied during the SARS-CoV-1 outbreak. Some vaccines worked really well and others, unfortunately, induced an inadvertent disease enhancement. For example, the double inactivated SARS-CoV-1 virus vaccine elicited an antibody-dependent enhancement (ADE) type of response. But I'm encouraged that even these kinds of inactivated vaccines against SARS-CoV-2 are inducing pretty robust neutralizing antibody responses with no evidence of ADE. Thus far, none of the vaccine candidates out there have reported any major adverse effects or ADE type of effects.
Topol: Antibody enhancement is a paramount concern. Do you believe that or an immune complex disease won't be a big issue going forward, or at least only on a very rare basis?
Iwasaki: That is my hope. The first two clinical trial phases haven't reported any of these effects; however, it's really during the phase 3 trials that we find out if there are adverse effects in rare cases and why. That's why it's so important not to rush that process.
Topol: We've noted a big gap between male vs female risk for COVID-19. Can you tell us what you think is causing that difference?
Iwasaki: We've been actively looking at sex differences in immunity to COVID-19. So far, we've found that male patients who develop severe COVID tend to have very low T-cell activation, whereas female patients who develop severe COVID have elevated innate immune cytokines. Thus, there seems to be a different way in which women and men respond to the virus. The lack of T-cell immunity in men is interesting, because when we look at age on the X axis and T-cell activation on the Y axis, we see an age-dependent decline in T-cell activation in men but not in women. So this may have something to do with why there is more severe disease in men who are infected.
Topol: There seems to be a preponderance of women in the long-haulers with COVID. Have you made any connections with that?
Iwasaki: It's tempting to speculate about a link between autoimmunity and these long-haulers, because the vast majority of autoimmune diseases have a preponderance in women vs men. Of the three hypotheses I listed, the autoimmune disease could be occurring in women and that may be contributing to the long-hauler disease. But without any data, I don't really want to speculate.
Topol: I guess we've asked you to speculate a lot, which is fun. It's great to hear your views.
I want to ask you about kids. We talked about MIS-C but we didn't talk about this whole controversy now with schools reopening and that children are less likely to manifest disease. Perhaps their transmission is less. There's been a lot of confusion about all of this. What are your thoughts about the unknowns in children as compared with adults? And is there a difference between younger and older kids?
Iwasaki: There definitely seems to be an age gradient of symptoms associated with exposures to SARS-CoV-2. But the symptoms do not relate well to whether they're infectious. Children can have a high titer of replicating virus in their noses even without symptoms. Whether they become spreaders without knowing they are infected is a real possibility. I have two children and they are dying to go back to school; they're so sick of spending the entire summer with their parents. So I totally get it. And it's important for their mental health for them to be with other children. But I do worry about their ability to transmit the virus, even if they don't have symptoms.
Topol: That brings up the question of their prior exposure to common cold coronaviruses and that children may have preexisting T-cell immunity. Perhaps that's happening more in children than adults in part because there's the temporal gap between when adults may have been exposed to the common cold before coronaviruses and when children were exposed. You're in New Haven, Connecticut. Things are pretty quiet there in terms of spread. Do you feel better about kids going to school and a lack of transmission chain in a place like Connecticut?
Iwasaki: As of now, we have a low number of cases, which is wonderful. But a lot of travel occurs within the country from states with high case numbers to those with low case numbers, even though there is a kind of quarantine. So it's difficult to know when we would feel safe because spreading may

be occurring without really knowing about it. It takes a couple of weeks for the numbers to actually come up. I'm definitely feeling better than I was in April, but at the same time, I still take as much caution as possible.
Topol: Will you have your kids in virtual classes or will they physically go to school?
Iwasaki: They would be very upset if I said they can only go virtual. Right now the school is planning to open and they will have in-person classes. But it's a fluid situation. I'm keeping my eyes on what's going on right now.
Verghese: I just wanted to follow up on a personal note. Initially, in March, all the research labs were shut down and gradually they're trying to open. But with all the challenges of having people in the same space, how have you managed your research lab? You've been incredibly productive. Tell us about the challenges of being at work.
Iwasaki: I personally haven't been at my workplace for a long time, in order to provide enough space for members of my lab to work. We did shut down quite aggressively in mid-March. The only type of research that was allowed was COVID-related research, so even though the university shut down, my laboratory kept going. In fact, they were working harder than ever, trying to study immune response in real time. My lab has been working hard but it's also following guidelines of physical distancing and de-densification. We couldn't have all the members of the lab working at the same time; it had to be one person per bay, so it did slow us down in that way because we weren't able to all be there. Fortunately, everyone practiced physical distancing and used personal protective equipment, so no one was exposed to the virus during that time.
Topol: Let's leave the pandemic for a bit and learn more about you, Akiko. You've had an amazing career. Your father was a physicist, your mother was an activist standing up for women's rights. How did they influence you in other things that happened in your career to get to where you are today?
Iwasaki: They had an enormous influence on me. Growing up in Japan, seeing how much my mother had to struggle to even keep working, really taught me the importance of speaking up and of believing in yourself as a woman, to be able to state the problem and to address it head-on. My mother is an activist. She is soft-spoken and the most gentle person you'll ever meet. But even with that sort of personality, she exhibited this strength. I definitely was influenced by that and I tried to emulate that in my life. Sex-based discrimination or racial discrimination unfortunately happens everywhere. So she taught me to be proactive and vocal about it without having to be extremely loud.
Watching my father through my childhood was interesting because I told myself that I'm never going to be a scientist; he's always reading journals and thinking about science, and what kind of life is that? Then eventually I became that person. I'm afraid that I'm deterring my daughters from pursuing science because I do the same as my father. Science is difficult, but it's also the most exciting thing for me to do. I can't imagine another job for which I get paid to do what I love thinking about.
Topol: Well, all the things that happened along the way created a phenom. You're a great educator as well as a great scientist. We're pleased to have had a chance to visit with you today.
Verghese: This has been a real eye-opener for me — a clear way to understand the immune system. Thank you for being with us, and good luck with your continued research.
Topol: I recommend to everyone that, if they're on Twitter, they follow Akiko Iwasaki (@VirusesImmunity) as their number-one source for really useful information. And if you're not on Twitter, you ought to get on it because she's got a lot to offer.
Akiko, thanks so much for taking the time to join us. We'll follow your work and your group very closely, because I know you're going to unravel and deconstruct a lot of the unknowns we have today.

***Eric J. Topol, MD**, is one of the top 10 most cited researchers in medicine and frequently writes about technology in healthcare, including in his latest book,* Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again.
***Abraham Verghese, MD**, is a critically acclaimed best-selling author and a physician with an international reputation for his focus on healing in an era when technology often overwhelms the human side of medicine.*
***Akiko Iwasaki, PhD,** is an immunobiologist at Yale University and the Howard Hughes Medical Institute. Her research focuses on immunity against viruses at the mucosal surfaces. She is particularly interested in educating the public about the immune system and how it works; she is also an advocate for improving the culture of science and for students in science.*

Study: Empty middle seats make flying safer during COVID-19

Source: https://mitsloan.mit.edu/ideas-made-to-matter/study-empty-middle-seats-make-flying-safer-during-covid-19



Aug 19 – Americans have debated the risks of getting on a plane during the COVID-19 pandemic — especially during the summer vacation season — with few clear answers or evidence to guide their decisions.

The airline industry itself has been split over pandemic safety approaches, with airlines including Delta, JetBlue, Alaska, and Southwest opting not to sell middle seats to provide more distance between passengers and reduce the risk of illness. Other airlines, like United, Spirit, and American Airlines, are not blocking middle seats, with United's chief communications officer calling the idea "a PR strategy" instead of a safety strategy.

"I've been doing research about aviation safety from a statistical viewpoint for many, many years, and this is the first time that I've seen where U.S. domestic airlines disagreed overtly on a matter related to safety," MIT Sloan professor and aviation safety expert said. "It seemed to me that all we were getting was a clash of conjectures."

A new working paper by Barnett, "COVID-19 Risk Among Airline Passengers: Should the Middle Seat Stay Empty?" sheds some light on the issue, finding that empty middle seats do decrease a passenger's risk of contracting coronavirus on a flight by a factor of about 1.8. **The overall risk from flying, Barnett also found, is similar to the risk of doing other day-to-day activities during the pandemic, like going to the supermarket or using public transportation.** The paper has not been peer-reviewed.

With powerful air purification systems, airplanes are "not like a typical indoor environment, so it is safe for that respect. But even so, you're much closer to people for a longer period of time than you would be normally," Barnett said. "In a supermarket, you can typically achieve social distancing … you can achieve physical separation in these places that you can't achieve on the plane."

For the study, Barnett calculated the risk of two hours (the average time for domestic flights) of coach-class domestic air travel in the United States with all seats full or with all seats except for middle seats full.

In making his estimates, Barnett approximated the probability that a given airline passenger has COVID-19, the probability that universal masking could prevent a contagious passenger from spreading the disease, and how risk of infection changes based on the locations of the infected and non-infected passengers.

Barnett assumed that everyone on a plane is wearing masks (all U.S. airlines have mandated mask policies), and that the primary risk to passengers comes from others in the same row and, to a lesser degree, the rows behind or in front of the passenger. Seatbacks provide some measure of protection from passengers in other rows, Barnett said. Other passengers do not pose as much of a risk because of the air purification systems on airplanes, he said.

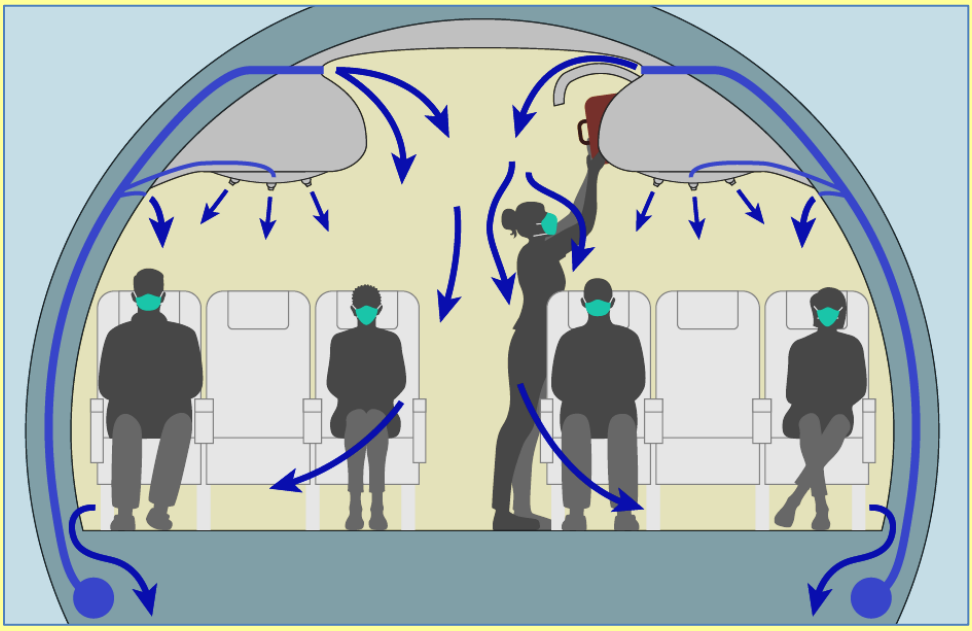
The calculations showed that when all seats are sold, the probability of getting COVID-19 from a nearby passenger is one in 4,300. If middle seats are empty, risk goes down to one in 7,700.

For a coach passenger who has a 1% chance of dying if infected with COVID-19, the estimated mortality risk on a full flight is one in 430,000, Barnett said, and one in 770,000 if middle seats are empty.

Airlines don't always sell every seat on a plane, though. The risk of dying from the disease when 85% of seats are filled — the average amount of seats sold on flights in 2019 — is one in 540,000. For comparison, the chance of being killed in a plane crash is one in 34 million, Barnett said.

Passengers infected by the virus can also spread it to others after the flight. Barnett found that if an infected passenger causes 0.5 other new infections (a conservative estimate), the resulting number of deaths from a full flight would be one per 310,000 passengers, and one per 390,000 if a flight is 85% full. If a flight has middle seats empty, the rate declines to one per 550,000 passengers.

Barnett said these estimates are subject to known and unknown sources of uncertainty, and have a "considerable" margin of error of a factor of 2.5. But the margin of error affects both filling all seats and leaving middle seats open the same way, he said, so the ratio between filling all seats and leaving middle seats empty would remain about the same at 1.8.



The chances of being infected with or dying from COVID-19 from a flight are both higher than dying in an airplane crash. And flying with filled middle seats increases that health risk, Barnett said. But everything that involves being around other people or being in public is riskier during a pandemic. Flying during the pandemic is not necessarily riskier than two hours of everyday activity right now, Barnett said.

"Everything is more dangerous these days, you could say," Barnett said. "Is it really more dangerous to fly than to engage in everyday activities? It's not more dangerous, but it's not less dangerous."

The relative risk for passengers might depend on the level of infection where they live, and whether they are practicing social distancing or not.

Meanwhile, the airline industry, like many other sectors, is struggling during the pandemic upheaval and likely faces a fall downturn. A $25 billion government bailout is paying airline employee salaries until the end of September, and some lawmakers have said they want to include more money for the sector in the next coronavirus aid package. Barnett said a fuller recovery depends on positive developments in fighting COVID-19, like a vaccine

"Business travel continues to be very, very low," Barnett said — for example, people are turning to online teleconferencing platforms for meetings or conferences that would otherwise happen in person. "The only people flying, by and large, are people who were engaged in leisure travel … but that will end very soon. I think the airlines expect that demand will diminish beginning next month, September, which is normally a relatively slow month."

EDITOR'S COMMENT: Statistics are helpful to understand trends and nothing more. If the 1 (one) in 4,300 or 7,000 mentioned herein is me, John, then the possibility is 100%. Just keep this in mind if you are the traveler. If you are the government then it is another story – these numbers are excellent for the propaganda game of both airliners and finance people who "care" about the travelers [and their pockets]!

More COVID-19 Reinfections Are Being Reported. Here's Why You Don't Need to Freak Out

Source: https://www.sciencealert.com/more-covid-19-reinfections-are-being-reported-but-here-s-why-that-s-not-a-bad-thing

Aug 26 – Just hours after the world's first confirmed coronavirus reinfection case was documented in Hong Kong on Monday, researchers reported a woman in Belgium had caught the virus a second time.

So, too, did Dutch virus experts, who announced an older person in the Netherlands as a third confirmed reinfection of COVID-19, the disease caused by the coronavirus.

Experts used genetic testing, in which they compare versions of the virus present in the first and second infections, to confirm these reinfections were distinct second cases, and not just lingering effects of the people's first infections.

But just because a few COVID-19 reinfections have started to crop up among more than 23.69 million documented coronavirus cases worldwide doesn't mean that an initial coronavirus infection does nothing to protect people from future illnesses, or that a vaccine won't help stamp out this pandemic.
"I don't want people to be afraid," Maria van Kerkhove, the World Health Organisation's technical lead for COVID-19, said on Monday when asked about the Hong Kong reinfection case.
"We need to ensure that people understand that when they are infected, even when they have a mild infection, that they do develop an immune response."

The new reinfection cases in Belgium and the Netherlands
The reinfection case in the Netherlands, diagnosed in an elderly person with a weakened immune system, was confirmed to Business Insider on Tuesday by Erasmus MC, where virologist Marion Koopmans works. (Her data on the case has not been made public yet, and Erasmus cited Dutch privacy laws when asked for details.)
"Just because you've built up antibodies doesn't mean you're immune," Koopmans said, in an interview about the reinfection case with Dutch public broadcaster NOS.
But even if a person doesn't develop full immunity to a virus, and gets reinfected, the body seems to remember its previous illnesses. In addition to antibodies, T cells and other components of a person's immune system all work together to better fight back an active infection the second time around.
That seems to be what happened in Belgium, where a woman in her 50s who already had the coronavirus in March was reportedly diagnosed a second time in June.
Belgian virologist Marc Van Ranst has not yet made public the data behind his claim either, but said the woman developed very few antibodies after her first infection, and surmised that that may be why she was susceptible to reinfection (though her second case was mild). "We would have preferred the time between two infections to have been longer," Van Ranst told Belgian public broadcaster VRT news. "The antibodies from the first time do not help enough to prevent the second infection."
He said more of these seemingly rare reinfection cases will likely continue to pop up in the coming months, as people's immunity to the coronavirus (from their previous infections) wanes. "Maybe there will be more who will have it a second time after 6 months, or 9 months," he said.

Researchers reported another reinfection case in Hong Kong Monday
The two European reinfection cases bring the official tally of coronavirus reinfection cases to three, among tens of millions.
Previous reports of 260 reinfections from South Korea in April turned out to be lingering cases of the same infection. One other potential reinfection case was reported in the US in June, and another 3 were flagged in July in France.
But those cases have not been considered confirmed reinfections because less time elapsed between the positive tests, and scientists did not do a genetic sequence of the viruses. Researchers from Hong Kong University announced Monday that "the world's first documentation of a patient who recovered from COVID-19 but got another episode of COVID-19, afterwards," is forthcoming in the peer-reviewed journal *Clinical Infectious Diseases*. A 33-year-old, seemingly healthy man who had been sick in March was diagnosed with the novel coronavirus a second time after travelling back to Hong Kong from Spain earlier this month.
While he had a fever, cough, and headaches during his first COVID-19 illness, the man had no symptoms during his second infection.

Why reinfection cases are not unexpected, or a reason to panic
Many epidemiologists have anticipated coronavirus reinfections like these could be possible.
"You can get repeatedly infected once your immunity goes down," Florian Krammer, a vaccine scientist and virus expert at the Icahn School of Medicine at Mount Sinai in New York, previously told Business Insider, when asked about coronavirus immunity.
These three cases, then, aren't a reason to panic. Instead, they show how previous infections can provide people with some decent protection from another coronavirus illness.
"That someone would pop up with a reinfection, it doesn't make me nervous," Koopmans told Reuters. "We have to see whether it happens often."
Indeed, Krammer predicted (just as these reinfection cases suggest) that a patient's second tangle with COVID-19, the disease caused by the novel coronavirus, will generally be less severe than their first: "It's very likely that if you did get reinfected after some time, it would be an attenuated disease," he said.
The same could be true of coronavirus vaccines, once they're developed: even if they don't protect people from infection at 100 percent, vaccines could help our immune systems battle this illness better.

First Oral Anthrax Vaccine for Livestock, Wildlife

Source: http://www.homelandsecuritynewswire.com/dr20200825-first-oral-anthrax-vaccine-for-livestock-wildlife

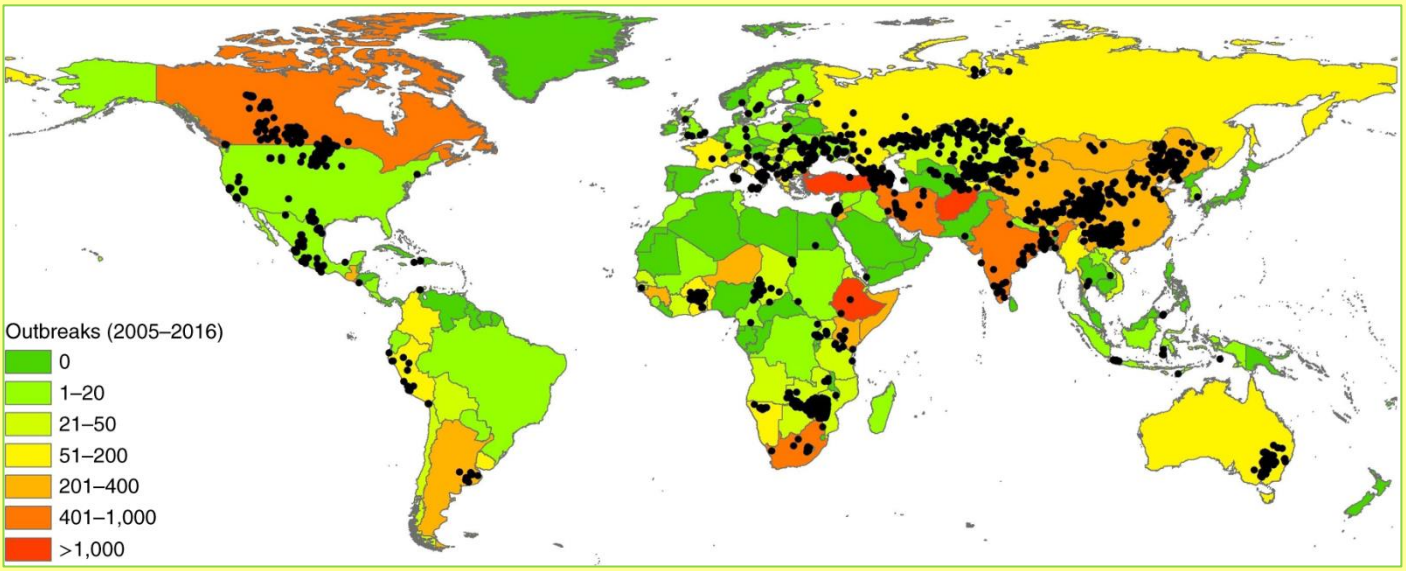
Aug 25 – There may soon be a new weapon in the centuries-old battle against anthrax in wildlife thanks to groundbreaking work at the Texas A&M University College of Veterinary Medicine & Biomedical Sciences (CVMBS).

Anthrax, a disease caused by a bacterium called *Bacillus anthracis*, contaminates surface soil and grasses, where it may be ingested or inhaled by livestock or grazing wildlife. This is especially common in the western Texas Hill Country, where each year the disease kills livestock and wildlife.

While normally not an attention-grabbing problem, a spike of cases in 2019 made headlines around the state.

According to Dr. Jamie Benn Felix, a postdoctoral research associate in the Cook Wildlife Lab led by CVMBS Department of Veterinary Pathobiology's (VTPB) Dr. Walt Cook, that spike may have been responsible for the deaths of more than 10,000 animals.

"If you assume the economic value for each animal was $1,000, which is probably extremely low given the number of exotic species on some of the ranches, you're looking at an economic loss of $10 million in just a few months," she said. "And given the problems with reporting cases, it could be significantly higher than that."



Global distribution of *B. anthracis*

The good news is that there is already a vaccine for anthrax, which many livestock owners administer annually. Unfortunately, it can only be administered with an injection that is time consuming for livestock and not feasible for wildlife.

With that in mind, Benn Felix and the Cook Wildlife Lab team, in collaboration with VTPB researchers Dr. Allison Rice-Ficht and Dr. Thomas Ficht, went to work to attempt to create a formulation to deliver the vaccine orally, which would allow for potential distribution to wildlife. She recently published the results of a pilot study in Nature and is now moving on to the next round of tests.

If successful, they will have developed the first effective oral vaccine against anthrax for wildlife.

"The preliminary results showed that this concept has potential, so now we are starting up a deer study and we'll see where it goes from there," Benn Felix said.

Anthrax is among the oldest enemies of microbiologists, and the current vaccination method — using what's known as the Sterne strain — is basically the same as it was 85 years ago when Max Sterne developed it, so an oral vaccine has been a goal for some time.

In fact, in the past, many livestock owners trying to save time and effort would pour the vaccine over food, but previous testing by Benn Felix proved the ineffectiveness of this method.

The main issue with an oral vaccine is the ability to keep the bacteria alive in the gastrointestinal tract long enough and in the right amount to produce the desired immune activity in the animal. To that end, other efforts have been made with different strains of the bacteria and other mediums, but have thus far not proven effective.

Benn Felix's approach is both simpler and more complex — simpler, because her approach uses the same strain that has been proven effective for decades, but more complex because of the use of a gel-like suspension.
"Our idea is that with this oral anthrax vaccine, we can get it into a bait of some sort and then easily vaccinate these animals," Benn Felix said. "The formulation that we're using is the same live strain of bacteria from the current commercial vaccine put into a gel-like substance."
Benn Felix compared the release of the vaccine in the gel-like substance, technically known as alginate encapsulation, to a common gumball machine.
"It's the same general idea as those big glass gumball machines you would see in the mall or a store, in which you put a quarter and get a single gumball out," she said. "The gel holds a bunch of the live attenuated bacteria and it gradually releases some of that bacteria over time."
Though they're currently still working at a small scale, Benn Felix and her team are keeping an eye to the distant future and considering how this vaccine might be implemented at a larger scale.
One example they're looking at is what Dr. Tonie Rocke did at the National Wildlife Health Center in Madison, Wisconsin, with a plague vaccine for prairie dogs.
"They put their vaccine into a bait that was flavored with peanut butter flavoring," Benn Felix said. "That is the same general idea that we're going for with this; we would just distribute the baits and then see how many were consumed, or we would have trail cameras that would see if there was any non-target species that ate any of it.
"There are a lot of things that would go into formulating the bait — making sure the vaccine is still stable and viable when it's in the bait and then seeing how it would affect or be consumed by wildlife or any other wildlife, we don't want to have it," she said.
Currently, one of Benn Felix's biggest obstacles is a lack of data on exactly how much damage is caused by anthrax in wildlife in Texas. Her team is actively reaching out to ranchers, hunters and other groups across the state in an effort to increase the reporting on anthrax cases.
"If anthrax outbreaks aren't reported, it appears as if it's not an issue and the federal government and other organizations don't prioritize funding," Benn Felix said. "I didn't realize this was even an issue until I moved to Texas. Reporting outbreaks will help generate critical data about this issue and demonstrate as a fact what we down here already know, which is that it's a huge issue."

Russian-made device that can detect COVID-19 in air ready for production

Source: https://apa.az/en/cis-countries-news/Russian-made-device-that-can-detect-COVID-19-in-air-ready-for-production-329049

Aug 27 – The Moscow Region's Krasnogorsky Zavod (KMZ) has presented Russia's first device for detecting viruses, including COVID-19, in the air, at the Army 2020 forum, Alexander Novikov, the plant's general director, said, APA reports citing Sputnik.
"KMZ has presented a completely new product — a bio-medical device dubbed 'Detector-BIO', which detects bacteria, toxins, and viruses, including COVID-19, in a room. This is our joint project with the [Russian] Health Ministry's N.F. Gamaleya Research Institute of Epidemiology and Microbiology. With the help of such a device, the automatic analysis of an air sample takes from 10 to 30 minutes, depending on the concentration of pathogens and other factors", Novikov said.
According to the plant's general director, the state tests of this device were completed in June, but the official paperwork for registration is still being prepared, so it is too soon to talk about distribution.
"However, we are completely ready, and if necessary, we can produce as many [devices] as a client needs. It is important that this device can detect various pathogens in the air, so it can be used both for civilian purposes and for ensuring biological safety", he noted.

Moderna COVID-19 Vaccine Shows Immunogenicity in Older Patients

Source: https://www.genengnews.com/news/moderna-covid-19-vaccine-shows-immunogenicity-in-older-patients/

Aug 27 – **Moderna today presented Phase I data showing that its closely-watched messenger RNA (mRNA) COVID-19 vaccine candidate mRNA-1273 showed immunogenicity in patients 55 years old and older that was roughly the same or higher than data seen in younger patients at the dosage the company is using in its Phase III trial.**
Moderna's series of two 100 mcg doses of mRNA-1273 seroconverted all 120 participants in a Phase I trial (NCT04283461) after the first dose given on Day 1, with the area under the curve for all age groups exceeding the median of convalescent sera, Jacqueline M. Miller, MD, FAAP, Moderna's

senior VP of infectious disease development, stated during a presentation at the August meeting of the CDC Advisory Committee on Immunization Practices (ACIP).
The presentation included Moderna's first release of detailed data on mRNA-1273 in patients older than age 55.
After the second dose was administered on Day 29, S-2P binding antibodies were seen in all age groups at levels equivalent to high-titer convalescent sera, Miller added. Moderna also reported geometric mean titer (GMT) levels of 267 for the 18–55 year old cohort, 324 for the 56–70 year old cohort, and 242 for the age 71-and-older cohort, compared to a previously published GMT of 109 in the convalescent sera.
mRNA-1273 was shown to induce CD4+ T-cells of the Th-1 phenotype 14 days after the second dose was given. Th1-biased CD4+ T-cell response was seen across all age groups, as were rare Th2 phenotype responses, Miller and Moderna added.
The new data has not been published in a peer-reviewed journal.
However, on July 14, researchers from Moderna and its clinical research partners published additional, mostly positive data in *The New England Journal of Medicine* (*NEJM*) from their interim analysis of the Phase I study showing that mRNA-1273 induced rapid and strong immune responses against SARS-CoV-2.
The findings published in *NEJM* were based on data through Day 57 across three dose levels (25, 100, 250 µg) in 45 healthy adults ages 18–55 years—15 adults in each dose cohort.
mRNA-1273 is a novel lipid nanoparticle (LNP)-encapsulated mRNA vaccine encoding for a prefusion stabilized form of the Spike (S) protein. mRNA-1273 is one of 18 "Front Runner" candidates among the nearly 300 COVID-19 therapeutics included in *GEN*'s updated "COVID-19 Drug & Vaccine Candidate Tracker."
The U.S. government has committed up to $2.5 billion toward mRNA-1273, including up to $1.525 billion toward manufacturing and delivering 100 million doses of the vaccine, through Operation Warp Speed, the program through which President Donald Trump's administration has committed the nation to delivering 300 million vaccine doses protecting against SARS-CoV-2 by January 2021.
Mani Foroohar, MD, a senior research analyst and managing director, genetic medicines with SVB Leerink, wrote in an investor note that the data was consistent with expectations based on data from prior cohorts.
"We already reflect higher penetration into elderly/high-risk populations in our SARS-CoV-2 market model, so we see limited incremental fundamental impact from these disclosures and leave our estimates unchanged at this time," Foroohar wrote.
Investors reacted to today's data disclosure by sending Moderna shares up 6.4% to $70.50 at the close of trading, up $4.25 from Tuesday's close of $66.25.
Foroohar added that he expected investor focus for Moderna stock to increasingly center on the upcoming release of interim data from the Phase III COVE trial (NCT04470427), which the company is conducting with the NIH's National Institute of Allergy and Infectious Diseases (NIAID), as well as the commercial dynamics of pricing strategy and share split compared with large pharma competitors.
The COVE trial, an approximately 30,000-patient study launched in July, is designed to evaluate the safety of mRNA-1273 in 30,000 adult volunteers who do not have COVID-19. Participants will receive two intramuscular injections approximately 28 days apart. Participants will be randomly assigned 1:1 to receive either two 100 µg injections of mRNA-1273 or two shots of a saline placebo.
COVE's primary endpoint will be the prevention of symptomatic COVID-19 disease. Key secondary endpoints include prevention of severe COVID-19 disease, as defined by the need for hospitalization), and prevention of infection by SARS-CoV-2.
Moderna is also studying mRNA-1273 in a NIAID-led Phase II trial (NCT04283461) designed to assess the safety, reactogenicity, and immunogenicity of two vaccinations given 28 days apart. The placebo-controlled, dose-confirmation study has enrolled a total 600 healthy participants across two cohorts: 300 adults ages 18–55 years, and 300 adults ages 55 years and up. Participants are assigned to placebo, a 50 µg, or a 100 µg dose at both vaccinations, and will be followed through 12 months after the second vaccination.
The Phase II study was "active, not recruiting" patients as of the most recent update July 17 on ClinicalTrials.gov.

Scientists May Have Identified Why COVID-19 Affects Men and Women So Differently

Source: https://www.sciencealert.com/different-immune-responses-could-explain-why-covid-19-kills-more-men

Aug 27 – A new study looking at male and female immune responses to the new coronavirus may shed new light on why men are more likely to become seriously ill with COVID-19, researchers said Wednesday.

Since early in the pandemic it has been clear that men, particularly older men, are at a far higher risk of dying from the virus than women of a similar age, but scientists have not yet been able to pinpoint exactly why.
A new study published in the journal *Nature* noted that globally men account for about 60 percent of deaths from COVID-19 and looked at whether differences in immune responses could explain why.
"What we found was that men and women indeed develop different types of immune responses to COVID-19," said the study's lead author Akiko Iwasaki, a professor at Yale University, in a video.
The immunity specialist said "these differences may underlie heightened disease susceptibility in men".
Researchers collected nasal, saliva, and blood samples from non-infected control subjects and patients with the disease who were treated at Yale New Haven Hospital in the United States.
They then monitored patients to look at their immune responses.

Researchers found that women mounted a more robust immune response involving T lymphocytes, which are a type of white blood cell that can recognize viruses and eliminate them.
This was the case even among older women, the study found.
In contrast, older men had weaker T cell activity – the older they were, the weaker the response.
Overall men also produced more cytokines, which are inflammatory proteins that form another part of the body's natural immune defence.
However, severe cases of COVID-19 have been linked to what is known as a "cytokine storm", when the immune system goes into overdrive, which is harmful and potentially deadly.
Men who showed high concentrations early on were more likely to have a severe case of the disease, while those women who also showed significant cytokine levels also appeared to fare worse, the study found.
According to the authors, this could imply that men and women need different treatments.
For men, for example "we should be enhancing their T cell responses with vaccines" Iwasaki said, while women could be given treatment to dampen the cytokine response.

Treated differently?
But the study has limitations.
Firstly, the sample size was relatively small, with 98 patients in total.
The average age of the patients was also high, at around sixty years.
Commenting on the research, Eleanor Riley, a professor at the University of Edinburgh, said some of the divergence noted in the study is "likely due to differences in age or BMI (the sex differences disappear once these other factors are taken into account)". BMI measures body fat.
She said others could have arisen "by chance".
"Importantly, although the average response may differ between men and women, the range of most of the measurements in men and women overlap significantly, meaning that many women have responses that are indistinguishable from those of many men," she added.
Riley said this is why treatments would be better if they were individually tailored, rather than defined solely on sex.

Counter-Terrorism Medicine: Creating a Medical Initiative Mandated by Escalating Asymmetric Attacks. [Journal Article]

By Court M, Edwards B, … Ciottone GPD
Prehosp Disaster Med. 2020 Aug 14 [Online ahead of print]

This editorial argues for the consolidation of the body of experience gathered since 2001 into an initiative called Counter-Terrorism Medicine (CTM). It proposes that previously discrete sub-specialty areas can be consolidated, with improvements in collective understanding, and can build on previous work to provide a non-political health care focused definition of terrorist events, based on the triad of Violence, Intent, and Heath Care Impact. It notes the importance this defining triad has in health care planning and response considerations. Finally, it defines the parameters of CTM within the larger specialty of Disaster Medicine (DM). There is a growing body of academic work on the health care implications of terrorism. The time is right to coalesce these into an initiative referred to as CTM and to consider this as a discrete part of DM.

Six-Hour Manual Ventilation with a Bag-Valve-Tube Device by Briefly Trained Non-Medical Personnel is Feasible

By Nana Maklada, Malka Katz Shalhav, Emanuele Lagazzi and Pinchas Halpern

Published online by Cambridge University Press: 01 June 2020

Source: https://www.cambridge.org/core/journals/prehospital-and-disaster-medicine/article/sixhour-manual-ventilation-with-a-bagvalvetube-device-by-briefly-trained-nonmedical-personnel-is-feasible/A092002DBF93BB37542498FB816F8135

Abstract

Rationale: Manual ventilation with a bag-valve device (BVD) is a Basic Life Support skill. Prolonged manual ventilation may be required in resource-poor locations and in severe disasters such as hurricanes, pandemics, and chemical events. In such circumstances, trained operators may not be available and lay persons may need to be quickly trained to do the job.

Objectives: The current study investigated whether minimally trained operators were able to manually ventilate a simulated endotracheally intubated patient for six hours.

Methods: Two groups of 10 volunteers, previously unfamiliar with manual ventilation, received brief, structured BVD-tube ventilation training and performed six hours of manual ventilation on an electronic lung simulator. Operator cardiorespiratory variables and perceived effort, as well as the quality of the delivered ventilation, were recorded. Group One ventilated a "normal lung" (compliance 50cmH2O/L, resistance 5cmH2O/L/min). Group Two ventilated a "moderately injured lung" (compliance 20cmH2O/L, resistance 20cmH2O/L/min).

Results: Volunteers' blood pressure, heart rate (HR), respiratory rate (RR), and peripheral capillary oxygen saturation (SpO2) were stable throughout the study. Perceived effort was minimal. The two groups provided clinically adequate and similar RRs (13.3 [SD = 3.0] and 14.1 [SD = 2.5] breaths/minute, respectively) and minute volume (MV; 7.6 [SD = 2.1] and 7.7 [SD = 1.4] L/minute, respectively).

Conclusions: The results indicate that minimally trained persons can effectively perform six hours of manual BVD-tube ventilation of normal and moderately injured lungs, without undue effort. Quality of delivered ventilation was clinically adequate.

Mechanical Ventilation with Room Air is Feasible in a Moderate Acute Respiratory Distress Syndrome Pig Model – Implications for Disaster Situations and Low-Income Nations

By Pinchas Halpern, MD; Michael Goldvaser, MA; Guy Yacov, BA; Amir Rosner, DVM;AdaWenger, MA; Keren Bachar, MD; Shahaf Katalan, MD

Prehosp Disaster Med. 2020;00(0):1–8.

Abstract

Introduction: Patients with respiratory failure are usually mechanically ventilated, mostly with fraction of inspired oxygen (FiO2) > 0.21. Minimizing FiO2 is increasingly an accepted standard. In underserved nations and disasters, salvageable patients requiring mechanical ventilation may outstrip oxygen supplies.

Study Objective: The hypothesis of the present study was that mechanical ventilation with FiO2 = 0.21 is feasible. This assumption was tested in an Acute Respiratory Distress Syndrome (ARDS) model in pigs.

Methods: Seventeen pigs were anesthetized, intubated, and mechanically ventilated with FiO2 = 0.4 and Positive End Expiratory Pressure (PEEP) of 5cmH2O. Acute Respiratory Distress Syndrome was induced by intravenous (IV) oleic acid (OA) infusion, and FiO2 was reduced to 0.21 after 45 minutes of stable moderate ARDS. If peripheral capillary oxygen saturation (SpO2) decreased below 80%, PEEP was increased gradually until maximum 20cmH2O, then inspiratory time elevated from one second to 1.4 seconds.

Results: Animals developed moderate ARDS (mean partial pressure of oxygen [PaO2]/FiO2 = 162.8, peak and mean inspiratory pressures doubled, and lung compliance decreased). The SpO2 decreased to <80% rapidly after FiO2 was decreased to 0.21. In 14/17 animals, increasing PEEP sufficed to maintain SpO2 > 80%. Only in 3/17 animals, elevation of FiO2 to 0.25 after PEEP reached 20cmH2O was needed to maintain SpO2 > 80%. Animals remained hemodynamically stable until euthanasia one hour later.

Conclusions: In a pig model of moderate ARDS, mechanical ventilation with room air was feasible in 14/17 animals by elevating PEEP. These results in animal model support the potential feasibility of lowering FiO2 to 0.21 in some ARDS patients. The present study was conceived to address the ethical and practical paradigm of mechanical ventilation in disasters and underserved areas, which assumes that oxygen is mandatory in respiratory failure and is therefore a rate-limiting factor in care capacity allocation. Further studies are needed before paradigm changes are considered.

EDITOR'S COMMENT: Both papers above focus on how to deal with certain aspects of mass casualty disasters or chemical agent attacks when there are limited supplies and/or resources – particularly apropos today. Ongoing pandemic revealed that it is not only the lack of specialized equipment that affects the outcome of the patients but also the lack of healthcare personnel with certain skills that might affect the quality of services provided – even in rich countries.

The 6-foot social-distancing rule is based on nearly 80-year-old science. Scientists at MIT and Oxford have created a traffic-light system to use instead.

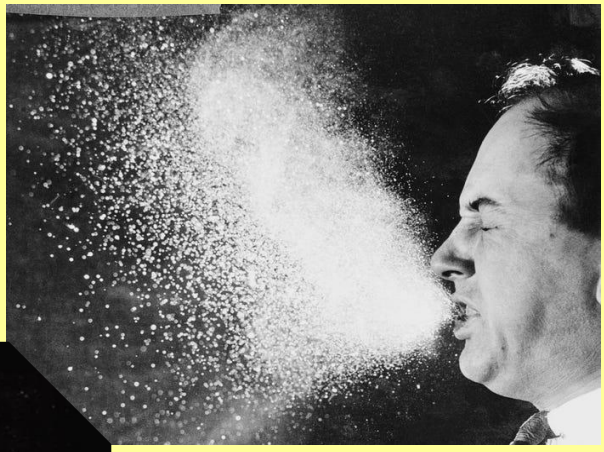
By Hilary Brueck

Source: https://www.businessinsider.com/6-foot-distancing-rule-is-outdated-oxford-mit-new-system-2020-8

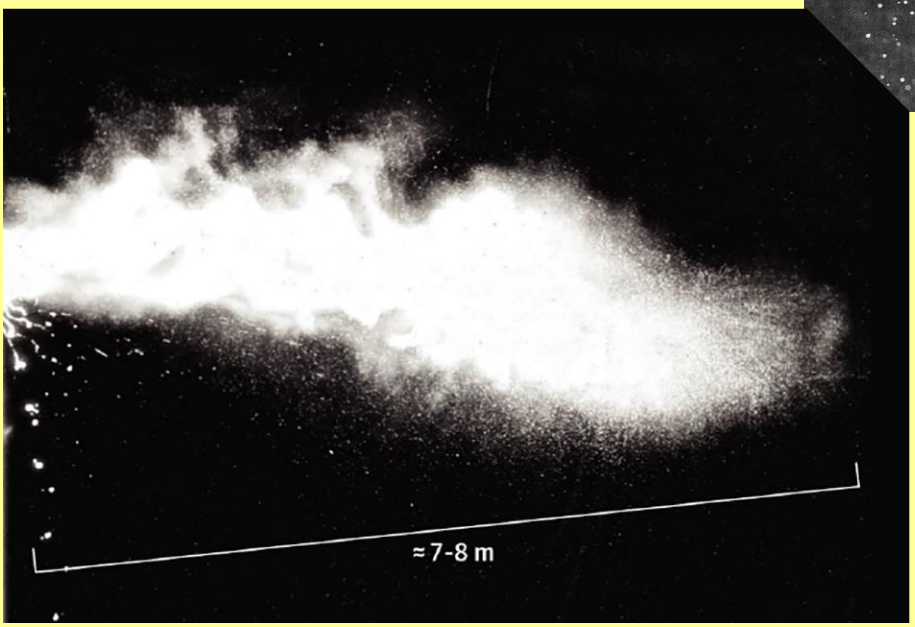
Academics in the reading rooms at the Bodleian Libraries on Tuesday in Oxford, England. After closing in mid-March because of the coronavirus pandemic, the world-famous libraries have partially opened for students and academics with strict social-distancing measures. Christopher Furlong/Getty Images

Aug 28 – In the late 1800s, the German scientist Carl Flügge had a hunch: Maybe if you maintain enough physical distance between people who are sick and those who are well, you can prevent the spread of pathogens from person to person.

At the time, it was just a hypothesis, one that scientists like him often tried to test out using glass plates.
But it would take another four decades for technology to advance enough to confirm the idea, with the advent of high-speed photography.
In the early 1940s, scientists finally got their first glimpses of people's sneezes hurtling through the air in real time, at a capture rate of 30,000 frames a second, confirming that indeed, most of the stuff we throw into the air when we sneeze, cough, or yell tends to settle down to the ground within about a wingspan or so (say, 3 to 6 feet).
Here is one of those (revolting) first images:



This photo of a sneezer caught in the act was taken by the professor Marshall Jennison from MIT and published in a 1941 research paper. Bettmann/Getty Images



Long range video imaging over 8 m of the multiphase turbulent cloud (gas cloud containing liquid droplets of all sizes) from natural human violent emission such as a sneeze, revealing a range of the cloud, and its droplet concentrated payload, of up to 7-8 m (Bourouiba 2020[2]).

When 'the dogma was born'

Back then, scientists maintained that most of the infectious gunk people expel (say, about 90% of their pathogens) travel less than 6 feet away.
Their study measurements were never meant to be taken as hard-and-fast rules about how far we should stand from other people during a pandemic, though.
Nevertheless, these 3-to-6-feet rules of thumb have become easy-to-follow protocols for keeping potentially sick people at arm's length during the coronavirus outbreak.
"The dogma was born," the professor Lidia Morawska, a leading aerosol scientist in Australia, said of the 80-year-old 6-foot rule. "Like any dogma, it's extremely difficult to change people's minds and change the dogmas."
But as the coronavirus pandemic drags on for months on end, Morawska and other leading air and virus scientists and engineers are starting to lead a charge toward dismantling the old 6-foot rule and taking a more nuanced approach to managing the novel coronavirus' spread.

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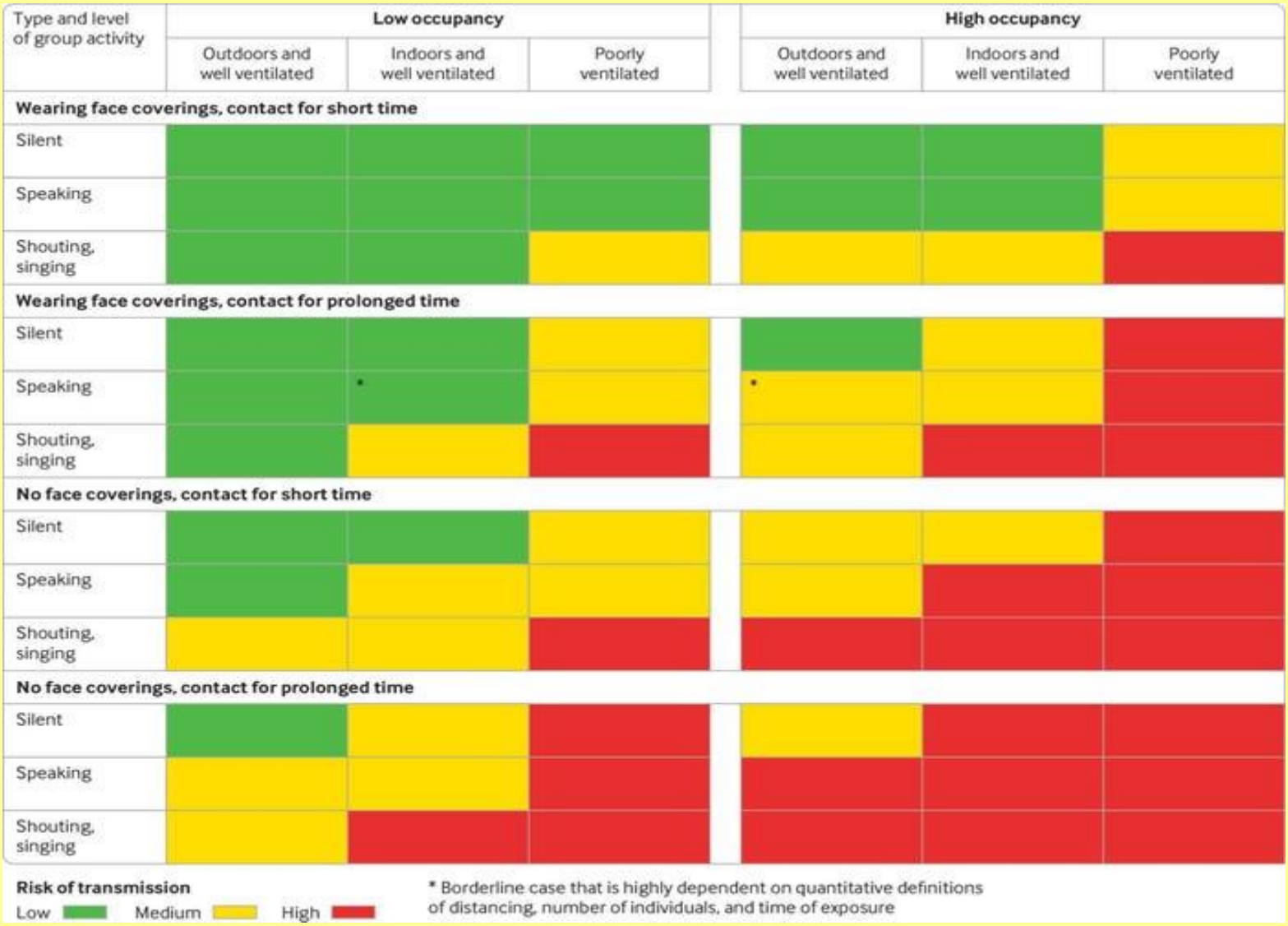
[2] Bourouiba L, Dehandschoewercker E, Bush John WM. *Violent expiratory events: on coughing and sneezing. J Fluid Mech2014; 745:537-63. doi:10.1017/jfm.2014.88.*

Instead of always being on super-high alert, or assuming that a distance of 6 feet (or wearing masks, or washing hands) keeps us 100% safe all the time, they say, we should be learning how better to assess the situations we're in every day, letting our guard down now and again when it's relatively safe and moving back onto high alert when it's appropriate.

Can we start thinking differently?

On Tuesday, hoping to inject a little more of such empowerment into the ways people protect themselves from the virus' spread, researchers from Oxford and MIT released a new traffic-light system that they hope will help people live life to its fullest while still being careful *enough* during the pandemic.



This is the chart that Lydia Bourouiba and her co-authors designed to help people make better decisions about where it's safe to let your guard down, during the pandemic. The BMJ

"With knowledge and tools that are relatively simple to use, that distill complex information, our hope is that decision makers, local community leaders, school leaders, and everybody that is organizing anything like a barbecue or party or a wedding, is empowered to be more resilient, by having the tools to make the right decisions and to impose the right restrictions," Lydia Bourouiba, an MIT professor who directs the university's Fluid Dynamics of Disease Transmission Lab, told Business Insider, shortly before her new tool was released in the BMJ.

"We equip people with understanding to adapt in various situations so that they know when they need to be absolutely vigilant, and when they can let their guard down," she said.

The most important things to keep in mind when assessing the riskiness of any situation include taking a look at the environment you're in and acknowledging the density of the crowd and the activities people are doing.

The coronavirus doesn't follow hard-and-fast rules about infection, and neither should you

Environmental scientists like Morawska say when it comes to talking about how the coronavirus spreads, there's no point in trying to distinguish a droplet from an aerosol or distinguish what happens at 3 feet away versus 10. What matters most is how much virus has a chance to get into your body, regardless of how it gets there.

"There are three modes of transmission, and all three modes of transmission have to be controlled," she said.

Those three modes are people (the most common source of infection), surfaces, and the air.

"These things happen at the same time, and therefore distinguishing what's what is very difficult," Morawska said.

Life is more dangerous, then, in places where people become animated, excited, or otherwise loud in close confines, with stale air.

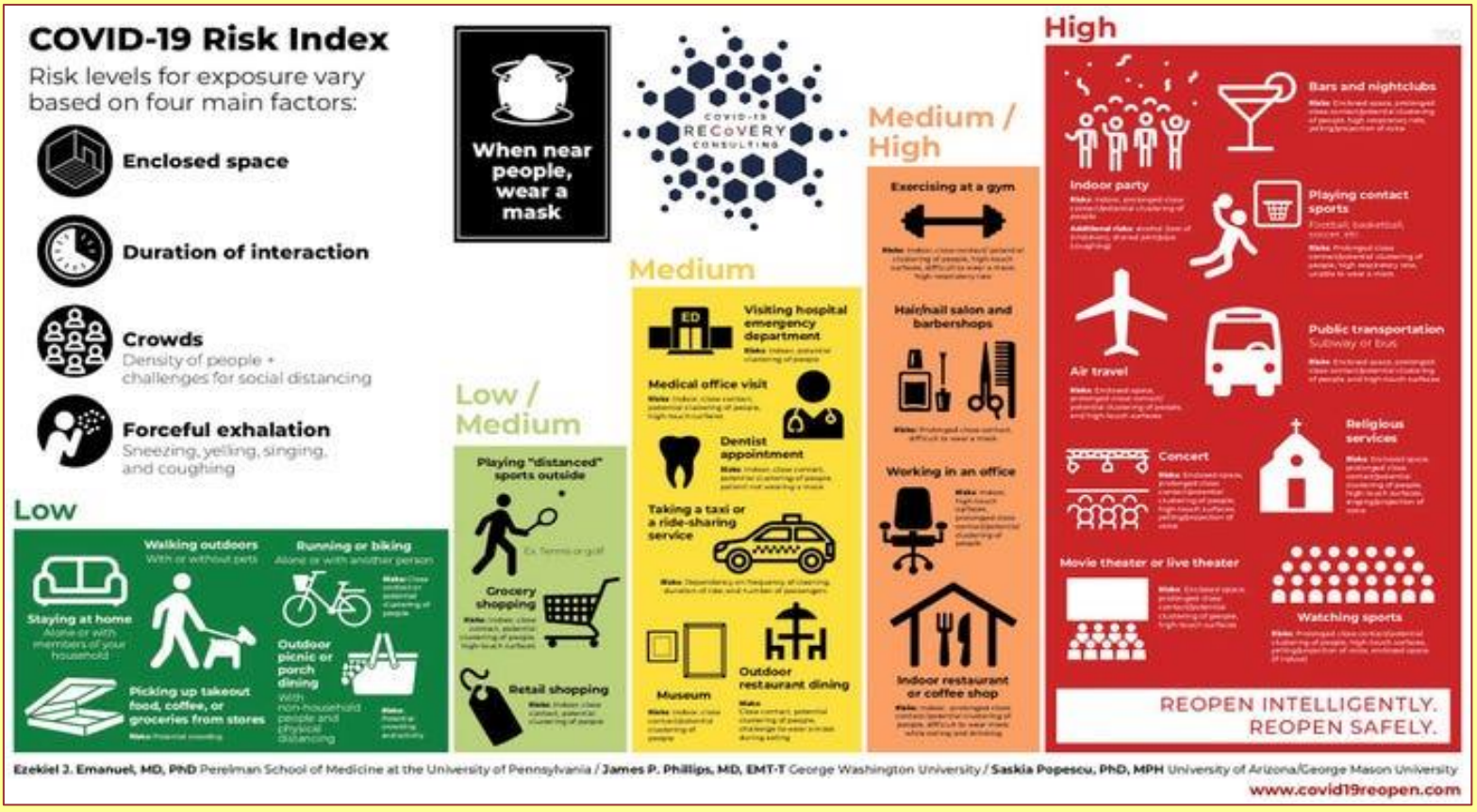
"Breathing out, singing, coughing, and sneezing generate warm, moist, high-momentum gas clouds of exhaled air containing respiratory droplets," Bourouiba and her coauthors wrote in the BMJ.

In such instances, a distance of even 20 to 30 feet may not be enough to protect you from an infection.

Meatpacking plants are then understandably ripe for viral spread because "the combination of high levels of worker contagion, poor ventilation, cramped working conditions, background noise (which leads to shouting), and low compliance with mask wearing" all contribute to viral spread, Bourouiba and her coauthors noted.

The same issue pops up easily in bars, gyms, indoor music venues, churches, and clubs.

We need to be able to adapt to environments with different levels of vigilance so we're not constantly on max alert

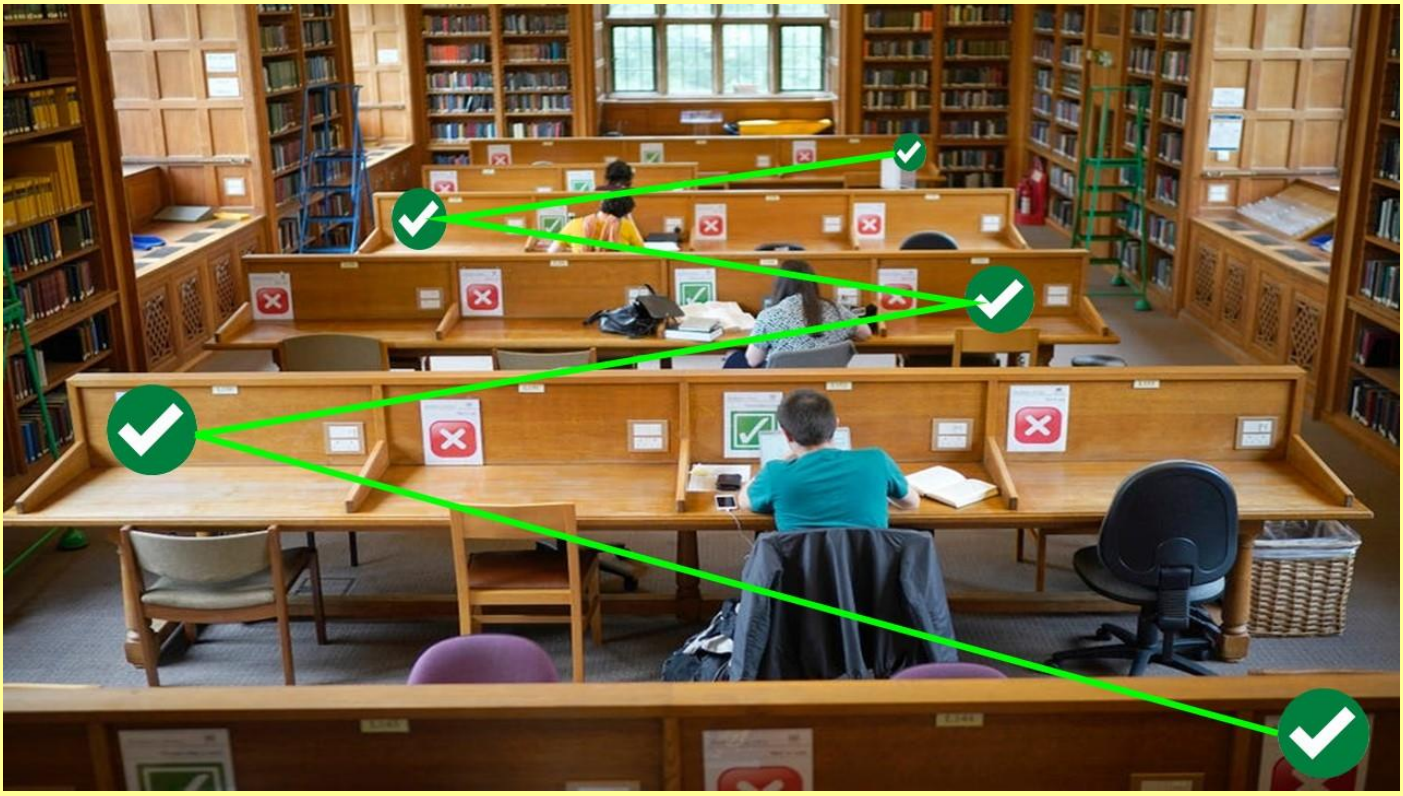


A different risk chart, similar to the one that Bourouiba and her coauthors invented for the BMJ, which weighs the relative risks of different activities during the pandemic, based on various criteria. Dr. Ezekiel Emanuel - University of Pennsylvania, Dr. James Phillips - George Washington University, Saskia Popescu - University of Arizona/George Mason University

Engineers, virologists, and environmental scientists all stress that learning how to live with the virus can be done.

"I think everybody understands what traffic lights are in the general public," Bourouiba said.

She says it's important to have such guides in mind as we weigh how to reopen, gather, and socialize during the pandemic, keeping our environment, and our behaviors in it, top of mind.
"We need to be able to adapt so that we are not constantly at max alert," she said. "Not just the 6-foot rule or the mask on its own," she added.
The simple questions to ask include: How long is the contact? Are people wearing face masks? Is the setting well-ventilated? And will it be quiet or loud?
"It's not rocket science to work out what needs to be done to minimize the risk of infection transmission," Morawska said.



Editor's proposal

Cat Got Your SARS-CoV-2 Antiviral?

Source: https://www.genengnews.com/news/cat-got-your-sars-cov-2-antiviral/

Aug 27 – After the 2003 outbreak of severe acute respiratory syndrome (SARS), researchers developed an antiviral drug that proved to be effective against **feline coronavirus** (FCoV), which sometimes leads to feline infectious peritonitis (FIP), an often-fatal disease in cats. Now it appears that the antiviral drug, a dipeptide-based protease inhibitor, may benefit COVID-19 patients.
The new findings are being reported by scientists at the University of Alberta (U of A), one of whom was also involved in the earliest work on the antiviral drug. This scientist, John C. Vederas, PhD, professor of chemistry, like his U of A colleagues D. Lorne Tyrrell, MD, PhD, professor, department of medical microbiology & immunology and M. Joanne Lemieux, PhD, professor of structural biology, is a corresponding author of a paper ("Feline coronavirus drug inhibits the main protease of SARS-CoV-2 and blocks virus replication") that appeared August 27 in *Nature Communications*.
Actually, the findings first appeared May 4 on *BioRxIV*, a research website. But the scientists could hardly be accused of letting the cat out of the bag. "There's a rule with COVID research that all results need to be made public immediately," said Lemieux, which is why the findings were posted before being published in a peer-reviewed journal.

She added that the article, which reflects the contributions of four U of A laboratories and the Stanford Synchrotron Radiation Lightsource, was accessed thousands of times as soon as it was posted. The scientists synthesized their antiviral compounds—a **prodrug (GC376) and its parent (GC373**)—and tested them against the SARS-CoV-2 virus in test tubes and in human cell lines. The scientists also studied crystal structures to determine how the drug binds with its protease target.

"In just two months, our results have shown that the drug is effective at inhibiting viral replication in cells with SARS-CoV-2," Lemieux asserted. "This drug is very likely to work in humans, so we're encouraged that it will be an effective antiviral treatment for COVID-19 patients."

The U of A researchers are preparing to launch clinical trials of the drug. In the meantime, they will continue to test modifications of the drug. "We determined the three-dimensional shape of the protease with the drug in the active site pocket, showing the mechanism of inhibition," she explained. "This will allow us to develop even more effective drugs." She added, however, that the current drug shows enough antiviral action against SARS-CoV-2 to proceed immediately to clinical trials.

In their *Nature Communications* article, the scientists examined the use of the prodrug, GC376, and the parent drug, GC373, to test inhibition of the SARS-CoV-2 M^{pro} in vitro. By inhibiting M^{pro}, which plays an essential role in the cleavage of the virus polypeptide, GC376 and GC373 interferes with the virus's ability to replicate, thus ending an infection.

"We demonstrate using recombinant SARS-CoV-2 M^{pro} that **GC373 and GC376 are potent inhibitors in the nanomolar range**," the article's authors detailed. "Crystal structures and NMR analysis of SARS-CoV-2 M^{pro} with GC373 and GC376 demonstrates the drug is covalently attached to Cys145 as a hemithioacetal and reveals residues important in inhibitor specificity. In cell culture, we show GC376 and GC373 block virus replication with no toxicity."

The researchers have established a collaboration with Anivive Life Sciences, a veterinary medicine company that is developing the drug for cats, to produce the quality and quantity of drug needed for human clinical trials. Lemieux said it will likely be tested in Alberta in combination with other promising antivirals such as remdesivir, the first treatment approved for conditional use in some countries including the United States and Canada.

"Typically for a drug to go into clinical trials, it has to be confirmed in the lab and then tested in animal models," Lemieux emphasized. "Because this drug has already been used to treat cats with coronavirus, and it's effective with little to no toxicity, it's already passed those stages, and this allows us to move forward."

Preventing Biological Threats: What You Can Do

Authors: Whitby, Simon M., Novossiolova, Tatyana, Walther, Gerald and Dando, Malcolm R.

Source:https://www.researchgate.net/publication/339677170_Preventing_Biological_Threats_What_You_Can_Do_A_Guide_to_Biological_Security_Issues_and_How_to_Address_Them_Credits_Contents

The outbreak of Ebola in West Africa in 2014 has underlined the risks posed by outbreaks of highly virulent and deadly diseases, whether caused naturally, accidentally or deliberately. It also emphasised the responsibility of all those engaged in the life sciences, whether in government, industry or academia, to ensure that research is done safely and securely. This book, Preventing Biological Threats, is intended to raise awareness and knowledge of biological security of everyone active in the life sciences, ranging from those engaged in research to those engaged in management and policy-making, both nationally and internationally. The advances in biotechnology over the past decades and in the future have brought and will bring significant benefits to humankind, animals and plants -- however, these advances also bring risks that we need to be aware of and ensure that they cause no harm. The continuing debate about the potential danger of carrying out 'Gain-of-Function' experiments with highly pathogenic viruses such as avian influenza has brought the problem of biological security to the attention of many within but also beyond the life science community. It also has left some of them wondering what biological security is and how it can be incorporated into the life sciences. What steps should be taken to ensure that these and other dual use research activities are not misused? It is being increasingly recognised that biosecurity and biosafety are not only relevant to activities within a laboratory, but also extend to the effects that these activities can have outside the laboratory if they result in accidental outbreaks of diseases in humans, animals or plants. The international basis for the prevention of the hostile misuse of life sciences is the Biological and Toxin

Weapons Convention which this year, on 26 March 2015, has been in force for forty years. The Convention was the first treaty to prohibit the development and possession of an entire category of weapons. At this moment 173 States Parties have ratified the Convention (and the Convention has a further 9 Signatories). At the Seventh Review Conference of the Biological and Toxin Weapons Convention in 2011, of which I was President, the States Parties agreed on the need for all those engaged in the life sciences to be involved as key stakeholders in the protection of their work from hostile misuse, and therefore on the importance of broad biosecurity education. This book with its 21 chapters addresses the need for biosecurity education, in six sections on the history of threats and responses; scientists, organisations and biosecurity; biosecurity and law enforcement; states and biosecurity; and biosecurity and active learning. It is a significant and welcome step forward both in its integrated content and the active learning focus in the associated Team Based Learning exercises. I am convinced that this approach will help all those engaged in the life sciences - in government, industry or academia – to become more aware of biosecurity and of their responsibilities for it. It is therefore a great pleasure to commend the authors and editors for their work and the Governments of Canada, Jordan and the United Kingdom for their funding and involvement in the production of this book under the Global Partnership. Ambassador Paul van den Ijssel.

12 Experts Questioning the Coronavirus Panic

Source: https://www.globalresearch.ca/12-experts-questioning-coronavirus-panic/5707532

A list of twelve medical experts whose opinions on the Coronavirus outbreak contradict the official narratives of the MSM, and the memes so prevalent on social media.

Large Study Links Asthma, Allergic Rhinitis to Severe COVID-19

Source (full paper): https://www.jacionline.org/action/showPdf?pii=S0091-6749%2820%2931136-2

Aug 27 – **People with allergic rhinitis and asthma may be slightly more prone to contracting COVID-19 and considerably more to developing severe disease when infected, according to a nationwide cohort study from South Korea.**

The risk was especially high for individuals with non-allergic asthma, who were more than four times as likely to have severe COVID-19 as those without asthma, Dr. Jee Myung Yang of the University of Ulsan College of Medicine, in Seoul, and colleagues found.

The team says their study provides strong evidence of a link between respiratory allergic diseases and the risk of contracting COVID-19 and/or having worse clinical outcomes of the infection.

Studies of COVID-19 and asthma to date have had mixed results, and small sample sizes, the authors note in the Journal of Allergy and Clinical Immunology.

They looked at data from South Korea's Health Insurance Review and Assessment Service for more than 219,000 adults who underwent COVID testing between January 1 and May 15, including 14.9% diagnosed with asthma, 63.1% with allergic rhinitis and 3.9% with atopic dermatitis.

A total of 7,340 tested positive for SARS-CoV-2, including 725 with asthma (9.9%), 4,210 with allergic rhinitis (57.4%) and 136 with atopic dermatitis (1.9%).

The rate of SARS-CoV-2 positivity was 2.3% for people with asthma and 2.2% for those without asthma (adjusted odds ratio 1.08; 95% confidence interval, 1.01 to 1.17) and 3.3% and 2.8% for those with and without allergic rhinitis, respectively (aOR, 1.18; 95% CI, 1.11 to 1.25).

The increase was greater for those with non-allergic asthma (aOR, 1.34; 95% CI, 1.07 to 1.71) than those with allergic asthma (aOR, 1.06; 95% CI, 0.97 to 1.17).

Severe clinical outcomes occurred in 6.9% of patients with asthma and 4.5% of those without (aOR, 1.62; 95% CI, 1.01 to 2.67), and in 4.7% of patients with allergic rhinitis and 3.7% of those with no allergic rhinitis (aOR, 1.27; 95% CI, 1.00 to 1.64).

The odds of developing severe COVID-19 was more than quadrupled for patients with non-allergic asthma (aOR, 4.09; 95% CI, 1.69 to 10.52), while the risk increase was less pronounced for those with allergic asthma (aOR, 1.40; 95% CI, 0.83 to 2.41).

Average hospital stay was 22.8 days for patients with allergic rhinitis and 21.8 days for those without allergic rhinitis (adjusted mean difference, 0.71; 95% CI, 0.02-1.40). Patients with asthma spent a mean of 24.6 days in the hospital, versus 22.1 days for those without (adjusted mean difference, 0.89; 95% CI, -0.25 to 2.3).

"**Because the immunological profile of COVID-19 patients is polarized toward a classic Th1 response, patients with non-allergic asthma might manifest an aggravated Th1 immune response.** Thus, they are predisposed to severe clinical outcomes of COVID-19," the authors write "Given these potential associations, patients with non-allergic asthma should be aware of the severe clinical outcomes of COVID-19, and careful monitoring of inflammatory status in this population should be emphasized."

Statins and Mortality

Source: https://www.medscape.com/viewarticle/936530

Aug 28 – Treatment with statins was associated with a reduced risk for a severe or fatal course of COVID-19, a meta-analysis of four retrospective studies suggests.
The analysis included nearly 9000 COVID-19 patients, and found a 30% reduced risk for fatal or severe COVID-19 among patients who were users of statins compared with nonusers. The findings "discredited the suggestion of harms with the use of statins in COVID-19 patients," the authors conclude.
While they caution that data from prospective studies is necessary to substantiate the results, they also propose that "moderate-to-high intensity statin therapy is likely to be beneficial" for COVID-19 patients.

Here Are 6 Myths About Masks That People Really Need to Stop Sharing

Source: https://www.sciencealert.com/here-are-6-myths-about-masks-that-everyone-should-stop-believing

Aug 29 – In recent months, masks have become a highly polarising topic. Despite intense debates online, and the sometimes violent conflicts that erupt in public about mask requirements, the science behind mask-wearing is not at all controversial.
There's extensive evidence to support wearing a mask to protect both yourself and other people, and help slow the spread of the coronavirus.
Here are some of the most common myths used to argue against mask-wearing, and why they're wrong.

Wearing a mask won't worsen a coronavirus infection

Myth: If I have the virus, wearing a mask means I'll be re-exposed to viral particles I exhale, making me sicker.
Fact: This claim was circulated in the pseudoscience documentary *Plandemic*, which has been thoroughly debunked by scientists.
You can't reinfect yourself if you already have the virus, and it's impossible for it to somehow "reactivate" in your body, research has shown.
"There is no science behind it, and it's totally false," microbiologist Dr. Miryam Wahrman, author of *The Hand Book: Surviving in a Germ-filled World*, previously told Business Insider about this claim.
More and more evidence suggests that once your body mounts an immune response to COVID-19, it's protected – for some time – from reinfection.

Masks don't reduce your oxygen levels

Myth: I can't breathe in a mask. It might be dangerous to wear one because it could limit my oxygen levels.
Fact: Masks have consistently been shown to be safe, which is why they were already used heavily by medical personnel even before the pandemic. The common rumour that they reduce the oxygen saturation level of your blood has been debunked by multiple medical doctors.
Furthermore, despite claims that a mask could exacerbate health conditions like asthma, doctors have repeatedly stated that there's no legitimate reason for a medical exemption from wearing a mask. Strategies like fitting your mask properly and choosing the right type of mask can help.
You can even work out in a mask until it becomes saturated with sweat, at which point it's less effective.
Certain types of industrial-quality sealed respirators may affect levels of oxygen intake, especially when worn for a prolonged period of time, but the most common types of protective mask, such as surgical masks and cloth masks, will not interfere with oxygen levels.

You should wear a mask even if you don't have symptoms

Myth: If I feel fine and don't have a cough or fever, I don't need to wear a mask.

Fact: As many as 40 percent of people infected with the coronavirus show no symptoms at all. These asymptomatic carriers of the virus can still spread it to other people without ever knowing they were sick in the first place.
Even people who do show signs of illness can be contagious before symptoms appear, research has shown.
This could be particularly crucial for young people as schools struggle to reopen this fall, since there is some evidence children are more likely to spread the virus without symptoms than adults.
That makes it especially important to have a consistent and comprehensive policies on mask-wearing to help slow the spread of the virus as people return to public life.

Masks protect the people around you

Myth: Only people who are afraid of getting sick should wear masks. If I'm healthy or brave, I don't have to.
Fact: The primary benefit of wearing a mask is to prevent the people around you from getting sick, which is why it's so important for everyone to do it, according to research.
Masks work by blocking potentially-contagious respiratory particles from flying out into the surrounding air (and onto other people) every time you cough, sneeze, breathe, or speak. They can also prevent you from breathing in some particles expelled by other people.
Inconsistent messaging about masks from health officials early on in the pandemic may have contributed to this myth, leading some people to believe healthy people don't need masks.
But based on the latest research, the most effective scenario for reducing coronavirus infection is when everyone involved wears a mask.
In a recent study from the CDC, masks helped to stop an outbreak at a hair salon in Missouri. Even though two employees were asymptomatic carriers of the virus, not a single one of 139 clients got sick, since clients and stylists all wore masks.

Neck gaiters don't increase your risk of viral infection

Myth: Research found that neck gaiters, the fleece wraps that runners often use, are worse for coronavirus risk than no mask at all.
Fact: A study from Duke University researchers swept the internet this month, reportedly finding that people who wear neck gaiters would be safer wearing no mask at all.
But these results were framed out of context. The study was not looking at the effectiveness of masks. In fact, researchers were studying how to measure a mask's effectiveness.
This is a key distinction since, as the researchers themselves note, the results were not intended to be comprehensive, but just to demonstrate that the methodology could work for larger-scale studies on masks to help compare their effectiveness.
It's true that some masks may be more effective than others, but more research is needed to understand how neck gaiters measure up in terms of effectiveness.

The science is clear that wearing a mask can help reduce the spread of the virus

Myth: Wearing a mask is an issue of politics, freedom, or just "virtue-signalling", and doesn't make a practical difference in whether or not people get sick.
Fact: The research is unambiguous. Masks work to reduce the spread of infectious viral particles, thereby preventing additional cases of the virus. Recent research from the UK found the getting the entire population to wear masks could be enough to slow the virus without resorting to lockdowns.
The more people wear masks, the more effectively a community can control the disease.
Health officials in the US, which has struggled to contain the coronavirus, are urging the public to wear masks after models have suggested doing so could save thousands of lives.

Masks don't replace other precautions like social distancing and hand-washing

Myth: If I wear a mask, I can be close to other people or in large groups without worrying.
Fact: While the research is clear that masks work, masks alone aren't enough. Health experts continue to recommend other precautions to slow the spread of the virus, such as washing your hands frequently and maintaining at least a 6-foot (2-metre) distance from others whenever possible.
Research has shown that these preventative measures, when combined, can significantly reduce the rate of transmission and save lives.

Swimming Is One Thing in The Pandemic. The Crowd at The Beach Is Something Else

Source: https://www.sciencealert.com/in-covid-19-risk-swimming-is-one-thing-the-crowd-at-the-beach-is-something-else

Aug 29 – As summer comes to an end, Americans are eager to make the most of the last remaining beach days – and across the country, some public pools and beaches are open with restrictions.

In Los Angeles County, for example, beaches reopened on May 13 for recreational activities including swimming and surfing. In Georgia, pools reopened the same day, provided the facilities could follow guidelines like limiting capacity to 10 people if they can't maintain six feet between patrons.

New York City reopened 15 of its public swimming pools on July 24 and Aug. 1. In Florida, lap swimmers can exercise in pools while following precautions like remaining six feet from other swimmers, limiting their time to one hour, and being prepared to swim only, since the showers and locker rooms are closed.

New York, New Jersey, Connecticut, and Delaware opened state beaches and lakeshores (though not those in New York City) at half capacity on May 22. Outside of the US, the French Riviera is open to recreationalists including swimmers, but they can't sunbathe afterwards.

But some swimmers are wary: Some viruses, bacteria, and parasites thrive in water. Last year, for example, there was an uptick in crypto infections, which can lead to diarrhoea and vomiting, at pools and water parks due to a parasite called cryptosporidium that's highly resistant to chlorine.

Fortunately, it seems highly unlikely you'll catch the coronavirus through water, but, as always, you can catch it from other people. Here's what to know about the risks of swimming, and how to make the smartest decision for you.

Water itself is unlikely to transmit the novel coronavirus

According to the Centers for Disease Control and Prevention, "there is **no evidence** that the virus that causes COVID-19 can be spread to people through the water in pools, hot tubs, spas, or water play areas." It says that treating these types of facilities with chemicals including chlorine should "should inactivate the virus in the water."

Even fresh or salt water is highly unlikely to spread the coronavirus since other coronaviruses aren't stable in water, Angela Rasmussen, a virologist at the Columbia University Mailman School of Public Health, told *The New York Times*.

That seems to be in part due to the fact that water dilutes the spit droplets that can transmit the disease, Dr. Leonard A. Mermel, a professor of medicine at the Warren Alpert Medical School of Brown University, said during an Infectious Diseases Society of America seminar on May 19.

And, although coronavirus RNA has been found in faeces, which could theoretically spread through water if you accidentally get some in your mouth, the virus in faeces "doesn't appear to be in an infective state," Krista Wigginton, an associate professor of environmental engineering at the University of Michigan's College of Engineering, told Insider.

"The bigger risk from all of these activities would be from interacting with others who are talking, coughing, or sneezing nearby," she said.

Plus, because catching the coronavirus usually involves inhaling it, not swallowing it, water is an unlikely route of transmission, Joseph Eisenberg, chair of the epidemiology department at the University of Michigan's School of Public Health, told Business Insider.

"In general, respiratory pathogens don't survive in the water," he said.

What we don't know about coronavirus in water

There's still a lot researchers don't know for sure about how this coronavirus acts in water.

There's a chance it could be spread in places where ocean water mixes with untreated wastewater that's contaminated by the virus. The waves could then, in theory, launch the virus into particles that the wind carries back to shore, according to the *South Florida Sun Sentinel*.

Kim Prather, an atmospheric chemist at the Scripps Institution of Oceanography in San Diego, is currently studying whether that's the case.

Charles Gerba, a professor of microbiology and immunology at the University of Arizona, told WebMD the virus could be in ocean water near sewage runoffs, but isn't particularly worried about it.

"I'd be more worried about hepatitis, swimming in raw sewage discharge, or many of the other pathogens," he said. "They present a far greater magnitude of risk, even if it turns out that coronavirus is transmitted by water."

Take serious precautions if you plan to swim

No matter the activity, the risk of contracting COVID-19 mostly depends on the same few factors: **How close are you to how many people, and for how long?**

"The general principle should be: Outside is better than inside; open is better than closed; fewer is better than more people; and stay away from sick people," Dr. Erich Anderer, a neurosurgeon and founding member of the North Brooklyn Runners group, previously told Insider.

When it comes to swimming, then, "swimming in an uncrowded pool, lake, or ocean is likely low risk compared to indoor activities and crowded outdoor activities like going to restaurants, malls, stores, and concerts," Wigginton said.

Broken down further: Jumping in a private chlorinated outdoor pool is about as safe as you can get, while riding waves on a busy ocean-front is riskier, particularly if you're clamoring for space to set up your towel on the sand afterward.

As for pools, lap swimming in a well-treated pool where you have your own lane and empty lanes next to you is pretty low-risk, while splashing around in a crowded indoor pool is higher risk because you'll likely be in close contact with others' spit as they yell "Marco Polo" or cough when accidentally gulping down some water.

It's even more dangerous if you're also using the locker room, where you may not only be in close proximity to strangers who aren't wearing masks, but also touching surfaces like doorknobs and shower handles that can harbour the virus.

Ultimately, **use common sense**. Swimming brings massive physical and mental benefits. If you can do it with a risk level, you're comfortable with, dive in.

A Supercomputer Analyzed Covid-19 — and an Interesting New Theory Has Emerged

Source: https://elemental.medium.com/a-supercomputer-analyzed-covid-19-and-an-interesting-new-theory-has-emerged-31cb8eba9d63

Sept 01 – Earlier this summer, the Summit supercomputer at Oak Ridge National Lab in Tennessee set about crunching data on more than 40,000 genes from 17,000 genetic samples in an effort to better understand Covid-19. Summit is the second-fastest computer in the world, but the process — which involved analyzing 2.5 billion genetic combinations — still took more than a week.

When Summit was done, researchers analyzed the results. It was, in the words of Dr. Daniel Jacobson, lead researcher and chief scientist for computational systems biology at Oak Ridge, a "eureka moment." The computer had revealed a new theory about how Covid-19 impacts the body: the bradykinin hypothesis. The hypothesis provides a model that explains many aspects of Covid-19, including some of its most bizarre symptoms. It also suggests 10-plus potential treatments, many of which are already FDA approved.

Jacobson's group published their results in a paper in the journal *eLife* in early July.

According to the team's findings, a Covid-19 infection generally begins when the virus enters the body through ACE2 receptors in the nose, (The receptors, which the virus is known to target, are abundant there.) The virus then proceeds through the body, entering cells in other places where ACE2 is also present: the intestines, kidneys, and heart. This likely accounts for at least some of the disease's cardiac and GI symptoms.

But once Covid-19 has established itself in the body, things start to get really interesting. According to Jacobson's group, the data Summit analyzed shows that Covid-19 isn't content to simply infect cells that already express lots of ACE2 receptors. Instead, it actively hijacks the body's own systems,

tricking it into upregulating ACE2 receptors in places where they're usually expressed at low or medium levels, including the lungs. In this sense, Covid-19 is like a burglar who slips in your unlocked second-floor window and starts to ransack your house. Once inside, though, they don't just take your stuff — they also throw open all your doors and windows so their accomplices can rush in and help pillage more efficiently.

The RAS controls many aspects of the circulatory system, including the body's levels of a chemical called bradykinin, which normally helps to regulate blood pressure. According to the team's analysis, when the virus tweaks the RAS, it causes the body's mechanisms for regulating bradykinin to go haywire. Bradykinin receptors are resensitized, and the body also stops effectively breaking down bradykinin. (ACE normally degrades bradykinin, but when the virus downregulates it, it can't do this as effectively.)

The end result, the researchers say, is to release a bradykinin storm — a massive, runaway buildup of bradykinin in the body. According to the bradykinin hypothesis, it's this storm that is ultimately responsible for many of Covid-19's deadly effects. Jacobson's team says in their paper that "the pathology of Covid-19 is likely the result of Bradykinin Storms rather than cytokine storms," which had been previously identified in Covid-19 patients, but that "the two may be intricately linked." Other papers had previously identified bradykinin storms as a possible cause of Covid-19's pathologies.

Covid-19 is like a burglar who slips in your unlocked second-floor window and starts to ransack your house.

As bradykinin builds up in the body, it dramatically increases vascular permeability. In short, it makes your blood vessels leaky. This aligns with recent clinical data, which increasingly views Covid-19 primarily as a vascular disease, rather than a respiratory one. But Covid-19 still has a massive effect on the lungs. As blood vessels start to leak due to a bradykinin storm, the researchers say, the lungs can fill with fluid. Immune cells

And Covid-19 has another especially insidious trick. Through another pathway, the team's data shows, it increases production of hyaluronic acid (HLA) in the lungs. HLA is often used in soaps and lotions for its ability to absorb more than 1,000 times its weight in fluid. When it combines with fluid leaking into the lungs, the results are disastrous: It forms a hydrogel, which can fill the lungs in some patients. According to Jacobson, once this happens, "it's like trying to breathe through Jell-O."

This may explain why ventilators have proven less effective in treating advanced Covid-19 than doctors originally expected, based on experiences with other viruses. "It reaches a point where regardless of how much oxygen you pump in, it doesn't matter, because the alveoli in the lungs are filled with this hydrogel," Jacobson says. "The lungs become like a water balloon." Patients can suffocate even while receiving full breathing support.

The bradykinin hypothesis also extends to many of Covid-19's effects on the heart. About one in five hospitalized Covid-19 patients have damage to their hearts, even if they never had cardiac issues before. Some of this is likely due to the virus infecting the heart directly through its ACE2 receptors. But the RAS also controls aspects of cardiac contractions and blood pressure. According to the researchers, bradykinin storms could create arrhythmias and low blood pressure, which are often seen in Covid-19 patients.

The bradykinin hypothesis also accounts for Covid-19's neurological effects, which are some of the most surprising and concerning elements of the disease. These symptoms (which include dizziness, seizures, delirium, and stroke) are present in as many as half of hospitalized Covid-19 patients. According to Jacobson and his team, MRI studies in France revealed that many Covid-19 patients have evidence of leaky blood vessels in their brains.

Bradykinin — especially at high doses — can also lead to a breakdown of the blood-brain barrier. Under normal circumstances, this barrier acts as a filter between your brain and the rest of your circulatory system. It lets in the nutrients and small molecules that the brain needs to function, while keeping out toxins and pathogens and keeping the brain's internal environment tightly regulated.

If bradykinin storms cause the blood-brain barrier to break down, this could allow harmful cells and compounds into the brain, leading to inflammation, potential brain damage, and many of the neurological symptoms Covid-19 patients experience. Jacobson told me, "It is a reasonable hypothesis that many of the neurological symptoms in Covid-19 could be due to an excess of bradykinin. It has been reported that bradykinin would indeed be likely to increase the permeability of the blood-brain barrier. In addition, similar neurological symptoms have been observed in other diseases that result from an excess of bradykinin."

Increased bradykinin levels could also account for other common Covid-19 symptoms. ACE inhibitors — a class of drugs used to treat high blood pressure — have a similar effect on the RAS system as Covid-19, increasing bradykinin levels. In fact, Jacobson and his team note in their paper that "the virus… acts pharmacologically as an ACE inhibitor" — almost directly mirroring the actions of these drugs.

By acting like a natural ACE inhibitor, Covid-19 may be causing the same effects that hypertensive patients sometimes get when they take blood pressure–lowering drugs. ACE inhibitors are known to cause a dry cough and fatigue, two textbook symptoms of Covid-19. And they can potentially increase blood potassium levels, which has also been observed in Covid-19 patients. The similarities between ACE inhibitor side effects and Covid-19 symptoms strengthen the bradykinin hypothesis, the researchers say.

ACE inhibitors are also known to cause a loss of taste and smell. Jacobson stresses, though, that this symptom is more likely due to the virus "affecting the cells surrounding olfactory nerve cells" than the direct effects of bradykinin.

Though still an emerging theory, the bradykinin hypothesis explains several other of Covid-19's seemingly bizarre symptoms. Jacobson and his team speculate that leaky vasculature caused by bradykinin storms could be responsible for "Covid toes," a condition involving swollen, bruised toes that some Covid-19 patients experience. Bradykinin can also mess with the thyroid gland, which could produce the thyroid symptoms recently observed in some patients.

The bradykinin hypothesis could also explain some of the broader demographic patterns of the disease's spread. The researchers note that some aspects of the RAS system are sex-linked, with proteins for several receptors (such as one called TMSB4X) located on the X chromosome. This means that "women… would have twice the levels of this protein than men," a result borne out by the researchers' data. In their paper, Jacobson's team concludes that this "could explain the lower incidence of Covid-19 induced mortality in women." A genetic quirk of the RAS could be giving women extra protection against the disease.

The bradykinin hypothesis provides a model that "contributes to a better understanding of Covid-19" and "adds novelty to the existing literature," according to scientists Frank van de Veerdonk, Jos WM van der Meer, and Roger Little, who peer-reviewed the team's paper. It predicts nearly all the disease's symptoms, even ones (like bruises on the toes) that at first appear random, and further suggests new treatments for the disease.

As Jacobson and team point out, several drugs target aspects of the RAS and are already FDA approved to treat other conditions. They could arguably be applied to treating Covid-19 as well. Several, like danazol, stanozolol, and ecallantide, reduce bradykinin production and could potentially stop a deadly bradykinin storm. Others, like icatibant, reduce bradykinin signaling and could blunt its effects once it's already in the body.

Interestingly, Jacobson's team also suggests vitamin D as a potentially useful Covid-19 drug. The vitamin is involved in the RAS system and could prove helpful by reducing levels of another compound, known as REN. Again, this could stop potentially deadly bradykinin storms from forming. The researchers note that vitamin D has already been shown to help those with Covid-19. The vitamin is readily available over the counter, and around 20% of the population is deficient. If indeed the vitamin proves effective at reducing the severity of bradykinin storms, it could be an easy, relatively safe way to reduce the severity of the virus.

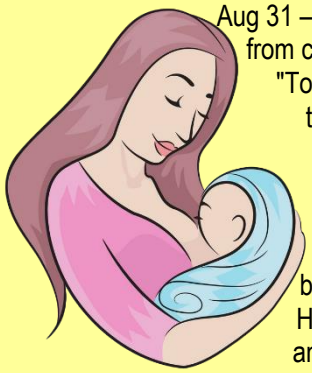
Other compounds could treat symptoms associated with bradykinin storms. Hymecromone, for example, could reduce hyaluronic acid levels, potentially stopping deadly hydrogels from forming in the lungs. And timbetasin could mimic the mechanism that the researchers believe protects women from more severe Covid-19 infections. All of these potential treatments are speculative, of course, and would need to be studied in a rigorous, controlled environment before their effectiveness could be determined and they could be used more broadly.

Covid-19 stands out for both the scale of its global impact and the apparent randomness of its many symptoms. Physicians have struggled to understand the disease and come up with a unified theory for how it works. Though as of yet unproven, the bradykinin hypothesis provides such a theory. And like all good hypotheses, it also provides specific, testable predictions — in this case, actual drugs that could provide relief to real patients.

The researchers are quick to point out that "the testing of any of these pharmaceutical interventions should be done in well-designed clinical trials." As to the next step in the process, Jacobson is clear: "We have to get this message out." His team's finding won't cure Covid-19. But if the treatments it points to pan out in the clinic, interventions guided by the bradykinin hypothesis could greatly reduce patients' suffering — and potentially save lives.

SARS-CoV-2 Appears Unlikely to Pass Through Breast Milk

Source: https://www.medscape.com/viewarticle/936609?src=wnl_edit_tpal&uac=82598DG&impID=2540295&faf=1



Aug 31 – Breast milk is an unlikely source of transmission of SARS-CoV-2 from mothers to infants, according to data from case reports and breast milk samples from 18 women.

"To date, SARS-CoV-2 has not been isolated from breast milk, and there are no documented cases of transmission of infectious virus to the infant through breast milk," but the potential for transmission remains a concern among women who want to breastfeed, wrote Christina Chambers, PhD, of the University of California, San Diego, and colleagues.

In a research letter published in JAMA, the investigators identified 18 women with confirmed SARS-CoV-2 infections (all but 1 of the women had symptomatic COVID-19 disease) and infants aged 0-19 months between March 27 and May 6, 2020. The average age of the mothers was 34 years, and 78% were non-Hispanic White. The women provided 1-12 samples of breast milk for a total of 64 samples collected before and after positive COVID-19 tests.

One sample yielded detectable RNA from SARS-CoV-2 and was collected on the day of the woman's symptom onset. However, one sample taken 2 days prior to symptom onset and two samples collected 12 and 41 days later tested negative for viral RNA, the researchers said. In addition, no replication-competent virus was identified in the positive sample or any of the other samples.

The researchers spiked two stored milk samples collected prior to the pandemic with replication-competent SARS-CoV-2. Virus was not detected by culture in the samples after Holder pasteurization, but was detected by culture in nonpasteurized aliquots of the same samples.

"These data suggest that SARS-CoV-2 RNA does not represent replication-competent virus and that breast milk may not be a source of infection for the infant," Dr. Chambers and associates said.

The results were limited by several factors including the small sample size and potential for selection bias, as well as the use of self-reports of positive tests and self-collection of breast milk, the researchers noted. However, the findings are reassuring in light of the known benefits of breastfeeding and the use of milk banks.

"This research is important because the pandemic is ongoing and has far-reaching consequences: as the authors indicate, the potential for viral transmission through breast milk remains a critical question for women infected with SARS-CoV-2 who wish to breastfeed," Janet R. Hardy, PhD, MPH, MSc, a consultant on global maternal-child health and pharmacoepidemiology, said in an interview.

"This virus has everyone on a rapid learning track, and all information that helps build evidence to support women's decision-making in the care of their children is valuable," she said. **"These findings suggest that breast milk may not be a source of SARS-CoV-2 infection for the infant. They provide some reassurance given the recognized benefits of breastfeeding and human milk."**

However, "This study is very specific to breast milk," she emphasized. "In advising women infected with SARS-CoV-2, clinicians may want to include a discussion of protection methods to prevent maternal transmission of the virus through respiratory droplets."

Although the data are preliminary, "the investigators established and validated an RT-PCR [reverse transcription polymerase chain reaction] assay and developed tissue culture methods for replication-competent SARS-CoV-2 in breast milk, both valuable tools for further studies. Next steps will include controlled studies of greater sample size with independent verification of RT-PCR positivity," said Dr. Hardy, a consultant to Biohaven Pharmaceuticals, New Haven, Conn.

Key to Preventing Covid-19 Indoors: Ventilation

Source: https://www.wsj.com/articles/key-to-preventing-covid-19-indoors-ventilation-11598953607

Sep 01 – After urging steps like handwashing, masking and social distancing, researchers say proper ventilation indoors should join the list of necessary measures. Health scientists and mechanical engineers have started issuing recommendations to schools and businesses that wish to reopen for how often indoor air needs to be replaced, as well as guidelines for the fans, filters and other equipment needed to meet the goals.

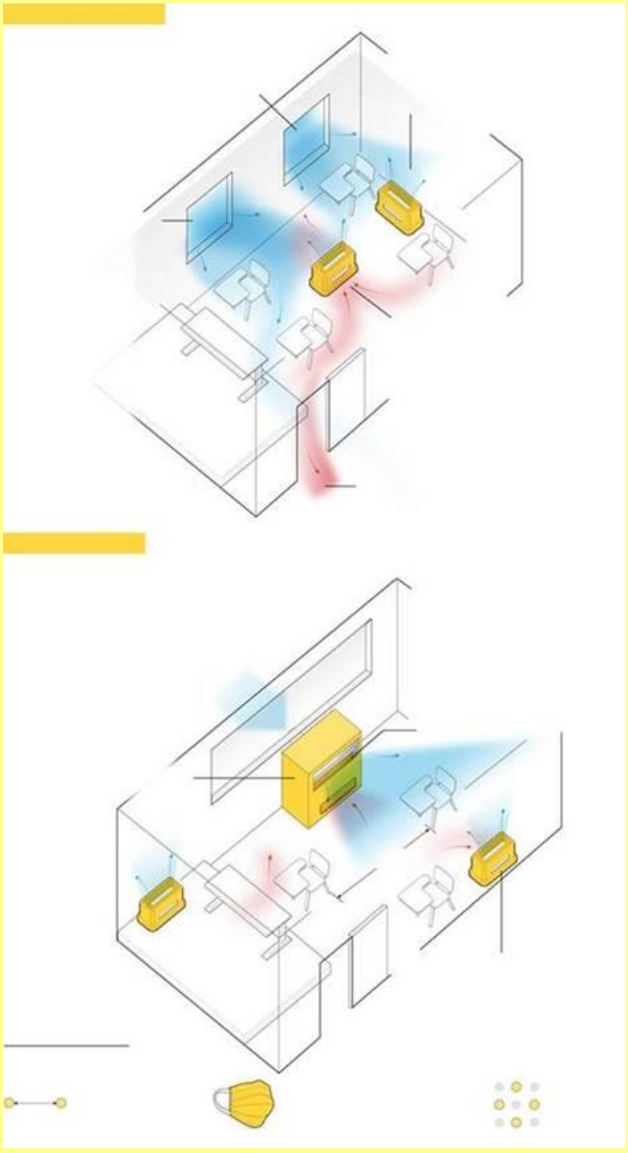
“We didn’t focus on it enough initially,” said Abraar Karan, a doctor at Brigham and Women’s Hospital in Boston who treated Covid-19 patients. “We told everyone to stay home. We weren’t thinking about people congregating in public spaces.”

Driving the thinking is mounting evidence that the new coronavirus is transmitted through the air among people with prolonged exposure to the pathogen. Especially troublesome, epidemiologists and other scientists say, is evidence from numerous indoor outbreaks suggesting the virus’s ability to spread to others even when close contact is avoided.

The precise role that airborne transmission plays is still being debated by parts of the scientific community. Yet proponents of aerosol transmission say the evidence so far argues for the need to keep clean air flowing in indoor spaces where people gather.
Ideally, they say, public spaces like a standard classroom should aim to have air replaced with clean air between four to six times an hour to dilute Covid-19 particles that might accumulate.
That can be done, aerosol scientists and building engineers say, through strategies that introduce outdoor air and filter indoor contaminants. Those include opening windows and doors, installing window fans, using portable air purifiers with high-efficiency particulate air, or HEPAfilters and upgrading heating, ventilation and air-conditioning systems to meet certain standards.

Keeping Classroom Air Clean

Scientists say schools and businesses should focus on improving ventilation to help prevent Covid-19's spread. Spaces such as a typical classroom should aim to have air replaced with clean air four to six times an hour, though recommendations can vary by room size and occupancy. That can be done by introducing more outdoor air and enhancing filtration.



Without air conditioning:

- ✓ Placement Matters
- ✓ Open Windows and Doors
- ✓ Place air purifiers centrally and in places without good ventilation to maximize air cleaning.
- ✓ Open windows and doors to introduce outdoor air. Aim for cross-ventilation via windows on opposite walls. If unsafe to open completely, six inches can still help.
- ✓ Fresh air
- ✓ Install Window Fans
- ✓ Fans placed inside open windows can increase airflow. Two fans, blowing fresh air in from one window, while pushing air out from another, may be helpful. Avoid positioning that would blow air directly from one person to another.
- ✓ Add Air Purifier
- ✓ Depending on the model, portable purifiers with HEPA filters can produce several air changes per hour. Most filter only small spaces. Schools should ensure purifiers are appropriately sized relative to the classroom.

With air conditioning:

- ✓ Start Earlier
- ✓ Upgrade Air-Conditioning Filters
- ✓ Keep HVAC systems, such as this unit ventilator, running frequently, and start earlier than usual to allow more time for airflow and filtering before the school-day begins.
- ✓ Choose HVAC filters that can remove a large portion of airborne particles, such as a MERV 13. If such a filter is incompatible, choose the most efficient filter.
- ✓ Increase Outdoor Air
- ✓ Increase the HVAC system's supply of outdoor air, to as much as the system can handle, in order to reduce reliance on recirculated air.
- ✓ Add Air Purifier
- ✓ Consider several purifiers for larger rooms. Change HEPA filters regularly while wearing a mask, goggles and gloves.
- ✓ Other Tools to Reduce Spread:
- ✓ Keep desks spaced at least six feet apart
- ✓ Reduce class sizes
- ✓ Have students, teachers and staff wear masks whenever possible

Sources: WSJ research; Joseph Allen, Healthy Buildings program at Harvard University; The American Society of Heating, Refrigerating and Air-Conditioning Engineers Epidemic Task Force

Some businesses have begun taking such steps, including malls and gyms in New York, where reopening guidelines list enhanced air filtration as mandatory for the spaces. But in aging schools nationwide, strengthening ventilation may be difficult.

About 41% of U.S. public-school districts need to update or replace their HVAC systems in at least half their schools, representing about 36,000 schools nationwide, according to a report published in June by the U.S. Government Accountability Office, a federal watchdog.

Repairs can be costly. Denver Public Schools plans to spend nearly $5 million before students return to improve HVAC systems across roughly 185 buildings, including upgrading filters, repairing broken parts and increasing the amount of outdoor air in the systems, it said.

	Minimum % of particles trapped		
	"PM 2.5 Zone"		
MERV Rating	0.3 - 1.0 Microns	1.0 - 3.0 Microns	3.0 - 10.0 Microns
MERV-16	>95%	>95%	>95%
MERV-15	>85%	>90%	>95%
MERV-14	>75%	>90%	>95%
MERV-13	>50%	>85%	>90%
MERV-12	>35%	>80%	>90%
MERV-11	>20%	>65%	>85%
MERV-10	-	>50%	>80%
MERV-9	-	>35%	>75%
MERV-8	-	>20%	>70%
MERV-7	-	-	>50%
MERV-6	-	-	>35%
MERV-5	-	-	>20%
MERV-4	-	-	<20%
MERV-3	-	-	<20%
MERV-2	-	-	<20%
MERV-1	-	-	<20%

Public health officials and scientists studying the virus are still working to better understand how Covid-19 is transmitted. Some argue it is predominantly spread by large droplets, transmitted by coughing, talking or sneezing, which people nearby can inhale. The droplets, which tend to fall to the ground quickly, can also splatter on surfaces that bystanders touch and transfer to their mouths, noses and eyes.

Other scientists argue a significant role is played by smaller particles invisible to the naked eye, called aerosols, that linger in the air and travel. A recent study—which found that particles extracted almost 16 feet from hospitalized Covid-19 patients could infect cells in a lab—suggests aerosols as a potential source of spread, aerosol scientists say. The study, posted on the preprint server medRxiv, hasn't been peer reviewed.

"Based on the evidence we have on hand, it seems wildly irresponsible to me not to recommend strategies" for ensuring strong ventilation, said Joseph Allen, director of Harvard University's Healthy Buildings program, which studies how buildings affect human health.

He and other health-science and mechanical engineering experts recently released a tool to help schools determine how to attain several air changes an hour. Currently, he said, some schools may only be achieving one or two.

Poor ventilation may have played an important role in several indoor Covid-19 cases, researchers said.

Five people sitting at tables adjacent to an infected but presymptomatic diner inside a Guangzhou, China, restaurant in January later tested positive for Covid-19, despite video that indicates the separate parties didn't have close contact, according to an April study published on a preprint server. Some patrons who contracted the virus, the authors said, were seated as far as 15 feet away from the infected diner.

The third floor of the restaurant, where the patrons were seated, had no outdoor air supply, exhaust fans in the walls weren't running and ventilation was mostly provided by an occasionally opened door, the study found.

Likewise, a coronavirus outbreak at a choir rehearsal in Washington state was likely exacerbated by poor ventilation, a study showed. Some 53 of 61 attendees were confirmed or strongly suspected to have Covid-19, including two who died.

Doors were closed at the church's fellowship hall where the March rehearsal took place, the study, published on a preprint server in June, found. One of the authors said the research team believes that a furnace wasn't likely operating for most of the rehearsal, providing no filtration or outdoor air supply through the system when it was off.

The studies demonstrate the importance of introducing outdoor air and having HVAC systems equipped with filters that can remove viral particles, according to scientists who have examined indoor outbreaks of Covid-19. Mechanical engineers recommend increasing a HVAC system's outdoor air supply and installing a MERV13 filterif the system can handle it. That filter, they say, can trap and remove a substantial number of small and large particles before recirculating air back into a room.

Absent a well-functioning HVAC system—or if no HVAC system exists—researchers who have studied ventilation say there are relatively inexpensive strategies that schools and businesses can implement to dilute virus-laden air, such as opening windows and doors.

Installing fans in windows, so long as they aren't positioned to directly blow air from one person to another, can also increase airflow.

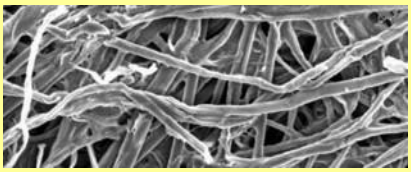
Both strategies, however, may be difficult to rely on during the winter. As a result, researchers proposed using portable air purifiers with HEPA filters.

HEPA filters, which trap contaminants pulled in by purifiers before pushing clean air back out, are almost 100% efficient at capturing all airborne particles, including the very smallest sizes.

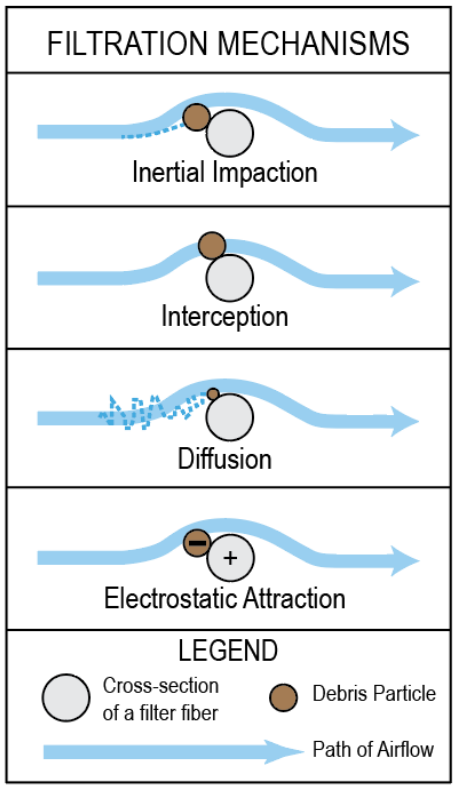
▶▶ **Read also this interesting article for a cheap MERV13 system.** 😊

Air filters

Source: https://www.sy-klone.com/merv-vs-hepa-how-air-filters-work.html



Filter media is made up of many criss-crossed fibers layered in random directions. When particles from the working environment enter the RESPA air intake port, the particles are impacted and intercepted onto the filter fibers. These particles are subjected to specific filtration mechanics and are dependent on the size of the particle and airflow velocity.



Here is a list of the filtration mechanics and their respective definitions:

1. ***Inertial impaction** – Occurs when a particle encounters a filter fiber due to the inertia of the particle.
   Example: A large dust particle is unable to change direction of flow *due to its inertia*, so it impacts the fiber and becomes attached to it.
2. ***Interception** – Occurs when a particle follows a gas streamline that happens to come in contact with the surface of a fiber.
   Example: An intermediate dust particle that readily follows the airflow stream comes in contact with a filter fiber.
3. ***Diffusion** – Occurs when particles do not follow gas streamlines as readily and are governed by random particle motion (Brownian motion of small particles).
   Example: A small particle, such as certain exhaust particles, encounter filter fibers at random.
4. **Electrostatic attraction** – Occurs when an electrostatic charge on the filter fibers are present.
   Example: Static charge on a fabric creating static cling.

**In terms of filtration, the most important filtration mechanics pertaining to everyday use are: 1) Intertial impaction and 2) Interception.*

The larger particles that encounter the engine filter tend to impact onto the exterior surface of the filter media. The smaller particles that follow airflow streamlines tend to impact and intercept within the depth of the engine filter media. For smaller particles, the filter fibers act as branches that catch harmful engine contaminants passing through the filter. Thus, when a Cab Air Quality System utilizes a precleaner, such as the RESPA-CF2, HVAC life is extended and down time is reduced as fewer contaminants are reaching the filter. Note: Our MERV 16 filter media has special patented properties that shed most particles.

MERV Filters

What is the definition of MERV and what does MERV mean when buying an air filter?

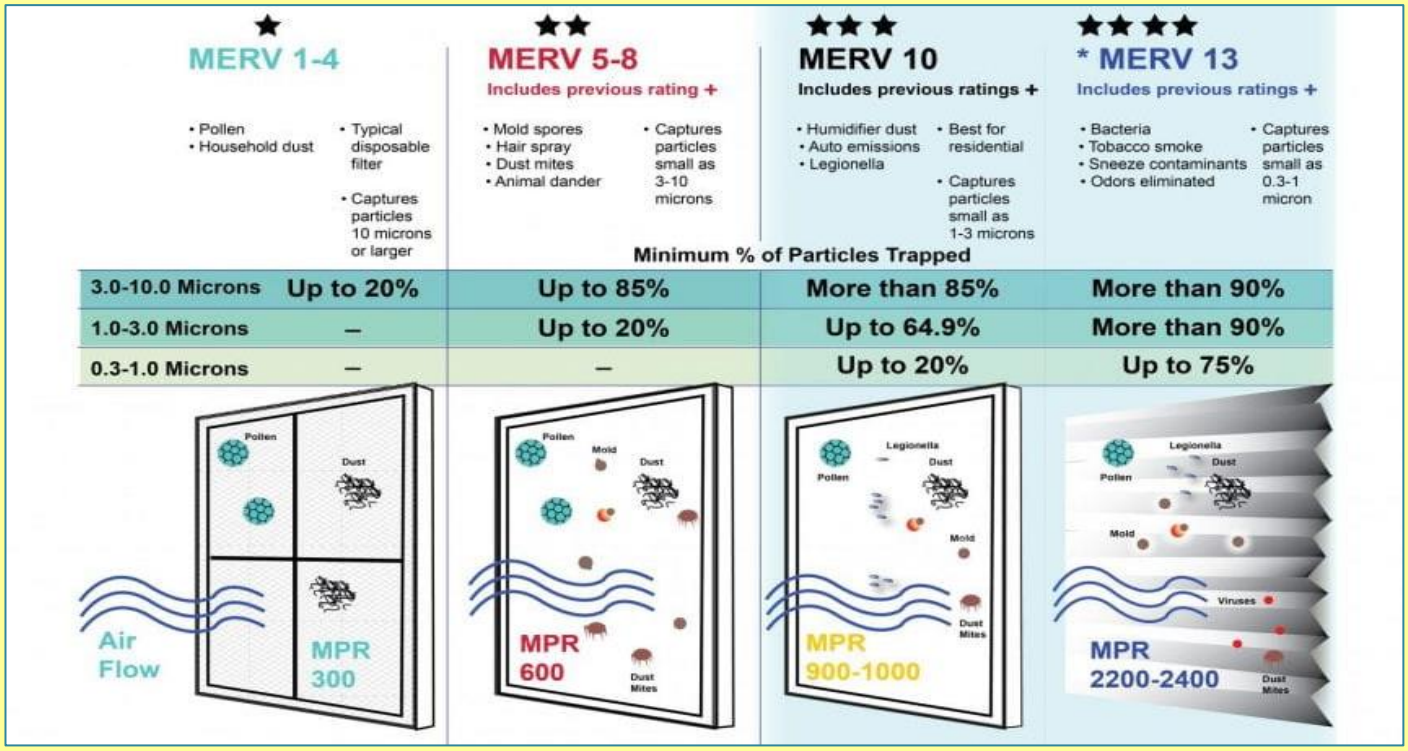
MERV is an acronym for "Minimum Efficiency Reporting Value". The MERV rating on an air filter describes its efficiency as a means of reducing the level of 0.3 to 10 micron-sized particles in air which passes through the filter. Higher "MERV" means higher filter efficiency. The purpose of the MERV standard is to permit an "apples to apples" comparison of the filtering efficiency of various air filters.

Air filter efficiency refers to the relative ability of a filter to remove particles of a given size or size range from air passing through the filter. If a filter were 100% efficient, none of the particles in a given size range would escape the filter and air which has passed through such a filter would contain zero particles.

The MERV Efficiency Rating Scale ranges from 1 to 16, with 1 being the lowest efficiency and 16 describing the highest efficiency. The particle size range addressed by the MERV scale is 0.3 to 10

microns. A logical inference is that if an air filter is removing particles down to 0.3-10 microns, it is certainly also at least that efficient at removing larger sized particles.
Our patented high-efficiency MERV 16 filters have unique properties, as the filter media sheds most dirt rather than the particles being embedded in the filter.

HEPA Filters
HEPA air filters are not MERV rated as they exceed the ASHRAE test protocol 52.2 used in determining the MERV ratings. In fact, HEPA air filters are the ONLY mechanical air filters that are tested and certified to meet a specific efficiency at a specific particle size. All HEPA air filters must meet a minimum efficiency of 99.97% at 0.3 microns. ASHRAE or MERV air filters are tested using the Dust Spot tests that incorporate some fine dust, powdered carbon and some cotton linters. The Dust Spot test particle size range is from 0.3 microns to 50 microns in size with an average size of approximately 20 microns in size.
HEPA air filters are tested using DOP, Mineral Oil and other materials that generate a mono-dispersed particle that are all .3 microns or smaller in size. In essence, if 10,000 0.3 micron sized particles are blown into a HEPA air filter, only 3 particles are allowed to pass through. Thus, you get the 99.97% at 0.3 micron rating. If you were to use the HEPA test on a 95% ASHRAE air filter they would be about 50% efficient on 0.3 micron sized particles once they loaded up with dust. So, HEPA air filters are at least 50% more effective at removing respirable sized airborne particles than any of the ASHRAE air filters previously available on the market.



MPR: Microparticle Performance Rating

Selecting the best filter for your environment

MERV 16 Filter: Recommended for uses where **airborne contaminants place operator at risk**, including contaminants such as Beryllium, DPM (Diesel Particulate Matter), and RCS (Respirable Crystalline Silica). *We highly recommend this filter as it represents the best mix of high efficiency filtration and economy.*

HEPA Filter: Recommended when **the very highest level of filtration is needed**, OR where **HEPA filters are necessary due to regulatory requirements**.

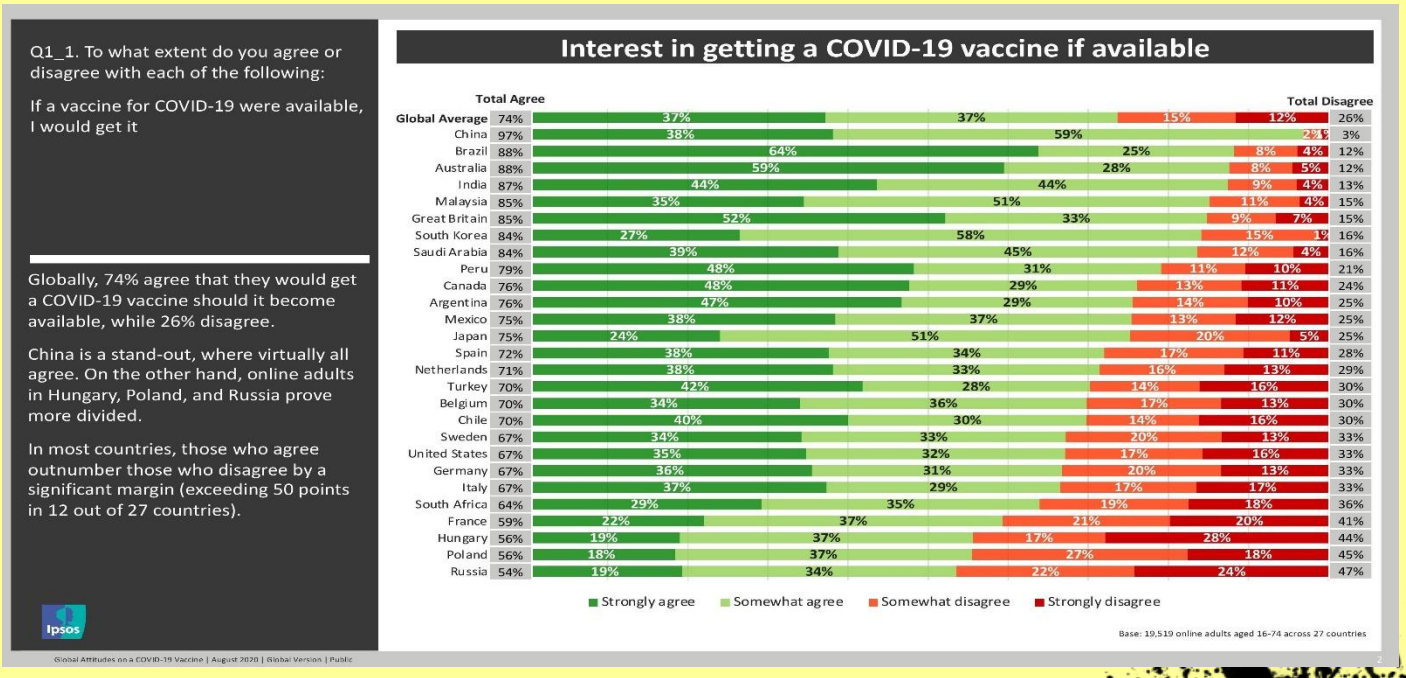
Face Shields and Masks with Valves Don't Effectively Block Droplets, Experiment Shows

3 in 4 adults around the world say they would get a COVID-19 vaccine

Source: https://www.weforum.org/agenda/2020/09/covid-19-coronavirus-vaccine-opinion-survey/

Sep 01 – A new Ipsos survey, conducted on behalf of the World Economic Forum, shows that three-quarters of adults would get a vaccine for COVID-19 if it were available.
But nearly two-thirds (59%) don't think one will be available by the end of 2020.
The study, which covers nearly 20,000 adults in 27 countries, also reveals where in the world take-up would be strongest.

Would you get a COVID-19 vaccine?



Of those surveyed, 74% strongly or somewhat agreed with the statement "if a vaccine for COVID-19 were available, I would get it". In China, this figure rose to 97%, but was lowest in Russia, Poland and Hungary.

If not, why not?
The survey also asked those who said they wouldn't get the vaccine why they wouldn't consider it.
Globally, 56% said they were worried about the side effects, 29% had concerns about its effectiveness and 17% said they were against vaccines in general.

But will it be ready?
Nearly 3 in 5 adults don't think a vaccine will be available to them by the end of 2020.
But, as with interest in getting a vaccine, China stands out. Nearly 90% of those surveyed strongly or somewhat agreed a vaccine is likely to be ready.

COVID's War Rhetoric Is Harmful to Med Students

By Tino Delamerced
Source: https://www.medscape.com/viewarticle/936465

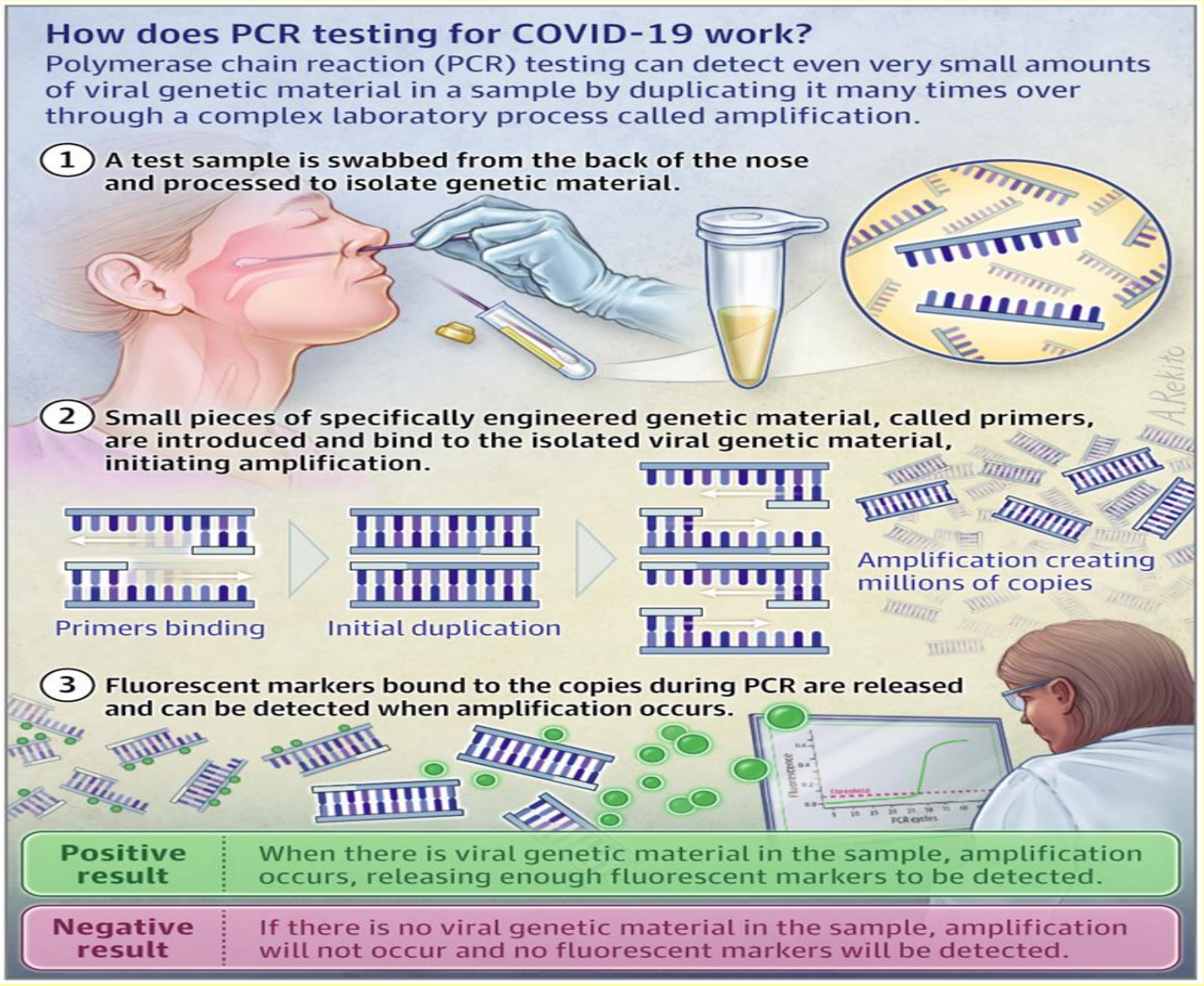
Sept 01 – Before my third year of medical school, the "war" began.
My father is an internist. As I waited to return to medical training, I watched him come home from the COVID-19 "front lines." Each day, he'd leave his N95 mask in the car, change out of his "uniform" in the garage, and immediately hit the showers. At the dinner table, we heard his "dispatches" from the "trenches." He told us about how cases were rising, what treatments they were trying, and how much PPE he had available. I listened in fear.
As I continued my studies at home, I listened to Donald Trump, a self-described "wartime president," speak about "the worst attack we've ever had." I saw the death toll of COVID-19 compared with those of the Pearl Harbor bombing, 9/11, and World War I.
I have come to realize that, as a medical student, it is the war rhetoric now synonymous with the pandemic that has actually scared and shaped me the most. When this all first began, it was that language that made me feel conflicted about how I was using my time. Although I desperately needed to study for my board examinations, I felt a "call of duty" to "serve" somehow. And I wasn't alone.
Like so many of my peers, I felt pulled in opposite directions. Was the "good" med student finding a way to help on the front lines, volunteering and "enlisting" for free? Should we participate in relief work or prioritize our learning? Many of us have tried to do both. But this continued rhetoric of war has made us feel like every day is a tradeoff between helping "the cause" and helping ourselves.
Nearly every aspect of training, from finishing a Step exam to simply completing a rotation, has been made more difficult by the pandemic. Yet the metaphors of war have only promoted an environment in which I have felt pressure to contribute to "the battle" at the expense of myself. We med students already face an unprecedented mental health crisis. In many ways, we are trained to forgo prioritizing ourselves. The new narrative surrounding COVID-19 further drives that potentially deadly message home.
I recently interviewed colleagues at the University of South Carolina School of Medicine Greenville. Medical students Alyssa Guo and Marissa Crum, along with Lauren Fowler, PhD, have begun to document the psychological toll that the pandemic has had on trainees. They shared with me that, according to their recent survey of more than 700 students at 15 medical schools across the United States, a third of respondents reported having moderate to severe anxiety since March. Each med school class has had its own unique sources of anxiety. As a newly minted third-year, I'm nervous about my shift from preclinical to clinical responsibilities.
Students have always had limited personal bandwidth. But the new framework of service pressures us to further self-sacrifice. I admire my classmates who have contributed their time and energy. However, the pandemic has also devastated many of our financial situations. If students decide to take on new, COVID-related work, I hope they won't do it for free.
Earlier this year, a graduation speaker asked trainees to answer "a clarion call," "jump in the trenches," and join "the COVID army." I understand that language creates a much-needed sense of urgency, but most medical students, including myself, didn't sign up for the military for a reason. Suddenly, our career choice has been recontextualized into something entirely different from the very thing that inspired us to pursue it in the first place.
As medical school is now resuming, faculty and others have the opportunity to reframe this pandemic for the next generation of doctors. Student leaders, deans, and speakers should abandon the jargon of conflict and invite trainees to be compassionate toward themselves, foster a positive learning environment, and establish a welcoming school culture. We shouldn't be manipulated into further valuing self-sacrifice before our careers have even begun.

In June, I started rotations. I am grateful to have returned to a regular daily schedule. Thankfully, my father has remained healthy and safe, although I still worry about the coming winter. If the pandemic worsens, will my fellow clinical students and I be sent home indefinitely or be asked to "fight"? Already we have seen our professional counterparts sacrifice and risk so much. Will leaders ask us for more?

The fallout of this pandemic will not be easy for any of us to endure. Authority figures within medicine must help those of us in the medical training pipeline avert burnout. Unlike many other issues, this problem has a relatively easy fix. In recognition of our fears, trials, and vulnerabilities, I hope medical education abandons the use of the militaristic language of self-sacrifice.

Tino Delamerced *is a third-year medical student at the Warren Alpert Medical School at Brown University. Before medical school, he studied Latin. He is interested in medical humanities, etymology, and the language of medicine.*

The rt-PCR



So, if we do a PCR corona test on an immune person, **it is not a virus that is detected**, but a small shattered part of the viral genome. **The test comes back positive for as long as there are tiny shattered parts of the virus left.** Even if the infectious viri are long dead, a corona test can come back positive, because the PCR method multiplies even a tiny fraction of the viral genetic material enough [to be detected] **+source**

Information Battleground: Vaccines

By Jakob Bund and Ann-Sophie Leonard
CSS Analyses in Security Policy
No 269, September 2020
Source: https://css.ethz.ch/content/dam/ethz/special-interest/gess/cis/center-for-securities-studies/pdfs/CSSAnalyse269-EN.pdf

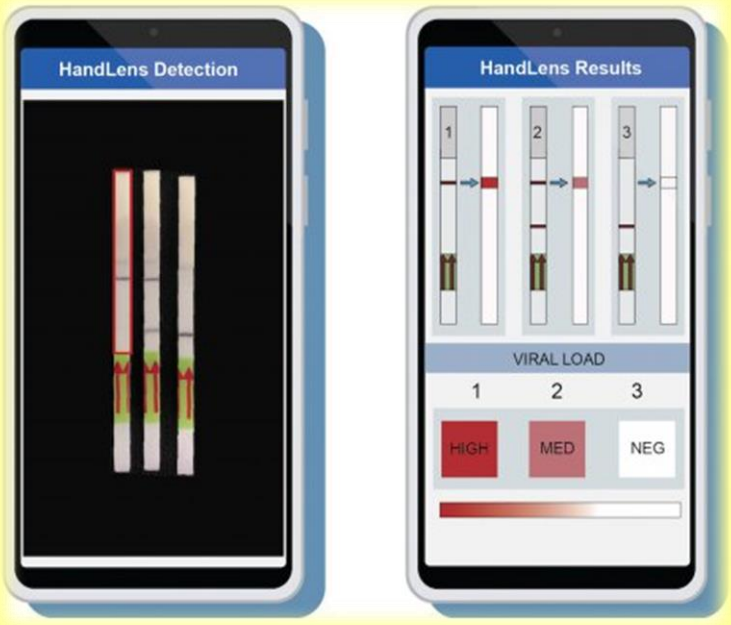
Rapid development of a vaccine has become a new measure of success in fighting coronavirus. More than any previously, this phase of the pandemic will be shaped by information, both positively through new knowledge on vaccines and negatively through influence attempts around their effectiveness and safety.

Jakob Bund *is Project Lead for Cyberdefense in the Risk and Resilience Team at the Center for Security Studies (CSS) at ETH Zurich.*
Ann-Sophie Leonard *is a Visiting Scholar at the Center for Security Studies (CSS) at ETH Zurich as part of the Mercator Fellowship on International Affairs.*

Rapid diagnostic detects Lassa and Ebola in real-time

Source: https://medicalxpress.com/news/2020-08-rapid-diagnostic-lassa-ebola-real-time.html

Aug 27 – One of the keys to bringing a viral outbreak under control is rapid detection and diagnosis, which depend on the availability of fast, low-cost, easy-to-use tests that don't require labs or expensive equipment to process them. Scientists at the Broad Institute of MIT and Harvard and collaborators in the United States, Nigeria, and Sierra Leone have now validated such tests for Ebola and Lassa—two of the deadliest and most transmissible human viruses—in settings with limited infrastructure. The work appears in *Nature Communications*.



The diagnostic tests use the CRISPR-based SHERLOCK assay to detect low levels of virus in patient samples and generate either a fluorescent readout or a result on a paper strip. The test can be tailored to detect specific viruses from certain regions, requires only a simple heat block and basic supplies to run, costs less than US$1 per sample, could be used on saliva or urine—eliminating the need for blood draws—and can return results in less than an hour.

The tests also use a rapid chemical and heat treatment called HUDSON to inactive the virus in patient samples. HUDSON makes the patient samples safer for clinical staff to handle in a low-tech environment, and eliminates the need to extract a virus's genetic material from the samples before analyzing.

The research team was led at Broad by Kayla Barnes, an NIH Fogarty K fellow at the Harvard School of Public Health and Broad Institute, Anna Lachenauer, a medical student at Stanford University School of Medicine, and institute member Pardis Sabeti, a professor at Harvard University and investigator with the Howard Hughes Medical Institute.

The research team discusses testing the SHERLOCK/HUDSON assay to diagnose deadly viruses in Nigeria and Sierra Leone. Credit: Broad Institute of MIT and Harvard

To showcase SHERLOCK's field utility, team members led by Christian Happi at Redeemer's University in Nigeria deployed a Lassa-specific assay during a recent Lassa fever outbreak—the first use of SHERLOCK in a low/middle income country. The team also compared the diagnostic against a standard RT-qPCR assay for Lassa.

Collaborators at Kenema Government Hospital in Sierra Leone and at the US Army Medical Research Institute of Infectious Diseases benchmarked an Ebola-specific version of the SHERLOCK assay, using samples collected during the 2014-16 outbreak in Sierra Leone and more recent outbreaks in

the Democratic Republic of the Congo. The NIH Integrated Research Facility also validated HUDSON's ability to heat-inactivate Ebola virus in their BL4 facilities, further establishing the safety and efficiency of this step.
The SHERLOCK assays performed as consistently as, or better than, other diagnostics in these validations—demonstrating the platform's potential for clinical use in the future in resource-limited areas.
The team also developed a mobile phone app called HandLens, spearheaded by Andres Colubri, assistant professor in the Bioinformatics and Integrative Biology program at the University of Massachusetts Medical School, that can read and immediately report paper strip SHERLOCK results. The tool can aid in situations where the paper strip gives a faint signal that is challenging for a clinician to interpret. This app can be adapted for use on any smartphone or tablet, according to the researchers, allowing a clear, unbiased diagnostic readout.

▶▶ **More information:** Kayla G. Barnes et al. Deployable CRISPR-Cas13a diagnostic tools to detect and report Ebola and Lassa virus cases in real-time, *Nature Communications* (2020). DOI: 10.1038/s41467-020-17994-9

EDITOR'S COMMENT: Why should we trust this rapid test the moment the academia does not trust them for Covid-19 preferring the molecular RT-PCR?

Ebola outbreak in western Democratic Republic of the Congo reaches 100 cases

Source: https://reliefweb.int/report/democratic-republic-congo/ebola-outbreak-western-democratic-republic-congo-reaches-100-cases

Aug 21 – The number of cases in the ongoing Ebola outbreak in western Democratic Republic of the Congo (DRC) has reached 100, a near two-fold increase in a little over five weeks. This latest outbreak, DRC's 11th, was declared on 1 June 2020 in Equateur Province. A cluster of cases was initially detected in Mbandaka, the provincial capital. The outbreak has since spread to 11 of the province's 17 health zones. 96 cases are confirmed,43people have lost their lives.

LED face mask speaks when you do and flashes smiles on demand

Source: https://newatlas.com/wearables/jabbermask-led-face-mask/

The JabberMask has an array of LEDs that can smile on demand or mimic your mouth while speaking

Sep 07 – Given the state of the world at the moment, it looks like face masks are here to stay for a while yet – so you might as well have some fun with them. An indie game maker is now launching the JabberMask, a voice-activated wearable packed with LEDs that move like a mouth in time with your speech, or can smile or display emojis on demand.
Created by game designer Tyler Glaiel, the JabberMask packs a grid of RGB LEDs in the front, and that blank canvas can be used to get a few different messages across. You can flash up a love heart, an emoji or a simple word like "NO" or "OK." To quickly smile, you just make a pop sound with your lips.
But maybe the most impressive thing about it is that it can pick up your voice and move a virtual mouth almost in time with what you're saying. From the videos it actually looks pretty responsive too, quickly swapping between closed and open-mouth positions. The effect is something like a digital Muppet, but that silliness is kind of the point. Nobody's wearing this thing to blend in at the supermarket.
But it's not entirely ridiculous, either – the JabberMask looks like a creative way to get around some of the communication barriers of a COVID-19 world. We humans are expressive creatures, and without those friendly little smiles we throw at each other it's easy to assume that everyone at the store actively hates you. A digital smile could go a long way.

The JabberMask should get the job done as a mask too. The protective part is a simple cotton mask, which recent studies have shown can work almost as well as surgical masks for blocking droplet transmission. This bit can be removed from the electronic components and washed. To try to keep it as light and comfy as possible, the straps go all the way around your head and the battery compartment sits right at the back.

Along with a smile, the JabberMask Pro can display different emojis, words or symbols using the app

There are three different versions of the JabberMask, depending on how much you want to chat to passersby. The JabberMask Lite is the basic model with a 6 x 6 LED grid, able to display the moving mouth and smile, and powered by four AAAA batteries. The JabberMask Deluxe ups things to an 8 x 8 LED grid and a rechargeable battery. And the JabberMask Pro adds emoji support, controlled through an Android and iOS app.
Glaiel is currently seeking funding for the JabberMask through Kickstarter, with pledges starting at US$29 for the Lite, $49 for the Deluxe and $69 for the Pro version. If all goes to plan, shipping should begin in May 2021.

▶▶ Check it out in action in this video.

Russia releases first batch of Covid-19 vaccine Sputnik V into public

Source: https://www.wionews.com/world/russia-releases-first-batch-of-covid-19-vaccine-sputnik-v-into-public-325883

Sep 08 – The Russian health ministry registered the first vaccine against COVID-19, named Sputnik V, on August 11.
The Russian Health Ministry has said that the first batch regarding the Sputnik V antibody against the deadly coronavirus, has been delivered into common course, local deliveries are planned in the near future.

The vaccine was created by Russia's Gamaleya National Research Center of Epidemiology and Microbiology and the Russian Direct Investment Fund (RDIF).
According to a statement issued by the Russian government "The first batch of the 'Gam-COVID-Vac' (Sputnik V) vaccine for the prevention of the new coronavirus infection, developed by the Gamaleya National Research Center of Epidemiology and Microbiology of the Ministry of Health of Russia, has passed the necessary quality tests in the laboratories of Roszdravnadzor (medical device regulator) and has been released into civil circulation,".
The preliminary results published in The Lancet journal on Friday revealed that the COVID-19 vaccine, which was approved by Russia last month, has been shown to elicit antibody response with no serious adverse events in small human trials.
Results from early-phase non-randomised vaccine trials in a total of 76 people show that two formulations of the vaccine have a good safety profile detected over 42 days, and induce antibody responses in all participants within 21 days.
The Russian ministry of health enrolled the main antibody against COVID-19, named Sputnik V, on August 11.
Moscow Mayor Sergey Sobyanin communicated trust on Sunday that most of the Russian capital's occupants will be immunized against the Covid within a few months.
As indicated by the ministry, the conveyance of the primary group of the Russian immunization to the nation's locales is arranged in the closest future.

Better Strategy to Protect U.S. Agricultural Sector

Source: http://www.homelandsecuritynewswire.com/dr20200907-better-strategy-to-protect-u-s-agricultural-sector

Sep 07 – The agriculture sector in the United States accounts for more than 5 percent of the U.S. gross domestic product (about a trillion dollars) and provides jobs for more than 10 percent of U.S. workforce.
Albert Mauroni, the editor of a new and important collection of studies on agroterrorism, notes that agriculture impacts more than just the food provided for the family dinner. It's a part of forestry, fishing, food and beverages for restaurants, textile, and leather products, plus tobacco products.
The Office of the Director of National Intelligence (ODNI) provides an unclassified assessment of threats to the United States every year in testimony and report to Congress. The report usually contains a paragraph or two on the threat posed by nation-states and violent extremist organizations in their development of weapons of mass destruction (WMD). In the *2019 Worldwide Threat Assessment*, the intelligence community notes that, "The threat from biological weapons has also become more diverse as BW agents can be employed in a variety of ways and their development is made easier by dual-use technologies."
Mauroni says that, often we view these statements as cautions warning about anti-human biological warfare (BW) agents, "but is the United States prepared for deliberately developed biological agents that target crops, plants, and animals?" he asks.
Between 2000 and 2004, in the wake of the 2001 Anthrax attacks, there were a number of academic papers and discussions on the threat of anti-plant and anti-animal BW agents.
These studies led more and more experts to argue that the United States had to develop a more comprehensive national strategy on biodefense. In 2004, the Defense Threat Reduction Agency (DTRA) asked the U.S. Air Force Counterproliferation Center (now the Center for Strategic Deterrence Studies) to conduct a study to determine the potential involvement of defense forces in response to a domestic agroterrorist attack. That report, titled *Agroterrorist Attack: DOD Roles and Responsibilities*, was released in 2006 to start a discussion on the threat and the military's role in combating agroterrorism.
Mauroni says that the report identified a number of challenges to the successful use of Department of Defense (DOD) assets in response to an agroterrorism attack. "It should not be a surprise that DOD defers to the Department of Homeland Security (DHS) and U.S. Department of Agriculture (USDA) for options on how to handle such events, and that DOD's priorities are often pointed at contingency operations in overseas locations," he writes. "That said, there are natural affinities to the DOD homeland security role, both in the form of forces provided through plans developed by U.S. Northern Command and in the extensive medical management and biosurveillance capabilities within the military services. It becomes a matter of employing the interagency to leverage DOD capabilities in a timely manner, ideally in a proactive manner, to prepare for agroterrorism events."
The just-published collection of studies provides an update on several of the topics associated with concepts to address agroterrorism, concepts and topics first raised in the 2006 volume.

Here is preface, by Lt. Gen. Ronald L. Burgess, Jr. (Ret.), to the new edicted

Preface

By Lt. Gen. Ronald L. Burgess, Jr., U.S. Army (Ret.)

Just as this book on agroterrorism reaches the final stages of development, our nation is in the midst of fighting a global war. Our foe is not an intractable nation-state bent on world domination, but rather an invisible, inanimate, mindless enemy that surrounds us.

The United States spends massive resources annually on responding to "thinking adversaries." However, this "unthinking adversary," the SARS-CoV2 virus and cause of the COVID-19 pandemic, has caused unprecedented global disruption, worthy of the most clever and powerful adversarial nation-state. Nature has once again proven to be the most dangerous bioterrorist and again reminded us that we have much to learn from it.

As of this writing, we certainly do not yet understand the full spectrum of implications from the coronavirus. Who would have anticipated that physicians and medical personnel in some parts of the country would experience pay cuts or job loss during a pandemic? And yet, it has happened. Before the start of the pandemic, the thought would have been inconceivable, yet what would happen to us if the trained health professionals just walked away, exhausted by the relentless hours and no longer willing to absorb the risks or personal costs?

We must recognize that a deliberate attack against our crops and livestock could be equally as devastating and exhausting as this current crisis. For many human and animal outbreaks that have occurred over the years, government, medicine, and business decisionmakers have demanded new technologies to help detect, contain, and mitigate the spread of disease. In most instances, the existing plans and capabilities had to be rapidly modified once the disease gained momentum. As is often the case, some assumptions borne of long planning and gaming were wrong, or perhaps only partly right, while others were spot on.

As the current pandemic has reminded us, logistics challenges always seem to occur during emergencies. A future agroterrorism incident will have similar features, such as a shortage of emergency supplies, deterioration of strategic stockpiles of certain items (e.g., surgical masks and gloves), or bureaucracies that emphasize form over function.

As we prepare to defend against agroterrorism, we must factor in the human element, the thinking adversary who chooses to advance the chaos borne of a pathogen to gain advantage. To be successful, the adversary must penetrate our nation's defenses before his pathogenic weapon can be deployed. Once deployed, the pathogen remains first undiscovered or undiagnosed, enabling it to gain a foothold in the targeted animal or plant population.

From there, the disease takes on a life of its own within that population, magnifying the disease effects, as its spreads. With the pathogen now delivered, the adversary can fade into the darkness, awaiting the next opportunity to attack.

Due to the intentionality of the adversary, agroterrorism has the real potential of needing an even more complex response than an outbreak of a naturally produced virus. The very real possibility of intentional chemical contamination of food further complicates matters, because response time and medical management would almost certainly prove inadequate.

Agroterrorism differs greatly from natural disease outbreaks and disasters for many reasons, primarily because Americans have not known widespread hunger since the Great Depression. Government and agribusiness are supposed to be vigilantly on the lookout for adversaries. However, as has been proven many times since the Sept. 11, 2001, (9/11) terrorist attacks, those in charge of surveillance have to be right every time while the adversary gains advantage by only having to be right once. The primary goal of the adversary, beyond diminishing the availability of the actual food supply, is stoking fear about what remains. Is it safe to eat?

Amidst the problems encountered in emergencies, people emerge by discovering expedient solutions to problems unimagined in white papers or mathematical models. People and their intellectual prowess will always remain our greatest assets and yet we often do not treat them as such with the freedom to think, question and challenge.

Countless times in our nation's history, these people have proven essential to our survival. The selections in this book demonstrate that we can listen to them and prepare for these crises, rather than have such crises come upon us unannounced.

Lt. Gen. Ronald L. Burgess, Jr., U.S. Army (Ret.), is Executive Vice President of Auburn University.

— Read more in Albert Mauroni and Robert A. Norton, eds., *Agroterrorism: National Defense Assessment, Strategies, and Capabilities* (U.S. Air Force Center for Strategic Deterrence Studies, Air University, Maxwell Air Force Base, August 2020)

Best and worst face coverings

TYPE OF COVERING	EFFICIENCY AT FILTERING LARGE DROPLETS	EFFICIENCY AT FILTERING AEROSOLS	WHERE IT CAN BE WORN
 N95 mask	99.9%	95%	Healthcare settings
 Surgical mask	98.5%	89.5%	Healthcare settings
 Hybrid mask	96%	94%	Public, indoor, and/or crowded settings
 Two-layer cotton mask	99.5%	82%	Public, indoor, and/or crowded settings
 Tea towel or dishcloth	98%	72.5%	Outdoor areas
 100% cotton t-shirt	97%	51%	Outdoor areas
 Natural silk	56%	54%	Outdoor areas
 Scarf or bandana	44%	49%	As a last resort
 Mask with built-in valve or vent	90%	90%	Never (does not protect others)

Sources: Democritus University of Thrace; Duke University; Journal of Hospital Infection; Public Health England; University of Chicago; University of Illinois at Urbana-Champaign

INSIDER

▶▶ Read more at: https://www.sciencealert.com/this-chart-shows-the-best-and-worst-face-masks-for-each-situation

Diagnostic Errors in the COVID-19 Era

By Jaya Mallidi, MD, MHS

Source: https://www.medscape.com/viewarticle/936606

Jaya Mallidi is an interventional cardiologist in Santa Rosa, California. An ardent patient advocate, she writes opinion pieces using patient stories as context to highlight problems in the practice of modern-day medicine.

Mysterious Post-COVID Syndrome Affecting Kids Appears to Be Even Worse Than We Thought

Source: https://www.sciencealert.com/mysterious-post-covid-syndrome-is-severely-damaging-kids-hearts-new-study-shows

Sep 07 – After contracting and beating a coronavirus infection, a body needs time to rest, to recover its health and strength. Sadly, for some children, that isn't what happens next.

A mysterious, new disease called multisystem inflammatory syndrome in children (MIS-C, and also known as paediatric multisystem inflammatory syndrome or PIMS) has affected hundreds of children around the world since it was first discovered earlier this year.

The condition, thought to be somehow linked to COVID-19, can emerge in kids even after very mild coronavirus infections. But a light case of coronavirus is no guarantee that a subsequent case of MIS-C won't be very serious, and sometimes even fatal.

"Children did not need to exhibit the classic upper respiratory symptoms of COVID-19 to develop MIS-C, which is frightening," says neonatologist Alvaro Moreira from the University of Texas Health Science Centre at San Antonio.

"Children might have no symptoms, no one knew they had the disease, and a few weeks later, they may develop this exaggerated inflammation in the body."

In a comprehensive new review of medical research into MIS-C, all of it from this year, Moreira and his team uncovered almost 40 observational studies involving 662 child patients in total who developed the syndrome.

MIS-C is marked by severe inflammation in multiple parts of the body, including, the heart, lungs, kidneys, brain, skin, eyes, and more. The symptoms resemble two other conditions – Kawasaki disease and toxic shock syndrome – but the amount and spread of overall inflammation in MIS-C is worse, Moreira says.

"It can be lethal because it affects multiple organ systems," Moreira says. "Whether it be the heart and the lungs, the gastrointestinal system or the neurologic system, it has so many different faces that initially it was challenging for clinicians to understand."

Now, several months into the COVID-19 pandemic, we're getting a clearer picture of what MIS-C looks like, although there's still much we don't understand about the syndrome – as well as what the long-term recovery prospects will be for the young people who experience this severe condition.

Of the 662 known cases worldwide looked at in the new review, 71 percent of the children were admitted to intensive care, and the average length of hospital stay was about eight days.

In every case, the patients showed fever, and the majority also presented with abdominal pain or diarrhoea (73.7 percent of cases) and vomiting (68.3 percent). Conjunctivitis and rash was also common.

Sadly, 11 of the children in the studies died. While this observed death rate for children with MIS-C does appear to be low (at about 1.7 percent of all child patients in this study), the researchers point out that this figure is actually much higher than the 0.09 percent mortality rate observed in children with COVID-19.

In cases where children did recover, however, there's a lot of concern about what MIS-C might be doing to their hearts. In the study, about 90 percent of the children had an echocardiogram (EKG) test, and more than half (54 percent) of the results that came back showed abnormalities.

These abnormalities included dilation of coronary blood vessels, depressed ejection fraction (reduced ability for the heart to pump oxygenated blood to body tissues), and in about 10 percent of patients, an aneurysm of a coronary vessel, which could put them at higher risk of future cardiac events.

"These are children who are going to require significant observation and follow-up with multiple ultrasounds to see if this is going to resolve or if this is something they will have for the rest of their lives," Moreira says.

"That's catastrophic to a parent who had a previously healthy child and then he/she is in the very small percentage of individuals who developed MIS-C after COVID-19 infection."

The authors note a number of limitations to their study, and point out that they may have missed some studies of MIS-C despite their wide search.

Nonetheless, while there's still a lot we don't know about MIS-C, the picture that's starting to emerge is something we have to take very seriously: a disease associated with COVID-19 that for many children who experience it is much worse than the COVID-19 they've already encountered.
In the rare cases where MIS-C is suspected, early medical attention is a crucial action that can save children's lives.
"Children will typically show signs/symptoms of MIS-C three to four weeks after COVID-19 infection and many will progress rapidly into shock and cardiorespiratory failure," the authors write in their study.
"Families should seek immediate medical care as children with this condition decompensate quickly and most children will need management in an intensive care unit. Overall, children will survive this hyperinflammatory condition with administration of IVIG, steroids, a multidisciplinary team of healthcare providers, and in some cases immunomodulatory agents."

▶▶ **The findings are reported in** *EClinicalMedicine*.

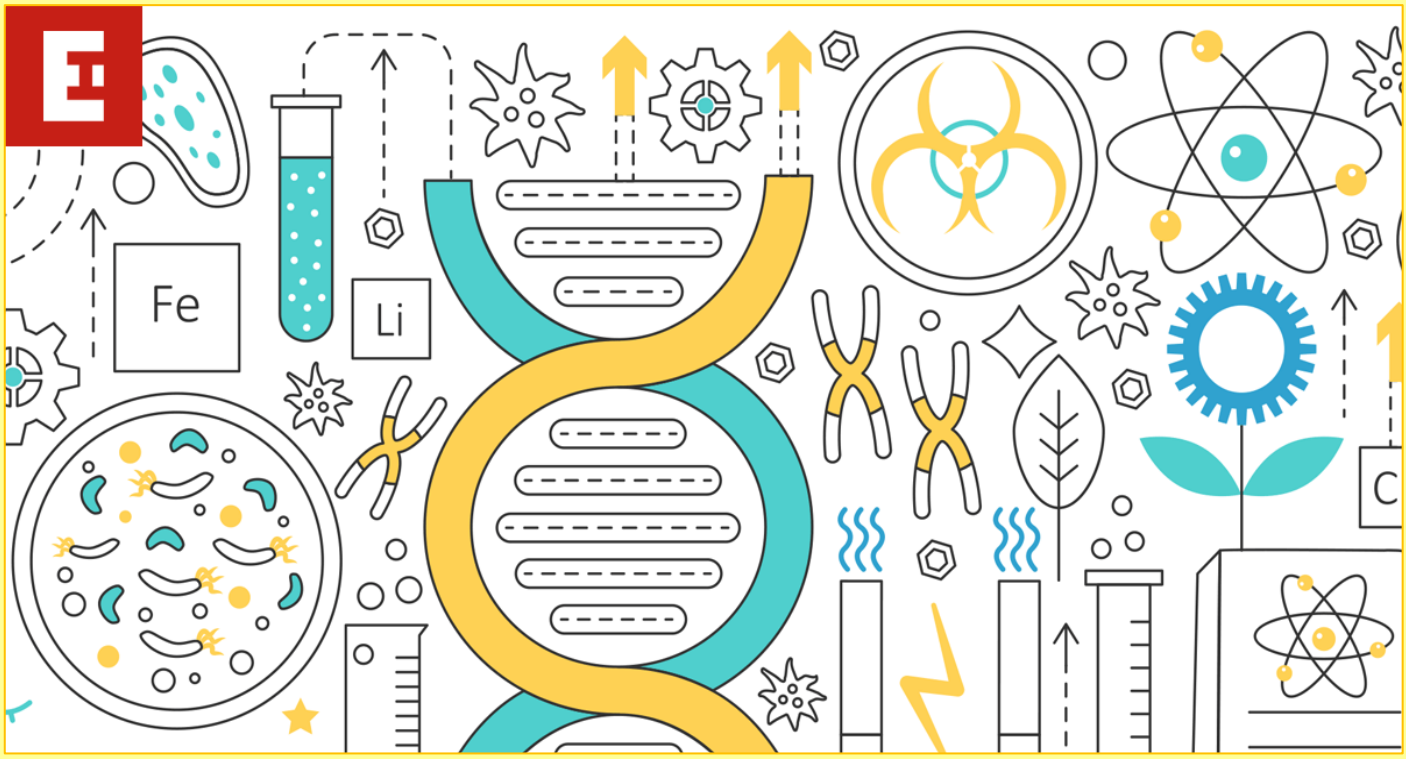
Engineered Pathogens and Unnatural Biological Weapons: The Future Threat of Synthetic Biology

Source: https://www.hstoday.us/subject-matter-areas/counterterrorism/engineered-pathogens-and-unnatural-biological-weapons-the-future-threat-of-synthetic-biology/

Sep 06 – The COVID-19 pandemic has demonstrated that significant biological threats can and will emerge from nature without warning, demonstrating that a single viral strain can have a profound impact on modern society. It has also demonstrated that infectious diseases can rapidly spread throughout a population without human engineering making them the ideal substrates from which to develop engineered weapons. Viruses and bacteria have been used as weapons for millennia.[1] Historically, biological weapons were derived from natural sources, such as anthrax from herbivores and domesticated animals, and smallpox from rodents. Those pathogenic organisms that were found to be suitable for weaponization were cultured directly from the environment; they were then isolated, purified, stored, propagated,[a] and used to fill biological munitions.[2] The most recent of example of this

was the production and stockpiling of numerous agents by the biological weapons program of the former Soviet Union. In this program pathogens were selected for specific characteristics directly from the natural environment, propagated, and stored for later use.[3] While these pathogens have evolved in nature for the purpose of persisting, they are not optimized for maintenance, storage, and deployment in a military setting. Consequently, while biological agents have not been widely employed as strategic or tactical weapons by state or non-state actors, there are some examples of their use in conflicts. The most significant of these is the well-documented use of crude bacteriological agents by the Japanese army against China during the Second World War.[4]

Recently, the convergence of advances in computer science, engineering, biological science, and chemistry have made it possible



to engineer living systems to optimize growth and increase pathogenicity (the propensity to cause disease). This interdisciplinary approach to providing novel biological functionality has had a positive impact on the biotechnological and biopharmaceutical industries. At the same time, these engineered bacteria and viruses can be co-opted for belligerent purposes. Indeed, the use of designer biological weapons could theoretically give a state or non-state actor an asymmetric advantage over an adversary that favors conventional weapons.

Synthetic biology (SynBio) is the scientific discipline that encompasses all aspects of the engineering of biological systems.[5] Beginning with the discovery of the chemical structure of DNA[b] in the 1950s, SynBio tools such as recombinant DNA technology[c] and genome editing tools[d] have developed at a fast pace as the fundamental molecular mechanisms underlying biology are discovered. These SynBio tools are lowering the education, training, cost, time, and equipment threshold required to modify and employ pathogenic organisms as biological weapons. The asymmetric threat posed by biological weapons will continue to increase as new tools and techniques are developed and as terrorist organizations become aware of and inspired by the society-wide economic, emotional, and government-destabilizing impacts caused by the COVID-19 pandemic.[e] Indeed, it can be argued that the total cost of this pandemic—including the loss of life and the stress to the economy—could be rivaled only by the deployment of an atomic bomb. Therefore, developments in SynBio should be continually monitored and reassessed within the context of technological change and its capacity to shift the geopolitical paradigm. In this article, the authors describe how biological systems' modular nature makes them amenable to engineering, the recent advances in synthetic biology, the impact of synthetic biology on the threat landscape, and the potential policy responses to the maturation of biotechnology in general, and synthetic biology in particular. This article has been developed using both primary and secondary literature sources recently published in peer-reviewed scientific papers.

▶▶ Read more at CTC Sentinel

How Long Are COVID-19 Antibodies Protective?

By John Whyte, MD, MPH; Alexander Greninger, MD, PhD
Source [interview]: https://www.medscape.com/viewarticle/936574

September 01, 2020

- In a new study, 85% of a Seattle fishing boat crew were infected onboard with COVID-19 in May. The entire crew had tested negative for infection and had blood drawn before departure. Upon return, the three people who had neutralizing antibodies before departure were not infected on the ship.
- The big question is, how long are COVID-19 antibodies protective? It depends on the titers, or the concentration of antibodies, in an individual's blood.
- **People with more severe COVID-19 infection probably have more antibodies, which could possibly protect them from reinfection for a year or more. Milder infections lead to fewer antibodies and could possibly provide protection for up to 6 months.**
- Reinfection of COVID-19 is possible. Studies indicate that about 10% of people with mild infections show little immune response, increasing their risk for reinfection.
- Reinfections are often milder and may be asymptomatic.

Facial Masking for Covid-19 — Potential for "Variolation" as We Await a Vaccine

By Monica Gandhi, M.D., M.P.H., and George W. Rutherford, M.D.
Source: https://www.nejm.org/doi/full/10.1056/NEJMp2026913

Sep 08 – As SARS-CoV-2 continues its global spread, it's possible that one of the pillars of Covid-19 pandemic control — universal facial masking — might help reduce the severity of disease and ensure that a greater proportion of new infections are asymptomatic. If this hypothesis is borne out, universal masking could become a form of "variolation" that would generate immunity and thereby slow the spread of the virus in the United States and elsewhere, as we await a vaccine.

One important reason for population-wide facial masking became apparent in March, when reports started to circulate describing the high rates of SARS-CoV-2 viral shedding from the noses and mouths of patients who were presymptomatic or asymptomatic — shedding rates equivalent to those among symptomatic patients.[1] Universal facial masking seemed to be a possible way to prevent transmission from asymptomatic infected people. The Centers for Disease Control and Prevention (CDC) therefore recommended on April 3 that the public wear cloth face coverings in areas with high rates of community transmission — a recommendation that has been unevenly followed across the United States.

Past evidence related to other respiratory viruses indicates that facial masking can also protect the wearer from becoming infected, by blocking viral particles from entering the nose and mouth.[2] Epidemiologic investigations conducted around the world — especially in Asian countries that became accustomed to population-wide masking during the 2003 SARS pandemic — have suggested that there is a strong relationship between public masking and pandemic control. Recent data from Boston demonstrate that SARS-CoV-2 infections decreased among health care workers after universal masking was implemented in municipal hospitals in late March.

SARS-CoV-2 has the protean ability to cause myriad clinical manifestations, ranging from a complete lack of symptoms to pneumonia, acute respiratory distress syndrome, and death. Recent virologic, epidemiologic, and ecologic data have led to the hypothesis that facial masking may also reduce the severity of disease among people who do become infected.[3] This possibility is consistent with a long-standing theory of viral pathogenesis, which holds that the severity of disease is proportionate to the viral inoculum received. Since 1938, researchers have explored, primarily in animal models, the concept of the lethal dose of a virus — or the dose at which 50% of exposed hosts die (LD50). With viral infections in which host immune responses play a predominant role in viral pathogenesis, such as SARS-CoV-2, high doses of viral inoculum can overwhelm and dysregulate innate immune defenses, increasing the severity of disease. Indeed, down-regulating immunopathology is one mechanism by which dexamethasone improves outcomes in severe Covid-19 infection. As proof of concept of viral inocula influencing disease manifestations, higher doses of administered virus led to more severe manifestations of Covid-19 in a Syrian hamster model of SARS-CoV-2 infection.[4]

If the viral inoculum matters in determining the severity of SARS-CoV-2 infection, an additional hypothesized reason for wearing facial masks would be to reduce the viral inoculum to which the wearer is exposed and the subsequent clinical impact of the disease. Since masks can filter out some virus-containing droplets (with filtering capacity determined by mask type),[2] masking might reduce the inoculum that an exposed person inhales. If this theory bears out, population-wide masking, with any type of mask that

increases acceptability and adherence,[2] might contribute to increasing the proportion of SARS-CoV-2 infections that are asymptomatic. The typical rate of asymptomatic infection with SARS-CoV-2 was estimated to be 40% by the CDC in mid-July, but asymptomatic infection rates are reported to be higher than 80% in settings with universal facial masking, which provides observational evidence for this hypothesis. Countries that have adapted population-wide masking have fared better in terms of rates of severe Covid-related illnesses and death, which, in environments with limited testing, suggests a shift from symptomatic to asymptomatic infections. Another experiment in the Syrian hamster model simulated surgical masking of the animals and showed

that with simulated masking, hamsters were less likely to get infected, and if they did get infected, they either were asymptomatic or had milder symptoms than unmasked hamsters.

The most obvious way to spare society the devastating effects of Covid-19 is to promote measures to reduce both transmission and severity of illness. But SARS-CoV-2 is highly transmissible, cannot be contained by syndromic-based surveillance alone,[1] and is proving difficult to eradicate, even in regions that implemented strict initial control measures. Efforts to increase testing and containment in the United States have been ongoing and variably successful, owing in part to the recent increase in demand for testing.

The hopes for vaccines are pinned not just on infection prevention: most vaccine trials include a secondary outcome of decreasing the severity of illness, since increasing the proportion of cases in which disease is mild or asymptomatic would be a public health victory. Universal masking seems to reduce the rate of new infections; we hypothesize that by reducing the viral inoculum, it would also increase the proportion of infected people who remain asymptomatic.[3]

In an outbreak on a closed Argentinian cruise ship, for example, where passengers were provided with surgical masks and staff with N95 masks, the rate of asymptomatic infection was 81% (as compared with 20% in earlier cruise ship outbreaks without universal masking). In two recent outbreaks in U.S. food-processing plants, where all workers were issued masks each day and were required to wear them, the proportion of asymptomatic infections among the more than 500 people who became infected was 95%, with only 5% in each outbreak experiencing mild-to-moderate symptoms.[3] Case-fatality rates in countries with mandatory or enforced population-wide masking have remained low, even with resurgences of cases after lockdowns were lifted.

Variolation was a process whereby people who were susceptible to smallpox were inoculated with material taken from a vesicle of a person with smallpox, with the intent of causing a mild infection and subsequent immunity. Variolation was practiced only until the introduction of the variola vaccine, which ultimately eradicated smallpox. Despite concerns regarding safety, worldwide distribution, and eventual uptake, the world has high hopes for a highly effective SARS-CoV-2 vaccine, and as of early September, 34 vaccine candidates were in clinical evaluation, with hundreds more in development.

While we await the results of vaccine trials, however, any public health measure that could increase the proportion of asymptomatic SARS-CoV-2 infections may both make the infection less deadly and increase population-wide immunity without severe illnesses and deaths. Reinfection with SARS-CoV-2 seems to be rare, despite more than 8 months of circulation worldwide and as suggested by a macaque model. The scientific community has been clarifying for some time the humoral and cell-mediated components of the adaptive immune response to SARS-CoV-2 and the inadequacy of antibody-based seroprevalence studies to estimate the level of more durable T-cell and memory B-cell immunity to SARS-CoV-2. Promising data have been emerging in recent weeks suggesting that strong cell-mediated immunity results from even mild or asymptomatic SARS-CoV-2 infection,[5] so any public health strategy that could reduce the severity of disease should increase population-wide immunity as well.

To test our hypothesis that population-wide masking is one of those strategies, we need further studies comparing the rate of asymptomatic infection in areas with and areas without universal masking. To test the variolation hypothesis, we will need more studies comparing the strength and durability of SARS-CoV-2–specific T-cell immunity between people with asymptomatic infection and those with symptomatic infection, as well as a demonstration of the natural slowing of SARS-CoV-2 spread in areas with a high proportion of asymptomatic infections.

Ultimately, combating the pandemic will involve driving down both transmission rates and severity of disease. Increasing evidence suggests that population-wide facial masking might benefit both components of the response.

The Pandemic Has Revealed the Cracks in U.S. Manufacturing: Here's How to Fix Them

By Sridhar Kota and Glenn S. Daehn

Source: http://www.homelandsecuritynewswire.com/dr20200908-the-pandemic-has-revealed-the-cracks-in-u-s-manufacturing-here-s-how-to-fix-them

Sep 08 – The COVID-19 pandemic has revealed glaring deficiencies in the U.S. manufacturing sector's ability to provide necessary products – especially amidst a crisis. It's been five months since the nation declared a national emergency, yet shortages of test kit components, pharmaceuticals, personal protective equipment and other critical medical supplies persist.

Globalization is at the heart of the problem. With heavy reliance on global supply chains and foreign producers, the pandemic has interrupted shipping of parts and materials to nearly 75% of U.S. companies.

Decades of "offshoring" domestic manufacturing to other countries have led the U.S. to the current crisis. It has seriously damaged the nation's industrial base, increased income inequality and caused stagnation in U.S. living standards. How the U.S. responds will determine the long-term health and prosperity of the nation.

Manufacturing Offshore

After World War II, U.S. policies promoted more liberal international trade, reducing tariffs and encouraging increasingly globalized manufacturing. The process accelerated during the 1980s, when the production of consumer electronics, vehicle parts, packaged semiconductors and other goods was transferred to Mexico, Taiwan, Malaysia and other low-wage countries. When China opened to foreign investment in 1978, its low-cost manufacturing proved irresistible to many American companies. From 2000 to 2019, U.S. direct investment in manufacturing in China jumped from US$7 billion to more than $54 billion.

The rising importance of shareholder profits in corporate decisions led companies to claim that the only way to remain competitive was by moving offshore to minimize production costs. In the U.S., investment shifted from manufacturing to marketing, branding, and research and development. With far fewer factories and factory jobs, the nation moved to a post-industrial "knowledge economy" driven by information technology, software, advanced communication and cutting-edge basic research.

In our work at the nonprofit MForesight, a technology forecasting project based at the University of Michigan, we address government policy and national manufacturing competitiveness. Our research has confirmed the detrimental effects of these trends on U.S. employment and resilience.

For example, the U.S. no longer has sufficient production capacity or the manufacturing know-how to provide essential goods amidst this current crisis – from pharmaceutical ingredients to fabrics for

personal protective equipment – or to meet critical defense needs. Globalization has eliminated more than 50,000 U.S. factories over the past 20 years along with over 5 million manufacturing jobs.
That's because a knowledge economy – unlike manufacturing – offers relatively few high-paying positions. New technologies invented in the U.S. are often manufactured abroad and then imported back, contributing to the current $850 billion trade deficit.

The Larger Costs

In our view, three widely embraced fallacies have caused U.S. policymakers to favor the knowledge economy over a production economy:

Fallacy 1: Research results and inventions are sufficient to create jobs and raise living standards.

The U.S. has built a world-leading research base, led by universities and national laboratories, which receives about $150 billion in federal funding each year. Under the current system, many important innovations conceived on American soil are then manufactured offshore, creating tens of millions of factory jobs in other countries – while hurting U.S. manufacturers. These products are then imported back: cellphones, flexible and flat panel displays, rechargeable lithium-ion batteries, solar cells, drones and more.
The economic benefits for American workers are minimal at best. Instead of high-wage factory positions, imports create jobs in warehousing, distribution and sales that pay too little to support adequate living standards.
A national commitment to domestic manufacturing from its R&D investments would generate high-paying jobs and produce valuable technology exports that would reduce the massive U.S. trade deficit.

Fallacy 2: Industrial policy is incompatible with American capitalism.

Across the globe, a range of industrial policies and government actions foster the development of specific industries, usually in support of strategic national goals. In the past, the United States has intervened to develop strong manufacturing in the aerospace, nuclear power, telecommunications and semiconductor industries, among others. Continued U.S. government support for military priorities is a key reason why aerospace has remained one of the few sectors with a trade surplus.
Since the Reagan administration, the U.S. has been reluctant to pursue industrial policies that have brought success to other manufacturing economies, including Germany, the Asian Tigers – Hong Kong, Singapore, South Korea and Taiwan – and China.
With a smarter industrial policy, the U.S. could become a world leader, for example, in the manufacture of clean energy products, power storage and electric cars.

Fallacy 3: What's good for large corporations is good for the United States.

Generally, social interests and corporate interests don't align – and haven't for more than three decades.
U.S. multinationals are in business to make money, with cost-cutting as a go-to strategy. Moving factories to low-wage countries has become a default decision, despite negative impacts on the skilled workforce, suppliers and overall job numbers. It has devastated domestic manufacturing while boosting corporate profits and executive salaries. The cost has been high during this current pandemic: Supply shortages have cost some people their lives.

National Response Needed

The pandemic has revealed the urgent need for an effective national response that reestablishes the ability to manufacture everything from small components to complex machines in the U.S.

Policies favoring domestic production of essential products would create a large number of well-paid jobs for skilled, innovative workers that can provide resiliency in a crisis. Identification of and support for critical industries and technologies, financial incentives to build U.S. factories and strict "Buy American" requirements for government purchases are examples of possible strategies.
Manufacturing is critical to innovation and job creation. We have recommended how to increase prosperity and regain industrial leadership through manufacturing. Those recommendations include rebuilding domestic supply chains, supporting local production of innovations emerging from U.S. research, creating manufacturing investment funds, and growing domestic engineering and technical talent.
Some of these ideas that would aid U.S. manufacturing are gaining traction in Washington, with at least four bills, including the Endless Frontier Act and the American Manufacturing Leadership Act, introduced into the House and Senate.
Provisions would bolster domestic manufacturing and competitiveness with increased funding for advanced technology development. They would also provide technical training and apprenticeships to strengthen the workforce and help small and medium-sized manufacturers upgrade equipment.
If the products created through taxpayer-funded research were manufactured in U.S. factories, both workers and the economy would benefit. Creation of a new federal agency focused on national manufacturing strategies and coordinated implementation would help maintain commitment to a

strong manufacturing sector. A Cabinet-level voice and sufficient, sustained funding would ensure that the nation responds effectively to the industrial shortcomings revealed by the current pandemic.
With the right steps, the COVID-19 crisis could become a positive tipping point. It could create a stronger, wealthier nation that is better prepared to confront the next crisis, be it medical, military or a natural disaster.

Sridhar Kota *is Professor of Mechanical Engineering, University of Michigan.*
Glenn S. Daehn *is Fontana Professor of Materials Science and Engineering, The Ohio State University.* ***Tom Mahoney****, associate director at MForesight, contributed to this article.*

EDITOR'S COMMENT: More or less, almost all nations worldwide faced similar problems based on similar strategies. Gaps identification means actions to be taken; if not, history has the habit to repeat itself! The thing is that in case of an ongoing pandemic this repetition will cause additional lives …

Covid-19: Italy's new rapid saliva test gives result in 3 minutes

Source: https://www.wantedinrome.com/news/covid-19-italys-new-rapid-saliva-test-gives-result-in-3-minutes.html

Sep 09 – Italy's health ministry has approved a rapid saliva test for covid-19 which provides results in just **three minutes**, reports Italian news agency ANSA.
The **Daily Tampon** has been developed by a company in Merate, near Lecco north of Milan, in collaboration with the University of Sannio, and is ready to start production.

How does the test work?
A saliva sample taken with a cotton swab is placed on the Daily Tampon which, similar to a pregnancy test, gives one of two results: **two lines positive, one line negative**.

Why Has COVID-19 Hit Minorities Harder?

By John Whyte, MD, MPH, and Valerie Montgomery Rice, MD
Source: https://www.medscape.com/viewarticle/937017

September 08, 2020

- Black Americans make up about 13% of the US population, but in some states they represent 30% of COVID-19 cases. Their death rate is also two to four times higher.
- Social determinants of health have a greater impact on people of color. In addition, Black and Hispanic people are more likely to work in essential services, where they have more contact with the public, increasing their risk for COVID-19.

Dr Valerie Montgomery Rice *is Dean and President of Morehouse School of Medicine.*

Unexpected Results in New COVID-19 'Cytokine Storm' Data

Source: https://www.medscape.com/viewarticle/937044

Sep 08 – The immune system overactivation known as a "cytokine storm" does not play a major role in more severe COVID-19 outcomes, according to unexpected findings in new research. The findings stand in direct contrast to many previous reports.
"We were indeed surprised by the results of our study," senior study author Peter Pickkers, MD, PhD, told *Medscape Medical News*.
In a unique approach, Pickkers and colleagues compared cytokine levels in critically ill people with COVID-19 to those in patients with bacterial sepsis, trauma, and after cardiac arrest.
"For the first time, we measured the cytokines in different diseases using the same methods. Our results convincingly show that the circulating cytokine concentrations are not higher, but lower, compared to other diseases," said Pickkers, who is affiliated with the Department of Intensive Care Medicine at Radboud University Medical Center in Nijmegen, the Netherlands.
The team's research was published online on September 3 in a letter in *JAMA*.

Cytokines Lower Than Expected

Normally, cytokines trigger inflammation and promote healing after trauma, infection, or other conditions.

Although a cytokine storm remains ill defined, the authors note, many researchers have implicated a hyperinflammatory response involving these small proteins in the pathophysiology of COVID-19.

The question remains, however, whether all cytokine storms strike people with different conditions the same way.

Pickkers, lead author Matthijs Kox, PhD, and colleagues studied 46 people with COVID-19 and acute respiratory distress syndrome (ARDS) who were admitted to the ICU at Radboud University Medical Center. All participants underwent mechanical ventilation and were treated between March 11 and April 27, 2020.

The investigators measured plasma levels of cytokines, including tumor necrosis factor (TNF), interleukin-6 (IL-6), and interleukin-8 (IL-8). They compared results in this group to those in 51 patients who experienced septic shock and ARDS, 15 patients with septic shock without ARDS, 30 people with out-of-hospital cardiac arrest, and 62 people who experienced multiple traumas. They used historical data for the non-COVID-19 cohorts.

Conditional Findings

Compared to patients with septic shock and ARDS, the COVID-19 cohort had lower levels of TNF, IL-6, and IL-8. The differences were statistically significant for TNF ($P < .01$), as well as for IL-6 and IL-8 concentrations (for both, $P < .001$).

In addition, the COVID-19 group had significantly lower IL-6 and IL-8 concentrations compared with the patients who had septic shock without ARDS.

The researchers likewise found lower concentrations of IL-8 in patients with COVID-19 compared to the out-of-hospital cardiac arrest patients. IL-8 levels did not differ between the COVID-19 and trauma groups.

Furthermore, the researchers found no differences in IL-6 concentrations between patients with COVID-19 and those who experienced out-of-hospital cardiac arrest or trauma.

However, levels of TNF in people with COVID-19 were higher than in trauma patients.

The small sample sizes and single-center study design are limitations.

"The findings of this preliminary analysis suggest COVID-19 may not be characterized by cytokine storm," the researchers note. However, they add, "Whether anticytokine therapies will benefit patients with COVID-19 remains to be determined."

Going forward, Pickkers and colleagues are investigating the effectiveness of different treatments to lower cytokine levels. They are treating people with COVID-19, for example, with the IL-1 cytokine inhibitor anakinra and steroids.

They also plan to assess the long-term effects of COVID-19 on the immune system. "Following an infection, it is known that the immune system may be suppressed for a longer period of time, and we are determining to what extent this is also present in COVID-19 patients," Pickkers said.

Enough to Cause a Storm?

The study "is quite interesting, and data in this paper are consistent with our data," Tadamitsu Kishimoto, MD, PhD, of the Department of Immune Regulation at the Immunology Frontier Research Center at Osaka University, Osaka, Japan, told *Medscape Medical News* when asked to comment.

His study, published online August 21 in *PNAS,* also revealed lower serum IL-6 levels among people with COVID-19 compared to patients with bacterial ARDS or sepsis.

Kishimoto drew a distinction, however: COVID-19 patients can develop severe respiratory failure, suggesting a distinct immune reaction compared to patients with bacterial sepsis. SARS-CoV-2 directly infects and activates endothelial cells rather than macrophages, as occurs in sepsis.

For this reason, Kishimoto said, "SARS-CoV-2 infection causes critical illness and severe dysfunction in respiratory organs and induces a cytokine storm," even in the setting of lower but still elevated serum IL-6 levels.

JAMA. Published online September 3, 2020. Abstract

Coming to terms with the real bioterrorist behind Covid-19: Nature

By David M. Morens *and* Joel G. Breman

Source: https://www.statnews.com/2020/09/09/emerging-viruses-real-bioterrorists-behind-covid-19/

Sep 09 – In 2001, not long after the 9/11 attacks, a mysterious spate of anthrax attacks by mail killed five people and sickened 17. What the FBI calls "the worst biological attacks in U.S. history" led to concerns that bioterrorists might weaponize other globally deadly diseases, like smallpox.

The sudden emergence of a highly infectious novel coronavirus in late 2019 has reminded us of a sobering fact: Nature is the ultimate bioterrorist. It's the one we should fear the most. An unknown virus that once existed only in nature quietly entered a major city in China sometime before the end of 2019 and then spread rapidly around the world. As we write this, SARS-CoV-2, the virus that causes Covid-19, has already killed nearly 860,000 people.

As the outbreak began, there was immediate speculation about the origins of the virus. Initial theories considered emerging viruses in wild animals sold for human consumption in a wet market in Wuhan. That turned out to be an unlikely origin. The legitimate quest for the source of the pandemic was then quickly overwhelmed by theories that were inconsistent with known facts about an accidental release of a novel coronavirus from a Chinese virology lab.

It's imperative that we return to a fact-based consideration of the origins of Covid-19. One day this pandemic will end. But as we and several colleague wrote recently in the American Journal of Tropical Medicine and Hygiene, another one could soon begin if we don't start focusing on what we know about the source of this and other potentially emerging viruses, and use these insights to prepare for the many other formidable threats brewing in nature.

Pandemics aren't new. As one of us (D.M.M.) wrote with our colleague Dr. Anthony Fauci in the September issue of Cell, Covid-19 is at least the seventeenth pandemic caused by an emerging disease since the so-called Plague of Athens began in 430 BCE.

For years, scientists had been predicting the inevitability of something like Covid-19. In the wake of the spread of severe acute respiratory syndrome (SARS) in 2002 and 2003, which was also caused by a coronavirus, scientists focused on the considerable reservoir of coronaviruses lurking in bats around the world. In 2007, one scientific group warned, "The presence of a large reservoir of SARS-CoV-like viruses in horseshoe bats … is a time bomb. The possibility of the re-emergence of SARS and other novel viruses … should not be ignored."

Unfortunately, scientists such as these became modern-day Cassandras, ignored until their terrible predictions came true.

Scientists studying SARS and the 2012 emergence of Middle East respiratory syndrome (MERS), another disease caused by a bat coronavirus, discovered a key fact: Many bat coronaviruses are naturally suited for causing infections in humans and in other animals. This is because of something infectious disease researchers call host switching, also known as a spillover event. It's a genetic change in a pathogen or parasite that allows it to live in a new host — in this case, switching from bats to humans.

After the SARS outbreaks — but long before Covid-19 — bat-to-human transmissions of SARS-like coronaviruses were detected in China, perhaps representing pandemic near-misses.

Today, the genetic sequence of SARS-CoV-2 indicates that its genome is 96% identical to certain coronaviruses found in wild bats. But the exact path the virus traveled as it switched from a bat host to a human host is not yet completely understood.

Several years ago, scientists identified a bat coronavirus "hot spot" in a vast contiguous area that includes Laos, Myanmar, Vietnam, and parts of south and southwest China. Disease experts also pointed to numerous ways these bat coronaviruses could jump to humans: cave exploration and bat tourism; wet markets that sell and butcher live animals; the growth of supply chains dedicated to selling wild animals for human consumption; destructive land management practices; and more.

While the detective work continues, it's clear that we have had ample evidence for more than a decade that bat coronaviruses pose a major risk of causing a pandemic. The key issue now is to learn from our failure to recognize and act on these warning signs.

It can be helpful to put the existential threat of pandemics into context. The horrific bombings of Hiroshima and Nagasaki in 1945 killed somewhere between 110,000 people and 210,000. In 1918, 50 million died of influenza. Nothing on the typical radar screen of national security threats comes close to pandemic threats.

Today, we have international agencies, programs, treaties, and agreements dedicated to preventing nuclear wars. At the very least, the threat of infectious disease outbreaks exploding into pandemics and keeping tabs on emerging viruses deserves this same level of attention, investment, and international cooperation.

For starters, significant increases in bat coronavirus surveillance and research are urgently needed. This important work, which has languished, should be greatly expanded, and we should encourage scientists working in China and other hot-spot countries to join international research and surveillance partnerships.

Strengthening basic public health measures, including hygiene and sanitation in all countries, can also make us more secure. Emerging viruses should not find ready pathways to facilitate their spread. A stronger global public health infrastructure is also needed to respond quickly and efficiently to emerging viruses and other pathogens.

It may seem strange to compare threats posed by human interactions with winged mammals that sleep upside down in caves to that of a terrorist group or a nuclear-armed nation. But scientific

evidence — and our collective daily experience coping with Covid-19 — tells us that pandemics may equal or surpass these dangers. It is time to significantly elevate our response to them so it is equal to the peril they present.

David M. Morens *is an infectious disease physician, chair of the American Committee on Arthropod-Borne Viruses, a fellow of the American Society of Tropical Medicine and Hygiene, and senior adviser to the director of the National Institute of Allergy and Infectious Diseases.*
Joel G. Breman *is physician-epidemiologist, senior scientist emeritus at the Fogarty International Center of the National Institutes of Health, and president of the American Society of Tropical Medicine and Hygiene.*

During the Vietnam War, these physician-scientists were called 'yellow berets.' They are what we need to fight Covid-19

By Haider J. Warraich
Source: https://www.statnews.com/2020/09/02/yellow-berets-physician-scientists-covid-19/

Sep 02 – As we face off against Covid-19, we urgently need physician-scientists who can quickly translate observations made at patients' bedsides into therapies. Sadly, they are in short supply.
Physicians who also have extensive training in scientific methods, often a Ph.D., are ideally suited to learn from the unusual clinical manifestations of Covid-19, such as strokes in young adults and autoimmune Kawasaki syndrome in children. Physician-scientists, however, are becoming extinct in the United States, comprising only about 1% of all physicians today, and with few young clinician researchers joining their ranks.
A solution to this crisis might be found in a quiet research program at the National Institutes of Health that flourished in the shadow of the Vietnam War. It may well have been the greatest medical research program in modern history. The two-year program, officially known as the NIH Associates Training Program, was started in 1953 as a way to bring newly minted physicians to the NIH campus in Bethesda, Md., so they could do research for two to three years under the guidance of senior NIH investigators.
Applications for the program surged during the Vietnam War. Why? It was one of the only ways for medical students to avoid being inducted into military service through the "doctor draft" and sent to Vietnam. Between 1955 and 1973, almost 3,000 medical school graduates enrolled in the program.
Nine physicians who trained at the NIH during this period went on to win Nobel Prizes. From the class of 1968 alone, Robert Lefkowitz discovered a family of cellular receptors that one-third of all approved drugs target; Michael Brown and Joseph Goldstein discovered a cholesterol receptor that led to the development of cholesterol-lowering statin medications; and Harold Varmus discovered some of the fundamental mechanisms of cancer.
The impact of the program extends far beyond Nobel laureates. A 1998 survey showed that its graduates comprised one-quarter of professors of medicine at Harvard, Johns Hopkins, and other leading medical schools. Dr. Eugene Braunwald, one of the most iconic cardiologists of the modern era (the hospital tower I work in at Brigham and Women's Hospital is named after him), also started his career in this NIH program in 1955. And the self-proclaimed "dummy" of this class has become the most influential physician-scientist of our time: Dr. Anthony Fauci, who has headed the National Institute of Allergy and Infectious Diseases since 1984 and is a powerful voice in the U.S.'s response to the Covid-19 pandemic.
Although they were officially called clinical associates, many at NIH and beyond came to call them the **yellow berets**, a term that started out as an insult inspired by Bob Seger's satirical song about "men who faint at the sight of blood," who "watched their friends shipped away, the draft dodgers of the yellow beret."
I interviewed a half-dozen of the associates. All of those I spoke with opposed the war. Some told me they alternated between performing experiments in their NIH labs and joining anti-war protests. Yet many, including Fauci, resent the implication of cowardice in the yellow beret moniker. As the achievements of the clinical associates have accumulated, that once snide term has become a badge of honor.
Few who applied for the program had any prior research experience. "I avoided all sorts of opportunities to do research," Lefkowitz said as we sat in his office, surrounded by framed accolades and memorabilia. The transition from the wards to the lab was daunting. "I had never before in my life met with such sustained and unremitting failure," he told me. Now he sees the lack of experience as advantageous, "Knowing too much hems you in."
Within 18 months at the NIH, Lefkowitz had purified adrenocorticotropic hormone, a hormone made by the pituitary gland, the first step in his journey to the 2012 Nobel Prize in chemistry.

The insights that physician-scientists receive from patients is essential to their discoveries. The research by Brown and Goldstein that led to the discovery of statins, for example, was inspired by two siblings born with high cholesterol. "The little girl had her first heart attack when she was 3 years old. She couldn't walk across the room without angina [chest pain]," Brown told me. "If we hadn't seen those two children, our lives would have been very different."

Such insights will be paramount to overcoming Covid-19.

The only blemish on the program was its lack of diversity. In one analysis of 1,577 associates between 1955 and 1973, only four (0.3%) were women, and almost none were people of color. A widely acknowledged yet unspoken fact was that women were not accepted into the program because they would take a research spot that might keep promising young male scientists "out of harm's way" in Vietnam.

"Whenever you have an endeavor that is meeting the general needs of the public and society, you always do better when the people who are actually performing the activity are representative of the society that it's trying to help," Fauci told me. "Just the way diversity is important in society to keep it enriched, diversity is important in the subspecialties of the things that contribute to society, like biomedical research."

As the yellow berets reach the twilight of their illustrious careers, the future of American medical science and the fate of the physician-scientist is more uncertain than ever before. One solution to resurrecting physician-scientists might resemble scientific conscription. While many medical schools incorporate a year of research in their curricula, I believe that this model should be expanded by requiring students to spend at least one structured year exploring an area outside of clinical medicine, such as basic science research, statistics, data science, or the humanities.

"If we could have some sort of obligation to the country in the field of medicine and science," said Fauci, "I would not be surprised if we got the same sort of extraordinary results that we got back then."

Academic medical centers are essential purveyors of life support for physician-scientists. In China, scientists earn more money than clinicians. In the United States, physician-scientists give up substantial, guaranteed income from clinical work in exchange for dwindling and uncertain sources of grant funding. Their employers need to put the *academic* back into academic medical centers by being "run like a real intellectual enterprise rather than a money making enterprise," said Brown.

That starts by giving young physician-scientists the freedom to creatively solve the greatest problems facing humankind.

The NIH took excellent physicians and scientists in the country and let them develop in an environment not governed by trying to get the next big grant or to bill for as many clinic visits and procedures as possible. "We had the freedom to pursue our own ideas in a way that was independent, with mentoring and coaching, but it wasn't like you were working for someone and doing someone else's work," said Fauci. "We were so young and we were thrust into the big leagues, as it were."

Covid-19 has made the need for physician-scientists starkly clear. The NIH continues to support physician-scientists through programs such as the Stadtman Investigators program, which provides ample freedom and support for emerging physician-scientists and which champions diversity and inclusion as a core pillar. Yet unless funding for research increases and the NIH and academic medical centers develop novel initiatives — even including a scientific draft — the yellow berets might well be remembered as the last of the great physician-scientists.

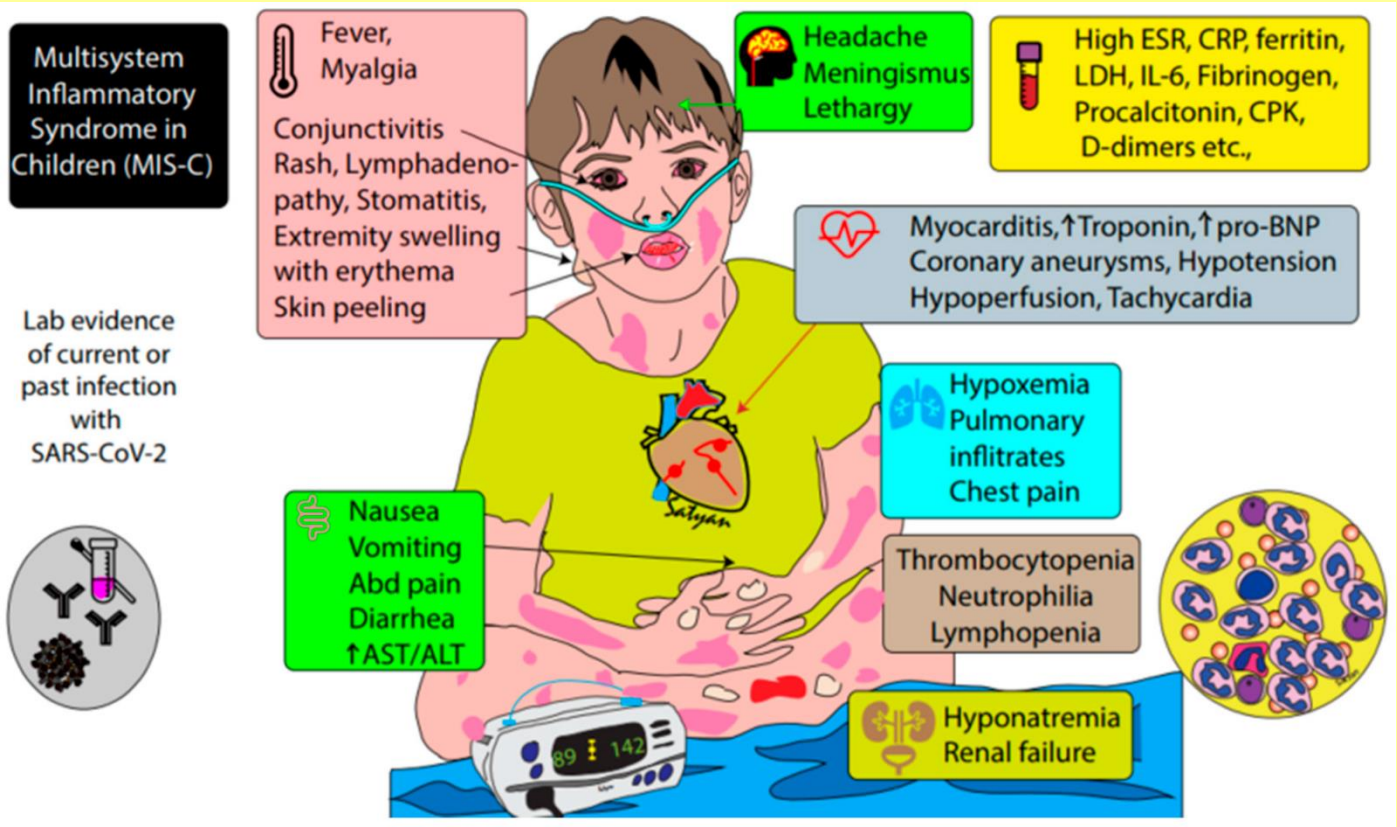
"It was a grand circus of ideas," said 84-year-old Jesse Roth, one of Lefkowitz's mentors, "a Garden of Eden for young investigators."

Haider Warraich *is a cardiologist and researcher at the VA Boston Healthcare System, Brigham and Women's Hospital, and Harvard Medical School.*

Children's COVID-19-Associated Inflammatory Syndrome, MIS-C, Described

Source: https://www.genengnews.com/news/childrens-covid-19-associated-inflammatory-syndrome-mis-c-described/

Sep 10 – COVID-19 is frequently asymptomatic in children and, if symptoms arise, they are typically mild. However, one complication that can arise from a SARS-CoV-2 infection is Multisystem Inflammatory Syndrome in Children (MIS-C). Little is known about MIS-C, which presents 4–6 weeks after infection with a high fever, organ dysfunction, and inflammation. Now, a team of researchers has mapped the immune response in children affected by MIS-C. The findings reveal that, although MIS-C shares some features with Kawasaki disease, the inflammatory response differs from that in Kawasaki disease and severe acute COVID-19.



Infographic showing CDC criteria for the diagnosis of MIS-C. A combination of fever, evidence of inflammation, involvement of at least two organ systems, and prior evidence of SARS-CoV-2 infection are required to establish the diagnosis.

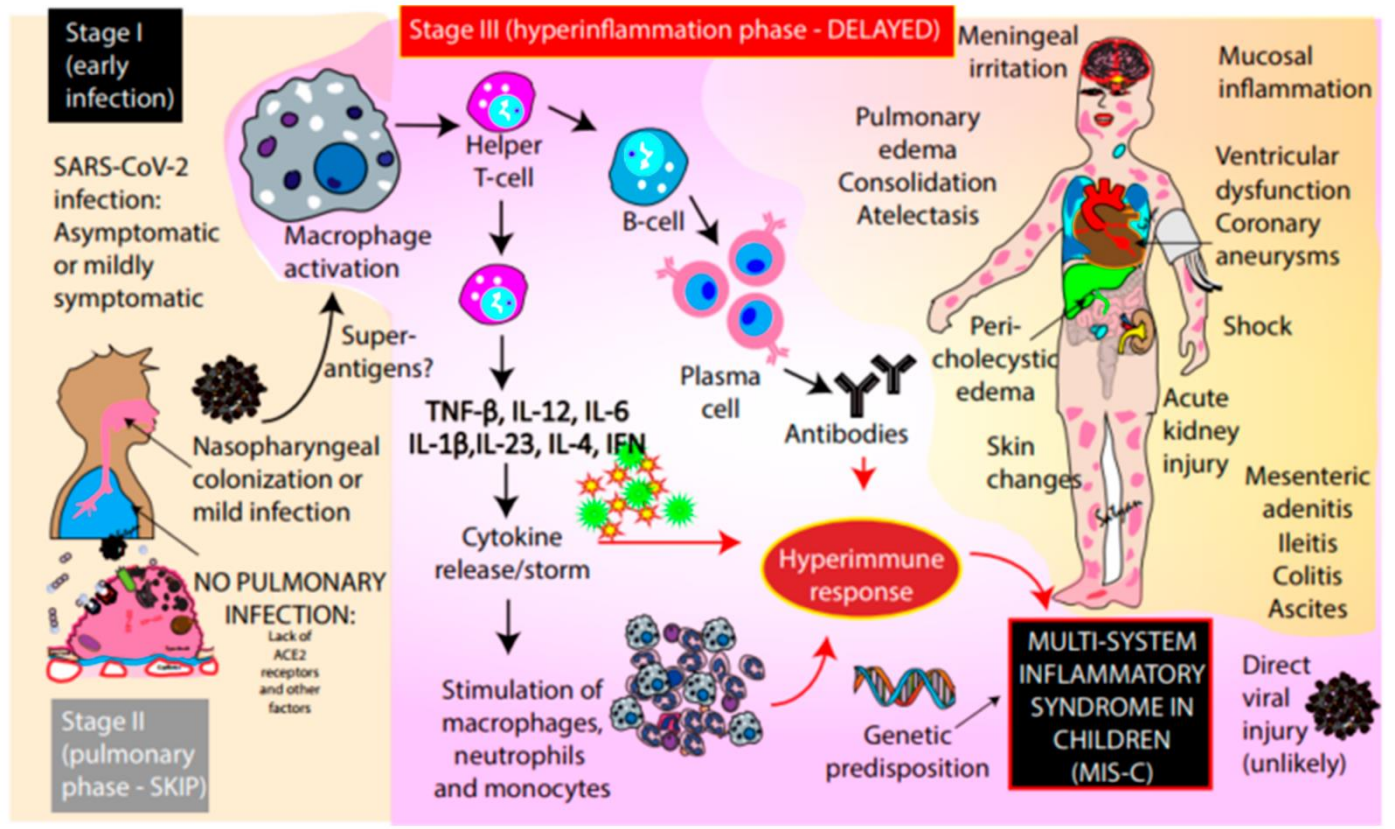
"Our results show that MIS-C is truly a distinct inflammatory condition from Kawasaki disease, despite having some shared features," said Petter Brodin, MD, PhD, pediatrician and researcher at the department of women's and children's health, Karolinska Institutet. "The hyperinflammation and cytokine storm detected in children with MIS-C is also different from that seen in adult patients with severe, acute COVID-19, which we recently described in another publication."

The study is published in the journal *Cell* in the paper titled, "The Immunology of Multisystem Inflammatory Syndrome in Children with COVID-19."

Researchers compared blood samples from 13 MIS-C-patients treated at Karolinska University Hospital in Stockholm, Sweden, and Bambino Gesù Children's Hospital in Rome, Italy, with samples from 28 Kawasaki disease patients collected from 2017 to 2018, prior to COVID-19. The analyses also included samples from children with mild COVID-19.

When comparing MIS-C to these other inflammatory states, the study observed differential frequency of specific immune cell populations, inflammatory cytokines, and chemokines in the blood. More specifically, the authors write that the "inflammatory response in MIS-C differs from the cytokine storm of severe acute COVID-19, shares several features with Kawasaki disease, but also differs from this condition with respect to T-cell subsets, IL-17A, and biomarkers associated with arterial damage."

Unlike children with Kawasaki disease and children with mild COVID-19, children who developed MIS-C were lacking IgG-antibodies to common cold coronaviruses. The researchers also found several autoantibodies that target the body's own proteins and that may contribute to the pathogenesis of MIS-C. These data, the authors noted, suggest "possible targets of autoimmune attack." The hypothesis that autoantibodies contribute to the pathology in MIS-C is supported, the authors write, "by the efficacy of intravenous immunoglobulin in MIS-C, a common approach to activate inhibitory Fc-receptors and prevent membrane-attack complexes by complement factors and thereby mitigating autoantibody-mediated pathology."



Pathogenesis of MIS-C. Early infection (phase I) with SARS-CoV-2 is likely to be asymptomatic or mildly symptomatic in children. The pulmonary phase (phase II) is severe in adults but is mild or absent in many children. The early infection appears to trigger macrophage activation followed by the stimulation of T-helper cells. This in turn leads to cytokine release, the stimulation of macrophages, neutrophils, and monocytes, along with B-cell and plasma cell activation with the production of antibodies leading to a hyperimmune response (stage III). This immune dysregulation is associated with the inflammatory syndrome in affected children. Direct infection with SARS-CoV-2 is less likely to play a role in MIS-C. ACE2—angiotensin converting enzyme 2 receptors; TNF-β—tumor necrosis factor β; IL—interleukins.

The researchers are now investigating the genetic risk factors for developing MIS-C after SARS-CoV-2 infection. The authors noted that treatments of MIS-C have, for the most part, followed protocols used in atypical Kawasaki disease "given the overlap in presentation between these groups of patients." Their data, they suggested, "present a more complex picture with both shared features and stark differences that should influence treatment strategies for these conditions."
"There is an urgent need to better understand why a small minority of children infected with SARS-CoV-2 develop MIS-C, and we are adding a piece to the puzzle," said Brodin. "Better knowledge of the pathogenesis is important for development of optimal treatments that can dampen the cytokine storm and hopefully save lives, as well as for vaccine development to avoid MIS-C caused by vaccination."

▶▶ **Read also:** https://www.mdpi.com/2227-9067/7/7/69/htm

Conspiracy theories

Source: https://misinforeview.hks.harvard.edu/wp-content/uploads/2020/09/jamison_vaccines_COVID19_infodemic_20200909.pdf

Jamison, M. A.; Broniatowski, D. A.; Dredze, M.; Sangraula, A.; Smith, M. C.; Quinn, S. C. (2020). **Not just conspiracy theories: vaccine opponents and pro-ponents add to the COVID-19 'infodemic' on Twitter.** *The Harvard Kennedy School (HKS) Misinformation Review.* https://doi.org/10.37016/mr-2020-38

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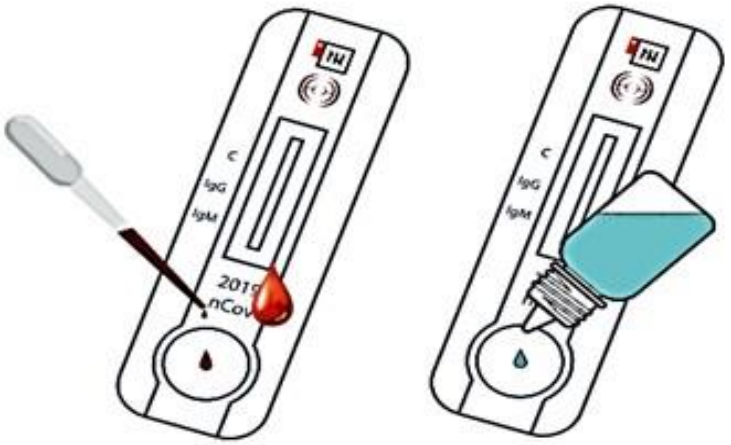

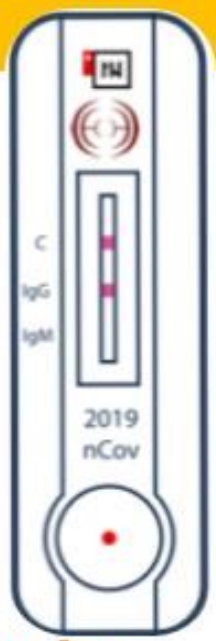

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Cartoons on protective suits comfort children infected with COVID-19

Source: http://www.ecns.cn/m/hd/2020-02-24/detail-ifztvsqr0578291.shtml

Children infected with COVID-19 living at isolation wards were afraid to see medical staff who had been wrapped in protective suits in Wuhan Children's Hospital.

Wang Jia, a nurse in the hospital who likes drawing, came up with an idea of drawing cartoons on the protective suits. She invited children to put color on her drawing, a way to make these children relaxed.

Many medical staff have been inspired by the idea and taken time to draw some cartoon characters on their protective suits. Children there have become more cooperative with the treatment in this way.

These Are the World's Most Troubling Hotspots of Vaccine Hesitancy

Source: https://www.sciencealert.com/vaccine-confidence-is-a-problem-around-the-globe-here-are-the-concerning-hotspots

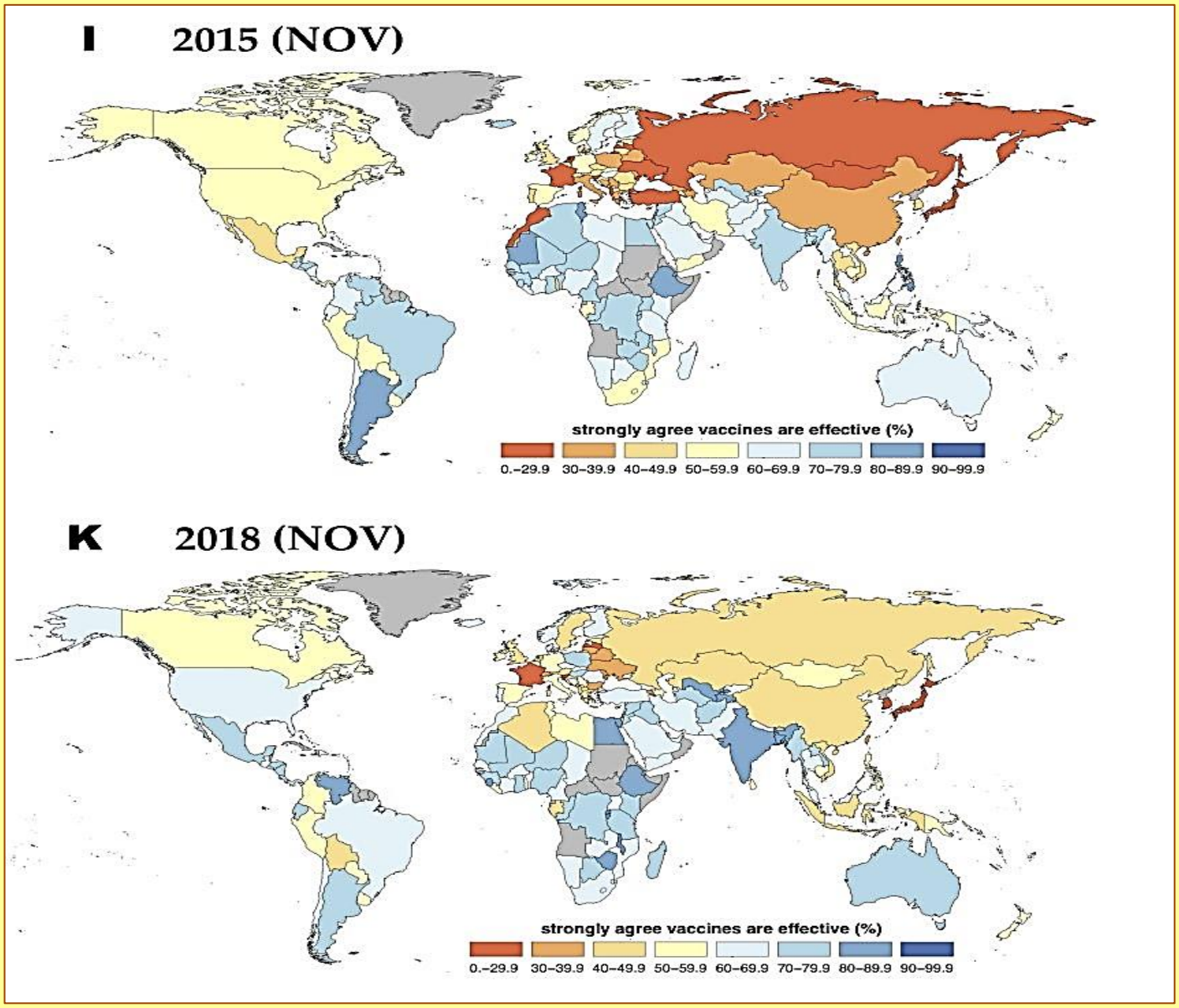
Sep 11 – As medical laboratories around the globe push limits to develop a vaccine that could end a pandemic once and for all, an even harder challenge awaits – getting it to where it can do the most good.

Ten years ago, an international team of researchers established the Vaccine Confidence Project (VCP) in order to clarify global attitudes regarding the safety and efficacy of vaccination.

While vaccination uptake itself is closely monitored around the world by groups like the World Health Organisation (WHO), our understanding of the cultural trends behind the decision process is threadbare at best.

To address this shortfall in data, the VCP analysed hundreds of surveys and tens of thousands of interviews collected between 2015 and 2019, providing vital information on the vaccination beliefs of more than 284,000 people across 149 countries.

The study's results provide us with a global map of rising and falling confidence in the overall safety and general effectiveness of vaccines and the perceived importance of vaccinating children.
The researchers also collected demographic details to combine with the survey's results, allowing them to model relationships between vaccine uptake and factors such as religious belief, socioeconomic status, and even sources of trust.
The result is an atlas of mounting fears, growing trust, and indications of troubling viral hotspots in years to come.
There's reason to be optimistic though. In France, confidence in vaccines has been notably low in recent years, with a mere one in five agreeing to their safety in 2018. By the end of 2019, this had improved to nearly one in three.



Model-based estimates of the percentage of respondents strongly agreeing that vaccines are effective in November 2015 and November 2018. No data were available for countries in grey.

Similar improvements have been seen in other places around Europe and the UK, including Finland, Italy, and Ireland. In fact, by the end of last year, most of the EU's confidence in vaccines had climbed.
Further to the east, things aren't looking quite as promising. In 2015, a mere 2 percent of people in Azerbaijan strongly disagreed that vaccines were safe. This jumped to a shocking 17 percent by late 2019.

Afghanistan, Indonesia, and Pakistan all had similarly small figures of 1 to 2 percent disagreeing in vaccine safety, with less significant jumps to 3 to 4 percent over a similar period.
Though not as alarming as Azerbaijan's plummeting confidence level, community safety is a numbers game, where a reluctant few can make the difference between the eradication of a virus and its persistence in pockets of sustained infection.
Links between demographic details and vaccine confidence could provide health workers with better ideas of who to engage, and how to go about changing perspectives. Men, for example, were less likely to vaccinate themselves. So were those with limited education.
In some cases the cause of a loss in confidence can be traced to specific events. For example, fears and confusion over a Dengue virus vaccine called Dengvaxia, controversially rolled out in 2017, seem to be behind a dramatic fall in vaccine confidence in the Philippines. In 2015 they were in the top 10 most confident countries, with 82 percent strongly agreeing they were safe. By 2019, this had fallen to 58 percent.
In countries like Indonesia, religious authorities can heavily influence public opinion over vaccination programs and their safety.
Beyond the raw statistics there are subtle details on how these attitudes might affect behaviours, such as vaccinating children.
"Our findings suggest that people do not necessarily dismiss the importance of vaccinating their children even if they have doubts about how safe vaccines are", says Clarissa Simas, a psychologist from the London School of Hygiene & Tropical Medicine, UK.
"The public seem to generally understand the value of vaccines, but the scientific and public health community needs to do much better at building public trust in the safety of vaccination, particularly with the hope of a COVID-19 vaccine."
Much has changed in recent months, of course. Attitudes are evolving almost weekly as misinformation is amplified by social media, and hopes and fears compete amid a global health catastrophe.
Which is all the more reason to build a clear foundation of knowledge on how people around the world come to change their minds on public health.
"It is vital with new and emerging disease threats such as the COVID-19 pandemic, that we regularly monitor public attitudes to quickly identify countries and groups with declining confidence, so we can help guide where we need to build trust to optimise uptake of new life-saving vaccines", says VCP director Heidi Larson, an anthropologist from the London school of Hygiene & Tropical Medicine, UK. In many ways, delivering vaccines is as much a scientific problem as their creation. Brute force isn't going to cut it, so we're going to need informed strategies of public engagement to build trust in healthcare.
Thankfully humanities are making headway in the understanding of the diverse and complex forces at work in our minds as we weigh up the pros and cons of vaccination.
To inform them, we're going to need more studies like this one.

▶▶ This research was published in *The Lancet*.

Depicting SARS-CoV-2 faecal viral activity in association with gut microbiota composition in patients with COVID-19

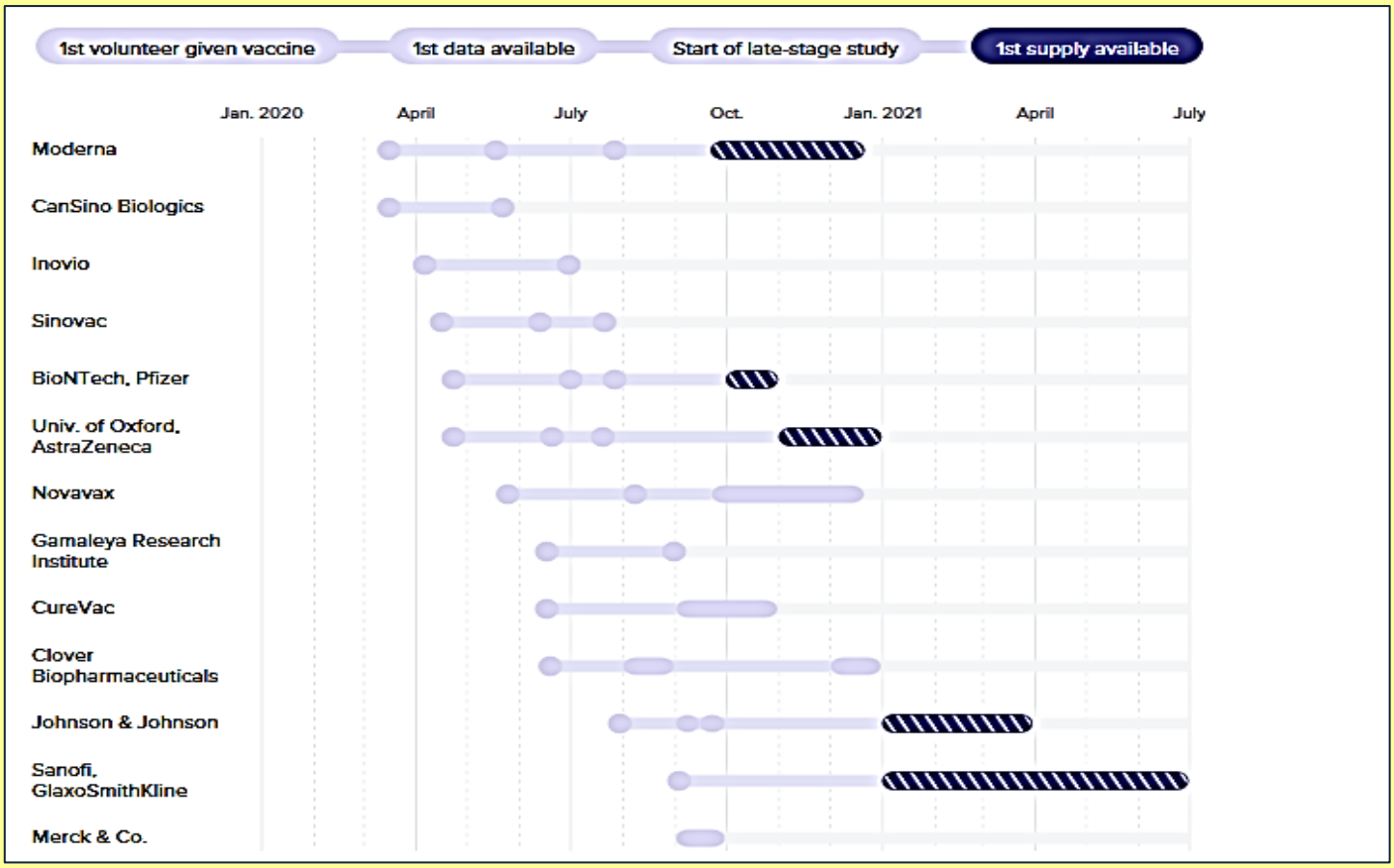
By Tao Zuo, Qin Liu, Fen Zhang, et al.
Gut 2020;0:1–9. doi:10.1136/gutjnl-2020-322294
Source: https://gut.bmj.com/content/gutjnl/early/2020/07/19/gutjnl-2020-322294.full.pdf

What are the new findings?

► We found for the first time a signature of active gut viral infection in a subset (47%) of patients with COVID-19 even in the absence of GI symptoms, suggesting 'quiescent' GI infection of SARS-CoV-2.
► The transcriptional activity of viral infection and replication persisted in the gut even after respiratory clearance of SARS-CoV-2.
► Faecal samples with a signature of high SARS-CoV-2 infectivity harboured a higher abundance of opportunistic pathogens, *Collinsella aerofaciens, Collinsella tanakaei, Streptococcus infantis, Morganella morganii* and an enhanced capacity for biosynthesis of nucleotide and amino acid and carbohydrate metabolism (glycolysis), whereas faecal samples with a signature of low-to-none SARS-CoV-2 infectivity had a higher abundance of short-chain fatty acid producing bacteria, *Parabacteroides merdae, Bacteroides stercoris, Alistipes onderdonkii and Lachnospiraceae bacterium 1_1_57FAA.*

The coronavirus vaccine frontrunners are advancing quickly. Here's where they stand.

Source: https://www.biopharmadive.com/news/coronavirus-vaccine-pipeline-types/579122/



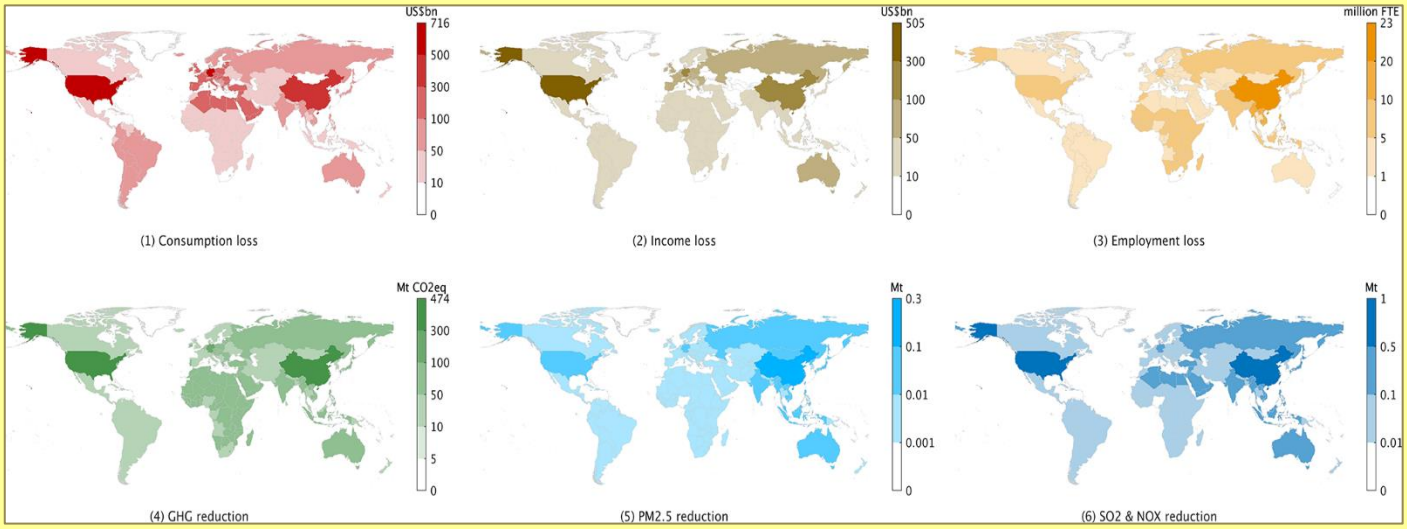
Editor's note: This is a June 2020 article without the recent developments regarding AstraZeneca vaccine and Sputnik-V Lancet paper. Nevertheless, it is a very informative recording of vaccine candidates.

Global socio-economic losses and environmental gains from the Coronavirus pandemic

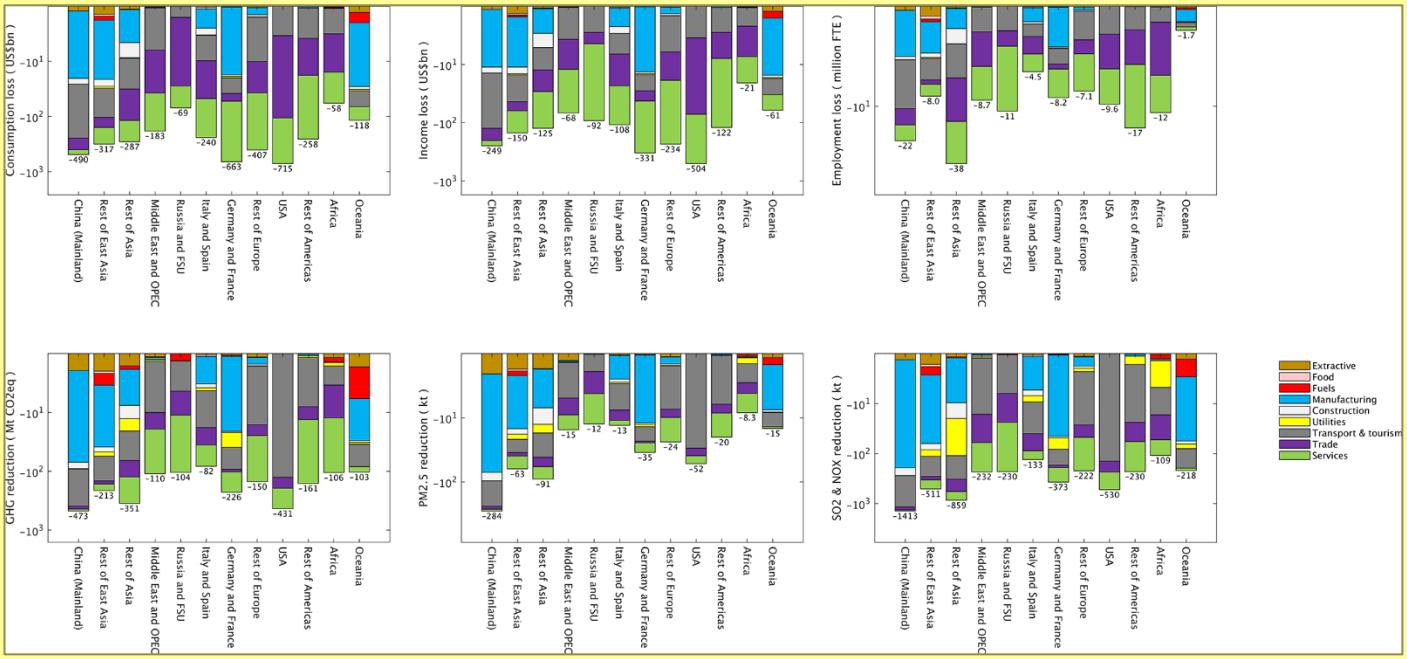
By Manfred Lenzen, Mengyu Li, Arunima Malik, et al.
Source: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0235654

Abstract

On 3 April 2020, the Director-General of the WHO stated: "*[COVID-19] is much more than a health crisis. We are all aware of the profound social and economic consequences of the pandemic* (WHO, 2020)". Such consequences are the result of counter-measures such as lockdowns, and world-wide reductions in production and consumption, amplified by cascading impacts through international supply chains. Using a global multi-regional macro-economic model, we capture direct and indirect spill-over effects in terms of social and economic losses, as well as environmental effects of the pandemic. Based on information as of May 2020, we show that global consumption losses amount to **3.8$tr**, triggering significant job (147 million full-time equivalent) and income (2.1$tr) losses. Global atmospheric emissions are reduced by 2.5Gt of greenhouse gases, 0.6Mt of $PM_{2.5}$, and 5.1Mt of SO_2 and NO_x. While Asia, Europe



and the USA have been the most directly impacted regions, and transport and tourism the immediately hit sectors, the indirect effects transmitted along international supply chains are being felt across the entire world economy.



Sectoral breakdown of global impacts from the COVID-19 pandemic, in indicator-specific units (US$bn for consumption and income, million FTE for employment, Mt for greenhouse gas emissions, and kt for other emissions) – enlarge page for better view.

These ripple effects highlight the intrinsic link between socio-economic and environmental dimensions, and emphasise the challenge of addressing unsustainable global patterns. How humanity reacts to this crisis will define the post-pandemic world.

World's first portable MRI machine comes to patients

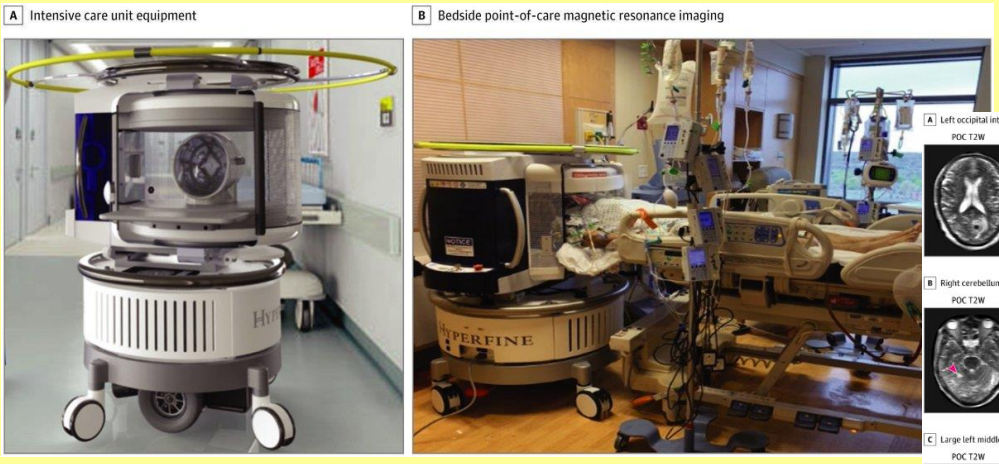
Source: https://newatlas.com/medical/portable-mri-hyperfine-yale-jama-study/

Sep 09 – The machine effectively detected neurological abnormalities in 29 out of 30 intensive care patients

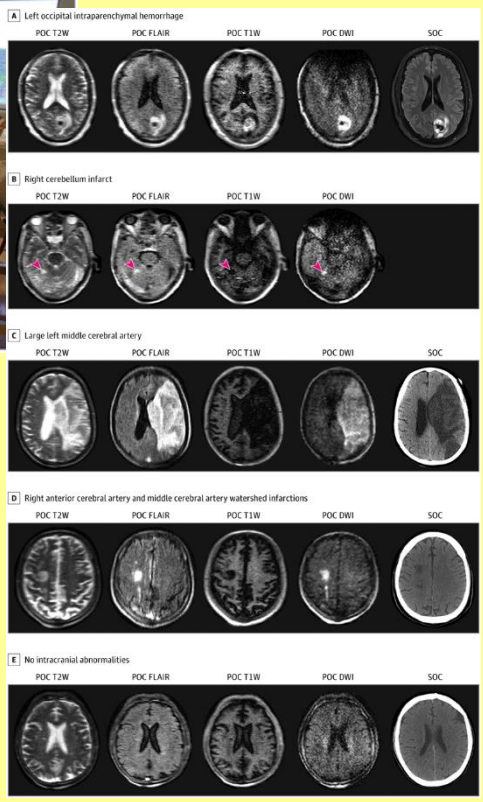
A study published in the journal *JAMA Neurology* is reporting promising results testing the world's first portable MRI machine in a real-world intensive care setting. The groundbreaking device

effectively detected brain abnormalities in almost all patients studied, paving the way for new bedside diagnostic capabilities.
Developed by healthcare technology company Hyperfine, the point-of-care (POC) magnetic resonance imaging (MRI) system was first revealed last year. The device is claimed to be 20 times less costly, use 35 times less power, and is 10 times lighter that current MRI machines.

Traditional MRI machines are big and expensive devices, requiring custom-built rooms to contain the powerful magnetic fields used for imaging. Until recently, the prospect of a portable MRI machine was unimaginable but recent advances in computing power have enabled images to be produced using smaller magnets.
The magnetic fields used in MRI machines are tracked with a unit of measurement called a Tesla (T). Most current MRI machines rely on powerful magnets ranging from 1.5 T to 3 T. Hyperfine's new POC machine uses a significantly smaller magnet of just 0.064 T.
This means the device can be easily rolled up to a patient's bedside without deploying any protective measures in the surrounding environment. The machine also uses less electricity than large MRI machines, allowing it to be powered from a standard wall outlet.
In this new study, researchers from Yale Medicine tested the efficacy of the new MRI device in 30 patients admitted to Yale New Haven Hospital's neuroscience intensive care unit. The new device detected a variety of abnormalities, ranging from brain tumors to ischemic stroke, in 29 of the patients.
The study also took the opportunity to study the neurological effects of COVID-19 in 20 patients admitted to intensive care. The nature of severe COVID-19 means these patients are generally unable to be transported to larger MRI rooms for imaging, so this proof-of-concept analysis suggests the portability of the POC device allows for many more patients to be investigated. Eight out of the 20 COVID-19 patients imaged showed acute neurological abnormalities associated with the disease.
More testing is necessary before the device is commercially rolled out into clinical environments and further studies will need to directly compare these POC MRI results to conventional MRI or CT imaging results. However, Hyperfine is clear in stating this new device is not designed to be a replacement for traditional high-field MRI imaging, but instead is intended to complement those diagnostic tools.



The device being used to image patients in an intensive care setting (Hyperfine)



If effectively validated in further tests this portable MRI machine offers profound new diagnostic opportunities for clinicians. In intensive care situations the machine allows for fast assessment of neurological injuries and the novel ability to gather serial measurements introducing temporal imaging profiles of the same patient over several days or weeks.

The mobility of the device also allows for better diagnostics in rural or remote environments. The developers even hypothesize the machine could be integrated into ambulances for mobile patient assessments. This could potentially offer paramedics the ability to immediately diagnose stroke symptoms before a patient even gets to a hospital.

Speaking to STATNews last year, Hyperfine's chief medical officer John Martin suggested the machine opens up incredible possibilities that could never have been considered, even a few short years ago.

"Now, the cool thing is that when you get this in front of doctors, they look at it, they start thinking about all kinds of creative ways in which they can use that," Martin said in 2019. "You know, the thought of this now being in a van floating around Africa, that's a mind-blowing concept, no one would ever dream of that at all. That's actually possible."

▶▶ **The new study was published in the journal** *JAMA Neurology*.

The proteomics contribution to the counter-bioterrorism toolbox in the post-COVID-19 era

By Jean Armengaud

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Journal Expert Review of Proteomics

Source (full paper): https://www.tandfonline.com/doi/pdf/10.1080/14789450.2020.1822745?needAccess=true

Abstract

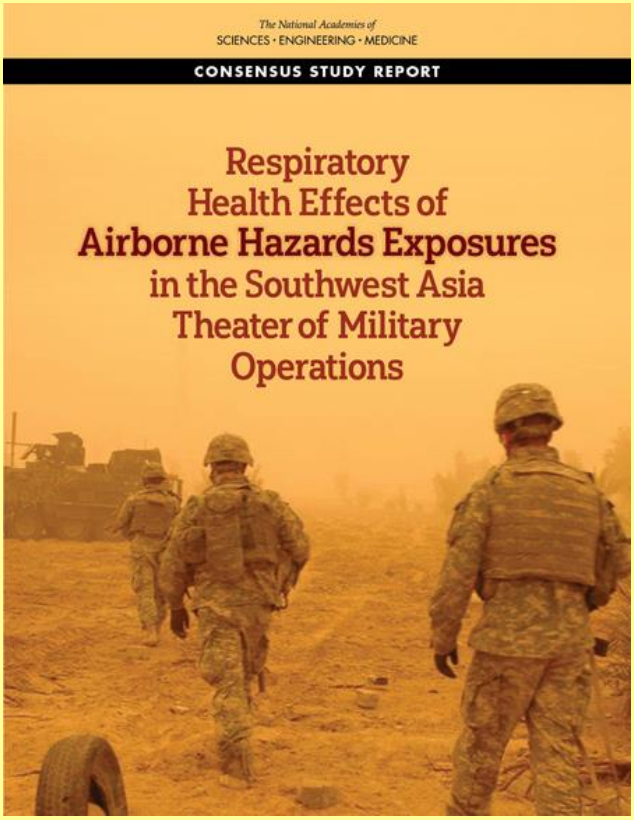
Biological agents, or live pathogens, could represent unconventional weapons. Luckily, CBRNE counter-terrorism experts can rely on an extended toolbox of next-generation technologies to detect them and minimize their impact. However, the **Black Swan Theory**, which considers an extremely improbable event which would have a disproportionately large impact, may apply to biological threats. This scenario is possible because some living organisms have an amazing capacity for amplification, and propensity to spread, while also having drastic effects. The etiological agent responsible for the COVID-19 pandemic, SARS-CoV-2 virus, has shown how pernicious and damaging sarbecoviruses can be. In the post-COVID-19 era, we must re-assess biological risks without compromise, taking into account the three grey swan coronavirus known outbreaks and the most recent societal changes. Proteomics has important

roles to play in improving and accelerating detection of pathogens and their potential resistance to current treatments, determining their source as quickly as possible, stratifying patients to improve therapeutic interventions, investigating new drug or vaccine therapies, characterizing pathogen reservoirs, and improving predictive epidemiological models. It thus constitutes an essential element in the counter-terrorism toolbox to deal with biological threats as developed hereafter.

New Approaches Are Needed to Determine Whether Respiratory Health Problems Are Associated with Military Deployment to the Persian Gulf Region

Source: https://www.nationalacademies.org/news/2020/09/new-approaches-are-needed-to-determine-whether-respiratory-health-problems-are-associated-with-military-deployment-to-the-persian-gulf-region

Sep 11 — Limitations in existing health studies have resulted in insufficient evidence to determine whether U.S. troops' exposure to burn pit emissions and other airborne hazards in Southwest Asia are linked to adverse respiratory health outcomes, says a **new report** from the National Academies of Sciences, Engineering, and Medicine. Through partnerships with other agencies, and the use of emerging exposure assessment technologies, the U.S. Department of Veterans Affairs (VA) could conduct or support well-designed studies that would yield more definitive answers.



Respiratory Health Effects of Airborne Hazards Exposures in the Southwest Asia Theater of Military Operations reviewed 27 respiratory health outcomes, including respiratory cancers, asthma, chronic bronchitis, sinusitis, and constrictive bronchiolitis. Of these 27 outcomes, none met the criteria for sufficient evidence of an association with service in the Southwest Asia theater, which comprises the Persian Gulf countries and Afghanistan. The evidence for respiratory symptoms — which included chronic persistent cough, shortness of breath, and wheezing — met the criteria for limited or suggestive evidence of an association for both veterans who served in the 1990-1991 Persian Gulf War and those who served in the military operations after the Sept. 11, 2001, attacks.

"New approaches are needed to better answer whether respiratory health issues are associated with deployment. The current uncertainty should not be interpreted as meaning that there is no association — rather, the issue is that the available data are of insufficient quality to draw definitive conclusions," said Mark Utell, a physician and professor of medicine and environmental medicine at the University of Rochester Medical Center, and chair of the committee that wrote the report. "However, the committee believes it is possible today to conduct well-designed studies that will provide more clarity to veterans who are seeking to understand the respiratory problems they are experiencing."

More than 3.7 million U.S. service members have served in the Southwest Asia theater of military operations since 1990. These operations include the 1990-1991 Persian Gulf War, a post-war stabilization period (1992-2001), and the post-9/11 conflicts. Deployment to the region exposed service members to airborne hazards including oil-well fire smoke, emissions from open burn pits, dust suspended in the air, exhaust from military vehicles, and local industrial emissions. Temperature extremes, stress, and noise encountered by service members may have increased their vulnerability to these exposures.

Existing studies on respiratory health and deployment to Southwest Asia have a number of limitations, says the report. For example, many studies implicitly assume that deployed veterans had the same exposures to airborne hazards, overlooking that burn pit emissions and other pollutants differed by conflict and varied by location and over time. Several studies failed to adequately account for cigarette smoking — a known cause of respiratory health problems — in their analyses of outcomes. Further, mortality reports have not consistently broken out deaths from respiratory disease, making it difficult to assess the extent of harm caused by airborne exposures.

Addressing Knowledge Gaps

The committee observed that there are several ways to address the knowledge gaps they found. To identify subpopulations that may be susceptible to respiratory health problems, future studies of theater veterans should evaluate how factors such as race, gender, and the location and timing of deployments and military service could modify the effects of airborne exposures.

Deployed service members are often at the peak of their lung function, which occurs in their early 20s, the report notes. The effects of exposures, including burn pits, related to deployment may take time to manifest. Longitudinal studies are therefore needed to record baseline lung function and examine changes over time. Other retrospective studies can feasibly be done using imaging and biomarkers.

The report also recommends that VA conduct an updated analysis of mortality among Southwest Asia theater veterans, since the last analysis was done in 2011. Future mortality studies should compare veterans exposed to higher and lower levels of airborne agents, rather than comparing all veterans to the general population.

Potential Partners for VA

VA already partners extensively with the U.S. Department of Defense (DOD), and the two agencies have been working toward a modernized and interoperable electronic health record system that is expected to roll out in late 2020. As part of this effort, VA and DOD should explicitly integrate research access considerations into the planning and implementation of their electronic health record system. They should exchange information on exposures that personnel encounter during military service; and their impact on health before, during, and after deployment and after transition to veteran status.

Other agencies hold data and manage technologies that could aid in the VA's research efforts. They include NASA, the National Oceanic and Atmospheric Administration, and the National Institute for Occupational Safety and Health.

Emerging Technologies to Aid Future Research

The report also identifies several emerging technologies that could address knowledge gaps. New discoveries in biomarkers — characteristics of the body that can be measured — could provide more information on environmental exposures, effects, and susceptibility. Recent advances in the analysis of satellite data may also enable more accurate estimates of past airborne pollutants levels and burn pit emissions. Other potential technologies include silicone wristbands for exposure detection; low-cost wearable devices that measure changes in health in real time; and, further in the future, portable "readers" that could map changes to the human genome resulting from certain hazardous exposures.

The study — undertaken by the Committee on the Respiratory Health Effects of Airborne Hazards Exposures in the Southwest Asia Theater of Military Operations — was sponsored by the U.S. Department of Veterans Affairs. The National Academies are private, nonprofit institutions that provide independent, objective analysis and advice to the nation to solve complex problems and inform public policy decisions related to

science, technology, and medicine. They operate under an 1863 congressional charter to the National Academy of Sciences, signed by President Lincoln.

Pitt Scientists Discover Tiny Antibody Component That is Highly Effective in Preventing and Treating SARS-CoV-2 Infection in Animal Models

Source: https://www.pittwire.pitt.edu/news/pitt-scientists-discover-tiny-antibody-component-highly-effective-preventing-and-treating-sars

Sep 14 – University of Pittsburgh School of Medicine scientists have isolated the smallest biological molecule to date that completely and specifically neutralizes the SARS-CoV-2 virus, which is the cause of COVID-19. This antibody component, which is 10 times smaller than a full-sized antibody, has been used to construct a drug—known as Ab8—for potential use as a therapeutic and prophylactic against SARS-CoV-2.

The researchers report today in the journal Cell that Ab8 is highly effective in preventing and treating SARS-CoV-2 infection in mice and hamsters. Its tiny size not only increases its potential for diffusion in tissues to better neutralize the virus, but also makes it possible to administer the drug by alternative routes, including inhalation. Importantly, it does not bind to human cells—a good sign that it won't have negative side-effects in people.

Ab8 was evaluated in conjunction with scientists from the University of North Carolina at Chapel Hill (UNC) and University of Texas Medical Branch (UTMB) at Galveston, as well as the University of British Columbia and University of Saskatchewan.

"Ab8 not only has potential as therapy for COVID-19, but it also could be used to keep people from getting SARS-CoV-2 infections," said co-author John Mellors, chief of the Division of Infectious Diseases at Pitt and UPMC. "Antibodies of larger size have worked against other infectious diseases and have been well tolerated, giving us hope that it could be an effective treatment for patients with COVID-19 and for protection of those who have never had the infection and are not immune." Xianglei Liu of Pitt is also co-lead author.

The tiny antibody component is the variable, heavy chain (VH) domain of an immunoglobulin, which is a type of antibody found in the blood. It was found by "fishing" in a pool of more than 100 billion potential candidates using the SARS-CoV-2 spike protein as bait. Ab8 is created when the VH domain is fused to part of the immunoglobulin tail region, adding the immune functions of a full-size antibody without the bulk.

Like the Pitt and UPMC vaccine candidate PittCoVacc that delivers an immunization through a spiky Band-Aid-like patch and overcomes the need for needles and refrigeration, the researchers are "thinking outside the box" when it comes to how Ab8 could be administered. Its small size might allow it to be given as an inhaled drug or intradermally, rather than intravenously through an IV drip, like most monoclonal antibodies currently in development.

Abound Bio, a newly formed UPMC-backed company, has licensed Ab8 for worldwide development.

Dimiter Dimitrov, senior author of the Cell publication and director of Pitt's Center for Antibody Therapeutics, was one of the first to discover neutralizing antibodies for the original SARS coronavirus in 2003. In the ensuing years, his team discovered potent antibodies against many other infectious diseases, including those caused by MERS-CoV, dengue, Hendra and Nipah viruses. The antibody against Hendra and Nipah viruses has been evaluated in humans and approved for clinical use on a compassionate basis in Australia.

Clinical trials are testing convalescent plasma—which contains antibodies from people who already had COVID-19—as a treatment for those battling the infection, but there isn't enough plasma for those who might need it, and it isn't proven to work.

That's why Dimitrov and his team set out to isolate the gene for one or more antibodies that block the SARS-CoV-2 virus, which would allow for mass production. In February, Wei Li, assistant director of Pitt's Center for Therapeutic Antibodies and co-lead author of the research, began sifting through large libraries of antibody components made using human blood samples and found multiple therapeutic antibody candidates, including Ab8, in record time.

Then a team at UTMB's Center for Biodefense and Emerging Diseases and Galveston National Laboratory tested Ab8 using live SARS-CoV-2 virus. At very low concentrations, Ab8 completely blocked the virus from entering cells. With those results in hand, a team at UNC tested Ab8 at varying concentrations in mice using a modified version of SARS-CoV-2. Even at the lowest dose, Ab8 decreased by 10-fold the amount of infectious virus in those mice compared to their untreated counterparts. Ab8 also was effective in treating and preventing SARS-CoV-2 infection in hamsters, as evaluated by scientists the University of Saskatchewan. Researchers at the University of British Columbia uncovered the unique way Ab8 neutralizes the virus so effectively by using sophisticated electron microscopic techniques.

"The COVID-19 pandemic is a global challenge facing humanity, but biomedical science and human ingenuity are likely to overcome it," said Mellors, also Distinguished Professor of Medicine, who holds the Endowed Chair for Global Elimination of HIV and AIDS at Pitt. "We hope that the antibodies we have discovered will contribute to that triumph."

Bioterrorism – The invisible enemy

By Mario Blokken (2019 Finabel[3])
Source: https://www.academia.edu/40729240/BIOTERRORISM_THE_INVISIBLE_ENEMY

The method of fighting a war has changed over time. Especially, the rapid development of biological science, particularly biotechnology and synthetic biology, as well as the fast accessibility to networks, resources, and expertise in these last 25 years led to an increase in the proliferation and the use of more deadly weapons for massive civil disruptionby both a number of states and nonstates actors.

Thermal temperature mask sensor detects fever

Source: https://www.theleader.info/2020/09/14/thermal-temperature-mask-sensor-detects-fever/

Sep 14 – A Mallorca based company has produced a thermal temperature sensor, amid the current coronavirus spike that is deemed to change to white, to detect a fever.

According to the company a thermal sensitivity turns white, when a temperature of 37.5 degrees is registered.
Experiments have said to have been carried out during the summer by companies who manufacture sanitary garments to protect against contagions. Mallorca based Colorprint Fashion has developed a fabric that can help detect people who have contracted the coronavirus using a fabric with thermal sensitivity, that activates following an increase in body temperature.

[3] Created in 1953, the Finabel committee is the oldest military organisation for cooperation between European Armies: it was conceived as a forum for reflections, exchange studies, and proposals on common interest topics for the future of its members. Finabel, the only organisation at this level, strives at: (1) Promoting interoperability and cooperation of armies, while seeking to bring together concepts, doctrines and procedures; (2) Contributing to a common European understanding of land defence issues. Finabel focuses on doctrines, trainings, and the joint environment.

The mask has been approved for use in hygienic masks by the Textile Technological Institute (AITEX), certifying its durability and effectiveness for the prevention of Covid-19.

The fabric, patented by the company, turns white at approximately 37.5 degrees and has a bacterial filtration rate of 98%, thus giving protection against coronovirus, with an alert to a rise in fever.

Meanwhile five people have been arrested by the National Policia for stealing 3.3 million gloves and masks in Leganes, Madrid, with a value of 700,000 euros. An investigation that has been ongoing for over a year got underway after surveillance at a warehouse in Leganés, discovered 40 pallets of sanitary protection material were allegedly stolen, according to the Higher Police Headquarters.

2,400,000 pairs of gloves, 800,000 surgical masks and 100,000 FFP2 masks were later transported to a warehouse in Fuenlabrada. Further investigation are ongoing.

FDA approves 1st fully transparent surgical mask

We Thought It Was Just a Respiratory Virus

We were wrong.

By Ariel Bleicher and Katherine Conrad

UCSF Magazine Summer 2020

Source: https://www.ucsf.edu/magazine/covid-body

In late January, when hospitals in the United States confirmed the presence of the novel coronavirus, health workers knew to watch for precisely three symptoms: fever, cough, and shortness of breath. But as the number of infections climbed, the symptom list began to grow. Some patients lost their sense of smell and taste. Some had nausea or diarrhea. Some had arrhythmias or even heart attacks. Some had damaged kidneys or livers. Some had headaches, blood clots, rashes, swelling, or strokes. Many had no symptoms at all.

By June, clinicians were swapping journal papers, news stories, and tweets describing more than three dozen ways that COVID-19, the disease the coronavirus causes, appears to manifest itself. Now researchers at UC San Francisco and around the world have begun taking a closer look at this dizzying array of symptoms to get at the disease's root causes. They are learning from people inside the hospital and out; people on the brink of death and only mildly sick; people newly exposed and recovered; people young and old, Black, brown, and white. And they are beginning to piece together the story of a virus unlike any known before.

How infection sets in

Viruses lead a curious purgatorial existence of being neither fully alive nor dead. Enveloped in a protein cloak, a virus consists almost entirely of genetic material – DNA or RNA, the blueprints for all

of life. But it can't reproduce on its own. To survive, it must break into a cell and co-opt the cell's gene-copying machinery.
The novel coronavirus, an RNA virus named SARS-CoV-2, has become notorious for its skill at breaking and entering human cells. Its tools of choice are the protein spikes protruding from its surface – a feature that distinguishes all coronaviruses. The spikes of SARS-CoV-2 are the crème de la crème: By the luck of the evolutionary draw, they are able to easily grab hold of protein gates on human cells known as ACE2 receptors and, like jackknives, pry these gates open.

"You can think of an ACE2 receptor like a docking site," says Faranak Fattahi, PhD, a UCSF Sandler Fellow. When the coronavirus pandemic hit San Francisco, Fattahi repurposed her laboratory to study this key receptor, which normally plays a role in regulating blood pressure. "When the virus lands on it," she says, "it initiates a molecular process that brings the virus inside the cell."
If you're exposed to SARS-CoV-2 – say, from a cough or sneeze – the virus will likely first encounter ACE2 receptors on cells in your nose or throat. But these receptors also populate your heart, gut, and other organs. Fattahi's team has found evidence suggesting that male sex hormones such as testosterone may increase the number of ACE2 receptors that cells produce, which could help explain why SARS-CoV-2 seems to wreak greater havoc on men than on women and why kids rarely get sick. "The fewer ACE2 receptors, the less risk of infection – that's the idea," she says, adding that this hypothesis for the disease's gender gap is only one of several.
Once inside a few initial host cells, the virus sets them to work churning out copies of itself. Within hours, thousands of new virus particles begin bursting forth, ready to infect more cells. Although SARS-CoV-2 is less deadly than the original SARS virus, which emerged in 2002, it replicates more rapidly. Also unlike SARS, which primarily infects the lungs, SARS-CoV-2 replicates throughout the airway, including in the nose and throat, making it highly contagious – like the common cold.
However, infection with SARS-CoV-2 usually doesn't feel like a cold. Fewer than 20% of infected people who eventually show up at a hospital report having had a sore throat or runny nose. During the first few days of being infected, you're more likely to have a fever, dry cough or, peculiarly, lose your sense of smell or taste.
Most likely, though, you won't feel sick at all. When UCSF researchers tested people for SARS-CoV-2 in San Francisco's Mission District, 53% of those infected never had any symptoms. "That's much higher than expected," says Monica Gandhi, MD, MPH, a UCSF professor of medicine with expertise in HIV. Surveys of outbreaks in nursing homes and prisons show similar or even higher numbers. "If we did a mass testing campaign on 300 million Americans right now, I think the rate of asymptomatic infection would be somewhere between 50% and 80% of cases," Gandhi says. Millions of people may be spreading the virus without knowing it, she points out, making asymptomatic transmission the Achilles' heel of efforts to control the pandemic – and highlighting the importance of universal masking.
"The majority of people who have COVID-19 are out in the community, and they are either asymptomatic or only mildly ill," says Sulggi Lee, MD, PhD, a UCSF assistant professor of medicine. When the coronavirus pandemic hit San Francisco in early March, Lee conceived a study to investigate why. She scrambled to assemble a team and procure funding and equipment. She borrowed a colleague's mobile clinic – a van outfitted with an exam table and a phlebotomy chair – so that her team could drive around the city, collecting samples from infected people. Lee hopes data from the study, called CHIRP (COVID-19 Host Immune Response Pathogenesis), will show how people's immune systems respond as SARS-CoV-2 starts to gain a foothold in their bodies.

"A lot is riding on that initial response," she says. If Lee and her collaborators can figure out the biological processes that allow some infected people to stay relatively well, they can perhaps use that knowledge to prevent others from falling severely ill.

Battling in the lungs

True to its name, SARS-CoV-2 (which stands for severe acute respiratory syndrome coronavirus 2) is first and foremost a bad respiratory virus. If your immune system doesn't defeat it at its landing site in your nose or throat, it will advance down your windpipe, infiltrating the cells lining your lungs' branching air tubes. At the tubes' ends, tiny air sacs called alveoli pass oxygen to your blood. As the virus multiplies, the alveoli may fill with fluid, shutting down this critical gas exchange. Your blood-oxygen level may drop and, typically about six days into an infection, you may start feeling short of breath.

What causes this mayhem? "Some of it is definitely caused by the virus itself," says Michael Matthay, MD, a UCSF professor of medicine who has studied acute respiratory diseases for more than 30 years. Inevitably, a fast-replicating virus will kill or injure many of the lung cells it infects; the more cells it infects, the more ruin it will leave in its wake.

But SARS-CoV-2 doesn't appear to be a savage destroyer of cells. Although it's too early to know for sure, the virus's fatality rate seems to be roughly 10 times that of the flu. "You would think that's because it's just a killing machine," says Max Krummel, PhD, UCSF's Smith Professor of Experimental Pathology and chair of the Bakar ImmunoX initiative. So far, however, the science suggests otherwise.

"One of the weirder things about this new coronavirus is it doesn't seem to be incredibly cytopathic, by which we mean cell-killing," Krummel says. "Flu is really cytopathic; if you add it to human cells in a petri dish, the cells burst within 18 hours." But when UCSF researchers subjected human cells to SARS-CoV-2, many of the infected cells never perished. "It's pretty compelling data that maybe we're not dealing with a hugely aggressive virus," Krummel says.

The bigger provocation, he suspects, may be your own immune system. Like any pathogen, SARS-CoV-2 will trigger an immune attack within minutes of entering your body. This counterstrike is extraordinarily complex, involving many tactics, cells, and molecules. In a UCSF study called COMET (COVID-19 Multi-Phenotyping for Effective Therapies), Krummel and other scientists have been observing this immune warfare in more than 30 people admitted to UCSF hospitals with COVID-19 and other respiratory infections. "What we're doing is looking at patients' blood, their genes, and the secretions from their noses and lungs, and we're asking, 'What's your army? What's your response strategy?'"

An early analysis of COMET data, Krummel says, suggests that the immune systems of many hospitalized patients mobilize differently – and more aggressively – against SARS-CoV-2 than against influenza viruses, which cause the flu. Their lungs are ravaged, these data suggest, not by the virus alone but by the detritus of an immunological battle gone awry. This rogue immune response could explain why, around day 11 of a COVID-19 infection, patients often develop a severe pneumonia known as acute respiratory distress syndrome, or ARDS.

Ultimately, COMET seeks to find COVID-19 therapies that can rein in an overeager immune system in order to prevent or treat ARDS. But that feat won't be easy, says Carolyn Calfee, MD, MAS '09, an ARDS expert, UCSF professor of medicine, and co-leader of the study. Too much or the wrong kind of intervention, she explains, could cripple a person's immune system to the point where it can't clear an infection. "It's a fine line between therapeutic and deleterious," Calfee says. "We're trying to find that balance."

Typically, people who die from COVID-19 ARDS die around day 19. Reported rates of mortality have varied widely, with the highest rates being where the pandemic has hit hardest, overwhelming hospital resources and staff. At UCSF hospitals – likely due to the city's early shelter-in-place orders, which prevented an initial surge of COVID-19 cases – so far only 10 of 85 critically ill patients have died.

"The good news is that we've been doing clinical trials of best-care practices for ARDS since 1998," Matthay says. Thanks to research by him and others, for example, clinicians have long known which ventilator settings result in the fewest deaths and how to flip patients onto their stomachs – a technique known as proning – to best help them breathe. If public health measures can keep hospital admissions low so that frontline providers can make good use of the skills and knowledge they already have, we may find that we have less to fear from SARS-CoV-2 than we thought.

On the other hand, the virus behaves in ways that are still mysterious.

Heart failure

In April, Susan Parson, MD, a Bay Area medical examiner, made a startling discovery. For nearly two months, officials had believed that the first people in the U.S. to die from COVID-19 had died of respiratory failure in Washington state in late February. At the time, the U.S. Centers for Disease Control and Prevention limited testing to people who had respiratory symptoms and had recently traveled to China or otherwise been exposed to the virus. Those restrictions, however, turned out to be misguided.

As a medical examiner for California's Santa Clara County, Parson had done a routine autopsy on a 57-year-old woman named Patricia Dowd, who had died suddenly at home on February 6. In Dowd's tissues, Parson found the cause of her death: SARS-CoV-2. But the virus hadn't wrecked Dowd's lungs. In fact, she had only mild pneumonia. Instead, SARS-CoV-2 had ruptured her heart.
Meanwhile, epidemiologists began learning that preexisting heart disease and related conditions put people at greater risk of suffering and dying from COVID-19. "We're finding that many patients who have more severe forms of the illness are obese, they are diabetic, they are hypertensive," says cardiologist Nisha Parikh, MD, a UCSF associate professor who specializes in population health research. Such risk factors, she says, are unusual. "They're not ones that really stood out in prior epidemics."
Clinicians, too, were seeing surprising numbers of COVID-19 patients develop heart problems – muscle weakness, inflammation, arrhythmias, even heart attacks. "We're not used to respiratory viruses having such dire consequences on the heart in such apparently high numbers," says cardiologist Gregory Marcus, MD, MAS '08, UCSF's Endowed Professor of Atrial Fibrillation Research. Many patients whose hearts acted up also had failing lungs. But others had no other symptoms or, like Dowd, only mild ones.
Since March, Marcus has co-led one of the largest community surveys to better understand the spread of SARS-CoV-2 and its myriad effects. The study, dubbed COVID-19 Citizen Science, has so far enrolled more than 27,000 people; anyone with a smartphone can participate. Marcus plans to also start collecting data from wearable devices, including Fitbits and Zio patches, which wirelessly monitor heart rhythms. "There may be large numbers of people who are suffering from cardiovascular effects of COVID-19 in the absence of other symptoms," Marcus says. "I'm worried we're missing those cases."
It stands to reason that SARS-CoV-2 affects the heart. After all, heart cells are flush with ACE2 receptors, the virus's vital port of entry. And, indeed, laboratory experiments suggest that the virus can enter and replicate in cultured human heart cells, says Bruce Conklin, MD, a professor of medicine and an expert in heart-disease genetics at UCSF and the Gladstone Institutes.
But Conklin doesn't think SARS-CoV-2 necessarily kills heart cells outright. Rather, in the process of copying itself, the virus steals pieces of the genetic instructions that tell the heart cells how to do their job. "It's hauling away and hijacking stuff that's necessary for the heart to beat," he says. He is currently testing this hypothesis using human heart cells grown in cup-sized vessels in the lab of Todd McDevitt, PhD, a bioengineer at UCSF and the Gladstone Institutes.
It's also possible, however, that an infected person's own immune system may do the majority of the damage in the heart, as it appears to do in the lungs. "The heart probably gets infected by a lot of other viruses, and they don't have a lethal effect," Conklin says. "What makes this one different?"
Graph with three bars. Bar at left has 80% at top and Non-Severe at bottom. Bar in middle has 15% at top and Severe at bottom Bar at right has 5% at top and Critical at bottom. Text below graph reads: Most symptomatic cases of COVID-19 are mild. To left of graph, small circle with the letter "i" in the middle opens to text reading: Graph Data: Wu et al., JAMA 2020. Livingston et al., JAMA 2020. Garg et al, MMWR 2020. Stoke et al., MMWR 2020. Left of graph: illustration of a coronavirus.

Stranger things

Toward the end of March, as San Francisco began to warm up, Sonia got cold feet. She put on wool socks and turned up her heater. Still, her feet felt frozen. Three days later, her soles turned splotchy purple. Red dots appeared on her toes. At night, her cold feet itched and burned. Walking hurt. And she was exhausted, napping through afternoon Zoom meetings. "It was so bizarre," says Sonia, a San Francisco resident. A week later, her symptoms were gone.
"Yes, COVID," wrote Lindy Fox, MD, a UCSF professor of dermatology, replying to an email describing Sonia's case. Sonia wasn't surprised. Anyone, like her, who's been following news of the pandemic has probably heard about "COVID toes," a painful or itchy skin rash that sometimes pops up in young adults with otherwise mild or asymptomatic cases of COVID-19. "It looks like what we call pernio, or chilblains," Fox says, "which is a pretty common phenomenon when somebody goes out in cold weather – they start to get purple or pink bumps on their fingers or toes."
Many people with rashes like Sonia's don't test positive for COVID-19, Fox says, which has made some clinicians skeptical of the connection; when patients have both, it's just a coincidence, they believe. But Fox doesn't think so. For one thing, "the time of year is wrong," she says. "Pernio usually shows up in the dead of winter." Even more compelling, dermatologists around the world are "getting crazy numbers of calls about it," Fox says. "In the last three weeks, I've had somewhere between 10 and 12 patients. Normally, I have four a year."
And it's not just dermatologists who are adding their observations to COVID-19's ever-expanding symptom list. Gut specialists are finding that **20% to 40% of people with the disease experience diarrhea, nausea, or vomiting before other symptoms,** says gastroenterologist Michael Kattah, MD, PhD, a UCSF assistant professor. If you swallow virus particles, he says, there's a good chance they will infect cells lining

your stomach, small intestine, or colon. As in the lungs and heart, these cells are studded with vulnerable ACE2 portals.
Especially disconcerting, Kattah says, is how long the virus seems to persist in the gut. About 50% of patients with COVID-19 have virus particles in their stools, often for weeks after their nose swabs test negative, he points out. Laboratory studies show that these particles are often still alive and can infect cells in a petri dish. Whether fecal transmission occurs between people, however, is an open question. If the answer is yes, people recovering from COVID-19 may need to stay quarantined even after they feel well, and the rest of us will need to be as meticulous about bathroom hygiene as we've become about handwashing and mask-wearing.
Other specialists are also raising flags. Neurologists worry about reports of COVID-19 patients with headaches, "brain fog," loss of the sense of smell, dizziness, delirium, and, in rare cases, stroke. Nephrologists worry about kidney stress and failure. Hepatologists worry about liver injuries. Ophthalmologists worry about pink eye. Pediatricians, meanwhile, worry about a peculiar COVID-related inflammatory syndrome that's showing up in kids and young adults.
Researchers are still sorting out the causes for this constellation of effects. If you come down with a particular symptom, is it because the virus is attacking your cells? Because your immune system is overreacting? Or just because you're very sick? In any severe illness, for example, the kidneys must work extra hard to filter waste and control nutrients and fluid; if overtaxed, they may begin to fail. Similarly, cognitive problems can result from increased blood toxins due to stressed kidneys or from low oxygen due to respiratory distress. "There's a lot of smoke," says Michael Wilson, MD '07, MAS '16, the Rachleff Distinguished Professor at UCSF's Weill Institute for Neurosciences. "We need to figure out where the fire is coming from."
Recently, there's been speculation that some of COVID-19's seemingly disparate symptoms may stem from trouble in the blood. Blood clots, for example, are showing up in cases of COVID-19 frequently enough for clinicians to take notice. "There's something unique about the coagulation system in these patients," says nephrologist Kathleen Liu, MD '99, PhD '97, MAS '07, a UCSF professor of medicine. In caring for COVID-19 patients on dialysis machines, she's been surprised to see blood clots block dialysis tubes more than usual. Clotted tubes are common, she says, "but this is extreme."
That may be because, as growing **evidence suggests, SARS-CoV-2 can infect cells in the walls of blood vessels that help regulate blood flow and coagulation, or clotting**. If true, this behavior could explain some of the virus's weirder (and rarer) manifestations, such as heart attacks, strokes, and even "COVID toes."
"Our vasculature is a contiguous system," says cardiologist Parikh. "Thus injury in one area, such as blood vessels in the lungs, can set off clotting cascades that affect multiple organs." Some of that trouble likely results from inflammation triggered by the immune system, she points out, although another culprit may be the body's RAAS, or renin-angiotensin-aldosterone system, a hormone system that controls blood pressure and fluid balance. Because RAAS involves ACE2 receptors, Parikh suspects it may become disrupted when the virus infects cells through these receptors, thus triggering coagulation and other downstream effects. Her lab is now studying this system in COVID-19 patients to better understand how SARS-CoV-2 infection affects it.
Inevitably, some ailments may turn out to be red herrings. During a pandemic, when people are flocking to hospitals with infections, clinicians will also see a rise in other health problems, simply by the rules of statistics, points out S. Andrew Josephson, MD, the Francheschi-Mitchell Professor, chair of UCSF's neurology department, and a member of the Weill Institute for Neurosciences. "If the prevalence of infection is high, then almost any condition – a broken leg, if you will – you might conclude is associated with COVID-19."
"As clinicians, we want to get information to our medical community and to the public as quickly as possible," Josephson says, "but we have to be cautious about not making too big a deal of a little blip."

The long tail

As with any infection, how long a bout of COVID-19 lasts varies from person to person. If you're ill enough to need critical care, you can expect the disease to take at least a few weeks to run its course. In some cases, symptoms persist for months. For a typical milder case, though, you should feel better within a couple weeks.
At that point, the question foremost on your mind will be: Am I immune? There are now more than a dozen antibody tests on the market, but most are unreliable, according to UCSF research. And even the best tests can't tell you whether you have enough of the right kinds of antibodies to protect you against reinfection. "There is a lot of hope and belief that we'll have an antibody test that actually informs us of immunity, but we're not quite there yet," says Chaz Langelier, MD, PhD, a UCSF assistant professor of medicine who is working to improve diagnostic tools for COVID-19.
What we have in the meantime are a lot of unknowns: If you do become immune to SARS-CoV-2, when and how does that occur? Will you gain immunity from a mild or asymptomatic case, as well as a severe one? How long will that immunity last?
"The answers will have huge implications for social distancing and masking and for getting the economy back up and running," says Michael Peluso, MD, a clinical fellow who came to UCSF three

years ago to help fight HIV. Now he's co-leading a new study called LIINC (Long-term Impact of Infection with Novel Coronavirus), which is enrolling people who have been infected with SARS-CoV-2 and will follow them for two years. Besides illuminating changes in immunity over time, LIINC is investigating chronic effects of infection on the immune system, lungs, heart, brain, blood, and other parts of the body.

"I hope people will recover and immunity will be protective and long-lasting, and that will be that," Peluso says.

It's what we all hope. We hope we will beat an infection swiftly – or, better yet, avoid the virus until there is a vaccine. We hope that if we do fall gravely ill, we will be cared for by the best providers and tended to by people we love. The reality, as we already know, is more complicated. And even if COVID-19 doesn't batter our bodies, the pandemic will surely leave scars – on our psyches, our livelihoods, our institutions, and our health – that we are only beginning to fathom. In truth, we don't know how our cards will fall, as individuals or as a people. Only time – and data – will tell.

Masks and PhDs …

EDITOR'S COMMENT: These are all lab PhDs[4] but they wear different face masks with different protection levels passing the wrong message to not medical people but also generating questions to the medical people who will advice non medical people on face masks. No comment on the proper use of the medical robe and gloves. This should have been part of their PhD studies …

[4] https://www.ucsf.edu/magazine/covid-testing-lab

5 Things COVID-19 Armchair 'Experts' Are Getting Wrong About the Pandemic

By Jacques Raubenheimer

Source: https://www.sciencealert.com/here-s-what-covid-19-armchair-experts-are-getting-wrong-about-the-pandemic

Sep 15 – If we don't analyse statistics for a living, it's easy to be taken in by misinformation about COVID-19 statistics on social media, especially if we don't have the right context.

For instance, we may cherry pick statistics supporting our viewpoint and ignore statistics showing we are wrong. We also still need to correctly interpret these statistics.

It's easy for us to share this misinformation. Many of these statistics are also interrelated, so misunderstandings can quickly multiply.

Here's how we can avoid five common errors, and impress friends and family by getting the statistics right.

1. It's the infection rate that's scary, not the death rate

Social media posts comparing COVID-19 to other causes of death, such as the flu, imply COVID-19 isn't really that deadly.

But these posts miss COVID-19's infectiousness. For that, we need to look at the infection fatality rate (IFR) - the number of COVID-19 deaths divided by all those infected (a number we can only estimate at this stage, see also point 3 below).

While the jury is still out, COVID-19 has a higher IFR than the flu. Posts implying a low IFR for COVID-19 most certainly underestimate it. They also miss two other points.

First, if we compare the typical flu IFR of 0.1 percent with the most optimistic COVID-19 estimate of 0.25 percent, then COVID-19 remains more than twice as deadly as the flu.

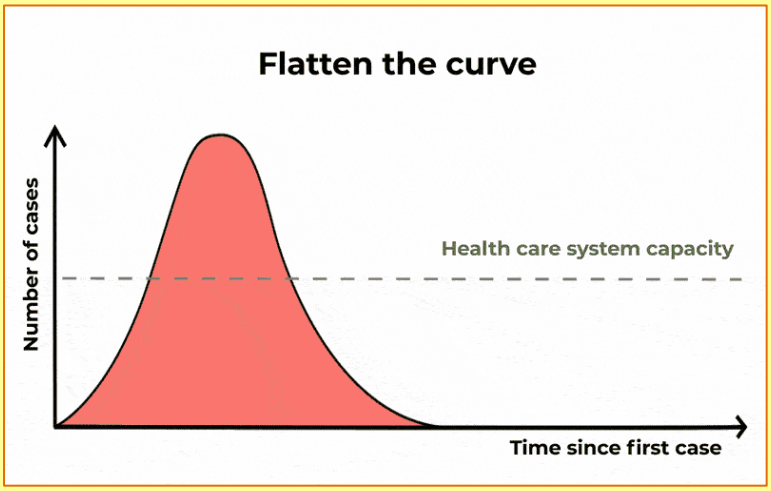
Second, and more importantly, we need to look at the basic reproduction number (R_0) for each virus. This is the number of extra people one infected person is estimated to infect.

Flu's R_0 is about 1.3. Although COVID-19 estimates vary, its R_0 sits around a median of 2.8. Because of the way infections grow exponentially (see below), the jump from 1.3 to 2.8 means COVID-19 is vastly more infectious than flu.

When you combine all these statistics, you can see the motivation behind our public health measures to "limit the spread". It's not only that COVID-19 is so deadly, it's deadly *and* highly infectious.

2. Exponential growth and misleading graphs

A simple graph might plot the number of new COVID cases over time. But as new cases might be reported erratically, statisticians are more interested in the rate of growth of total cases over time. The steeper the upwards slope on the graph, the more we should be worried.



For COVID-19, statisticians look to track exponential growth in cases. Put simply, unrestrained COVID cases can lead to a continuously growing number of more cases. This gives us a graph that tracks slowly at the start, but then sharply curves upwards with time. This is the curve we want to flatten, as shown below.

"Flattening the curve" is another way of saying "slowing the spread". The epidemic is lengthened, but we reduce the number of severe cases, causing less burden on public health systems.

However, social media posts routinely compare COVID-19 figures with those of other causes of death that show:

- more linear patterns (figures increase with time but at a steady rate)
- much slower-growing flu deaths or
- low numbers from early stages of the outbreak and so miss the impact of exponential growth.

Even when researchers talk of exponential growth, they can still mislead.

An Israeli professor's widely-shared analysis claimed COVID-19's exponential growth "fades after eight weeks". Well, he was clearly wrong. But why?
His model assumed COVID-19 cases grow exponentially over a number of days, instead of over a succession of transmissions, each of which may take several days. This led him to plot only the erratic growth of the outbreak's early phase.
Better visualisations truncate those erratic first cases, for instance by starting from the 100th case. Or they use estimates of the number of days it takes for the number of cases to double (about six to seven days).

3. Not all infections are cases

Then there's the confusion about COVID-19 infections versus cases. In epidemiological terms, a "case" is a person who is diagnosed with COVID-19, mostly by a positive test result.
But there are many more infections than cases. Some infections don't show symptoms, some symptoms are so minor people think it's just a cold, testing is not always available to everyone who needs it, and testing does not pick up all infections.
Infections "cause" cases, testing discovers cases. US President Donald Trump was close to the truth when he said the number of cases in the US was high because of the high rate of testing. But he and others still got it totally wrong.
More testing does not *result* in more cases, it allows for a *more accurate estimate* of the true number of cases.
The best strategy, epidemiologically, is not to test less, but to test as widely as possible, minimising the discrepancy between cases and overall infections.

4. We can't compare deaths with cases from the same date

Estimates vary, but the time between infection and death could be as much as a month. And the variation in time to recovery is even greater. Some people get really ill and take a long time to recover, some show no symptoms.
So deaths recorded on a given date reflect deaths from cases recorded several weeks prior, when the case count may have been less than half the number of current cases.
The rapid case-doubling time and protracted recovery time also create a large discrepancy between counts of active and recovered cases. We'll only know the true numbers in retrospect.

5. Yes, the data are messy, incomplete, and may change

Some social media users get angry when the statistics are adjusted, fuelling conspiracy theories.
But few realise how mammoth, chaotic and complex the task is of tracking statistics on a disease like this.
Countries and even states may count cases and deaths differently. It also takes time to gather the data, meaning retrospective adjustments are made.
We'll only know the true figures for this pandemic in retrospect. Equally so, early models were not necessarily wrong because the modellers were deceitful, but because they had insufficient data to work from.
Welcome to the world of data management, data cleaning and data modelling, which many armchair statisticians don't always appreciate. Until now.

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COVID-19 May Devastate Lungs by Prompting Excessive Release of Sticky DNA Webs
By Veras et al. J. Exp. Med. 2020; 217 (12): e20201129.
Source: https://www.genengnews.com/news/covid-19-may-devastate-lungs-by-prompting-excessive-release-of-sticky-dna-webs/

Sep 14 – White blood cells called neutrophils have been implicated in severe cases of COVID-19. Although neutrophils cast sticky, microbe-fouling neutrophil extracellular traps (NETs) made of DNA, they can be overzealous, damaging the body's own tissues. Neutrophils have already been implicated in severe COVID-19 by studies linking SARS-CoV-2-associated lung pathology and large numbers of circulating neutrophils. Additional support—large numbers of NETS distributed throughout the lungs, and elevated numbers of NETs in plasma—comes from two studies that appeared September 14 in the *Journal of Experimental Medicine* (*JEM*).

The first study, "Neutrophil extracellular traps infiltrate the lung airway, interstitial, and vascular compartments in severe COVID-19," comes from Liege University, where researchers led by Thomas Marichal, Cécile Oury, and Philippe Delvenne found substantial quantities of NETs in distinct compartments of the lungs of patients who died from COVID-19 and who exhibited histopathological features of diffuse alveolar damage. In contrast, noted Marichal, the NETS "were absent in the lungs of patients who died from another cause."

According to the researchers, NETs often appeared to almost completely obstruct the small bronchioles and alveoli that mediate gas exchange. NETs were also formed at sites of inflammation located in the interstitial compartment between the alveoli and blood vessels, and could even be seen in the blood vessels themselves near tiny blood clots known as microthrombi.

"NETs were found in the airway compartment and neutrophil-rich inflammatory areas of the interstitium, while NET-prone primed neutrophils were present in arteriolar microthrombi," Marichal and colleagues wrote in *JEM*. "Our results support the hypothesis that NETs may represent drivers of severe pulmonary complications of COVID-19 and suggest that NET-targeting approaches could be considered for the treatment of uncontrolled tissue-damaging and thrombotic responses in COVID-19."

"NETs can form a platform for the adhesion of platelets and other blood-clotting factors," he explained. He added, however, that whether NETs actually contribute to the formation of COVID-19-associated pulmonary microthrombi will require further investigation.

In the second study, "SARS-CoV-2–triggered neutrophil extracellular traps mediate COVID-19 pathology," a team of researchers led by Fernando Queiroz Cunha, Flavio Protasio Veras, and Thiago Mattar Cunha at the University of São Paulo also identified increased numbers of NETs in the lungs of severe COVID-19 patients and found that NET formation was elevated in COVID-19 patients' blood plasma as well.

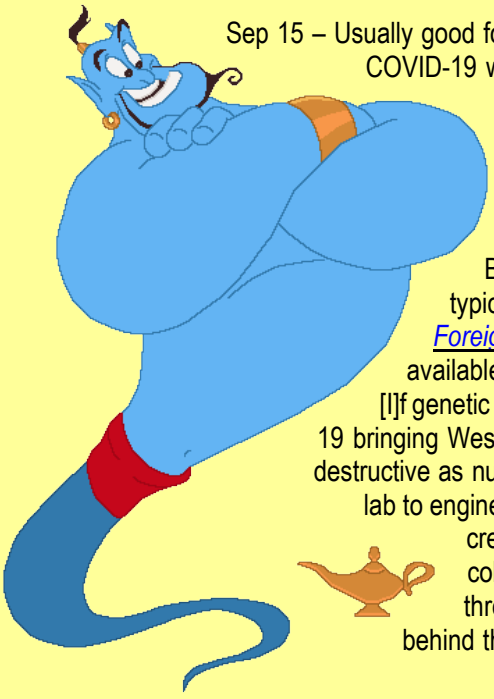
"We found that viable SARS-CoV-2 can directly induce the release of NETs by healthy neutrophils," the researchers emphasized. "Mechanistically, NETs triggered by SARS-CoV-2 depend on angiotensin-converting enzyme 2, serine protease, virus replication, and PAD-4."

Finally, NETs released from SARS-CoV-2-infected neutrophils were seen to induce the death of lung cells grown in the lab. However, the researchers found that cell death can be prevented if NET release is inhibited or the NETs are degraded by an enzyme that chews up DNA.

"Our study," said Cunha, supports the use of inhibitors of NET synthesis or promoters of NET fragmentation as a strategy to ameliorate the organ damage associated with severe COVID-19."

The Genetic Engineering Genie Is Out of the Bottle

Source: http://www.homelandsecuritynewswire.com/dr20200915-the-genetic-engineering-genie-is-out-of-the-bottle



Sep 15 – Usually good for a conspiracy theory or two, President Donald Trump has suggested that the virus causing COVID-19 was either intentionally engineered or resulted from a lab accident at the Wuhan Institute of Virology in China. Its release could conceivably have involved an accident, but the pathogen isn't the mishmash of known viruses that one would expect from something designed in a lab, as a research report in *Nature Medicine* conclusively lays out. "If someone were seeking to engineer a new coronavirus as a pathogen, they would have constructed it from the backbone of a virus known to cause illness," the researchers said.

But if charging that COVID-19 was an engineered virus was a typical Trumpian assertion – typical in that it was not supported by the facts — the next pandemic, Vivek Wadhwa writes in *Foreign Policy*, could well be bioengineered in someone's garage using cheap and widely available technology.

[I]f genetic engineering wasn't behind this pandemic, it could very well unleash the next one. With COVID-19 bringing Western economies to their knees, all the world's dictators now know that pathogens can be as destructive as nuclear missiles. What's even more worrying is that it no longer takes a sprawling government lab to engineer a virus. Thanks to a technological revolution in genetic engineering, all the tools needed to create a virus have become so cheap, simple, and readily available that any rogue scientist or college-age biohacker can use them, creating an even greater threat. Experiments that could once only have been carried out behind the protected walls of government and corporate labs can now

practically be done on the kitchen table with equipment found on Amazon. Genetic engineering—with all its potential for good and bad—has become democratized.

….

If experimenting with DNA once required years of experience, sophisticated labs, and millions of dollars, CRISPR has changed all that… Very little of this research is limited by regulations, largely because regulators don't yet understand what has suddenly become possible.

….

There really is no turning back to correct the mistakes of the past. The genie cannot be put back in the bottle. We must treat the coronavirus pandemic as a full-dress rehearsal of what is to come—unfortunately, that includes not only viruses that erupt from nature, but also those that will be deliberately engineered by humans. We must learn very quickly to build the same types of types of defenses that our computers have against their invaders. The good that might ultimately come from this is the cure for all disease. The bad is just about too terrible to think about.

Africa: Milder COVID-19 Pandemic than Expected Puzzles Experts

Source: http://www.homelandsecuritynewswire.com/dr20200915-africa-milder-covid19-pandemic-than-expected-puzzles-experts

Sep 15 – Hundreds of thousands or even millions of deaths and serious infections causing the collapse of already shaky health care systems —this is how experts imagined the effect of the coronavirus pandemic in most African countries.

But, more than four months later, one can say that this horror scenario has not materialized.

While rates of infection and death on other continents have sometimes exploded in recent months, Africa has been spared a high COVID-19 mortality rate — and this despite the fact that people in cities like Dakar and Lagos live under very crowded conditions, with many suffering from poverty and a lack of basic hygienic facilities.

Scientists have been examining the possible reasons for the mild course of the pandemic on the continent.

In an analysis for the journal *Science* in August, one group of researchers surmised that early action by authorities may have played a role. "Measures such as travel restrictions, curfews and school closures were implemented early in Africa compared with other continents, often before an African country had detected a case," they wrote.

The authors attributed this readiness to take early action to the experiences of many African countries with other infectious diseases such as Ebola and Lassa fever. The rapid response most likely led to a slower spread of the infection, they said.

"The Measures Are Working"

"We know that the measures are working," says Edward Chu, emergency medicine adviser at Doctors Without Borders. "However, strict measures are difficult to maintain over a long period of time. We can therefore assume that with further relaxation, the number of infections will also increase."

Nevertheless, according to the authors of the *Science* article, there must be other reasons why the worst-case scenario has not occurred, because "[m]ost people work in the informal business sector, such as in traditional markets, making strict lockdown measures impossible to implement."

Young Continent

Age, for example, could be one reason. On average, the population of the African continent is 19.7 years old — only half as old as people in the US. Although the novel coronavirus also infects the young, it is mainly the elderly who come to hospitals with severe cases of the disease and die from the infection.

The low recorded infection rates could also be related to this low average age on the continent. That is because young people are more often asymptomatic. Because they do not become noticeably ill, they are less likely to be tested and examined, says Chu — especially when the country's health care system is shaky anyway and testing capacity is low.

"The lack of testing capacity makes it extremely difficult to say how much the pandemic will actually affect the populations of African countries," says Chu.

Parasitic Boost to Immune System?

The analysis published in *Science* says immune systems influenced by African environments could be another reason for the comparatively mild course of the pandemic. "It is increasingly recognized that the immune system is shaped not only by genetics but also by environmental factors, such as

exposure to microorganisms and parasites. This educates the immune system to protect against invading pathogens not only specifically but also nonspecifically," the researchers write.
This could decisively mitigate the severity of an infectious disease and be another reason why the expected high number of victims in Africa has so far failed to materialize.
The immunologist and parasitologist Achim Hörauf is researching this hypothesis at the University Hospital in Bonn. He is especially interested in worms, which live more or less harmoniously as parasites in the bodies of people in many African countries.
This harmony is possible only because in many cases the worms do not trigger a strong immune response. They avoid it by signaling to the immune system with certain secretions that there is no reason for it to get het up. "It could be that the COVID-19 infection is better tolerated this way," says Hörauf. An excessively violent response from the immune system can lead to severe courses of COVID-19.
While parasites may make a milder course of infection more likely, non-infectious conditions such as cardiovascular illnesses, obesity and type 2 diabetes often cause big problems. And these are typical diseases above all in Western industrialized countries. At least, for now: In the urban regions of African states, these lifestyle diseases have already found their way into the population.

Collateral Damage
But although the expected complete catastrophe has not yet occurred, SARS-CoV-2 has still had devastating consequences for Africa. "The virus indirectly has enormous effects on many people in the African states. The collateral damage caused by the pandemic measures could be much more acute in many countries than the direct damage caused by the virus," says physician Chu. The youngest ones are hit the hardest here, Chu says, adding that food and medication shortages often have fatal consequences for children in particular.
The organization UNAIDS, for example, reported back in May that there were bottlenecks in the supply of antiretroviral drugs, which are essential for the treatment of HIV. The closure of national borders and the temporary suspension of air traffic opened up a supply gap that was exacerbated by the fact that HIV drugs were used to treat COVID-19 patients as well.
UNAIDS and the World Health Organization (WHO) have predicted that this situation could lead to an additional 500,000 AIDS deaths. The aid organization Oxfam warned in July that measures imposed to stem the spread of the pandemic could result in 12,000 starvation deaths per day around the globe by the end of the year.
Six of the 10 "worst hunger hotspots" named by Oxfam are in Africa.

Restaurants May Be Key Component to COVID-19 Spread

MMWR Morb Mortal Wkly Rep. 2020; 69:1258-1264. Full text
Source: https://www.medscape.com/viewarticle/937430

Sep 15 – Restaurants appear to play a key role in the spread of COVID-19, researchers at the Centers for Disease Control and Prevention (CDC) say.
"Masks cannot be effectively worn while eating and drinking, whereas shopping and numerous other indoor activities do not preclude mask use," write Kiva A. Fisher, PhD, from the CDC, and colleagues.
Although public health authorities have recommended social distancing and mask-wearing for months, knowing exactly where people contracted the virus could help hone those recommendations, the researchers say. Their findings were published in *Morbidity and Mortality Weekly Report* on September 11.
Most research into the ways people have contracted COVID-19 has not included control groups, the researchers found.
To address that gap, they compared 154 adults who had symptoms of COVID-19 and had tested positive for the disease with 160 adults who had similar symptoms and who tested negative. The two groups were matched by age, sex, and study location.
The researchers asked the participants about wearing a mask and possible community exposure activities, such as attending gatherings with fewer than or more than 10 people in a home; shopping; dining at a restaurant; going to an office, salon, gym, bar/coffee shop, or church/religious gathering; or using public transportation. The participants indicated their responses using a five-point scale; responses ranged from "never" to "always."
The two groups reported similar exposures to COVID-19, although there were a few key differences. Of those who tested positive, 42% reported having close contact with someone who had COVID-19; by contrast, only 14% of those who tested negative indicated such contacts. Of those close contacts who had the disease, 51% were family members.

Those who tested positive were 2.4 times more likely to have dined at a restaurant in the 2 weeks prior to falling ill (adjusted odds ratio [aOR] 2.4; 95% CI, 1.5 – 3.8). In the study, restaurant dining included being seated at a patio, being seated outdoors, or being seated indoors.

Masks Matter

Among participants who had not come into recent contact with someone who had COVID-19, those who tested positive were almost three times more likely to have dined at a restaurant (aOR, 2.8; 95% CI, 1.9 – 4.3). In this subset, those who tested positive were almost four times as likely to have gone to a bar or cafe (aOR, 3.9; 95% CI, 1.5 – 10.1).

Among the 107 participants who reported dining at a restaurant and the 21 who reported going to a bar or coffee shop, those who tested positive for COVID-19 were less likely to report seeing most of the other patrons adhering to recommendations such as wearing a mask or maintaining distance from each other.

Of the people who tested positive, 71% said they always used cloth face coverings or other types of masks when in public during the 2-week period before illness onset; of those who tested negative, 74% said they always used a mask during the 2-week period.

In addition to the difficulty of wearing a mask while dining, some reports have implicated the ventilation systems of restaurants, the researchers note.

The researchers note limitations to their study. Notably, many of those they contacted refused to participate, and there could be d ifferences in participation among those who tested positive and those who tested negative.

The researchers conclude that "implementing safe practices to reduce exposures to SARS-CoV-2 during on-site eating and drinking should be considered to protect customers, employees, and communities and slow the spread of COVID-19."

The researchers reported multiple relationships with pharmaceutical companies, as indicated in the original article.

The History of Biological Weapons Use: What We Know and What We Don't

W. Seth Carus

Source: https://www.academia.edu/26923955/The_History_of_Biological_Weapons_Use_What_We_Know_and_What_We_Dont

This article critically reviews the literature on the history of biological warfare, bioterrorism, and biocrimes. The first serious effort to review this entire history, made in 1969, had numerous limitations. In recent decades, several authors have filled many of the gaps in our understanding of the past use of biological agents (including both pathogens and toxins), making it possible to reconstruct that history with greater fidelity than previously possible. Nevertheless, there are numerous remaining gaps, and closer inspection indicates that some supposed uses of biological weapons never took place or are poorly substantiated. Topics requiring additional research are identified.

Study Challenges Idea That Children Are Asymptomatic COVID-19 Spreaders

Source: https://bit.ly/3bVVrBo JAMA Pediatrics, online September 14, 2020.

Sep 15 – A study from Italy does not support the theory that children are more likely than adults to be asymptomatic carriers of the novel coronavirus.

The researchers studied 83 children and 131 adults admitted to the pediatric and adult emergency departments at Fondazione Ca' Granda Osperdale Maggiore Polyclinico in Milan for noninfectious conditions and with no symptoms or signs of COVID-19.

yielding an odds ratio of 0.12 (95% confidence interval, 0.02 to 0.95) compared with adults, report Dr. Carlo Agostoni and colleagues in JAMA Pediatrics.

None of the children or adults developed signs or symptoms of SARS-CoV-2 infection in the 48 hours after the admission.

In email to Reuters Health, Dr. Agostoni noted that children have been suggested to possibly be "facilitators of SARS-CoV-2 transmission and amplification" since most are asymptomatic. A report from China suggested that children who are asymptomatic represent 15% of individuals positive for SARS-CoV-2.

"In our survey, the proportion was even lower (1% of children out of 9% of adults without any symptoms or signs suggestive of SARS-CoV-2 infections tested positive for the virus)," he said.

"Today primary schools in most regions of Italy are re-opening, and hopefully these data, while helping to understand the epidemiology of the virus, could contribute -- together with the still valid

recommendation of social distancing and wearing the masks as indicated -- to start the new scholastic year with a less pessimistic view. We have to be on guard in any case," Dr. Agostoni added.
He cautioned, however, that the results "should be considered within their limits and the setting, that is, a retrospective analysis of cases accessing the ER and requiring hospitalization within a unique hospital (IRCCS Policlinico, in the center of Milano) in the lockdown period (March 1 to April 30, 2020)."

Gel vaccines may be more effective than currently used liquids

Some vaccines aren't very effective, which is due at least partially to the amount of time that they're active within the body. A new injectable hydrogel, however, could allow them to act for a longer period of time, making them more potent. Read more

Open Letter from Medical Doctors and Health Professionals to All Belgian Authorities and All Belgian Media

Sep 17 – "We, Belgian doctors and health professionals, wish to express our serious concern about the evolution of the situation in the recent months surrounding the outbreak of the SARS-CoV-2 virus. We call on politicians to be independently and critically informed in the decision-making process and in the compulsory implementation of corona-measures. We ask for an open debate, where all experts are represented without any form of censorship. After the initial panic surrounding covid-19, the objective facts now show a completely different picture – there is no medical justification for any emergency policy anymore. …

Unusual Features of the SARS-CoV-2 Genome Suggesting Sophisticated Laboratory Modification Rather Than Natural Evolution and Delineation of Its Probable Synthetic Route

By Yan, Li-Meng; Kang, Shu; Guan, Jie; Hu, Shanchang[5]
Source: https://zenodo.org/record/4028830#.X2UgUYu_zIX

Sep 14 – The COVID-19 pandemic caused by the novel coronavirus SARS-CoV-2 has led to over 910,000 deaths worldwide and unprecedented decimation of the global economy. Despite its tremendous impact, the origin of SARS-CoV-2 has remained mysterious and controversial. The natural origin theory, although widely accepted, lacks substantial support. The alternative theory that the virus may have come from a research laboratory is, however, strictly censored on peer-reviewed scientific journals. Nonetheless, SARS-CoV-2 shows biological characteristics that are inconsistent with a naturally occurring, zoonotic virus. In this report, we describe the genomic, structural, medical, and literature evidence, which, when considered together, strongly contradicts the natural origin theory. The evidence shows that SARS-CoV-2 should be a laboratory product created by using bat coronaviruses ZC45 and/or ZXC21 as a template and/or backbone. Building upon the evidence, we further postulate a synthetic route for SARS-CoV-2, demonstrating that the laboratory-creation of this coronavirus is convenient and can be accomplished in approximately six months. Our work emphasizes the need for an independent investigation into the relevant research laboratories. It also argues for a critical look into certain recently published data, which, albeit problematic, was used to support and claim a natural origin of SARS-CoV-2. From a public health perspective, these actions are

[5] All four Chinese virologists fled to the US earlier this year.

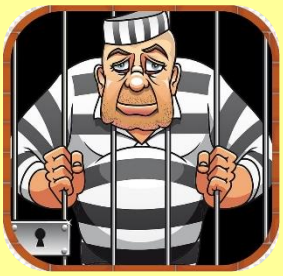
necessary as knowledge of the origin of SARS-CoV-2 and of how the virus entered the human population are of pivotal importance in the fundamental control of the COVID-19 pandemic as well as in preventing similar, future pandemics.

▶▶ **Read also:** https://www.sciencealert.com/chinese-virologist-claimed-sars-cov-2-intentionally-released-she-works-for-a-group-led-by-steve-bannon

Pandemic inspires push to shrink jails, prisons

By Kelly Servick

Source: https://science.sciencemag.org/content/369/6510/1412



Sep 18 – Even before COVID-19 began to sweep through U.S. correctional facilities, Michael Daniels saw the storm coming. As the director of justice policy and programs for Franklin county in Ohio, Daniels knew the county's two jails, with about 1950 inmates, wouldn't allow for social distancing to control the coronavirus' spread. So, back in March, he asked his team: How could they get as many people as possible out of there quickly?

In New York City, Elizabeth Glazer, director of the Mayor's Office of Criminal Justice, was having similar conversations. The pandemic "distilled to its essence [how] we think about the use of jail," she says. "Was it worth putting somebody in jail if you thought that they were at risk of getting COVID?"

As they feared, crowded jails and prisons have been deadly. By now 120,000 COVID-19 cases and 1000 deaths have been documented among people incarcerated in U.S. prisons alone. As cases surged, public health experts amplified a long-standing, unfulfilled demand of criminal justice reform advocates: Lock fewer people up. Because of the virus, such decarceration efforts suddenly made speedy progress. "Policy recommendations that we were unable to get traction on for 2 years—we were able to get them done in 3 weeks," Daniels says.

Nationwide, jail populations plunged by about 25% between March and June, according to an analysis by the nonprofit Vera Institute of Justice. New York City and Franklin county both managed reductions of 30% in their jails, which primarily hold people charged with crimes but not yet convicted. Populations of prisons, which hold people serving sentences after a conviction, budged much less; an analysis by the Marshall Project and the Associated Press found an 8% decrease nationwide during that period.

The result is a major experiment in public health and criminal justice. Initial studies suggest decarceration has lowered infection rates in some jails. But overcrowding persists, and advocates urge further reductions. A committee convened by the U.S. National Academies of Sciences, Engineering, and Medicine (NASEM) is developing best practices for decarceration as a COVID-19 response, slated for publication in October. And scientists hope to study potential social consequences of population reductions, including changes in crime rates. "We've created … a society that has relied on incarceration as a solution to our social problems—and recently, that system was downgraded by like 30%," says Vincent Schiraldi, a justice policy researcher at the Columbia School of Social Work. "Shame on us if we don't study that in a sophisticated way."

Prison and jail outbreaks heighten the inequality of COVID-19's burden. People of color are incarcerated at higher rates than white people and tend to get longer sentences, and people who are incarcerated have higher rates of underlying health conditions that predispose them to severe COVID-19. Meanwhile, the safety of people in prisons is entangled with that of the surrounding community. The virus can travel back and forth with employees (23,000 infections have been documented among prison staff) and with people held for short jail stays or transferred between facilities. A June study in *Health Affairs* estimated that 15.7% of COVID-19 cases documented in Illinois by mid-April were associated with people moving through Chicago's Cook County Jail.

"If we care about the community rates [of COVID-19], then we have to care about prisons and jails," says Emily Wang, a physician at the Yale School of Medicine who heads its Health Justice Lab and co-chairs the NASEM committee on decarceration.

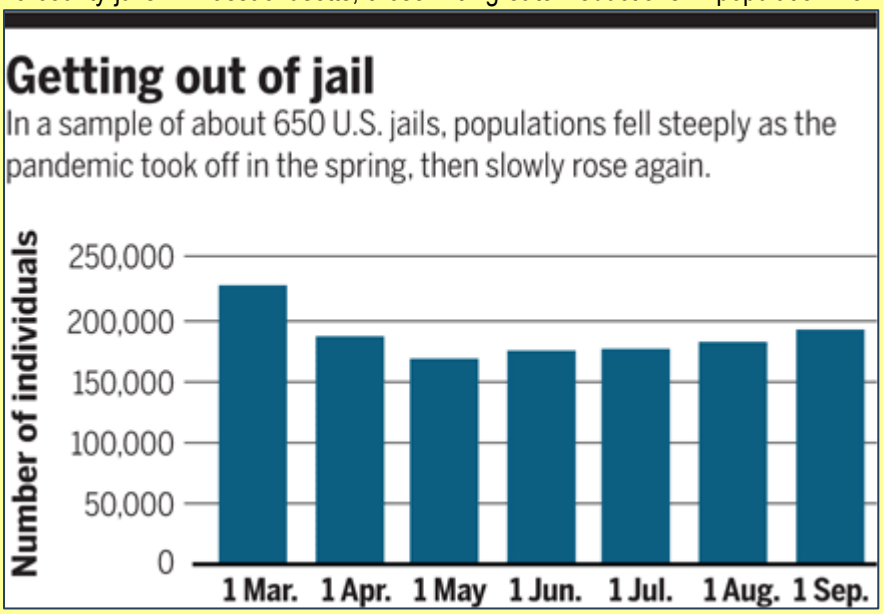
Jurisdictions have taken various tacks to reduce populations. New York City did it primarily by releasing two groups from jails: people being held for parole violations and those serving short sentences. The strategy in Franklin county included waiving some cash bail requirements, expanding the use of electronic monitoring to allow more people to await trial at home, and encouraging citations rather than arrests for certain misdemeanors.

Nationwide, the population drop in jails reflected a drop-off in arrests—likely because fewer crimes were committed during lockdowns and law enforcement officers aimed to avoid unnecessary physical contact, says Michael Jacobson, a sociologist at the City University of New York who has analyzed data on crime and policing in 50 cities.

To reduce prison populations, some states, including California, Oklahoma, Illinois, and Colorado, have halted the transfer of people who would normally move from jail to prison after sentencing. Governors have also commuted the sentences of inmates who were deemed medically vulnerable or were nearing the end of their sentences. And some states are trying to ramp up mental health care, addiction treatment, and other services that ultimately divert people from prisons. "The most successful [approach] is simply to not put people in to begin with," Annette Chambers-Smith, director of the Ohio Department of Rehabilitation and Correction, told attendees in a 20 August NASEM webcast. "Turn the tap off."

As populations dropped, some researchers tried to track the effects on disease spread. Wang and her colleagues estimated the reproduction number of the virus—how many people are infected by each newly infected person—over 83 days at a large urban jail, which they did not identify publicly. As the jail reduced its population by 25% and moved about two-thirds of residents into private cells, that number dropped from 8.25 to 1.72, they reported in a June preprint on medRxiv. (It later dipped below one, indicating the outbreak was in check, after the jail set up widespread testing of asymptomatic people.)

In another study, published 21 August in *JAMA*, Harvard University epidemiologist Monik Jiménez and colleagues found that among 13 county jails in Massachusetts, those with greater reductions in population from early April to early July also had lower rates of COVID-19 infections. Jiménez notes, however, that limited and inconsistent testing data make it hard to sort out exactly how much decarceration helped prevent infections.



Lauren Brinkley-Rubinstein, a community psychologist at the University of North Carolina, Chapel Hill, aims to better predict such health effects. Through the COVID Prison Project, her team pulls daily case counts from state prison reports. She collaborated with researchers at Stanford University and the University of Miami to group 103 Texas prisons based on rates of COVID-19 cases and deaths. Prisons classified as "low outbreak" were at 85% capacity, the team reported in a preprint last week on medRxiv, proposing that number as a "benchmark" for reducing infections.

With Wang's team and researchers at Stanford, Brinkley-Rubinstein hopes to combine case numbers with publicly available data about the layout of different facilities and how inmates are housed. That might help them forecast how changes in a given facility's population will influence its risk of COVID-19, she says. "I can say all day long, 'Reduce your population,' [but] a department of corrections might come back to me and say, 'OK, but how many? Who should I target? How many should I release?' That precision is very important."

Other researchers aim to document the effects of the speedy decarceration on public safety. Decades of criminology research suggest many inmates can be released with minimal risk of recidivism, Jacobson says. But the fear of releasing even one person who might commit a crime helps explain why researchers have had little opportunity to study the effects of rapid, large-scale decarceration before the pandemic. Even now, political calculations explain why jails—most of whose inmates have not been convicted—shrank more than prison populations during the pandemic, says Sharon Dolovich, a law professor at the University of California, Los Angeles, and head of the Covid-19 Behind Bars Data Project, which tracks efforts to improve conditions and reduce populations in jails and prisons.

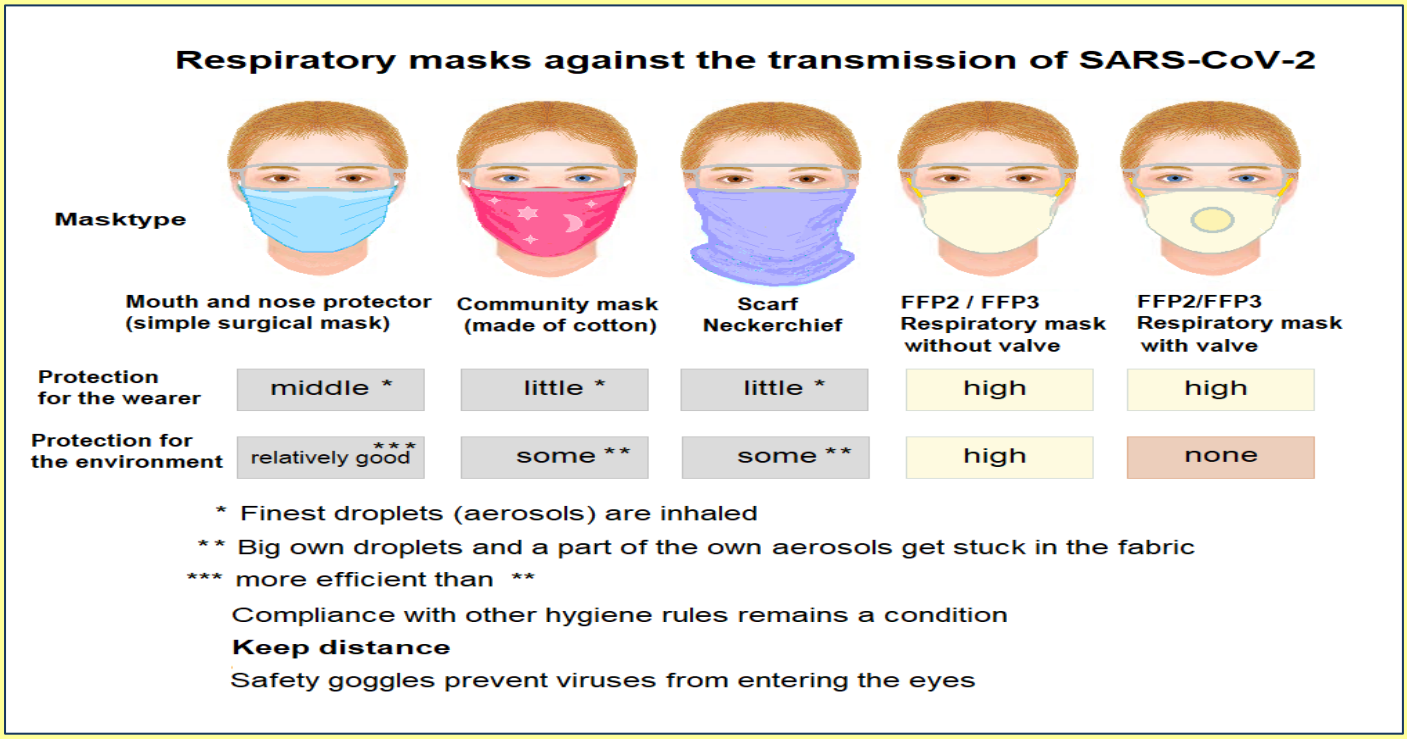
There's no evidence so far that pandemic-inspired releases have raised crime rates. A July analysis of 29 U.S. locations by the American Civil Liberties Union found no relationship between reductions in jail populations and crime trends between March and May. Both Glazer's and Daniels's teams have thus far found very few reoffenses among the people released early from the New York City and Franklin county jails. Criminologist Daniel Nagin and statistician Amelia Haviland at Carnegie Mellon University plan to document the impact of the pandemic on jail populations and explore how population changes in U.S. jails relate to crime rates.

A potential downside of the pandemic's speedy decarceration, says Matthew Akiyama, a clinician and public health researcher at the Albert Einstein College of Medicine, is that "discharge planning wasn't as rigorous as it might have been." People released from prison already struggle to access medical care, addiction treatment, and other supports for re-entry into society, he notes, and the new releases "left people floating in the wind, to a certain extent."

But the threat of COVID-19 has also inspired new forms of support. On 27 August, California Governor Gavin Newsom announced a joint effort with philanthropic groups to provide $30 million to organizations that offer transportation, quarantine housing, health care, and other services to people released from prison. California and New York City have set up hotel stays for people leaving jail, allowing them to quarantine and avoid crowded homeless shelters. Such initial stability may help them thrive long term, Glazer says. But many jail systems, including Glazer's in New York City and Daniels's in Franklin county, have seen upticks in their populations since the rapid plunges earlier in the pandemic—likely at least in part because rates of arrest rebounded.
Local officials are trying to hang on to the recent progress, Daniels says. Franklin county's municipal court has made the issuance of citations standard for some offenses and downgraded failure to appear in court from a jailable offense. Now that he's confident the county can quickly shrink its jails without risking public safety, there's no reason they shouldn't stay that way, he says. "Not if I can help it."

Kelly Servick *is a staff writer at* Science. *She studied cognitive science and comparative literature at the University of Georgia before setting out in search of the vague job description "learn and explain things." She led educational hikes with Americorps and worked with kids as a cognitive skills trainer before the graduate program at the University of California, Santa Cruz, introduced her to science writing. She now focuses on stories about biomedical research and policy. Her work has appeared on KUSP radio, Wired.com, Scientific American, and other outlets.*

Keep in mind



Transmission of SARS-CoV-2: A Review of Viral, Host, and Environmental Factors

By Eric A. Meyerowitz, MD, Aaron Richterman, MD, MPH, Rajesh T. Gandhi, MD, and Paul E. Sax, MD
Annals of Internal Medicine; 17 Sept 2020
Source: https://www.acpjournals.org/doi/10.7326/M20-5008

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the etiologic agent of coronavirus disease 2019 (COVID-19), has spread globally in a few short months. Substantial evidence now supports preliminary conclusions about transmission that can inform rational, evidence-based policies and reduce misinformation on this critical topic. This article presents a comprehensive review of the evidence on transmission of this virus. Although several experimental studies have cultured live virus from aerosols and surfaces

hours after inoculation, the real-world studies that detect viral RNA in the environment report very low levels, and few have isolated viable virus. Strong evidence from case and cluster reports indicates that respiratory transmission is dominant, with proximity and ventilation being key determinants of transmission risk. In the few cases where direct contact or fomite transmission is presumed, respiratory transmission has not been completely excluded. Infectiousness peaks around a day before symptom onset and declines within a week of symptom onset, and no late linked transmissions (after a patient has had symptoms for about a week) have been documented. The virus has heterogeneous transmission dynamics: Most persons do not transmit virus, whereas some cause many secondary cases in transmission clusters called "superspreading events." Evidence-based policies and practices should incorporate the accumulating knowledge about transmission of SARS-CoV-2 to help educate the public and slow the spread of this virus.

Key Summary Points

- Respiratory transmission is the dominant mode of transmission.
- Vertical transmission occurs rarely; transplacental transmission has been documented.
- Cats and ferrets can be infected and transmit to each other, but there are no reported cases to date of transmission to humans; minks transmit to each other and to humans.
- Direct contact and fomite transmission are presumed but are likely only an unusual mode of transmission.
- Although live virus has been isolated from saliva and stool and viral RNA has been isolated from semen and blood donations, there are no reported cases of SARS-CoV-2 transmission via fecal–oral, sexual, or bloodborne routes. To date, there is 1 cluster of possible fecal–respiratory transmission.

Transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes coronavirus disease 2019 (COVID-19), requires that a minimum but as yet unknown dose of replication-competent virus be delivered to a vulnerable anatomical site in a susceptible host. A combination of viral, host, and environmental characteristics affect transmission.

Do-it-yourself COVID-19 vaccines fraught with public health problems

September 18, 2020 University of Illinois
Source: https://scienceblog.com/518590/do-it-yourself-covid-19-vaccines-fraught-with-public-health-problems/

Study shows first proof that a safer UV light effectively kills virus causing COVID-19

Source: https://www.eurekalert.org/pub_releases/2020-09/hu-ssf091620.php

Sep 17 – A study conducted by Hiroshima University researchers found that using Ultraviolet C light with a wavelength of 222 nanometers which is safer to use around humans effectively kills SARS-CoV-2 -- the first research in the world to prove its efficacy against the virus that causes COVID-19.

Other studies involving 222 nm UVC, also known as Far-UVC, have so far only looked at its potency in eradicating seasonal coronaviruses that are structurally similar to the SARS-CoV-2 but not on the COVID-19-causing virus itself. A nanometer is equivalent to one billionth of a meter.

An in vitro experiment by HU researchers showed that 99.7% of the SARS-CoV-2 viral culture was killed after a 30-second exposure to 222 nm UVC irradiation at 0.1 mW/cm^2. The study is published in the *American Journal of Infection Control*.

Tests were conducted using Ushio's Care222™ krypton-chloride excimer lamp. A 100-microliter solution containing the virus (ca.

5 × 10^6 $TCID_{50}$/mL) was spread onto a 9-centimeter sterile polystyrene plate. The researchers allowed it to dry in a biosafety cabinet at room temperature before placing the Far-UVC lamp 24 centimeters above the surface of the plates.

222 nm vs 254 nm UVC

A wavelength of 222 nm UVC cannot penetrate the outer, non-living layer of the human eye and skin so it won't cause harm to the living cells beneath. This makes it a safer but equally potent alternative to the more damaging 254 nm UVC germicidal lamps increasingly used in disinfecting healthcare facilities.

Since 254 nm UVC harms exposed human tissues, it can only be used to sanitize empty rooms. But 222 nm UVC can be a promising disinfection system for occupied public spaces including hospitals where nosocomial infections are a possibility.

The researchers, however, suggest further evaluation of the safety and effectiveness of 222 nm UVC irradiation in killing SARS-CoV-2 viruses in real-world surfaces as their study only investigated its in vitro efficacy.

Covid-19: Do many people have pre-existing immunity?

(Published 17 September 2020)

Source: https://www.bmj.com/content/370/bmj.m3563

At least six studies have reported T cell reactivity against SARS-CoV-2 in 20% to 50% of people with no known exposure to the virus. In a study of donor blood specimens obtained in the US between 2015 and 2018, 50% displayed various forms of T cell reactivity to SARS-CoV-2. A similar study that used specimens from the Netherlands reported T cell reactivity in two of 10 people who had not been exposed to the virus.

Coronavirus can spread on airline flights, two studies show

Source: https://edition.cnn.com/world/live-news/coronavirus-pandemic-09-18-20-intl/h_9deb3d1111725f47f8f0c92edd92cb27

Sep 18 – The young woman and her sister had traveled across Europe just as the coronavirus pandemic was taking off there, visiting Milan and Paris before heading to London.

When the woman left London on March 1, she had a sore throat and cough as she boarded a flight home to Vietnam. But no one noticed.

By the time she got off the flight in Hanoi 10 hours later, 15 other people who had been on the plane with her were infected, researchers reported Friday.

This story is one of two published Friday demonstrating how coronavirus can spread on airline flights, and suggesting that **simply spacing people out a little will not fully protect them.**

In another incident, passengers on a flight from Boston to Hong Kong appear to have infected two flight attendants.

Both cases involved long flights early in the pandemic, before airlines began requiring face masks.

▶▶ **Read more here:** Coronavirus can spread on airline flights, two studies show

Epidemics and Pandemics Can Exacerbate Xenophobia, Bigotry

Source: http://www.homelandsecuritynewswire.com/dr20200918-epidemics-and-pandemics-can-exacerbate-xenophobia-bigotry

Sep 18 – When viruses, parasites and other pathogens spread, humans and other animals tend to hunker down with immediate family and peer groups to avoid outsiders as much as possible.

But could these instincts, developed to protect us from illnesses, generalize into avoidance of healthy individuals who simply look, speak or live differently?

Jessica Stephenson, an assistant professor in the Department of Biological Sciences in the University of Pittsburg's Kenneth P. Dietrich School of Arts and Sciences, coauthored a paper exploring the answer, which was recently published in the *Proceedings of the Royal Society of London, Series B*.

One example noted in the study showed that black garden ants exposed to a fungus clustered together in groups much smaller than researchers could predict by chance, which effectively limited the spread of disease. Similar behaviors seen among 19 non-human primate species were also credited for lowering direct spread of parasites.

Human beings share these same biological impulses to separate into modular social groups. However, when pathogens are spreading, humans tend to also adopt a set of behaviors that are "hypervigilant and particularly error prone," the researchers wrote.

"It's interesting and really disappointing," Stephenson said. And as COVID-19 continues its spread, humans are even more susceptible to the impulse.

"During epidemics, humans tend to become overly sensitive, so any sort of physical abnormality that somebody has suddenly becomes a potential indicator of infection. We become much more bigoted, we pay way more attention to things that differentiate people from what we perceive as our own phenotype. People who look different from us and sound different from us, which, of course, leads to a lot more xenophobia," said Stephenson, who runs Stephenson Lab of Disease Ecology and Evolutionary Parasitology at Pitt.

A prior Stephenson study published in *The Royal Society Biology Letters* in November 2019 outlined how individuals differ in their response to potential contagion. In both humans and the guppies she studied, the individuals most susceptible to the disease showed the strongest avoidance.

During that study, male guppies were placed in a large tank, flanked by a smaller one containing a group of three female guppies that were visibly infected with parasites. Many males preferred to spend time near the female guppies, despite the risk of contagion. But some male guppies strongly avoided the other fish. The socially distant male guppies were later shown to be highly susceptible to worm infections.

Stephenson said human beings are generally "normal social animals in many of our behavioral responses to infectious diseases." But, if humans choose social urges over infection control, efforts such as global disease surveillance and centralized public health responses could be wasted, she said.

"That the vast majority of our species has largely squandered the potential payoffs of these benefits is again consistent with other social animals: the cost of social distancing itself can outweigh the cost of contracting the disease," Stephenson said.

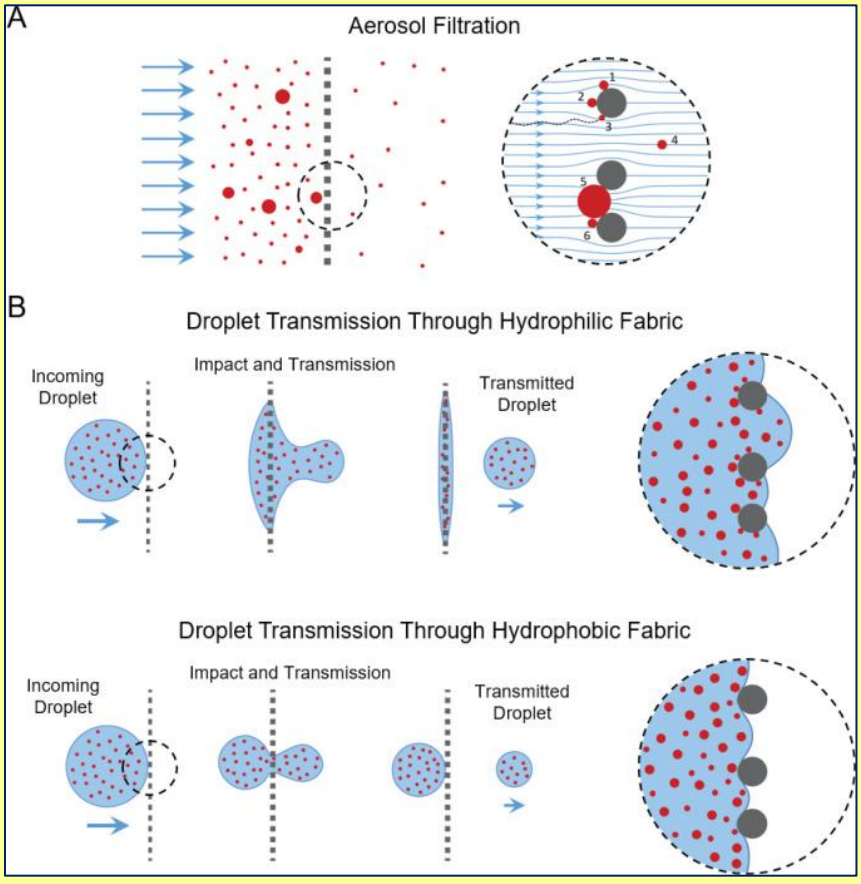
But humans have a leg up on fish: access to information and means of virtual communication. Stephenson's 2020 study noted that synchronous communication, virtual or not, can mitigate some of the effects of confinement. Computer-mediated discussions can also promote more equal participation from minority groups.
"For some, no amount of Zoom and FaceTime can make up for the lost benefits of social interactions. These frustrating, if wholly natural, behavioral decisions will result in the persistence of COVID-19 until the advent of perhaps our greatest advantage over other species facing emerging infectious diseases: vaccination."
"We shouldn't discriminate against different groups in our social distancing, or in our efforts to work together to beat the virus," she added. "But I think our natural, evolved tendencies would be to associate only within our ingroups. We have to fight that **natural antipathy** towards people who differ from ourselves, and not shut down."

EDITOR'S COMMENT: There is real life and academia in a world that is not of angelic material. Comparison of humans with guppies seems a bit ackward. And the "antipathy" mentioned is not natural but provoked by the actions of other people who emphatically ignore rules and norms; and so is "xenophobia".

Most homemade masks are doing a great job, even when we sneeze, study finds

Source: https://medicalxpress.com/news/2020-09-homemade-masks-great-job.html

Sep 18 – Studies indicate that homemade masks help combat the spread of viruses like COVID-19 when combined with frequent hand-washing and physical distancing. Many of these studies focus on the transfer of tiny aerosol particles; however, researchers say that speaking, coughing and sneezing generates larger droplets that carry virus particles. Because of this, mechanical engineer Taher Saif said the established knowledge may not be enough to determine the effectiveness of some fabrics used in homemade masks.



Distinction between aerosol filtration and large droplet blocking by fabrics. (A) Typical mechanisms of particle capture and transport during aerosol filtration: Particles 1, 2, and 3 are captured by the fiber *via* interception, impaction, and diffusion, respectively. Particle 4 is smaller than the inter-fiber spacing and is transmitted through the fabric, carried by air flow. Particle 5, being larger than the inter-fiber spacing, is captured by straining. Particle 6 is subsequently captured by settling/caking. (B) Blocking of nanoparticles carried by large droplets. Top and bottom rows represent transmission through hydrophilic and hydrophobic fabrics, respectively. Droplets impact the fabric with high velocity, squeeze through the pores, and part of the volume can transmit. This process involves energy costs associated with interfacial energies and shear stresses, which may be influenced by fabric porosity, fabric type, and viscosity of the droplet. Energy barriers for transmission increase with decreasing pore size, increasing droplet viscosity, as well as hydrophobicity of the fabric. For example, interfacial energy barrier for transmission through hydrophobic fabric is much higher than that for hydrophilic one.

Saif, a mechanical science and engineering professor at the University of Illinois, Urbana-Champaign, led a study that examined the effectiveness of common household fabrics in blocking droplets. The findings are published in the journal Extreme Mechanics Letters.

Aerosol particles are typically classified as less than 5 micrometers, and lie in the range of hundreds of nanometers. However, larger droplets—up to about 1 millimeter in diameter—can also be expelled when an individual speaks, coughs or sneezes. These larger droplets pose a problem because, with sufficient momentum, they can squeeze through the pores of some fabrics, break into smaller droplets and become airborne.

However, for an individual to feel compelled to wear a mask, it must be comfortable and breathable, the researchers said.

"A mask made out of a low-breathability fabric is not only uncomfortable, but can also result in leakage as the exhaled air is forced out around contours of a face, defeating the purpose of the mask and providing a false sense of protection," Saif said. "Our goal is to show that many common fabrics exploit the trade-off between breathability and efficiency of blocking droplets—large and small."

The team tested the breathability and droplet-blocking ability of 11 common household fabrics, using a medical mask as a benchmark. The fabrics selected ranged from new and used garments, quilted cloths, bedsheets and dishcloth material. The researchers then characterized the fabrics in terms of their construction, fiber content, weight, thread count, porosity and water-absorption rate.

"Testing the breathability of these fabrics was the easy part," Saif said. "We simply measured the rate of airflow through the fabric. Testing the droplet-blocking ability is a bit more complicated."

In the lab, the researchers fill the nozzle of an inhaler with distilled water seeded with easy-to-find 100-nanometer diameter fluorescent particles—which happens to be the size of a novel coronavirus particle. When puffed, the inhaler forces the water through the nozzle and generates high-momentum droplets that collect on a plastic dish placed in front of the inhaler. To test the fabrics, the researchers repeat this process with the various materials placed over the collection dishes.

"We count the number of nanoparticles landing on the dish using a high-resolution confocal microscope. We can then use the ratio of the number collected with and without the fabric to give us a measure of droplet-blocking efficiency," Saif said.

The team also measured the velocity and size of the particles expelled from the inhaler using high-speed video.

Their analyses revealed that droplets leave the inhaler at about 17 meters per second. Droplets released by speaking, coughing and sneezing have velocities within the range of 10 to 40 meters per second, the researchers said.

In terms of size, the high-speed video detected droplets with diameters in the 0.1 to 1 millimeter range, matching that of the larger-sized droplets released by speaking, coughing and sneezing.

"We found that all of the fabrics tested are considerably effective at blocking the 100 nanometer particles carried by high-velocity droplets similar to those that may be released by speaking, coughing and sneezing, even as a single layer," Saif said. "With two or three layers, even the more permeable fabrics, such as T-shirt cloth, achieve droplet-blocking efficiency that is similar to that of a medical mask, while still maintaining comparable or better breathability.

"Our experimental platform offers a way to test fabrics for their blocking efficiency against the small—and now—larger droplets that are released by human respiratory events."

More information: Onur Aydin et al. Performance of fabrics for home-made masks against the spread of COVID-19 through droplets: A quantitative mechanistic study, *Extreme Mechanics Letters* (2020). DOI: 10.1016/j.eml.2020.100924

Editor's note: There are some very interesting (downloadable) videos on spray dynamics in the link above.

Scientists are working on vaccines that spread like a disease. What could possibly go wrong?

By Filippa Lentzos, and Guy Reeves

Source: https://thebulletin.org/2020/09/scientists-are-working-on-vaccines-that-spread-like-a-disease-what-could-possibly-go-wrong/

Sep 18 – Once a COVID-19 vaccine is approved for public use, officials around the world will face the monumental challenge of vaccinating billions of people, a logistical operation rife with thorny ethical questions. What if instead of orchestrating complicated and resource-intensive campaigns to vaccinate humans against emerging infectious diseases like COVID-19, we could instead stop the zoonotic diseases that sometimes leap from animals to people at their source? A small, but growing number of scientists think it's possible to exploit the self-propagating properties of viruses and use them to spread immunity instead of disease. Can we beat viruses like SARS-CoV-2, the novel coronavirus, at their own game?

A virus that confers immunity throughout an animal population as it spreads in the wild could theoretically stop a zoonotic spillover event from happening, snuffing out the spark that could ignite the next pandemic. If the wild rats that host the deadly Lassa virus, for example, are vaccinated, the risks of a future outbreak among humans could be reduced. For at least 20 years, scientists have

been experimenting with such self-spreading vaccines, work that continues to this day, and which has gained the attention of the US military.

For obvious reasons, public and scientific interest in vaccines is incredibly high, including in self-spreading vaccines, as they could be effective against zoonotic threats. The biologists Scott Nuismer and James Bull generated fresh media attention to self-spreading vaccines over the summer after publishing an article in the journal *Nature Ecology & Evolution*. But the subsequent reporting on the topic gives short shrift to the potentially significant downsides to releasing self-spreading vaccines into the environment.

Self-spreading vaccines could indeed entail serious risks, and the prospect of using them raises challenging questions.

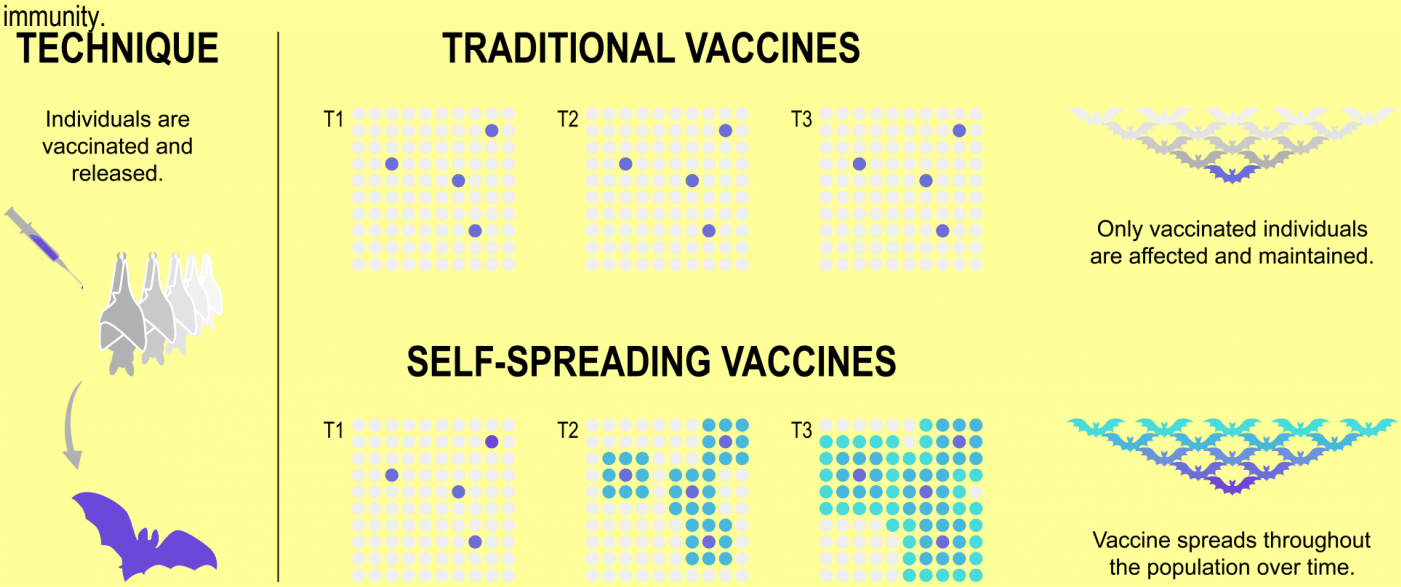
Who decides, for instance, where and when a vaccine should be released? Once released, scientists will no longer be in control of the virus. It could mutate, as viruses naturally do. It may jump species. It will cross borders. There will be unexpected outcomes and unintended consequences. There always are.

While it may turn out to be technically feasible to fight emerging infectious diseases like COVID-19, AIDS, Ebola, and Zika with self-spreading viruses, and while the benefits may be significant, how does one weigh those benefits against what may be even greater risks?

How they work

Self-spreading vaccines are essentially genetically engineered viruses designed to move through populations in the same way as infectious diseases, but rather than causing disease, they confer protection. Built on the chassis of a benign virus, the vaccines have genetic material from a pathogen added to them that stimulates the creation of antibodies or white blood cells in "infected" hosts.

These vaccines could be particularly useful, some scientists say, for wildlife populations where direct vaccination is difficult due to issues like inaccessible habitats, poor infrastructure, high costs, or lack of resources. The idea, essentially, is to vaccinate a small proportion of a population through direct inoculation. These so-called founders will then passively spread the vaccine to other animals they encounter either by touch, sex, nursing, or breathing the same air. Gradually, these interactions could build up population-level immunity.



A diagram of how a self-spreading vaccine could spread among bats. "Founder" bats inoculated with a self-spreading vaccine passively spread the vaccine to other bats they encounter over time, gradually building up population-level immunity. Credit: Derek Caetano-Anollés.

Self-spreading vaccines have some of their roots in efforts to reduce pest populations. Australian researchers described a virally spread immunocontraception, which hijacked the immune systems of infected animals—in this case a non-native mouse species in Australia—and prevented them from fertilizing offspring. The earliest self-spreading vaccine efforts targeted two highly lethal infectious diseases in the European rabbit population (myxoma virus and rabbit hemorrhagic disease virus). In 2001, Spanish researchers field-tested a vaccine in a wild rabbit population living on Isla del Aire, a small Spanish island just off Menorca. The vaccine spread to more than half the 300 rabbits on the island, and the trial was deemed a success.

In 2015, another team of researchers speculated on the development of a self-spreading vaccine for the Ebola virus that could be used on wild great apes like chimpanzees. Since then, scientists have

come to see a wide array of animals—from wildlife such as bats, birds, and foxes to domesticated animals like dogs, pigs, and sheep—as amenable to self-spreading vaccines.
So far, researchers have not developed experimental self-spreading vaccines for humans; there is no clear evidence that anybody is actively working on the technology. Nuismer and Bull argue, rather, that self-spreading vaccines present a revolutionary approach to control emerging infectious diseases before they even spill over from animals into the human population.
Zoonotic spillover is certainly a pressing problem; alongside SARS-CoV-2, HIV, Ebola virus, and the Zika virus, there are over a thousand other new viruses with zoonotic potential that have been detected in wild animals over the last decade. Prevention is better than a cure, Nuismer and Bull say in a *New Scientist* article. In their *Nature Ecology & Evolution* article, they claim they are "poised to begin developing self-disseminating vaccines to target a wide range of human pathogens" in animals.
Outside of an experiment, scientists would face massive technical and practical hurdles in identifying the most appropriate targets for intervention and ensuring immunity is maintained in the wildlife populations. Despite these substantial challenges, the potential security implications of self-spreading vaccines are even more serious.
The principal security concern is that of dual-use. In essence, this means that the same research that is used to develop self-spreading vaccines to prevent disease, could also be used to deliberately cause harm. You could, for instance, engineer triggers into a virus that cause immune system failures in infected people or animals, a bit like HIV does naturally. Or you could create triggers in a virus that cause a harmful autoimmune response, where the body starts attacking its own healthy cells and tissues.

The bioweapon question

While researchers may intend to make self-spreading vaccines, others could repurpose their science and develop biological weapons. Such a self-spreading weapon may prove uncontrollable and irreversible.
We don't have to dig very deep for a historical example of weaponized biology. As the apartheid-era South African biowarfare program shows, social, political, and scientific pressures can lead to the misuse of biological innovation.
Codenamed Project Coast, South Africa's program was primarily focused on covert assassination weapons for use against individuals deemed a threat to the racist apartheid government. In addition to producing contraptions to inject poisons, Project Coast researchers developed techniques to lace sugar cubes with salmonella and cigarettes with Bacillus anthracis.
While there have been many biowarfare programs, including several that were far more elaborate and sophisticated, the South African program is particularly relevant in thinking through malicious uses of self-spreading vaccines. One of Project Coast's research projects aimed at developing a human anti-fertility vaccine.
The idea took hold during a time of widespread concern over worldwide population explosion. Schalk Van Rensburg, who oversaw fertility-related work at a Project Coast laboratory, told South Africa's post-apartheid Truth and Reconciliation Commission, a forum for examining the sordid history of the era and laying the foundation for future peace and tolerance, that he thought the project was in line with the World Health Organization's attempts to curb rising global birth rates. He believed it could bring his lab international acclaim and funding. According to Van Rensburg, Wouter Basson, the director of the biowarfare program, said the military needed an anti-fertility vaccine so that female soldiers would not fall pregnant.
While some of the scientists involved in the project denied awareness of ulterior intentions or even that their fertility work was part of a military endeavor, Van Rensburg and Daniel Goosen, a lab director, told the Truth and Reconciliation Commission that the real intention behind the project was to selectively administer the contraceptive in secret to unwitting Black South African women.
In the end, the anti-fertility vaccine was not produced before Project Coast was officially closed down in 1995, 12 years after it was initiated. An early version was tested in baboons, but never in humans. South Africa isn't the only country to try and forcibly sterilize parts of its population. European countries, including Sweden and Switzerland, sterilized members of the Roma minority in the early half of the 20th century and some, like Slovakia, continued even beyond that. More recently, analysts have alleged that the Chinese government is sterilizing women in Xinjiang, a province with a large population of Uighur Muslims.
It doesn't take a massive leap of the imagination to see how the aims of South Africa's anti-fertility vaccine project would have benefited from research into self-spreading vaccines, particularly if you combine it with current developments in pharmacogenomics, drug development, and personalized medicine. Taken together, these strands of research could help enable ultra-targeted biological warfare.

An expanding potential for abuse

The Biological Weapons Convention, the treaty that bans biological weapons, is nearly 50 years old. Negotiated and agreed to in the depths of the Cold War, the convention suffers from outdated modes of operation. There are also significant compliance assessment challenges. The convention certainly didn't stop South Africa from pursuing Project Coast in the early 1980s.

Self-spreading vaccine research is a small but growing field. At the moment, about 10 institutions are doing significant work in the area. These laboratories are primarily located in the United States, but some are in Europe and Australia, as well. As the field expands, so does the potential for abuse.

So far research has primarily been bankrolled by US government science and health funders like the National Science Foundation, the National Institutes of Health, and the Department of Health and Human Services. Private organizations like the Gates Foundation and academic institutions have also financed projects. Recently, the Defense Advanced Research Projects Agency (DARPA), sometimes thought of as the US military's research and development wing, has gotten involved in the research. The University of California, Davis, for example, is working on a DARPA administered project called Prediction of Spillover Potential and Interventional En Masse Animal Vaccination to Prevent Emerging Pathogen Threats in Current and Future Zones of US Military Operation. According to a pamphlet, the project is "creating the world's first prototype of a self-disseminating vaccine designed to induce a high level of herd immunity (wildlife population level protection) against Lassa virus … and Ebola."

Military investment in biological innovation for defensive or protective purposes is permissible under the Biological Weapons Convention, but it can still send the wrong signals. It could cause countries to doubt one another's intentions and lead to tit-for-tat investment in potentially risky research, including in self-spreading vaccines. The result of research gone awry or biowarfare could be catastrophic for health and the environment.

At a time when the norm against chemical weapons is degrading, underscored most recently by the poisoning of Russian opposition leader Alexei Navalny with the nerve agent Novichok—a crime for which many European officials blame Russia—the international community simply can't afford to have the same thing happen to the norm against the use of biological weapons. It would completely defy the spirit of the treaty if it seemed like states would even want to pursue high-risk dual use activities in biology.

Early, open, good-faith conversations about scientific aims and advances that cause particular dual-use concerns, as self-spreading vaccines do, are essential to exploring the broader stakes of certain technical trajectories. The University of California, Davis program is pursuing ways to incorporate an "off switch" to safely control the technology. And DARPA says any field experimentation related to the project would follow biosafety protocols. But these pledges won't suffice. Our ambition must be to make a collective decision about the technical pathways we are willing, or not willing, to take as a society.

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Severe COVID-19 Infections—Knowledge Gained and Remaining Questions

By Lieuwe D. J. Bos, MD, PhD; Daniel Brodie, MD; and Carolyn S. Calfee, MD, MAS

JAMA Intern Med. Published online September 18, 2020.
Source:10.1001/jamainternmed.2020.6047

Patients with acute respiratory failure due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have overwhelmed critical care capacity in some cities and countries. The mortality of patients who require critical care is high but varies widely among hospitals.[1] Despite a rapidly increasing understanding of the pathogenesis of coronavirus disease 2019 (COVID-19), uncertainty remains about the reasons that some patients develop respiratory failure and others have no to minimal symptoms, as well as about the optimal management of patients with severe COVID-19 disease.[2] We review the evidence for the management of patients with the acute respiratory distress syndrome (ARDS) that may apply to patients with severe COVID-19, what has been learned about treatment of these patients, and the gaps in knowledge that remain.

Supportive Care

Critically ill patients with severe COVID-19 frequently meet the criteria for ARDS, including bilateral radiographic opacities and a sufficient degree of hypoxemia (partial pressure of arterial oxygen to fraction of inspired oxygen ≤300 mm Hg). Although there are no specific pharmacologic therapies for ARDS, decades of rigorous clinical trials have established that meticulous supportive care with the foundation of lung-protective ventilation improves ARDS outcomes.[3] Lung protective ventilation can be defined as a low-volume, low-pressure ventilation strategy (Box). Standardized protocols can help to ensure high-quality care, particularly during a crisis when less experienced physicians may be caring for critically ill patients. In addition to supportive care and lung protective

ventilation, treatment of patients with ARDS typically includes symptom-targeted sedation and analgesia, consideration of neuromuscular blockade for ventilator dyssynchrony or severe hypoxemia, prone positioning for moderate to severe ARDS, and consideration of extracorporeal membrane oxygenation for patients with very severe ARDS (Box).[3] At present, most reports suggest that the respiratory physiology of ARDS both associated and not associated with COVID-19 are similar, thus reinforcing the importance of adhering to evidence-based management principles that have proven effective for ARDS management.[3]

Fundamentals of Acute Respiratory Distress Syndrome Care That Apply to Patients With Severe Coronavirus Disease 2019

- Patients should be ventilated with a lung protective strategy, including targeting low tidal volumes of 4- to 8-cc/kg predicted body weight and limiting plateau pressure to 30 cm H_2O or less.
- Sedation and analgesia should be provided at the minimum level required to promote patient comfort and ventilator synchrony. Neuromuscular blockade (with deeper sedation) can be used if dyssynchronies limit the application of lung protective ventilation or result in life-threatening problems with gas exchange. When possible, the duration of neuromuscular blockade should be brief.
- A conservative strategy for the administration of fluids, including aggressive diuresis, if needed, should be pursued once patients are out of shock (ie, off vasopressors).
- Prone positioning should be strongly considered for patients with a ratio of the partial pressure of arterial oxygen to fraction of inspired oxygen less than 150, unless contraindicated by severe hemodynamic instability, pregnancy, open abdomen, or other reasons.
- Venovenous extracorporeal membrane oxygenation should be considered if severe gas exchange abnormalities (eg, profound hypoxemia, severe respiratory acidosis) persist despite standard interventions, including prone positioning.

Early in the COVID-19 pandemic, there were concerns about emergency endotracheal intubation in patients with a highly infectious respiratory virus. As a result, many intensivists intubated patients before the onset of frank respiratory failure. Although we are unaware of trials that have specifically addressed the timing of intubation for patients with COVID-19, accumulated experience has led most clinicians to approach decisions about the timing of intubation in a similar fashion to decisions for patients without COVID-19 but with incipient respiratory failure. An important caveat is that the optimal timing for intubation in ARDS remains uncertain and was hotly debated, even before COVID-19.

Likewise, an initial reluctance to use various forms of noninvasive ventilation for patients with COVID-19, including high-flow nasal cannula oxygen therapy, owing to concerns about aerosolization of the virus and exposure of essential health care workers, appears to have largely subsided. Moreover, as the pandemic has progressed, new practices around so-called *awake proning* of patients with early, nonintubated respiratory failure have become increasingly widespread. Small studies have provided evidence of improvement in gas exchange when patients who are not intubated are encouraged to maintain themselves in the prone position for prolonged periods of time. Clinical trials to assess the efficacy of this approach for patient-centered outcomes are ongoing.[4]

Treatment of COVID-19

The COVID-19 pandemic has reinforced the fundamental teaching that treatment of the underlying cause of ARDS is essential to improving outcomes. In hospitalized patients, treatment of SARS-CoV-2 with remdesivir shortens the time to recovery.[5] However, the utility of remdesivir in patients requiring mechanical ventilation remains uncertain, and additional evidence is needed. The RECOVERY trial[6] demonstrated a survival benefit of dexamethasone treatment in patients with COVID-19 who require oxygen or mechanical ventilation. Subsequently, 3 additional randomized clinical trials and a meta-analysis have been published,[7-10] all consistent with a beneficial effect of use of corticosteroids for severe or critical COVID-19. The World Health Organization has issued guidelines recommending use of corticosteroids in such patients.[11] The effect size and clarity of the results for patients with COVID-19 contrasts with the equivocal findings of prior corticosteroid trials in ARDS, in which decades of research have led to conflicting results and no consensus.

Unproven Therapies

The need to exercise caution when using unproven therapies for COVID-19 on the basis of theoretical understandings of disease pathogenesis is another important lesson. Despite the hype around use of hydroxychloroquine and lopinavir/ritonavir early in the pandemic, these agents have proven ineffective for treatment of COVID-19. Similarly, on the basis of media reports and some scientific articles describing a *cytokine storm* that was thought to characterize COVID-19, many patients have been treated with agents that block interleukin-6 (IL-6), an adaptation of the treatment of patients with cytokine release syndrome following chimeric antigen receptor T-cell therapy. However, the limited data that are available indicate that plasma IL-6 levels in patients with

COVID-19 are orders of magnitude lower than in patients with cytokine release syndrome and, in some cases, lower than in patients with ARDS not associated with COVID-19.[12,13] At present, there is no evidence from randomized clinical trials that IL-6 blockade has beneficial effects for patients with severe COVID-19. Moreover, there are increasing reports of opportunistic infections associated with these therapies.[14] The lessons are that unproven therapies for COVID-19 may provide more harm than benefit and that there are no substitutes or shortcuts for well-conducted randomized clinical trials.

Outcomes of Critical Care

Evidence is increasing that clinical outcomes for patients with ARDS associated with COVID-19 may be quite similar to those for patients with ARDS not associated with COVID-19, and much better than was initially feared. Whereas studies published early in the pandemic, largely from hospitals overwhelmed by critically ill patients, reported hospital mortality rates approaching 90%, more recent studies have reported outcomes more typical for patients with ARDS, with hospital mortality of 30% to 40% and in some cases remarkably lower.[1] This hopeful development may be seen as a testament to the value of meticulous critical care that can be provided in hospitals with adequate resources and that are not operating under severe strain. At the same time, the disproportionate effects of COVID-19 on vulnerable populations, including minority communities, those with low socioeconomic status, and the elderly, demonstrate the imperative to bridge the gaps in health care systems, address systemic biases, and lessen these disparities.

Remaining Questions

Despite rapid progress, much remains to be learned about severe COVID-19. For example, the pathophysiological pathways in COVID-19 that result in ARDS and how these relate to the classical understanding of ARDS are uncertain. Over the past decades, it has become increasingly evident that the clinical definition of ARDS captures a heterogenous syndrome without a uniform pathologic process. In a given patient, there is wide variance in the degree to which the key pathways of injury (ie, epithelial, endothelial, inflammatory, coagulation) are operative. With a single causal etiology (ie, SARS-CoV-2), COVID-19 likely results in a more specific and more uniform clinical and biological phenotype of ARDS. An important goal of elucidating the distinct pathways of injury that are shared between patients with severe COVID-19 is to determine which are specifically treatable. Although autopsy findings have been variable, some evidence suggests that endothelial injury and coagulopathy may be central mediators of lung injury in COVID-19.[15] If confirmed, therapies that target endothelial activation or coagulopathy may hold promise and should be evaluated for ARDS associated with COVID-19.

The importance of a single causal phenotype is exemplified by the effect of dexamethasone in treatment of COVID-19 pneumonia, in contrast with the conflicting prior studies in treatment of ARDS. The survival benefit of dexamethasone suggests that the host response in severe COVID-19 is, at least partly, injurious. Yet inflammatory cytokine levels in plasma are similar to or, in some cases, lower in patients with ARDS associated with COVID-19 than in patients with ARDS due to other causes.[12,16] One explanation for this finding may be that the injurious host response is more compartmentalized to the lung, rather than a systemic cytokine storm. Moreover, in patients with COVID-19 not requiring oxygen, dexamethasone may be harmful.[6] Deeper biological phenotyping of lung-specific vs systemic inflammatory responses, as well as studies identifying which specific aspects of the immune response are associated with poor clinical outcomes in COVID-19,[17] should increase our understanding of how to best modulate the deleterious aspects of the host response while preserving its beneficial effects.

The RECOVERY trial[6] has demonstrated that pragmatic trials are possible during a pandemic and can rapidly provide answers to important clinical problems. Ongoing trials are testing a variety of therapies, including aggressive anticoagulation, convalescent plasma, monoclonal antibodies, and additional immunomodulatory agents. Access to randomized clinical trials should be expanded to as many patients as possible, including the elderly and those in minority communities hardest hit by the pandemic who have not traditionally had equal access to research protocols, to ensure that these potentially lifesaving therapies can be systematically evaluated.

Finally, many patients, gratefully, recover from severe COVID-19. The long-term sequelae of the disease need to be further studied, including how recovery from COVID-19 does or does not differ from recovery of other forms of severe critical illness. Critical care has been revolutionized by the realization that many patients survive their acute illness only to suffer serious long-term functional and psychological consequences of their stay in intensive care units.[18] A better understanding of the most common postrecovery sequelae of severe COVID-19 can help clinicians best care for the increasing number of patients who do survive.

▶▶ References are available at source's URL.

Lies, Damned Lies and Health Statistics – The Deadly Danger of False Positives

By Dr. Mike Yeadon
September 21, 2020

I believe I have identified a serious, really a fatal flaw in the PCR test used in what is called by the UK Government the Pillar 2 screening – that is, testing many people out in their communities. the Health Secretary, Matt Hancock, misled the House of Commons and also made misleading statements in a radio interview.

Dr Mike Yeadon *is the former CSO and VP, Allergy and Respiratory Research Head with Pfizer Global R&D and co-Founder of Ziarco Pharma Ltd.*

COVID19 PCR Tests Are Scientifically Meaningless

By Torsten Engelbrecht and Konstantin Demeter
Source: https://www.globalresearch.ca/covid19-pcr-tests-scientifically-meaningless/5717253

June 2020 – Lockdowns and hygienic measures around the world are based on numbers of cases and mortality rates created by the so-called SARS-CoV-2 RT-PCR tests used to identify "positive" patients, whereby "positive" is usually equated with "infected." But looking closely at the facts, the conclusion is that these PCR tests are meaningless as a diagnostic tool to determine an alleged infection by a supposedly new virus called SARS-CoV-2.

▶▶ Read the entire article at source's URL and make your own conclusions. **The thing is that how comes PCR be the "golden standard" when there is nothing similar to compare to?**

Torsten Engelbrecht *is an award-winning journalist and author from Hamburg, Germany. In 2006 he co-authored Virus-Mania with Dr Klaus Kohnlein, and in 2009 he won the German Alternate Media Award. He has also written for Rubikon, Süddeutsche Zeitung, Financial Times Deutschland and many others.*
Konstantin Demeter *is a freelance photographer and an independent researcher. Together with the journalist Torsten Engelbrecht he has published articles on the "COVID-19" crisis in the online magazine Rubikon, as well as contributions on the monetary system, geopolitics, and the media in Swiss Italian newspapers.*

Ensuring public's trust in COVID-19 vaccine is critical part of pandemic fight

By Asha M. George
Source: https://eu.usatoday.com/story/opinion/2020/09/18/building-public-trust-covid-19-vaccine-critical-part-mission-column/3478538001/

I fought in Desert Storm, the massive military offensive in the Persian Gulf. Although it began nearly 30 years ago, I see parallels between decisions I made on the battlefield and decisions all Americans will have to make about a COVID-19 vaccine.

As a platoon leader and a military intelligence officer, I knew all too well the biological threat we faced from Iraq. Saddam Hussein had weaponized anthrax and loaded it into SCUD missiles. My troops, colleagues and I walked around for weeks wearing protective gear, prepared for an attack with a biological or other weapon of mass destruction.

Because I had earned a Master of Science in Public Health before going on active duty, I had enough academic background to understand how the vaccine worked and how it would stimulate an immune response. I also knew that the Food and Drug Administration had approved this vaccine for use against cutaneous anthrax, but not the inhalational anthrax we worried about.

I remember trying to decide whether to take the vaccine, despite being generally in favor of immunization. The Department of Defense recommended that military personnel deployed in Desert Storm take the vaccine because of the immediate threat we faced. I ultimately took it and felt comfortable with that decision, having had enough information to weigh the risks.

Even so, during a nighttime SCUD attack, I stood in the desert, watching PATRIOT and SCUD missiles collide overhead. I wondered if the SCUD contained anthrax, and if it did, whether the anthrax vaccine I had taken would protect me.
Today, the biological threat comes from COVID-19. In the race to produce much-needed vaccine, companies and governmental agencies are just now running clinical trials and determining how vaccine candidates could affect human beings.
On Wednesday, Centers for Disease Control Director Dr. Robert Redfield told a Senate Appropriations subcommittee that a potential vaccine likely will be available in limited quantities by the end of this year. But it may be only 70% effective.
The CDC also announced a plan to make COVID-19 vaccinations free to all Americans. But Redfield said it will take "six to nine" months to vaccinate most of the public.

Americans distrust rush for vaccine
National polls tell us what we are up against in building public confidence. A USA TODAY/Suffolk Poll found that two-thirds of U.S. voters say they will not try to get a COVID-19 vaccine as soon as it becomes available, and one in four say they will never get it.
The survey found Americans distrustful of the Trump administration's push to speed up its development of a vaccine and have the FDA issue an Emergency Use Authorization before researchers and manufacturers prove that the vaccine is safe and effective.
According to the Health and Human Services website, the FDA can issue EUAs during public health emergencies to help make medical products available more quickly than would ordinarily be the case. But that is only if "the known and potential benefits of the product, when used to diagnose, prevent, or treat the identified disease or condition, outweigh the known and potential risks of the products."
Recently, AstraZeneca, one of the pharmaceutical companies working on a vaccine for COVID-19, temporarily suspended one of its clinical trials because of one adverse event. This is by no means unusual during a clinical trial.
What is unusual is that a group of biopharmaceutical companies felt compelled to release a statement trying to reassure the public that they would not take shortcuts or produce a vaccine before they felt it was ready and safe — knowing of the concerns that President Donald Trump may be pressuring the FDA to provide an EUA for a vaccine to be delivered shortly before Election Day in November.

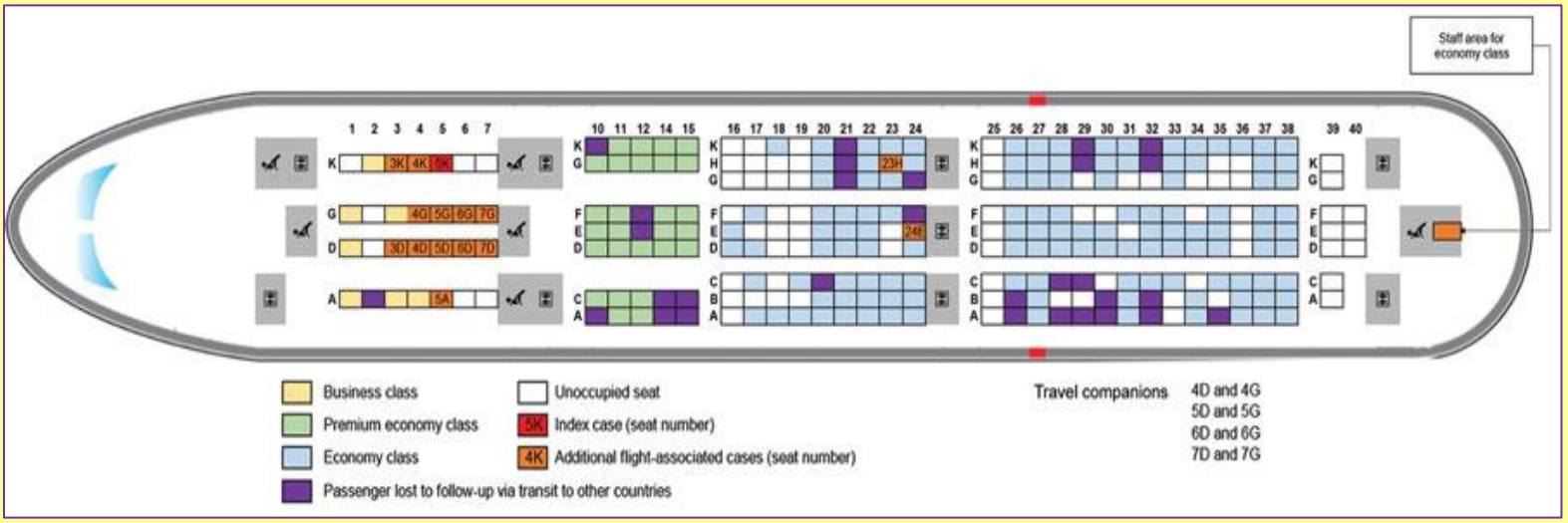
Help public make informed decision
While there may be enough information for the FDA to authorize emergency use, it will likely not be enough to help Americans make an informed decision about whether to take the new COVID-19 vaccine.
With bombs exploding around me, I felt that the benefits of taking the anthrax vaccine outweighed the risks associated with unnecessary immunization. I believed the threat was great enough to warrant taking this protective action.
When it comes to COVID-19, if it means waiting another month or two to finish clinical trials, and get the FDA the information they need to fully authorize use of the vaccine, I believe fewer Americans will be left to wonder whether the vaccine they just took will protect them and their families.

***Asha M. George**, who holds a doctorate in public health, is executive director of the Bipartisan Commission on Biodefense. She is a former U.S. Army military intelligence officer and paratrooper.*

Transmission of Severe Acute Respiratory Syndrome Coronavirus 2 During Long Flight

By Nguyen Cong Khanh, Pham Quang Thai, Ha-Linh Quach, et al.
Emerging Infectious Diseases | Volume 26, Number 11—November 2020
Source: https://wwwnc.cdc.gov/eid/article/26/11/20-3299_article

Abstract
To assess the role of in-flight transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), we investigated a cluster of cases among passengers on a 10-hour commercial flight. Affected persons were passengers, crew, and their close contacts. We traced 217 passengers and crew to their final destinations and interviewed, tested, and quarantined them. Among the 16 persons in whom SARS-CoV-2 infection was detected, 12 (75%) were passengers seated in business class along with the only symptomatic person (attack rate 62%). Seating proximity was strongly associated with increased infection risk (risk ratio 7.3, 95% CI 1.2–46.2).



Seating location of passengers on Vietnam Airlines flight 54 from London, UK, to Hanoi, Vietnam, on March 2, 2020, for whom severe acute respiratory syndrome coronavirus 2 infection was later confirmed.

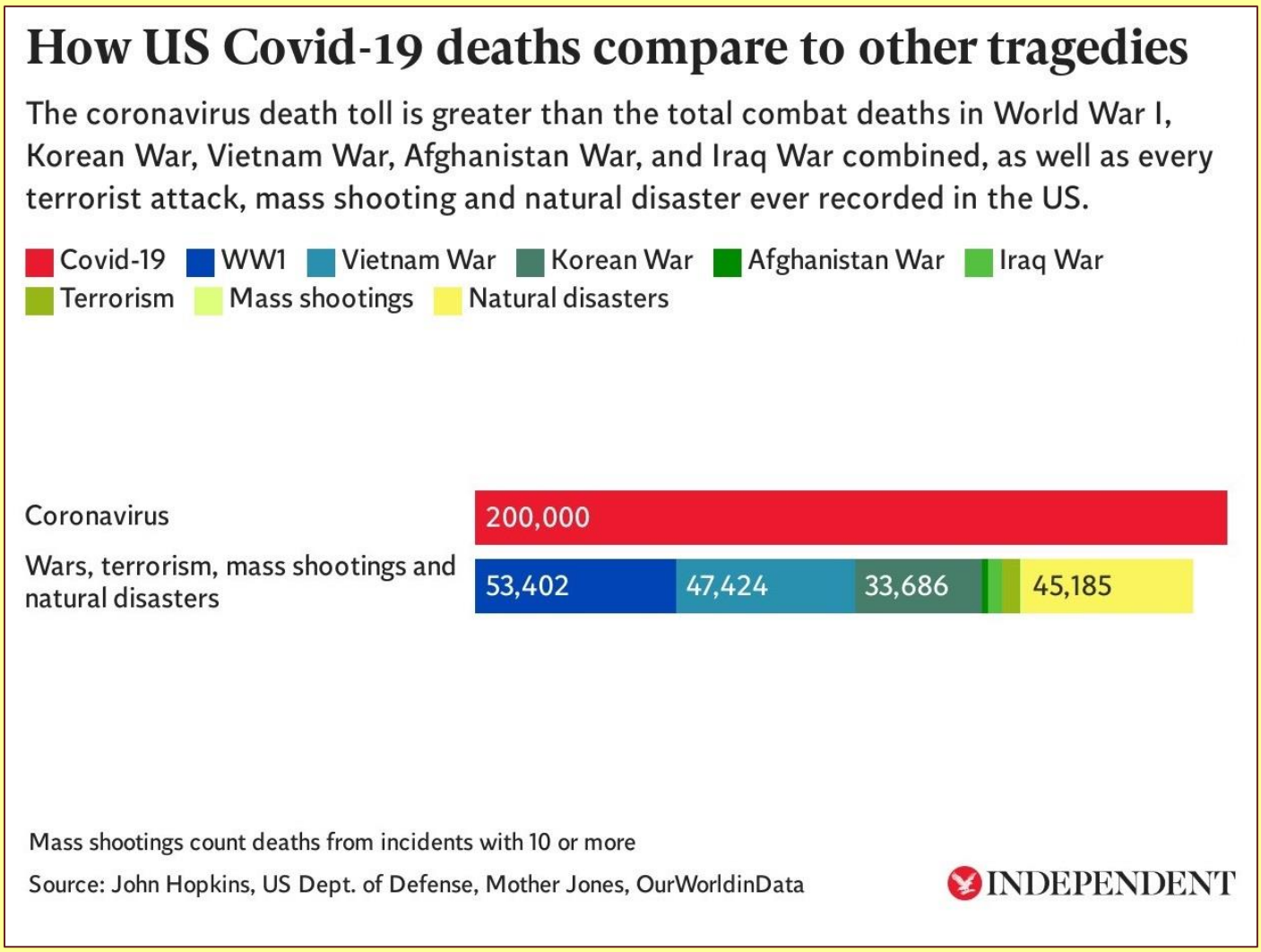
We found no strong evidence supporting alternative transmission scenarios. In-flight transmission that probably originated from 1 symptomatic passenger caused a large cluster of cases during a long flight. Guidelines for preventing SARS-CoV-2 infection among air passengers should consider individual passengers' risk for infection, the number of passengers traveling, and flight duration.

How air gets filtered on an airplane

Source (**video**): https://www.nbcnews.com/now/video/how-air-gets-filtered-on-an-airplane-87167557768

Many travelers are nervous about what they might be exposed to the next time they fly. NBC News' Blayne Alexander went into the belly of a Delta airplane to learn more about the air passengers breathe at 30,000 feet up.

▶▶ Read also: CDC reverses itself and says guidelines it posted on coronavirus airborne transmission were wrong



Does Wearing Glasses Protect You from Coronavirus? Here's What You Need to Know

By Simon Kolstoe

Source: https://www.sciencealert.com/does-wearing-glasses-protect-you-from-coronavirus-here-s-what-you-need-to-know

Sep 22 – Researchers in China have found that people who wear glasses appear to be at lower risk of catching COVID-19.

The authors of the study, published in *JAMA Ophthalmology*, noticed that since the coronavirus outbreak in Wuhan in December 2019, few patients with spectacles were admitted to hospital suffering from COVID-19.

To investigate further, they collected data on the wearing of glasses from all patients with COVID-19 as part of their medical history. Their small study found that only 16 (5.8 percent) of the 276 patients admitted with COVID-19 wore glasses for more than eight hours a day.

As they determined that all these patients were short-sighted, they next looked up the proportion of people with myopia (short-sightedness) in Hubei Province, where the hospital is located.

They found this to be much larger (31.5 percent), indicating that the proportion of short-sighted COVID-19 hospital admissions was over five times lower than might be expected from that population.

This is a fascinating observation, but as with all single studies the results must be treated with caution.

While eye protection has always been an important component of personal protective equipment (PPE), the magnitude of difference reported by this study raises suspicion.

This is not to say that the results may not be real, but rather that we shouldn't start advising large-scale behavioural changes (such as wearing goggles alongside our face masks) until they have been independently confirmed.

Are eyes a window for the virus?

One of the key steps for any viral infection is the initial entry into the body. While most of our body is covered with protective skin, which is very effective at preventing viruses or bacteria crossing into our body, far thinner "membranes" cover our airways, digestive system and eyes.

The role of these thinner membranes is to allow external things such as oxygen, food, and in the case of eyes, light, into our bodies. Unfortunately, viruses have learned to take advantage of these entry points.

This is the reason PPE is designed to protect these entry points, through the use of face masks, goggles and protective clothing.

However, whereas we might imagine that the main attack on these regions comes from viral particles transmitted through the air as aerosols, the main way that viral particles get to these weak points is actually via our hands. Hence the COVID-19 advice to wash our hands often, for 20 seconds or more, and avoid touching our faces.

It therefore makes sense that covering our eyes with glasses may offer extra protection, both from the virus that may be carried in other people's breath, but also in preventing wearers from touching their eyes.

Indeed, as far back as February there were reports of people catching COVID-19 by not suitably protecting their eyes in healthcare settings. It is also known that similar points of entry into the body (ACE-2 receptors) favoured by the coronavirus are also present in the eyes.

Should we start wearing goggles?

A critical part of interpreting any evidence coming from observational studies is remembering that correlation (two things happening together) does not necessarily mean causation (one thing causes the other). To test for causation, a controlled trial or test is now needed.

Ideally, this would follow two carefully matched groups of people – some wearing glasses and some not wearing glasses – to see which group gets infected more often. Evidence from such a controlled trial will always be far stronger than evidence from an observational study such as that in the recent paper.

We must also note that the authors of this study listed a number of weaknesses. It was a very small study at a single site.

The researchers' data for the general population came from a much earlier study on a sample that was not exactly matched (in terms of age, demography and other factors) to their sample admitted to hospital with COVID-19. And they couldn't guarantee that all the people with short-sightedness in the general population also wore glasses for more than eight hours a day.

So, although this new study is very interesting, there are plenty of reasons to be cautious about this result. We certainly need more data before any advice can be given about wearing goggles alongside our face masks.

Simon Kolstoe, *Senior Lecturer in Evidence Based Healthcare and University Ethics Advisor, University of Portsmouth.*

EDITOR'S COMMENT: Almost all goggle wearers – including myself – have a bad habbit: we exhale on glass surface and then use the piece of cloth provided to clean the glasses. It is time to change and start using certain products designed to clean the lenses of our glasses.

Comparing COVID-19 Immune Responses Uncovers Key Differences between Adults and Children

Source: https://www.genengnews.com/news/comparing-covid-19-immune-responses-uncovers-key-differences-between-adults-and-children/

Sep 22 – One of COVID-19's many unsolved puzzles is why a SARS-CoV-2 infection has a vastly different impact on children versus adults. Although many hypotheses have been raised, the different

responses of the immune systems seem to be a key component between the two. Now, a new study that compared the immune responses of adults and children with COVID-19 has detected key differences that may contribute to understanding why children usually have milder disease than adults. The findings suggest that the poor outcome in hospitalized adults with COVID-19 compared to children may not be attributable to a failure to generate adaptive immune responses.

The findings, which have important implications for vaccines and drugs being developed to curb COVID-19, are published in *Science Translational Medicine* in the article, "Immune responses to SARS-CoV-2 infection in hospitalized pediatric and adult patients."

The study, conducted by researchers at Albert Einstein College of Medicine, Children's Hospital at Montefiore (CHAM), and Yale University, involved 60 adult COVID-19 patients and 65 pediatric COVID-19 patients (less than 24 years old) hospitalized at CHAM and Montefiore Health System between March 13 and May 17. Twenty of the pediatric patients had multi-system inflammatory syndrome (MIS-C).

The children with COVID-19 fared significantly better than adults; the pediatric patients had a shorter length of stay, decreased requirement for mechanical ventilation, and lower mortality compared to adults. More specifically, 22 adults (37%) required mechanical ventilation compared with only five (8%) of the pediatric patients. In addition, 17 adults (28%) died in the hospital compared with two (3%) of the pediatric patients. No deaths occurred among pediatric patients with MIS-C.

The reasons for the differences in clinical manifestations suggest that age-dependent factors may modulate the anti-viral immune response. The patients' blood was tested for the presence of several types of immune cells, antibody responses, and cytokines, comparing humoral and cellular immune responses of the patients.

"Our findings suggest that children with COVID-19 do better than adults because their stronger innate immunity protects them against SARS-CoV-2, the novel coronavirus that causes the disease," said co-senior author Betsy Herold, MD, chief of infectious diseases and vice chair for research in the department of pediatrics at Einstein and CHAM. Kevan C. Herold, MD, the C.N.H. Long professor of immunology and of medicine at Yale School of Medicine, was the other co-senior author on the study.

Compared with adult patients, pediatric COVID-19 patients in the study possessed significantly higher levels of certain cytokines associated with the innate immune response. This suggests that young people's more robust innate response protects them from developing acute respiratory distress syndrome (ARDS)—the hallmark of severe and often fatal COVID-19 cases.

One cytokine in particular, IL-17A, was found at much higher levels in pediatric patients than in adults. "The high levels of IL-17A that we found in pediatric patients may be important in protecting them against progression of their COVID-19," said K. Herold.

The authors noted that the serum concentrations of IL-17A **and IFN-γ**, but not TNF-α or IL-6, were inversely related to age. They wrote that, "Adults mounted a more robust T-cell response to the viral spike protein compared to pediatric patients as evidenced by increased expression of CD25+ on CD4+ T cells and the frequency of IFN-γ+CD4+ T cells."

Both pediatric and adult COVID-19 patients were found to make antibodies against the spike protein of SARS-CoV-2, which the virus uses to latch onto and infect cells. Those spike-protein antibodies include neutralizing antibodies, which block the coronavirus from infecting cells. Counterintuitively, the researchers found that neutralizing antibody levels in adult COVID-19 patients who died or required mechanical ventilation were higher than in those who recovered—and significantly higher than levels detected in pediatric patients.

"These results suggest that the more severe COVID-19 disease seen in adults is not caused by a failure of their adaptive immunity to mount T-cell or antibody responses," said K. Herold. "Rather, adult patients respond to coronavirus infection with an over-vigorous adaptive immune response that may promote the inflammation associated with ARDS."

The findings have important implications for COVID-19 therapies and vaccines. "Our adult COVID-19 patients who fared poorly had high levels of neutralizing antibodies, suggesting that convalescent plasma—which is rich in neutralizing antibodies—may not help adults who have already developed signs of ARDS," said B. Herold. "By contrast, therapies that boost innate immune responses early in the course of the disease may be especially beneficial."

As for vaccines, B. Herold noted that most vaccine candidates for protecting against SARS-CoV-2 infection are aimed at boosting neutralizing-antibody levels. "We may want to consider assessing vaccines that promote immunity in other ways, such as by bolstering the innate immune response," she said.

Americans Increasingly Skeptical of COVID Vaccine: Poll

Source: http://www.homelandsecuritynewswire.com/dr20200922-americans-increasingly-skeptical-of-covid-vaccine-poll

Sep 22 – In a week that saw President Donald Trump publicly at odds with the head of the Centers for Disease Control and Prevention (CDC) over the timeline and distribution of a COVID-19 vaccine,

a new survey reveals that Americans are becoming increasingly wary about getting the vaccine once it becomes available.

In the latest poll from the Pew Research Center, which surveyed more than 10,000 U.S. adults from Sep 8 to Sep 13, about half (51 percent) say they would definitely or probably get a COVID-19 vaccine if it were available today. When Pew conducted the same poll in late April and early May, 72 percent said they would get a COVID-19 vaccine when it became available.

The decline was observed among all major political and demographic groups, Pew found, and could be attributable to concerns about the vaccine approval process. More than three quarters of respondents (77 percent) said they think it's very or somewhat likely that a vaccine will be approved before its safety and effectiveness are fully understood, and 78 percent said their greatest concern was that the approval process will move too quickly.

In addition, 76 percent said concern about side effects is a major reason they would not get the vaccine, while 72 percent cited uncertainty about the effectiveness. The poll's margin of error is plus or minus 1.6 percentage points.

Vaccine Approval, Distribution Under Scrutiny

Concerns about the vaccine approval process extend beyond the general public. In a letter sent yesterday to the leaders of the Food and Drug Administration (FDA), members of more than 90 organizations representing physicians, public health experts, scientists, and patients urged the agency to make the approval process fully transparent and adhere to regulatory standards.

"Sound safety and efficacy data that are reviewed by FDA and independent vaccine experts must support the authorization or licensure of a COVID-19 vaccine," the groups wrote to FDA Commissioner Stephen Hahn, MD, and Peter Marks, MD, PhD, director of the FDA's Center for Biologics Evaluation and Research. "Thorough and transparent FDA review of data supporting a vaccine's approval is the essential foundation upon which we can strengthen public confidence in a COVID-19 vaccine."

The letter also said that COVID-19 vaccines should be studied in the people most affected by the COVID-19 pandemic, "specifically racial and ethnic minorities, elderly individuals, and people with other medical conditions."

Questions about when a vaccine will be approved and distributed came to a head earlier this week, when CDC Director Robert Redfield, MD, told U.S. lawmakers that a vaccine wouldn't be widely available until the spring or summer of 2021. Hours later, President Trump said in a press conference that Redfield was mistaken, and that a vaccine could be distributed as soon as October or November.

In a press conference last Friday (18 September), Trump said the United States will manufacture 100 million COVID-19 vaccine doses by the end of the year, and that there will be enough to inoculate every American by April.

The companies with COVID-19 vaccine candidates in large phase 3 trials—Pfizer, Moderna, and AstraZeneca—have suggested they may have enough data to know whether their vaccines are safe and effective by October or November. But even if the FDA approved a vaccine or issued emergency use authorization before the end of the year, most experts agree that any COVID-19 vaccine won't be widely available until the middle of next year. Initial doses will be in short supply, and early distribution will be focused on healthcare personnel, first responders, and those at increased risk of infection and severe illness.

Meanwhile, state health officials and medical supply experts tell the *Wall Street Journal* that they're concerned about the many critical vaccine distribution issues that remain unresolved. The Trump administration released two vaccine distribution plans this week that rely heavily on the states, but state officials say it's unclear whether the states will receive all the vaccine supplies, how many doses each state will get, and how states should handle the cold-storage requirements of the Moderna and Pfizer vaccines.

Redfield told Congress last week that **the CDC urgently needs $6 billion for COVID-19 vaccine distribution efforts.**

COVID Triggers Premature Births in Infected Moms

Source: https://www.medscape.com/viewarticle/937773?src=wnl_edit_tpal&uac=82598DG&impID=2580650&faf=1

Sep 21 – A new CDC report says pregnant women who have coronavirus appear to have a higher risk of giving birth prematurely.

The CDC studied 598 pregnant women who were hospitalized with coronavirus between March and August, according to the information published this week in the CDC's Morbidity and Mortality Weekly Report.

Of 445 live births reported, 12.6% were premature, which the CDC defined as before 37 weeks. That rate is about **25% higher than the rate of premature births for the general population**, the CDC said.

Of the live births, 23.1% of symptomatic women and 8% of asymptomatic women had premature births. Two live-born newborns died in the hospital -- both born to symptomatic women who required mechanical ventilation. Two mothers died in the hospital, both of whom were symptomatic.

"Severe illness and adverse birth outcomes were observed among hospitalized pregnant women with COVID-19," the CDC said. "These findings highlight the importance of preventing and identifying COVID-19 in pregnant women."
The CDC recommended the testing of newborns born to mothers with COVID-19, isolating mothers with COVID-19 and their babies from other mothers in the hospital, and taking measures to prevent newborns from being infected.
"Continued surveillance for COVID-19 in pregnant women is important to understand and improve health outcomes for mothers and newborns," the CDC said.
The CDC report said about half of pregnant women were symptomatic when they were admitted to the hospital. Among that group, 16.2% had to be admitted to an ICU and 8.5% required "invasive mechanical ventilation." None of that happened to asymptomatic women.
Ten completed pregnancies resulted in "pregnancy losses" including miscarriages, stillbirths, and therapeutic abortions, the CDC said.
The study says it appears Hispanic and Black pregnant women have disproportionately higher rates of COVID-19-associated hospitalization.

Glycans Points to New Therapeutic and Vaccine Strategies

Source: https://www.genengnews.com/news/closer-look-at-sars-cov-2-protein-glycans-points-to-new-therapeutic-and-vaccine-strategies/

Sep 23 – Researchers at the University of California, San Diego (UCSD), the University of Texas at Austin, and Maynooth University in Dublin, Ireland, have uncovered an active role for glycans—sugar molecules that can coat proteins—in the process by which the SARS-CoV-2 spike protein attaches to its human receptor, angiotensin-converting enzyme 2 (ACE2), to gain entry to human cells. Reporting on their work in *ACS Central Science*, UCSD research leads, Lorenzo Casalino, PhD, and Zied Gaieb, PhD, and colleagues, say their findings could lead to the identification of new drug targets, and point to "opportunities and challenges for small molecules and vaccine design."
Their research is described in a paper titled, "Beyond Shielding: The Roles of Glycans in the SARS-Cov-2 Spike Protein."
Coronaviruses, including SARS-CoV-2, are lipid-enveloped, positive-sense RNA viruses, the authors explained. "Together with the host-derived membrane, a set of structural proteins provides an organizational scaffold that wraps and contains the viral RNA." Among these viral proteins, the most critical is the spike, or S protein, which is conserved to varying degrees across the Coronaviridae family of viruses and plays a key role in how the virus attaches to and fuses with the host cell.
Research focused on the development of vaccines and drugs against SARS-CoV-2 is largely centered on this spike protein, which binds to ACE2 expressed on human cells, as part of the process by which the virus gains entry into the cell. Before the SARS-CoV-2 spike protein can interact with ACE2, it changes shape to expose its receptor-binding domain (RBD), the part of the protein that interacts with ACE2.

In this illustration, glycans (dark blue) coat the SARS-CoV-2 spike protein (light blue), which is anchored in the viral envelope (colorful bilayer on bottom). [Adapted from ACS Central Science 2020, DOI: 10.1021/acscentsci.0c01056] The simulations also identified regions of the spike protein that weren't coated by glycans and thus could be vulnerable to antibodies, especially after the shape change. In laboratory experiments using biolayer interferometry, the team showed that mutating the spike protein so that it no longer had glycans at N165 and N234 reduced binding to ACE2.

Like many viral proteins, the SARS-CoV-2 spike protein has a thick coat of glycans on its surface. These glycans, which are attached at specific sites, help to shield the viral proteins from the host immune system. "Similar to many other viral fusion proteins, the SARS-CoV-2 spike utilizes a glycan shield to thwart the host immune response," the scientists noted. For their newly reported work, the researchers investigated whether certain glycans in the SARS-CoV-2 spike protein might also be active players in the process leading to infection.
To look at this in more detail, the researchers used structural and glycomic data to build molecular dynamics simulations of the SARS-CoV-2 spike protein embedded in the viral membrane. "… we built a full-length model of the glycosylated SARS-CoV-2 S protein, both in the open and closed states,

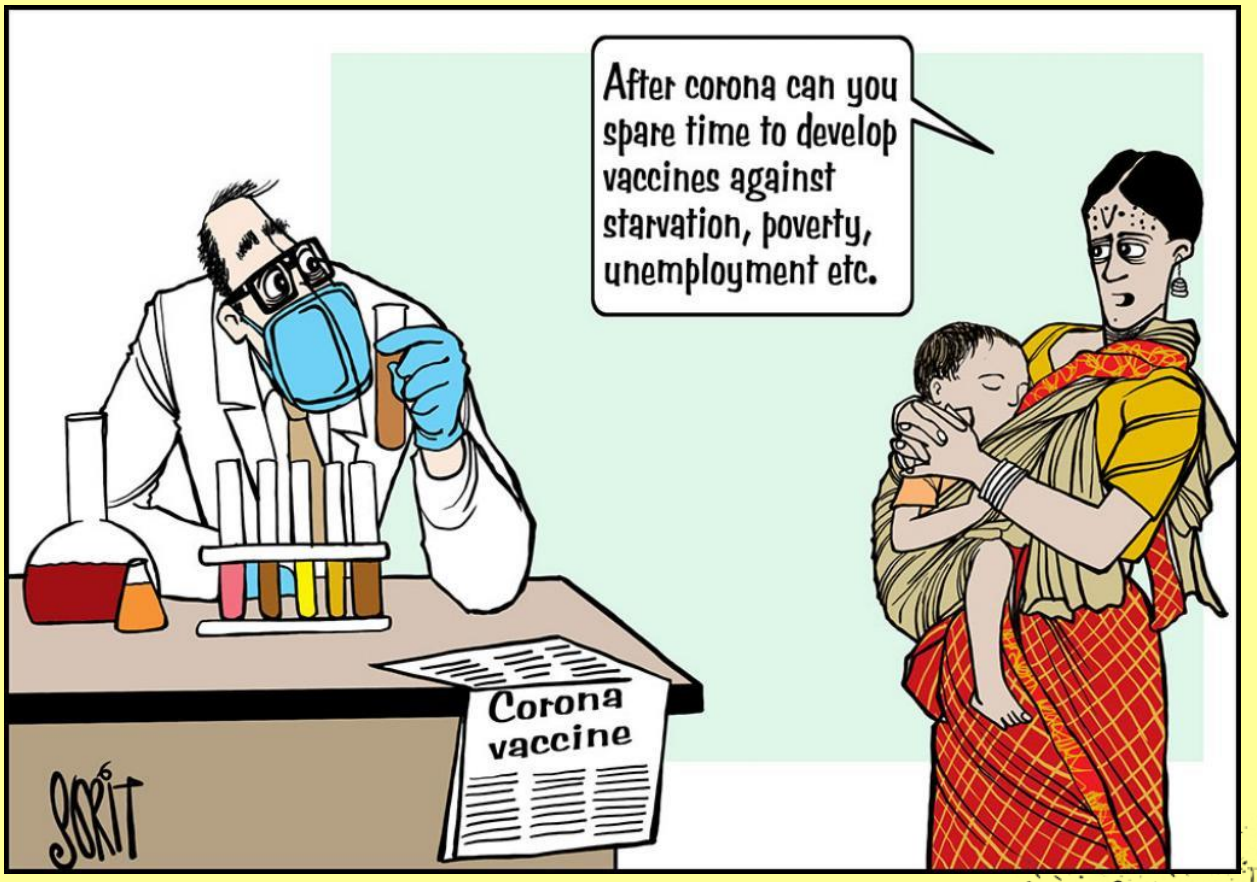
augmenting the available structural and biological data," they noted. The computer models, which presented a detailed snapshot of every atom in the spike glycoprotein, revealed that N-glycans linked to the spike protein at certain sites (N165 and N234) helped to stabilize the shape change that exposes the RBD, and so could help to promote infection.

"We reveal an essential structural role of N-glycans at sites N165 and N234 in modulating the conformational dynamics of the spike's receptor-binding domain (RBD), which is responsible for ACE2 recognition," the authors stated. "This finding is corroborated by biolayer interferometry experiments, which show that deletion of these glycans through N165A and N234A mutations significantly reduces binding to ACE2 as a result of the RBD conformational shift toward the 'down' state."

The scientists suggested that their findings could lay the foundation for new strategies to fight the SARS-CoV-2 pandemic. "Overall, this work provides an atomic-level perspective on the SARS-CoV-2 S protein, highlighting the importance of glycans not only as shielding devices for immune evasion but also as essential structural elements for virus infectivity," they concluded. "These insights lay the foundations for a possible strategy to modulate the RBD conformational plasticity and virus infectivity, which could be harnessed in the development of therapeutics aimed at fighting the pandemic threat."

"While [synthetic biology] has tremendous promise for curing currently incurable diseases, you don't have to have too much imagination to see how someone could misuse it."

Steve Fetter, Science and Security Board, in "Doomsday Clock ticks closer to disaster," *Physics World*



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