

HSZS

# 2 CBRNE



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*Dedicated to Global  
First Responders*

# DIARY

May 2021



**HZZ C<sup>2</sup>BRNE DIARY– 2021<sup>©</sup>**

May 2021

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# EDITOR'S CORNER





### Editorial

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

*Editor-in-Chief*  
H2S C<sup>2</sup>BRNE Diary



Dear Colleagues,

May was stigmatized by the ongoing pandemic, the removal of Americans from Afghanistan, and the conflict between Israel and Hamas in Gaza.

It seems that the virus is still winning and that vaccines are not the silver bullet able to kill the beast. Global vaccination is not progressing according to plans even in the most developed countries. In any case, the pathogenesis of the rapid production of all vaccines currently on the market is demonstrated, while the reservations and reluctance of the people to be vaccinated are justified. The classification of all the people who are concerned about the dangers, which the scientific research itself reveals every day, in the field of conspiracy theories and paranoia is certainly an immoral practice on the part of the governments, but also of the propaganda mechanisms that have undertaken their support. Pandemic and infodemic proceed hand by hand and we have to get used to that. The same applies regarding the politics involved in vaccination. EU still does not have access to the Sputnik V vaccine

because of some stupid excuses covered with a scientific cape. To the left, there is a recent Internet poll on what Greeks believe about available and non-available vaccines. The only lesson we learned for good is the fact that public health is not above profits and diplomacy and this is something we must fix as soon as possible.

Americans decided to withdraw from Afghanistan mainly because they finally realized that they can answer the question “what we are doing here?” The Taliban (and the Chinese) must be very happy with that mainly because they proved that in conflicts patience is the hidden weapon. And they are

expressing their joy with hundreds of IEDs and armed attacks. Poor Afghani people! Your history does not deserve this and your future will be dark and medieval once more... But who cares about an entire nation? The only thing is to bring our boys back home – a very good point for the next elections!

The Middle East conflict between Hamas and Israel proved that problems are not solved if there is no desire to solve them. As of the covid infodemic was not enough we have the



### ΕΡΕΥΝΑ

Αν υπήρχε δυνατότητα επιλογής για το εμβόλιο κατά του Covid-19, εσείς ποιο θα επιλέγατε; (If you could choose your vaccine, what would be your choice?)

N = 23,938



additional propaganda in favor of Hamas and against Israel who is killing innocent children and women. I am confident that shortly there will be smart ammunition of all kinds that they can identify the person they are going to hit before penetrating the body or explode. In that way, there will be no collateral damages and only the real enemy will be eliminated. In the meantime, it is wise not to launch missiles and rockets from the top of apartment buildings or schools, or markets because the enemy might like to strike back and innocent people might be killed. And please, do not target the nuclear power plant of Dimona – keep in mind that your neighbor has nuclear weapons and that can very easily turn Gaza into a radioactive ghost area. Yes, this is inhuman but this is why certain countries have nuclear weapons and other countries are looking to have one or two of them. To use them if there is no alternative or if the threat against their people is difficult to handle despite military superiority. On top of this conflict guess who is trying to benefit from the overall adverse situation? The usual aggressor Turkish president. If I am not wrong, the only case that Turkey is not involved in is the drug cartels' war in Latin America. Syria, Libya, Armenia, Iraq, Lebanon, Kurdistan, Gaza, Kashmir, Greece – you name it, they are there. Sometimes, I am just wondering how peaceful our part of the world would be if there was no Turkey, no Hamas, no Hizbollah, and no Kim Jong-un (surprised?). Not that the rest of us are angels but I think that we do have the brain capacity to solve our problems without threats, bullying, or armed disputes.

**Member national assembly Maulana Chitrali says jihad against Israel is the only option for Pakistan. "We made atom bomb to showcase it in the museum? We don't need missiles, atomic bombs or a huge army if they can't be used to liberate Palestine and Kashmir."**  
[pic.twitter.com/TDOVbi2zZY](https://pic.twitter.com/TDOVbi2zZY)  
 – Naila Inayat (@nailainayat) May 18, 2021

Other issues of interest? The Colonial pipelines (USA) hacking was very impressive and a strong warning of what we might experience again in the future. The debate between the Japanese government and the healthcare sector regarding the Olympic Games in Tokyo – another fine example indicating that money talks despite the warning of the medical community about something called "public health". And last but not least, the resurgence of illegal immigration in Spain (Ceuta), Italy (Lampedusa Island), and Greece Evros and Aegean islands). The countermeasure issued by Spanish board authorities was quite innovative: "you swam here; you will swim back home" (Morocco). It will come a day that the Mediterranean European countries will stop been so polite and humanitarian and nobody would like that. Countries of origin should stop exporting immigrants and seriously manage the problem to avoid consequences.

First Responders be prepared. The unexpected always happens!

*The Editor-in-Chief*



## Humanity Now Lives in The Anthropocene. But What Does That Actually Mean?

Source: <https://www.sciencealert.com/there-is-more-than-one-anthropocene-scientists-argue-here-s-why-that-s-important>

Apr 24 – In the last two decades, the [Anthropocene](#) has become an informal buzzword to describe the numerous and unprecedented ways humans have come to modify the planet.

The **Anthropocene** is an unofficial label for the dawn of a new human epoch. While the idea remains contentious among scientists, colloquially, it refers to a block of time in which our species has permanently altered Earth's geology. Today, we are currently living in the Holocene epoch, which has persisted since the last Ice Age. Yet in the face of a modern climate crisis, a mass extinction and widespread pollution, some geologists think we have entered a whole new time, and it deserves a whole new name.

As the concept has become more widely adopted, however, definitions have begun to blur. Today, the very meaning of the Anthropocene and its timeline differs considerably depending on who is doing the talking.

To geologists and Earth system scientists, the Industrial Revolution is often considered the dawn of the Anthropocene – when human influence on Earth's systems became *predominant* worldwide.

Many anthropologists, historians, and archaeologists, however, consider the 18th century as more of a sunrise, when the era of humans truly began to heat up in some regions. Before that, there were already glimmers of human domination.

Since the Late Pleistocene, right through to the Holocene (our current epoch), humans have been producing "distinct, detectable and unprecedented transformations of Earth's environments," [states](#) a new paper on the subject.

And while these changes might not be enough to be technically defined as a new geological epoch, we need terms to describe this earlier influence, too. Because right now, people from various disciplines are using the term with subtly different meanings.

"Dissecting the many interpretations of the Anthropocene suggests that a range of quite distinct, but variably overlapping, concepts are in play," [says](#) geologist Colin Waters from the University of Leicester in the UK.

Thousands of years before the boom of industrialization, globalization, nuclear bombs, and modern [climate change](#), humans were already in the first stages of becoming a dominant planetary force.

The rise of crop domestication and hunting, the [spread of livestock](#) and mining, and the move to urbanization, for instance, have all caused great changes to Earth's soil signature and its fossil record, setting us on a course to the modern day.

As far back as 3400 BCE, for instance, people in China were already smelting copper, and 3,000 years ago, most of the planet was already transformed by hunter-gatherers and farmers.

While these smaller and slower regional changes did not destabilize Earth's entire system as more modern actions have, some researchers [think](#) we are underestimating the climate effects of these earlier land-use changes.

As such, some have considered using the terms "pre-Anthropocene" or "proto-Anthropocene" to describe significant human impacts before the mid-twentieth century.

Others argue a capitalized "Anthropocene" should represent the tightly defined geological concept of an epoch, while the uncapitalized version should be used for broader interpretations.

Even after the Industrial Revolution, when human influence is clear to see, some argue we need to define further advances of the Anthropocene.

The "Great Acceleration" of the mid-twentieth century, for instance, has been proposed as a "second stage" to the Anthropocene, when human enterprise and influence began growing exponentially.

This second stage not only encompasses rapid geological changes, but it also refers to socioeconomic factors and modern biophysical processes that humans have also begun to alter with our actions.

"This shows an exemplar of ways in which ideas and terms move between disciplines, as is true for the Anthropocene," researchers [write](#).

It's unclear what the next stage of the Anthropocene will look like, but many of the changes we have made are currently irreversible and may continue long after our species is gone.

Still, the authors argue, one thing is clear. The exceptionally rapid transformations humans have made to our planet since the Great Acceleration ["vastly outweigh"](#) earlier climactic events of the Holocene.



"Given both the rate and scale of change marking the onset of the chronostratigraphic Anthropocene, it would be difficult to justify a rank lower than series/epoch," the authors [conclude](#).

▶▶ The study was published in [Earth's Future](#).



## Every Time the US “Saves” a Country, It Converts It Either into a Madhouse or a Cemetery

By Prof. Vijay Prashad

Source: <https://www.globalresearch.ca/every-time-us-saves-country-converts-either-madhouse-cemetery/5743629>

Apr 26 – After twenty years, the United States government – and the forces of the North Atlantic Treaty Organisation (NATO) – will depart from Afghanistan. They said that they came to do two things: to destroy al-Qaeda, which had launched an attack on the United States on 11 September 2001, and to destroy the Taliban, which had given al-Qaeda a base. After the great loss of life and the further destruction of Afghan society, the US departs – as it did from Vietnam in 1975 – in defeat: al-Qaeda [covertly supported by the US] has regrouped in different parts of the world, and the Taliban is set to return to the capital, Kabul.

The speaker of Afghanistan’s parliament, Mir Rahman Rahmani, [warns](#) that the country is poised to enter a new period of civil war, a repeat of the terrible civil war that ran from 1992 to 2001. The United Nations [calculates](#) that in the first quarter of 2021, civilian casualties rose by 29% compared to last year, while the number of women casualties increased by 37%. It is unclear if there will be further talks between the Taliban, the Afghan government of President Ashraf Ghani, the Turks, the Qataris, the United States, and the United Nations. Afghanistan sits on the brink of further violence, whose impact can so aptly be described by the words of the poet **Zarlasht Hafeez**:

*The sorrow and grief, these black evenings,  
Eyes full of tears and times full of sadness,  
These burnt hearts, the killing of youths,  
These unfulfilled expectations and unmet hopes of brides*



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

*Vijay Prashad is an Indian historian, journalist, commentator, and a Marxist intellectual. He is an executive-director of Tricontinental: Institute for Social Research and the Chief Editor of LeftWord Books. He was the George and Martha Kellner Chair in South Asian History and a professor of International Studies at Trinity College in Hartford, Connecticut, United States from 1996 to 2017. In 2013–2014, he was the Edward Said Chair at the American University of Beirut and has been a Senior Fellow of the Issam Fares Institute for Public Policy and International Affairs in Beirut. Prashad is the author of thirty books.*

## Increasing Immigration Vital to the U.S. Continued Global Economic Leadership

Source: <http://www.homelandsecuritynewswire.com/dr20210427-increasing-immigration-vital-to-the-u-s-continued-global-economic-leadership-study>

Apr 27 – A new report just released from George Mason University in collaboration with [FWD.us](#), [Increasing Future Immigration Grows the U.S.’ Competitive Advantage](#), presents new data showing that increasing immigration is vital to the U.S.’ continued global economic leadership, and how the U.S. must raise immigration levels—and create a humane, orderly



system for family- and employment-based immigration—in order to remain the world’s largest economy, maintain a strong, competitive workforce, and outperform global competitors.

FWD.us, a think-tank supporting increased immigration levels, says that the new report underscores how Congress must act with urgency to expand immigration avenues to help ensure the U.S.’ global competitiveness. “The size, age, and skills of the U.S. population, which are all greatly enhanced and improved through immigration, will help determine our ability to stay competitive with other countries, support critical programs like Social Security, and grow an economy that creates jobs,” FWD.us says. “Without boosting immigration significantly now, the U.S. will sacrifice our position as the world’s largest economy by 2030, and leave the reserves of vital programs like Social Security depleted by 2034.”

“The data is clear: by increasing immigration and ensuring that our system of laws provides for humane, fair, and orderly processes for family- and employment-based immigration, the United States can maintain our global economic leadership, invest in a strong, innovative future workforce, and do right by millions of American families,” said Todd Schulte, President of FWD.us. “We encourage Congress and the Biden Administration to pursue policies that expand avenues to immigration for our continued prosperity, and to create new jobs across the country.”

“At a time when population dynamics promise rapid aging and a drop in economic productivity, welcoming more newcomers would make the United States workforce younger and more prosperous,” said Professor Justin Gest, a political scientist at George Mason University and the lead author of the study. “This study peers into a set of alternative American futures, and finds that much of our economic and population growth depends on whether Congress acts to recruit new citizens.”

Without increased immigration, the coming decades will see [an increasingly older U.S. population](#), with the ratio of seniors to working-age adults increasing - and with our economy suffering as older Americans leave the workforce. This means that aging Americans will draw on safety net programs like Social Security more quickly than working-age people will be able to support them. It also means more of America’s resources will be devoted to supporting the aging population than to growing the economy through new investments and innovation.

As an example, if immigration levels were doubled, the senior-to-working-age ratio in 2050 would be 31 seniors (65 and older) for every 100 working age people (ages 16 to 64). Comparatively, projections indicate that if immigration levels are kept the same as they are today, 37 seniors would live in the U.S. in 2050 for every 100 working-age people. “The U.S. can reverse these demographic trends and increase economic growth if elected officials in Congress strategically increase immigration, as well as continuing to [reject calls from immigration restrictionists](#) to cut legal immigration levels,” FWD.us says.

Projections show that U.S. gross domestic product (GDP) could double and grow as large as \$47 trillion in today’s dollars in 2050 if immigration levels were doubled to more than 2 million new permanent and temporary immigrants each year.

Per capita, this increase would lead to a 3 percent increase in average income by 2050 for all Americans compared with keeping immigration at recent levels, and a 7 percent increase compared with a zero immigration scenario.

“Delaying major immigration reform hurts the U.S. economy and millions of families. The U.S.’ economic and demographic future is directly linked to future immigration to our country. The status quo on immigration is unacceptable for our future prosperity.”



**EDITOR’S COMMENT:** Is unemployment in the US so close to zero that the markets require new imported blood? Many economists find it [promising](#) that the U.S. unemployment rate fell from a high of 14.7 percent in [April 2020](#) to 8.4 percent in [August 2020](#). Some policymakers have used this as evidence that little further fiscal relief is [warranted](#). Significantly, however, unemployment rates have not fallen for everyone: The Black unemployment rate reached a high of 16.6 percent in May 2020, and as of August 2020, it was still at 13.2 percent. Conversely, the white unemployment rate fell to 6.9 percent in August 2020 from a high of 12.8 percent in April, or nearly half of the Black unemployment rate. The ratio of Black-to-white unemployment went from





1.27 in April 2020 to 1.97 in August 2020—that is, the Black unemployment rate is currently double the white unemployment rate. In the United States, the unemployment rate fell marginally in February 2021 (to 6.2%, from 6.3% in January), along with a decline in the number of people on temporary lay-off. Based on the above, it seems that the new study was only in support of the new administration's policy for open borders.

## Biden officially recognizes the massacre of Armenians in World War I as a genocide

Source: <https://edition.cnn.com/2021/04/24/politics/armenian-genocide-biden-erdogan-turkey/index.html>

Apr 24 – [President Joe Biden](#) on Saturday became the first US president to officially recognize the [massacre of Armenians](#) under the Ottoman Empire as a genocide, risking a potential fracture with Turkey but signaling a commitment to global human rights. In a statement marking the 106th anniversary of the massacre's start, Biden wrote, "Each year on this day, we remember the lives of all those who died in the Ottoman-era Armenian genocide and recommit ourselves to preventing such an atrocity from ever again occurring."

"Today, as we mourn what was lost, let us also turn our eyes to the future -- toward the world that we wish to build for our children. A world unstained by the daily evils of bigotry and intolerance, where human rights are respected, and where all people are able to pursue their lives in dignity and security," Biden said. "Let us renew our shared resolve to prevent future atrocities from occurring anywhere in the world. And let us pursue healing and reconciliation for all the people of the world."

The move fulfills Biden's campaign pledge to finally use the word genocide to describe the systematic killing and deportation of Armenians in what is now Turkey more than a century ago. Biden's predecessors in the White House had stopped short of using the word, wary of damaging ties with a key regional ally.

Earlier this week, US officials had [been sending signals](#) to allies outside the administration -- who have been pushing for an official declaration -- that the President would recognize the genocide. Addressing the potential move in an interview with a Turkish broadcaster this week, Turkish Foreign Minister Mevlut Cavusoglu said, "If the United States wants to worsen ties, the decision is theirs."

Cavusoglu on Saturday said Ankara completely rejects Biden's use of the term. "We are not going to take lessons about our history from anyone. Political opportunism is the biggest betrayal of peace and justice. We completely reject this statement that is only based on populism," he said in [a tweet](#).

Turkish [President Recep Tayyip Erdoğan](#) on Saturday offered condolences to "Ottoman Armenians, who lost their lives under the difficult circumstances of World War I." That message to Patriarch of Turkish Armenians Sahak Mashalian echoed Erdoğan's previous statements on April 24 and came before Biden's declaration.

Turkish Presidency communications director Fahrettin Altun later Saturday said that "the Biden administration's decision to misportray history out with an eye on domestic political calculations is a true misfortune for Turkey-U.S. relations."

Turkey later summoned [David M. Satterfield](#), the US ambassador to the country, following the announcement, according to Turkish state media Anadolu.

"Turkey's strong reaction was conveyed to David Satterfield, who was accepted by Deputy Foreign Minister Sedat Onal, according to diplomatic sources," Anadolu reported. "Satterfield was told that Turkey finds the statement unacceptable, totally rejects and strongly condemns it."

The government of Turkey often registers complaints when foreign governments describe the event, which began in 1915, using the word "genocide." They maintain that it was wartime and there were losses on both sides, and they put the number of dead Armenians at 300,000.

Presidents Barack Obama and Donald Trump both avoided using the word genocide to avoid angering Ankara.

But Biden has determined that relations with Turkey and Erdoğan -- which have [deteriorated over the past several years](#) anyway -- should not prevent the use of a term that would validate the plight of Armenians more than a century ago and signal a commitment to human rights today.

Armenian Prime Minister Nikol Pashinyan welcomed Biden's statement as such, tweeting that "the US has once again demonstrated its unwavering commitment to protecting human rights and universal values."

The declaration will not bring with it any new legal consequences for Turkey, only diplomatic fallout.



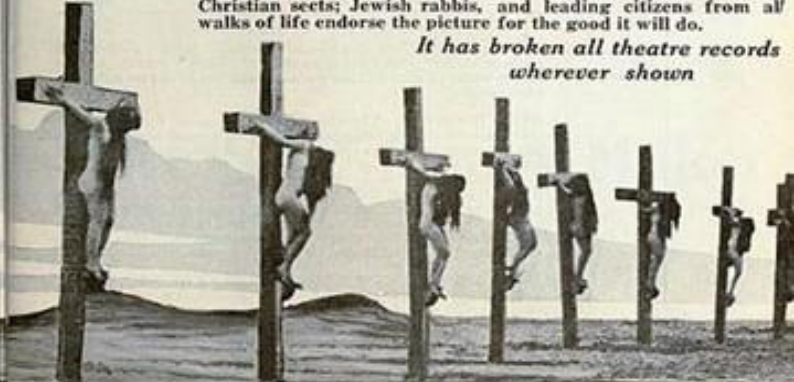


This scene is an enlargement from the film and is presented here to show exhibitors the extraordinary character of the production.

These martyred Armenian women are paying for their Christianity with their lives. Their crucifixion is but the climax of previous sufferings declared by Aurora Mardiganian to be worse than death itself.

The National Board of Censors; Charles W. Elliot, President Emeritus of Harvard University; distinguished churchmen of all Christian sects; Jewish rabbis, and leading citizens from all walks of life endorse the picture for the good it will do.

*It has broken all theatre records wherever shown*



There never has been and probably  
**"AUCTION**  
 That great 7 Reel

never will be another Motion Picture like  
**of SOULS**  
 \$10<sup>00</sup> Per Seat Picture  
 A "First National" Attraction



**American film Auction of Souls (1919) aka Ravished Armenia  
 – the crucifixion of nude Armenian girls**



**THE ARMENIAN GENOCIDE: 1915-1923**

**● ● ●**  
 Massacre sites: The marker size represents the number of deaths.

**→ → →**  
 Death March Routes: Turkish troops forced Armenians into the desert, without food or water, to die of starvation and heat exhaustion.

**● ● ● ●**  
 Concentration Camps

**● ● ● ● ● ● ● ●**  
 Deportation Checkpoints

**— — —**  
 Present day regional country borders

**— — —**  
 Historic Armenia borders

**— — —**  
 Current Armenia borders

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As vice president, Biden dealt frequently with Erdoğan and made four trips to Turkey, including in the aftermath of a failed coup attempt. But since then he's offered a less-than-rosy view of the Turkish leader.

"I've spent a lot of time with him. He is an autocrat," he told the New York Times editorial board in 2020. "He's the President of Turkey and a lot more. What I think we should be doing is taking a very different approach to him now, making it clear that we support opposition leadership."

Biden spoke by telephone with Erdoğan on Friday, his first conversation with the Turkish leader since taking office. The long period without communication had been interpreted as a sign Biden is placing less importance on the US relationship with Turkey going forward.

The two men agreed to meet in person on the sidelines of a mid-June NATO summit in Brussels. The White House said Biden conveyed "his interest in a constructive bilateral relationship with expanded areas of cooperation and effective management of disagreements," but the readout did not mention the Armenian genocide issue.

The campaign of atrocities Biden is acknowledging began the nights of April 23 and 24, 1915, when authorities in Constantinople, the Ottoman capital, rounded up about 250 Armenian intellectuals and community leaders. Many of them ended up deported or assassinated. April 24, known as Red Sunday, is commemorated as Genocide Remembrance Day by Armenians around the world.

The number of Armenians killed has been a major point of contention. Estimates range from 300,000 to 2 million deaths between 1914 and 1923, with not all of the victims in the Ottoman Empire. But most estimates -- including one of 800,000 between 1915 and 1918, made by Ottoman authorities themselves -- fall between 600,000 and 1.5 million.

Whether due to killings or forced deportation, the number of Armenians living in Turkey fell from 2 million in 1914 to under 400,000 by 1922.

While the death toll is in dispute, photographs from the era [document some mass killings](#). Some show Ottoman soldiers posing with severed heads, others with them standing amid skulls in the dirt. The victims are reported to have died in mass burnings and by drowning, torture, gas, poison, disease and starvation. Children were reported to have been loaded into boats, taken out to sea and thrown overboard. Rape, too, was frequently reported.

As a candidate, Biden said that if he were elected, "I pledge to support a resolution recognizing the Armenian Genocide and will make universal human rights a top priority for my administration."

Similar pledges have gone unfulfilled before. When Obama was running for president, he declared in a lengthy statement that he shared "with Armenian Americans -- so many of whom are descended from genocide survivor -- a principled commitment to commemorating and ending genocide."

But like presidents before him, the realities of diplomacy intervened once he took office. In all eight years of his presidency, Obama [avoided using "genocide"](#) when commemorating the April event. With Turkey then positioned as a key partner in the fight against ISIS terrorists, the issue appeared even less palatable.

Some officials who served in Obama's administration, including his deputy national security adviser Ben Rhodes and then-US Ambassador to the United Nations Samantha Power, later voiced regret at not having taken the step. Power is Biden's nominee to lead the US Agency for International Development.

In 2019, the House and Senate [passed a resolution](#) recognizing the mass killings of Armenians from 1915 to 1923 as genocide. Prior to its passage, the Trump administration had [asked Republican senators](#) to block the unanimous consent request several times on the grounds that it could undercut negotiations with Turkey.



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Trump attempted to cultivate a friendship with Erdoğan, even as relations between Washington and Ankara soured over Turkey's purchase of a Russian-made air defense system and [alleged human rights abuses](#) by Turkish-backed forces in Syria.

A group of more than 100 Republican and Democratic lawmakers wrote a letter to Biden this month calling on him to formally recognize the Armenian genocide. The group was led by Rep. Adam Schiff, a California Democrat. A large Armenian American community resides in and around Schiff's district in Los Angeles.

House Speaker Nancy Pelosi said in a statement Saturday that "our hearts are full of joy that President Biden has taken the historic step of joining Congress with formal recognition on Armenian Genocide Day."

"To commemorate this solemn day of remembrance, let us pledge to always stand strong against hatred and violence wherever we see it and recommit to building a future of hope, peace and freedom for all the world's children."

## China kindergarten: Two children die in stabbing at Beiliu City

Source: <https://www.bbc.com/news/world-asia-china-56923427>

Apr 29 – Two children have died and 16 other people have been wounded after a man entered a kindergarten with a knife in southern China, state media report. Two of the wounded are in a serious condition after the mass stabbing in Beiliu City, in Guangxi Zhuang autonomous region. Police have arrested a suspect and an investigation into the attack is under way, Xinhua news agency reports.

China has faced a spate of knife attacks on schools over the years.

Those found to have carried out the attacks have usually been people living with mental illness, or seeking revenge against officials or individuals known to them. The motive for Wednesday's attack is not clear, but the suspect is reported to have entered the kindergarten in the Xinfeng area of Beiliu at around 14:00 local time. Sixteen children and two teachers were injured. Xinhua reported that two children subsequently died of their injuries. Two of the injured were undergoing surgery and a further 14 were receiving medical treatment. Kindergartens in China generally take children from the ages of three to six.

Previous deadly attacks on school children in China include an incident in September 2019 in which eight children were killed in Hubei province, and the death of [nine middle school students in northern China when a man attacked them as they were on their way home](#) in April 2018. The 28-year-old reportedly claimed he had been bullied at the school as a child.



**EDITOR'S COMMENT:** The worst kind of pure evil terrorism! EVER!

## The Threat of Border-Crossing Migrants on Terror Watch List Is Real

By Todd Bensman

Source: <https://www.meforum.org/62211/cbp-removes-migrant-press-release>

Apr 27 – Amid a gathering mass-migration crisis on the southern border came a U.S. Customs and Border Protection (CBP) [announcement](#) April 5 that two Yemeni nationals who



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illegally crossed from Mexico into California were already on the FBI's terrorism watch list before their arrivals. The agency removed the statement within 24 hours with no explanation, but too late:



[Images from the deleted U.S. Customs and Border Protection press release](#)

One of the Yemenis, it said, also was on the FBI's rarified No Fly list, normally reserved for individuals that U.S. intelligence deems highly dangerous, and had secreted a cell phone sim card in his shoe insole. The press release gave few further details, as an FBI Joint Terrorism Task Force investigation continues. But the nation's Chief Border Patrol Agent seemed to understand the import.

"Part of the Border Patrol's mission states we will protect the country from terrorists," Chief Patrol Agent Gregory K. Bovino said in a prepared statement

for the press release. "Today, like every other day, our agents did that."

CPB said the release "was not properly reviewed and contained certain disclosure and policy information related to national security that required CBP to remove it from our website."

Absent much more context and better information, this short-lived official confirmation seems likely only to confuse an American public that has heard media fact-checkers and Democratic lawmakers for years assert that terrorist border crossings [do not really happen](#). Indeed, the revoked press release landed even before the dust had settled from the latest such public argument over whether terrorist infiltration is a real threat; media organizations like the *Washington Post* [carried stories](#) last month ridiculing House Minority Leader Kevin McCarthy for relaying information about three Yemeni terror suspects and one Serb recently caught after illegal crossings into New Mexico. ...

So what can be truthfully said of this contentious threat issue? ...

### U.S. Agencies Regard It as Real

[Abdulahi Hasan Sharif, a migrant who crossed the U.S. southern border, carried out an ISIS-inspired terror attack.](#)

Islamic extremists and those associated with terrorist organizations cross the U.S. southern border in [consequential](#), though low numbers. Terror suspects like the Yemenis travel in an endless stream of some 3,000-4,000 migrants a year from Muslim-majority nations who get categorized in government nomenclature as ["special interest aliens."](#) They are able to journey such great distances into Latin American landing and staging nations with the help of specialized global smuggling networks. Their total numbers may be comparatively small, but attacks by just a few portend vastly outsized national consequences. ...

U.S. homeland security professionals see the threat from special interest alien traffic as so consistently pressing, that they deployed counterterrorism programs at that southern border and throughout Latin America after 9/11. They have repeatedly detected terror suspects and, via deportation, neutralized any potential plots for years.

The programs are divided between a "near war," in which intelligence officers interview and investigate those caught at the border, and a "far war," in which U.S. agencies partner with vetted local intelligence units throughout the Americas to hunt and destroy smuggling networks and capture jihadists en route. Most of those who are caught end up deported in what I term "better-safe-than-sorry" moves that few Americans ever hear about.

Democratic leaders have maintained the secret programs, one of the most [recent proponents of them being Jeh Johnson](#), the DHS Secretary appointed by President Barack Obama. ...

### Facts vs. Political Spin

Democrats and liberals interested in less or no border enforcement have invested tremendous energy over the years in disputing factual information about this threat. But the facts keep proving irrefutable.



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During a televised hearing on March 17, newly-confirmed Department of Homeland Security Secretary Alejandro Mayorkas confirmed the existence of a covert border war against jihadist border infiltration. ...

Mayorkas acknowledged that jihadist suspects were frequently caught by an "architecture, a multi-layered security apparatus" built to catch them.

"A known or suspected terrorist — KST is the acronym that we use — individuals who match that profile have tried to cross the border, the land border, have tried to travel by air into the United States, not only this year but last year, the year prior and so on and so forth," [Mayorkas testified](#). "And it is because of our multi-layered security apparatus, the architecture that we have built, since the commencement of the Department of Homeland Security, that we are in fact able to identify and apprehend them and ensure they do not remain in the United States. And so we actually deny them entry based on our intelligence and based on our vetting procedures, which have only grown in sophistication throughout the years."

The deleted CBP press release and Mayorkas's comments stand as inconvenient truths in contrast with relentlessly posted "[fact-check](#)" stories.

To date, the covert border war has done a remarkable job, even with developing cracks and problems in its "architecture." The concern now is that a mass-migration crisis has developed that in the past has collapsed all normal systems. In extreme circumstances when high human volumes overwhelm security processes, all bets are off that the covert border war can function the way it must to catch more Yemenis on the terror watch list.

*Todd Bensman is a fellow at the Middle East Forum and a senior national security fellow for the Center for Immigration Studies. He previously led counterterrorism-related intelligence efforts for the Texas Intelligence and Counterterrorism Division.*

## The Pilot of The First Moon Landing (Apollo 11), Michael Collins, Has Passed Away Age 90



**"Hey, Houston, I've got the world in my window!"**

## 'Insider Attacks' on Afghan Forces Increased by 82%, US Agency Reports

Source: <https://www.globalsecurity.org/military/library/news/2021/04/mil-210430-voa03.htm>

Apr 30 – A new quarterly U.S. report has documented a staggering 82% increase in "insider attacks" on Afghan government security forces in the first quarter of 2021, resulting in 115 personnel killed and 39 wounded.

The Special Inspector General for Afghanistan Reconstruction (SIGAR) reported Thursday to the U.S. Congress that overall Afghan National Defense and Security Forces (ANDSF) casualties also were substantially higher than during the same period last year.

SIGAR is not allowed to include full ANDSF casualty data because U.S. forces in Afghanistan keep it classified at the request of the Afghan government.



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The report noted that ANDSF suffered a total of 31 insider attacks from Jan. 1 through April 1, and the number of casualties they caused was more than double compared to the same period in 2020.

Taliban insurgents posing as Afghan police or military personnel are behind most of these insider attacks.

SIGAR submitted its quarterly report as 2,500 or so U.S. troops are preparing to begin pulling out of Afghanistan beginning Saturday. The military drawdown is to end by Sept. 11 and intends to conclude America's longest war.

Nearly 17,000 U.S. Defense Department contractor personnel supporting the agency's Afghan operations also will move out of the country along with the American troops. This includes 6,147 U.S. citizens, 6,399 third-country nationals, and 4,286 Afghan nationals, according to SIGAR.

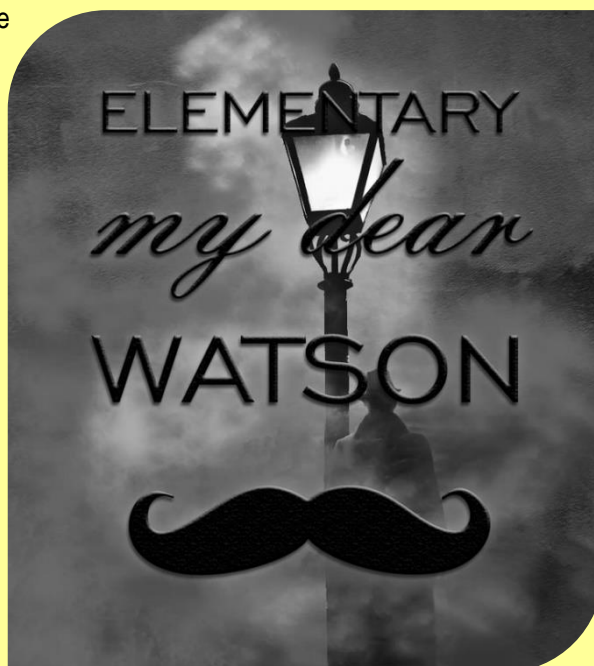
The agency noted it is unclear who, if anyone, will replace contractor personnel or perform their work after their withdrawal.

"Without continued contractor support, none of the Afghan Air Force's (AFF) airframes can be sustained as combat effective for more than a few months, depending on the stock of equipment parts in-country, the maintenance capability on each airframe, and when contractor support is withdrawn," SIGAR said, citing U.S. military assessments.

The quarterly report explained that DOD contractors provide for and maintain ANDSF ground vehicles and train local technicians. Although the ANDSF has "dramatically improved its share of the work, it is still falling well below benchmarks for its share of the maintenance work orders they are supposed to perform."

The withdrawal of American and NATO forces stems from a year-old agreement Washington negotiated with the Taliban, raising expectations at the time it also would encourage the insurgents and the Afghan government to agree on a power-sharing political deal to end the war.

But talks between the Afghan adversaries, which started last September, have failed to produce the desired outcome; rather, they have remained largely deadlocked, raising fears the conflict could intensify and cause more bloodshed once all foreign troops depart. American military commanders have in recent statements admitted Afghan security forces "will certainly collapse" in the face of increased Taliban assaults if the U.S. is to stop all assistance.



**The Afghan war, which started with the October 2001 U.S.-led international military invasion of the country, is said to have killed an estimated 241,000 people to date. This includes at least 71,344 civilians; 2,442 American service members; 78,314 Afghan military and police; and 84,191 insurgents, said a private U.S. study released earlier this month.**

### The guards caring for Chernobyl's abandoned dogs

Source: <https://www.bbc.com/future/article/20210422-the-guards-caring-for-chernobyls-abandoned-dogs>

Apr 23 – It wasn't long after he arrived in the irradiated landscape of the Chernobyl Exclusion Zone that Bogdan realised his new job came with some unexpected companions. From his first days as a checkpoint guard in Chernobyl, he has shared the place with a pack of dogs.

Bogdan (not his real name) is now in his second year of working in the zone and has got to know the dogs well. Some have names, some don't. Some stay nearby, others remain detached – they come and go as they please. Bogdan and the other guards feed them, offer them shelter, and occasionally give them medical care. They bury them when they die.

All the dogs are, in a sense, refugees of the 1986 disaster in which Reactor No. 4 at the Chernobyl Nuclear Power Plant exploded. In the aftermath, tens of thousands of people were evacuated from the Ukrainian city of Pripyat. They were told to leave their pets behind. (*Read more about [the long-term toll of the Chernobyl disaster](#).*)

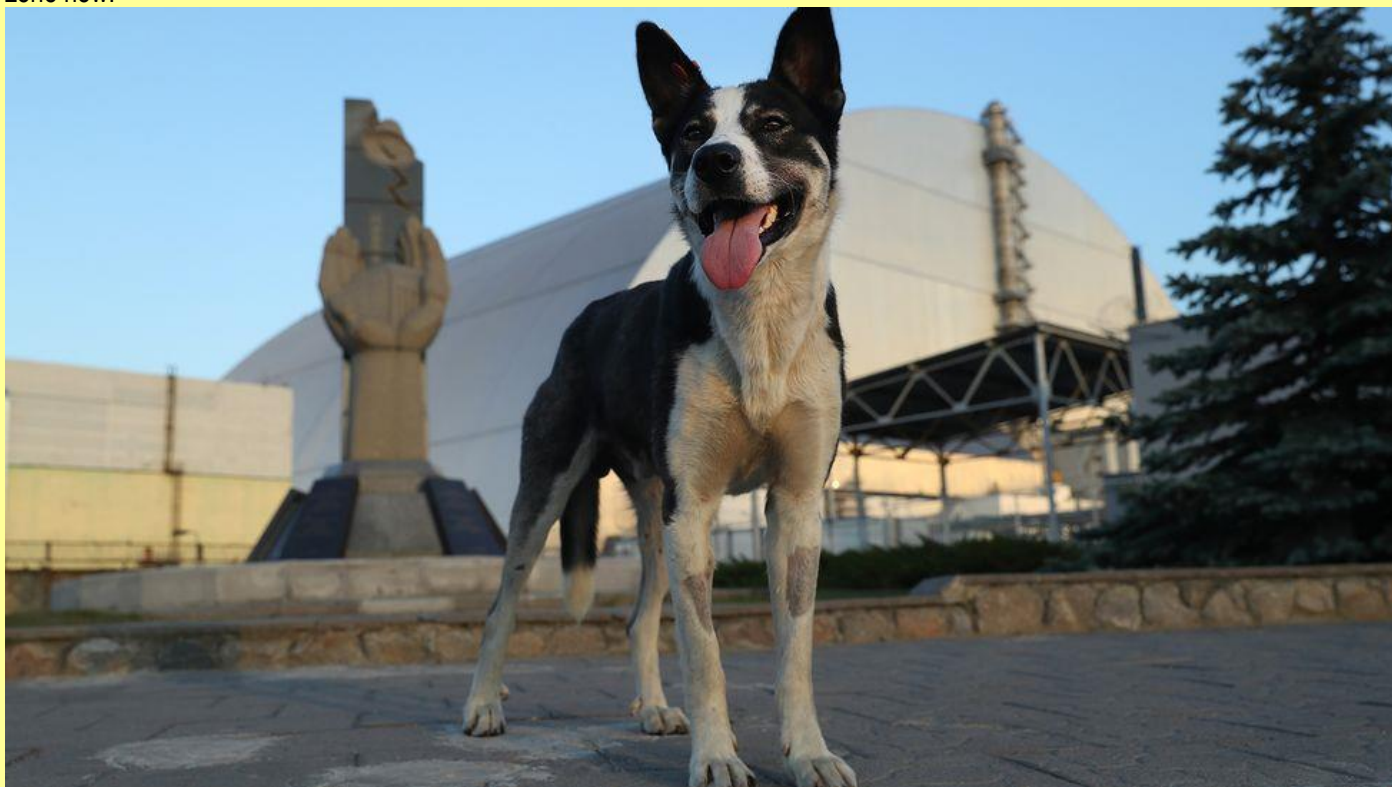
[Soviet soldiers shot many of the abandoned animals](#) in an effort to prevent the spread of contamination. But, undoubtedly, some of the animals hid and survived. Thirty-five years later, hundreds of stray dogs now roam the 2,600km (1,000 sq mile) Exclusion Zone put in place to restrict human traffic in and out of the area. Nobody knows which of the dogs are



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directly descended from stranded pets, and which may have wandered into the zone from elsewhere. But they are all dogs of the zone now.



Their lives are perilous. They are at risk from radioactive contamination, wolf attacks, wildfires and starvation, among other threats. The dogs' average lifespan is [just five years](#), according to the Clean Futures Fund, a non-governmental organisation that monitors and provides care for dogs living within the Exclusion Zone.

That dogs inhabit this ruined place is well known – some of them have even become minor celebrities on social media. Clean Futures Fund co-founder Lucas Hixson, who gave up a research career to look after the animals, offers [virtual tours of the Exclusion Zone featuring the dogs](#).

But less is known about the local workers who interact with these canines on a daily basis.

Jonathon Turnbull, a PhD candidate in geography at the University of Cambridge, realised it might be worth collecting these people's stories.

"If I wanted to know the dogs," he says, "I needed to go to the people who know them best – and that was the guards."

What he discovered is a heart-warming story of the guards' relationship with the animals they encounter in this abandoned environment – a tale that provides insights into the deep bond between humans and dogs.

For instance, the guards have given several of the dogs nicknames. According to Turnbull, there's Alpha, whose name refers to a type of radiation, and Tarzan, [a dog well-known to Chernobyl tourists](#), who can do tricks on command and who lives near the famous [Duga radar installation](#) built by the Soviets. Then there is Sausage – a short, fat dog that likes to warm herself in the winter by lying on heating pipes. These pipes serve one of the buildings used by workers in the Exclusion Zone who are part of ongoing efforts to decommission and decontaminate [the ruined power plant](#).

Access to the Chernobyl Exclusion Zone [requires a permit](#), so guards are tasked with controlling checkpoints on roads in and out of the area. People who dodge these checkpoints to trespass in the Exclusion Zone are [known as "stalkers"](#). Guards report them to the police.

When Turnbull, who lives in Ukraine's capital Kyiv, started making regular visits to the zone, he met Bogdan, and other checkpoint guards. They were reluctant to talk at first so he had to win them over. Then he offered them to chance to take part in his research, which he says was a "turning point". His idea was to give the guards disposable cameras and ask them to take pictures of the dogs – not posed portraits but scenes of everyday life. The guards only had one other request - "please, please – bring food for the dogs". So Turnbull did.





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The guards used disposable cameras to capture the dogs' daily behaviour in Pripyat amusement park near Chernobyl (Credit: Chernobyl Guards/Jonathon Turnbull)

The photos taken by the guards revealed how much they had developed companionships with the wandering dogs of the Exclusion Zone.

Turnbull published some of the resulting images and material from interviews with the guards [in a paper](#) in December. More recently, he interviewed one of the study participants again on behalf of BBC Future. The guard in question has asked not to be identified to avoid disciplinary action at work, so we refer to him here by the pseudonym "Bogdan".



The guards in the Exclusion Zone feed and care for the stray dogs – and some say they help to alert them to trespassers (Credit: Sean Gallup/Getty Images)

When Bogdan walks around the abandoned streets of the zone to check for stalkers, the dogs happily accompany him, he says. They always appear eager to see whether he, or a passing tourist, might be carrying food. Should a companion dog get distracted or run off to chase an animal, it always eventually returns to Bogdan, he adds.

The loyalty goes both ways. Turnbull says the guards sometimes go to the trouble of helping the dogs by pulling out ticks embedded in their skin, or by giving them rabies injections.

Monitoring who comes and goes from the Exclusion Zone sometimes makes for a dull occupation. But there are always dogs nearby. At some checkpoints, the guards have more or less adopted some of the animals. They feed them and give them shelter. But not all are so tame. During his research, one guard told Turnbull, "We can't inject Arka because she bites."

Another participant spoke of one dog that was even more difficult to approach. It refuses to be touched at all. "You should just give her a pan [of food] and go. She waits until you leave and then she eats," the guard explained.

The dogs sometimes bark at strangers on first sight, that's their nature, says Bogdan. But so long as they don't feel threatened, they sometimes calm down and wag their tails. Occasionally it even seems as though they're smiling, he adds.

Generally, visitors to Chernobyl are [advised not to touch the dogs](#), for fear that the animals may be carrying radioactive dust. It's impossible to know where the dogs roam and some parts of the Exclusion Zone are [more contaminated than others](#).

There is wildlife living in the Chernobyl Exclusion Zone besides dogs. In 2016, Sarah Webster, a US government wildlife biologist who was working at the University of Georgia at the time, and colleagues [published a paper](#) in which they revealed how mammals, from



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wolves to boars and red foxes, had colonised the Exclusion Zone. Camera trap data showed that the animals' numbers were not noticeably lower in those areas where radioactive contamination is higher.

Animals living in the Exclusion Zone are not necessarily confined there. A [later study](#) by Webster and colleagues, published in 2018, detailed the movements of a wolf tagged with a GPS device. It travelled 369km (229 miles) from its home range in the zone, taking a long arc to the south-east, then north-east again, eventually entering Russia.

**Wolves, dogs and other animals could in theory carry radioactive contamination, or genetic mutations potentially passed on by breeding, to places outside the Exclusion Zone.**

"We know it's happening but we don't understand the extent or the magnitude," says Webster.

Turnbull says the guards do not generally worry about radiation, though they might occasionally use dosimeters to check a dog over. It actually seems as though the dogs, through the companionship they offer, end up reassuring those who interact with them regularly, says Greger Larson, an archaeologist who studies animal domestication at the University of Oxford and who was not involved in Turnbull's research.



"They're kind of putting themselves in the shoes of the dogs," he suggests, referring to the guards. "If the dog is fine, that means you're fine."

But in truth, this may only be a false sense of security.

"It's an uncanny environment," notes Turnbull. "You can't see the danger. You're constantly aware that it might be there but everything looks normal."

Despite the fact that the dogs could pose a risk in terms of radioactivity, guards like Bogdan instead emphasise the benefits of having them around. For example, he claims to know dogs that bark in noticeably different ways depending on what they have spotted in the distance – a human stranger, a vehicle, a wild animal. Because of these helpful warning signals, Bogdan thinks of the dogs as "assistants".

What's happening in the Exclusion Zone is an echo of interactions with dogs that are known to have occurred within human civilisations for thousands of years, says Larson.





"We find this for the last 15,000 years or more, this is what people do, they make very close associations with not just dogs but a lot of domestic animals [...] to sort of say, 'this is our attachment to the landscape'," he explains.

All over the world, there are dogs that inhabit a similar, in-between state – not quite fully domesticated, not quite fully wild. These are the feral dogs that roam cities and industrial areas looking for food, the ones that may become to some extent adopted by people but still wouldn't be considered pets.

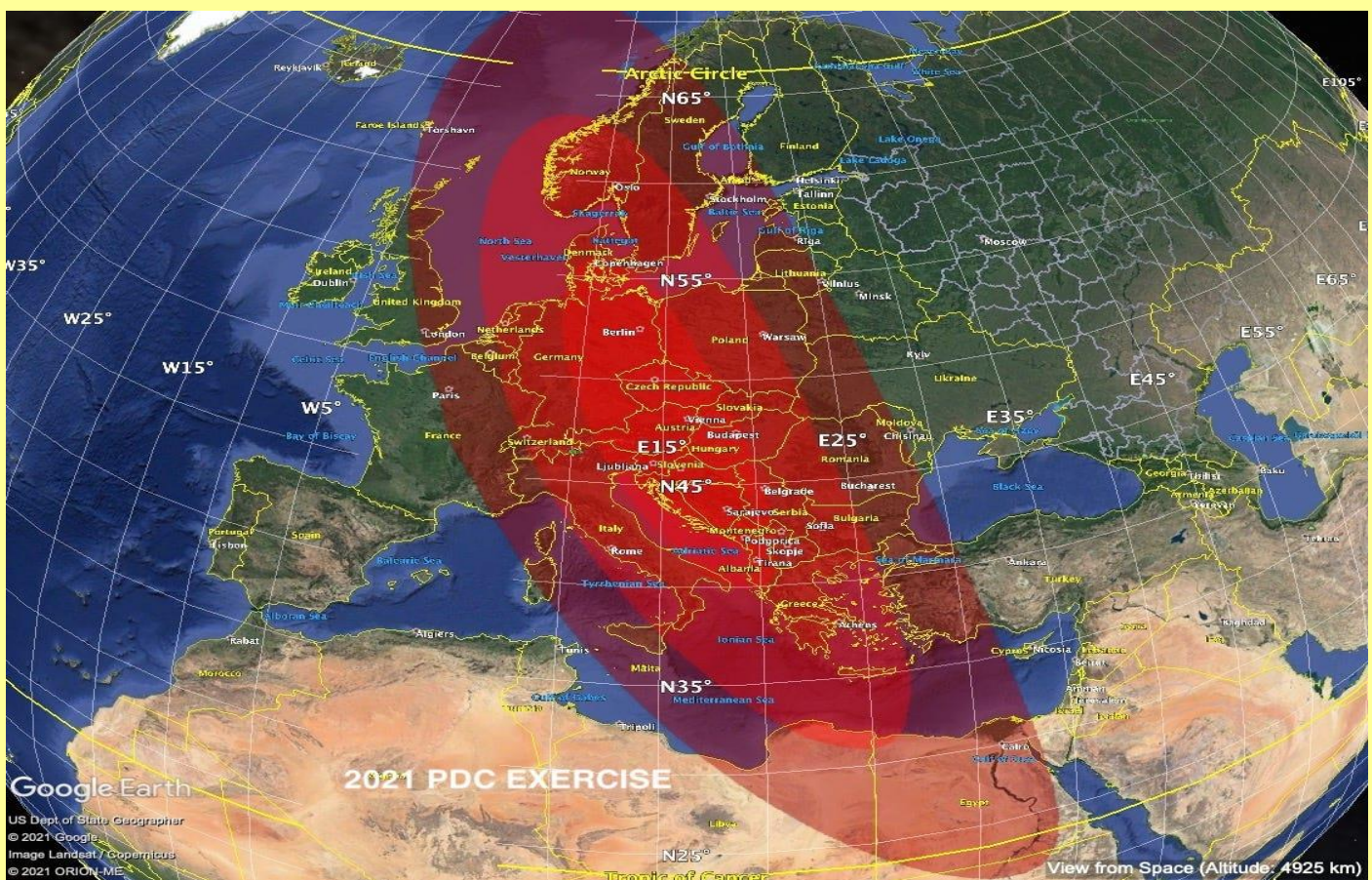
Chernobyl's dogs also live in this sort of space, on the edge of domestication, but there is a difference argues Webster, who has participated in a separate study of Turnbull's in the past.

"The Exclusion Zone is very different in that it's abandoned by humans," she says. "The only people in that landscape on a day-to-day basis, really, are the guards." As such, the dogs' opportunities for befriending humans are very limited.

While the outside world remains fascinated by the dogs, and their story, for many guards the connection runs much deeper. Bogdan says he is often asked why the dogs ought to be allowed to stay in the Exclusion Zone. "They give us joy," he replies. "For me personally, this is a kind of symbol of the continuation of life in this radioactive, post-apocalyptic world."

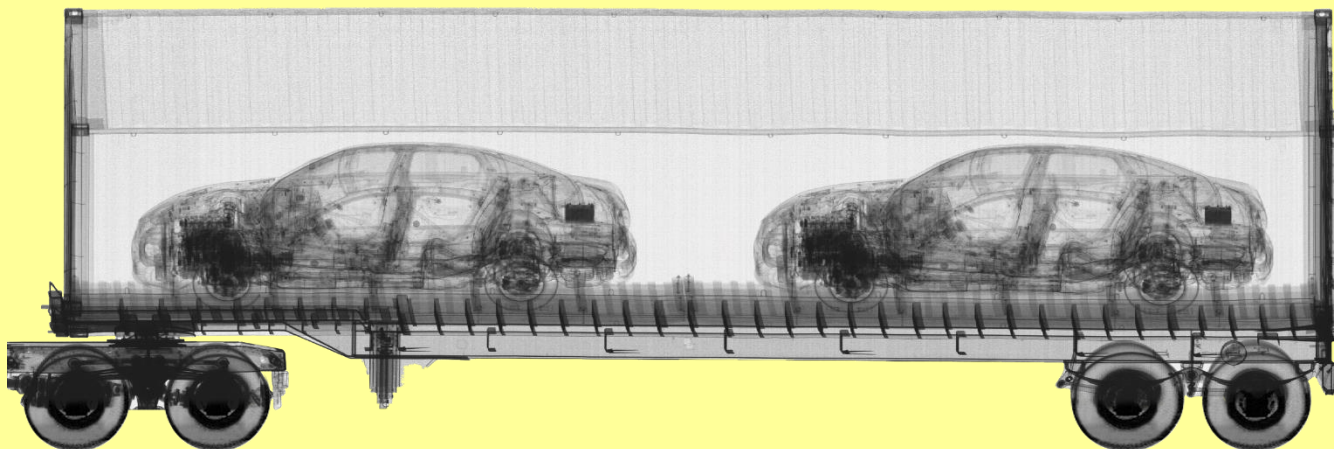
## Hypothetical Asteroid Devastates Europe in Domsday NASA Simulation

Source: <https://www.sciencealert.com/nasa-s-emergency-simulation-reveals-why-we-may-not-be-able-to-stop-an-asteroid-impact>



## See through!

Source: <https://www.astrophysicsinc.com/hxp-freightscan-integrations/>



Astrophysics' HXP-FreightScan™ is a fully-automated x-ray scanner designed to see every element inside trucks and shipping containers, while also protecting drivers and security personnel. Capable of penetrating through thick steel, our advanced software creates high-resolution images allowing operators to easily identify hidden threats and verify manifests. Built with superior reliability, fully-integrated networks, and ruggedized climate protection, this high-energy portal can meet and exceed any agencies' security expectations world-wide.

## Gel under development could improve battlefield wound treatment, military researchers say

Source: <https://www.stripes.com/news/army/gel-under-development-could-improve-battlefield-wound-treatment-military-researchers-say-1.672307>

May 05 – Medics can apply coagulants like QuikClot to wounds to stem blood loss long enough for a service member to get to a field hospital. But arterial wounds can be hard to treat in the field, said Robert Mantz, a chemistry branch chief with the Army Research Laboratory.

Troops dying from blood loss to parts of the body where bandages or tourniquets can't be applied has been a persistent problem during battles of the past two decades. The researchers say that StatBond, a clear, silicon-based gel, may help.



"The thing that excites me about this is that we have data that shows this works on an arterial bleed, and to my knowledge, none of the other products out there can handle that," Mantz said on the phone Tuesday.

Blood pulsing out from arterial wounds can wash away coagulants before they can stem the bleeding, unless someone stays to apply pressure, which medics under fire may not always be able to do. Wounded fighters handed over for transport also may not have someone available to apply pressure.

The Defense Health Agency has funded the research into **StatBond**, which is applied using something like a caulking gun.

The hemostatic gel flows into the

wound and seals it, allowing leaking blood vessels to clot, an Army statement said. The gel could be placed into areas such as the groin, trunk, armpit, neck, internal organs and eyes. The research was conducted by the University of Mississippi Medical Center, Vanderbilt University and the Nashville, Tenn.-based Ichor Sciences.



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Similar products such as WoundStat have been pulled from use by the Army due to issues with safety.

Animal testing hasn't found any negative reactions to StatBond, Mantz said, adding that the gel does not chemically react, generate heat or harden. It can be left in the body and flush out over time naturally.

The gel is going through registration with the U.S. Food and Drug Administration and human testing may begin soon, Mantz said. The product may be available to physicians by next year and to soldiers by 2025 if testing goes well, said Joe Lichtenhan, vice president of technology for Hybrid Plastics, a Mississippi-based nanotechnology company involved in the research.

### An honest question



The first ever all gay US Navy helicopter crew: Why they have to make a bedroom statement?

### Post-withdrawal Afghanistan

Source: <https://www.thenews.com.pk/print/832621-post-withdrawal-afghanistan>

May 09 – On April 14, US President Joe Biden extended the utopian deadline of May 1st, 2021 for the American withdrawal from Afghanistan that was negotiated between the Trump administration and the Taliban.

The three months of White House analysis has allowed Biden to formally announce the ending of the “forever war”. The new date for withdrawal of foreign troops is now September 11, 2021 – marking 20 years of the 9/11 attack that significantly changed the world. The US landed on Afghan soil after the Afghan Taliban rejected the American demand of handing over Osama bin Laden. The war started with widespread international support, but it too became a long and bloody slog. Afghanistan is called the graveyard of empires for a reason. But is this graveyard of empires destined to be a graveyard for human freedom in a post-American withdrawal Afghanistan?

While there has been a lot of scepticism of what is about to happen next, it is pretty clear that the West-backed Afghan government has not been able to strengthen itself in the last two decades to rule the country. And now Afghanistan will probably be back into the hands of the Taliban. As a first step, the Taliban would be demanding the release of roughly 7,000



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Taliban prisoners that are held by the government in Kabul. The US is leaving Afghanistan with a weak and fragile Kabul government which stands on charges of corruption and internal rifts. In the first two weeks of America's announcement of pulling its troops back, violence increased. More than 100 hundred security personnel have been killed amid the clashes in Afghanistan in the past few weeks.

As the US withdraws, its Secretary of State Antony Blinken says while talking to CNN that America is not disengaging from Afghanistan, and that they are deeply engaged in diplomacy in support of the Afghan government and its people. American engagement while being far off the land would not be fruitful for the Afghan government. Even in the years of its rule, the American backed Kabul government could hardly rule half of the country. Most of the provinces were ungoverned and left onto the Taliban to exercise their powers. Ungoverned spaces are an asset for the flourishing of extremism.

As the US withdraws, the Taliban will be all set to achieve the dreams of establishing their self-hypothesized version of an Islamic regime. "Our guns and bombers are ready to strike on [the] remaining forces in Afghanistan and the puppet regime", said a Taliban leader and ex-governor in Eastern Afghanistan while talking to the Financial Times. Human rights are destined to be crushed in a post-withdrawal Afghanistan: free speech curbed, women ousted from the public sphere, harsh punishments enacted and little to no religious freedom.

The Afghan war has not been a success for the United States. Around 2,500 American troops lost their lives, and the financial cost goes beyond two trillion dollars. Afghan society remained caught between the brutal influence of Taliban and power brokerage by the US. Generations have paid the price of the cold-war politics that did not end with the cold war and rather backfired on the Afghans themselves. After the collapse of the Soviet Union, the Frankenstein's monster created by the American CIA with the help of Pakistan to fight against the Red Bear was not easy to deal with. The Taliban became strong, and Afghan society disintegrated. The price of such strategic miscalculations has to be borne by the common people.

**When the Americans entered on to Afghan soil in 2001, they made two strategic mistakes.** **First**, they tried social engineering in Afghanistan which is rarely successful in any part of the world. It is even impossible when a group of people have been armed with ideology as well as guns to be used for a vested interest. The Taliban were an asset to the US back in the cold war. Trying to convert Afghanistan into a modern Western-style democracy after empowering those who disregard any prospects of democracy was an act of negligence by the US.

**Second**, the Americans diverted their attention by landing into another war in Iraq simultaneously, and that too on false charges of weapons of mass destruction (WMDs). Putting one foot in Iraq and another in Afghanistan at the same time was a perfect recipe for failure. The use of military force for social engineering in foreign soils is a blunt tool that is unable to achieve its aim; rather it makes the matters worse. Resultantly, America weakened its soft power while dealing with Afghanistan.

Liberal internationalism is impossible to sustain. Democracy has unfortunately been on a retreat worldwide and even imperiled in the United States itself. America must realize that its era of grand strategy is coming to an end. The unipolar moment is arguably seeing its last days. With the rise of a peer competitor, China, it was evident that Washington had to wind up the aimless war in Afghanistan and concentrate on the rise of the dragon. Has the US done the right way? Probably not.

**China might take the advantage of US withdrawal and look forward to making investments in Afghanistan.** The major issue till now for China to invest in Afghanistan was that of instability in addition to excessive American involvement. Now that American engagement in Afghanistan will be significantly reduced, it is to be seen how China utilizes the Afghan situation for its advantage. China already is investing in Pakistan under the China-Pakistan Economic Corridor (CPEC) and aims to make extensive investments of \$400 billion in Iran. The whole region can come under Chinese sphere of influence as China connects with the oil-rich Central Asian Republics (CARs).

**It is too early to predict the future of Afghanistan and its relations with neighbors. But it is equally difficult to say if Afghanistan can find peace in near future after a significant reduction of American involvement.**

## Second Open Letter by French Soldiers Warns of Civil Insurrection

Source: <http://www.homelandsecuritynewswire.com/dr20210510-second-open-letter-by-french-soldiers-warns-of-civil-insurrection>

May 10 – Disquiet is growing within France's military ranks, with the publication of a second open letter — this time by serving soldiers — warning growing Islamism, delinquency and violence threaten the country's very survival.



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This latest open letter by members of France's armed forces is making headlines — and stirring debate. Like one last month signed by some twenty retired generals, it too warns of civilian insurrection — fueled, it claims, by President Emmanuel Macron's alleged concessions to fundamentalist Islam.

But this newest missive, published late Sunday by right-wing magazine [Valeurs Actuelles](#), is from an anonymous group of soldiers currently serving in the army. **They describe serving in countries like Afghanistan and Central African Republic—and losing friends in the fight against fundamentalist Islam which they claim Macron is caving into at home.**

The group endorses the earlier letter by the generals—and criticizes the president for allegedly disrespected those officers. But it says the military will maintain order in France, should civil war break out.

Macron's government blasted the generals' letter as defying Republican principles and the army's duty. It says its signatories will be punished.

Critics also include far-left leader Jean-Luc Melenchon. In remarks to French media, he called for an investigation claiming the generals' letter amounted to a call for a coup.

But a recent poll suggests the majority of French support that letter. An online petition backing this latest letter by serving officers quickly got nearly 1,000 signatories within hours. News reports suggest up to 2,000 French soldiers also back the generals' call.

So does the main opposition far-right National Rally party.

Leading National Rally politician, Thierry Mariani, told French radio Monday the military are loyal to the country. The letters' authors, he said, were simply voicing today's reality.

The letters come amid heightened concern about radical Islam here, following a spate of terrorist attacks. Government legislation, aimed to boost the anti-terrorism response and crack down on extremist groups, has drawn criticism from the left for going too far—and the right for not going far enough.



### Endless provocations



Constantinople, Turkey: Hagia Sophia Orthodox church (now transformed into mosque) –  
*“There in no other God than Allah!”*



## Pandemic Boosting Terror

By Lt. Gen Prakash Katoch

Source: <https://www.thenorthlines.com/pandemic-boosting-terror/>

May 10 – The second pandemic wave is ravaging India and is yet to reach its peak – when no one knows. But K Vijaya Raghavan, Principal Scientific Advisor to the Government, recently proclaimed that the third wave is “inevitable”. Wonder if Chinese President Xi Jinping’s plans have been intercepted or Raghavan found an eight-month old script that was to warn of the second wave that he forgot to announce.

However, it is more than certain that the second wave will continue to spread very fast which is not only because of vaccine and oxygen shortages but unchecked public behaviour defying Covid norms with the administration’s concurrence by design or default eyeing vote-banks. If Haridwar was in news earlier, witness the recent religious festivities in Ahmedabad and thronging of markets in Hyderabad, all covered by electronic media, not to talk of packed Goa resorts throwing caution to the winds in the greed for money. While India combats the pandemic, which may go well into the next year or more, our adversaries, possibly assisted by indigenous accomplices, would find it the best time to mount terror attacks. After Prime Minister Imran Khan and his master Army Chief Qamar Javed Bajwa smoked the peace pipe briefly, Pakistan is back to its old antics. On May 3, 2021, Pakistan Rangers opened unprovoked firing in Ramgarh Sector of Samba District of Jammu and Kashmir. This ceasefire violation was after India and Pakistan agreed on February 25 this year to uphold the 2003 Ceasefire Agreement. Since Pakistan resorts to unprovoked firing to assist infiltration or divert attention from rabid rats tunneling into India, it is back to square one.

Have we noticed that India is already being subjected to indirect terrorism concurrent to the pandemic? Fake Remdesvir vaccine has been caught at different locations in India, while many times more may be in circulation or under manufacture. In one case a consignment of 2,73,70,000 fake Remdesvir vaccine vials has been seized in Gujarat. Eight persons have been arrested and the factory reportedly busted. In another case, the Delhi Police has arrested two persons for selling fake Remdesvir vaccine. In the latter case, the source of these fake vials has not been reported but it would be prudent to acknowledge that these may not be the only sources where fake vaccines are being manufactured.

We must also accept that this is far worse and potent indirect terrorism than pumping in fake currency. Whether external forces are behind this already is not known but it certainly is a racket they would want to exploit. Also, while the pandemic is claiming mounting casualties and infections in Nepal, many opinions are veering towards the possibility of Chinese nationals bringing Covid mutants into India via Nepal. The government needs to look into this issue. Fake vaccines and mutants actually fit into China’s strategy of ‘Unrestricted Warfare’. Xi Jinping’s sympathetic phone call to Prime Minister Narendra Modi could well be to divert attention from all this. Was Hitler sympathetic to anyone other than Mussolini?

A disturbing development is the seizure of 7.10 kg of Natural Uranium worth Rs 21.30 crore and arrest of two accused individuals (identified as Jigar Jayesh Pandya and Abu Tahir Afzal Hussain Choudhary) in Maharashtra. The seized Uranium has been sent to the Bhabha Atomic Research Centre (BARC) at Trombay in Mumbai. According to media, the police received information on February 2, 2021, that Abu Tahir who is a scrap dealer was going to sell Uranium to Pandya. Accordingly, a trap was laid that led to the seizure and arrests. From where Tahir obtained the Uranium has not been revealed but this is an issue which must be followed up and leaks plugged.

In 2010, Cobalt-60, a radioactive material used to treat cancer, was found in the crap market of Mayapuri in New Delhi that caused the death of one labourer and grave injuries to three shopkeepers. In February 2010, Delhi University had sold a ‘Gamma Irradiator’ that had not been used for many years in an auction fetching Rs 1.5 lakh. This led to one of the worst radiation leaks in the country. Theft of a truck full of Cobalt-69 in Mexico in December 2013 and recovery of a Uranium mine in northeast India by the Army during 2014 are examples of inherent dangers of CBRN terrorism. Terrorist organizations, particularly the ISIS, have been developing CBRN capabilities, assisted by fissile material available in the black market. Toxic radioactive agents can be paired with conventional explosives and turned into a radiological weapon.

US troop withdrawal from Afghanistan will encourage terrorists and their supporters to direct more terrorism towards India. If car bombs are going off in Afghanistan, Mohamed Nasheed, former Maldives President has just survived an assassination attempt in a bomb blast. Nasheed, a pro-democracy leader, was against Chinese investments in Maldives. The multitude of insurgencies and radical organizations supported internally and aided and abetted externally makes India an inviting asymmetric battlefield ready to be exploited.

Global radical and terrorist organizations have designs on India. There are indications that the Sikhs For Justice (SFJ) supported by China-Pakistan want their international efforts to pick up momentum in early August in the run up to August 15. In November 2020, the Chief





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Minister of Punjab had met the Union Home Minister to apprise him of Pakistani activities to create disturbances in Punjab in concert with the agitation by farmers. The ironic part is that the SFJ movement is headquartered in the UK but the Boris Johnson Administration will do nothing to curtail their movement.

In an interview with media on January 30, 2021, the Chief Minister of Punjab cautioned the Centre to be extra vigilant in view of attempts by Pakistan trying to infiltrate the borders and sending weapons in increased numbers through drones since the beginning of the agitation by the farmers. He told media, "The Government should be on its toes. I have been warning them for a long time that Pakistan is trying to infiltrate the borders. Their weapons are coming in. They have sleeper cells here that they can awaken anytime they want. A disturbed Punjab suits Pakistan's policies...It is drones that are bringing weapons in... We may capture 30 drones, but there are 20-30 that may get past us, to their objectives.... Why weapons, money, and heroine are coming in?"

Finally, it is reiterated that India has to be extra careful against possibility of terrorist attacks while combating the pandemic. And, it is not just Jammu and Kashmir and Punjab that can be targeted. Obviously, the intelligence agencies are working overtime. But in addition we must adopt the concept of putting on ground billion plus eyes for surveillance.



### Insights from the Bin Laden Archive

In 2017, the United States Central Intelligence Agency (CIA) disclosed approximately **470,000 files** recovered in Abbottabad, Pakistan, during the 2011 raid on Osama Bin Laden's compound.

[Read more>>](#)

## The feeding of the one thousand: Idlib sanctuary offers cats a refuge from war

Source: <https://www.reuters.com/article/syria-animals-int-idUSKBN2BN1NY>



 The Aleppo  
**CATMEN**

Mar 31 – When Syria's war forced Alaa al-Jaleel to close his cat sanctuary in Aleppo in 2015 and head north to the rebel stronghold of Idlib, he took around 100 animals with him and reopened it there.

Now his successors at Ernesto's Sanctuary care for more than 1,000 - and feeding time tends to be loud and chaotic.





“Most of the animals are injured because of the war and because their owners had to leave them when they left their homes. We gave (the cats) shelter, medical care and food,” its current manager, Mohamad Wattar, said.

Named after a favourite cat of the Italian women who helped to set it up before it relocated, the expanded and fenced-off sanctuary covers 2,000 square metres (21,500 sq ft) of the city, located close to the Turkish border and still held by opposition forces.

►► Support Aleppo Catmen: <https://ernestosanctuary.org/>

## Al Qaeda, Supporters Advocate for Lone Actor Attacks in the West

Source: <http://www.homelandsecuritynewswire.com/dr20210513-al-qaeda-supporters-advocate-for-lone-actor-attacks-in-the-west>

May 13 – A pro al-Qaeda digital propaganda group (Jaysh Al-Malahim Al-Electroni [Electronic Battle Army]) has released digital articles which call on Americans to engage in lone-wolf terror attacks against fellow Americans. Because American counterterrorism pressure has severely degraded its capabilities, Al Qaeda appears to believe its best hope of achieving a terrorist attack against the West is to inspire domestic extremists.

## France, Britain Fearful of Resurgent Jihadist Threat After Lockdown

Source: <http://www.homelandsecuritynewswire.com/dr20210513-france-britain-fearful-of-resurgent-jihadist-threat-after-lockdown>

May 13 – Nearly 200 jihadists imprisoned in France are due to be released over the next two years and French security officials are pressing French lawmakers to approve fresh antiterrorist measures to impose enhanced restrictions on those freed and to give police new legal powers to fight terrorism. British officials, likewise, are fearful of a resurgent jihadist threat and are considering overhauling Britain’s 650-year-old treason law to make it easier to prosecute militants returning from Syria and Iraq.

**EDITOR’S COMMENT:** “... pressing French lawmakers”. WHY? Like if they do not love their country? And why keep them in the country? Civilized democracy? Passion for multicultural societies? Fear to be criticized from personal rights’ advocates? Fans of Albert Einstein’s quotes?



## Neuroscience Professor Removed From APA Discussion After Saying There Are Only Two Genders

Source: <https://www.newsweek.com/neuroscience-professor-removed-apa-discussion-after-saying-there-are-only-two-genders-1591697>

May 14 – A neuroscience professor was ousted from the American Psychological Association's (APA) email discussion group by vote after suggesting that there are only two genders as well as past concerns over his posts, the College Fix reported Friday. Psychology and neuroscience professor John Staddon at [Duke University](#) was removed from the APA's Society for Behavioral Neuroscience and Comparative Psychology (SBNCP) Division 6 listserv and was notified via email by the group's presidential trio who said use of the forum was a "privilege," in the statements republished by the National Association of Scholars (NAS) on April 30.

"It is sad that an audience of supposed scientists is unable to take any dissenting view, such as the suggestion that there really are only two sexes," Staddon said in reply to the notification of his removal from the division's group before allowing NAS to publish the email exchange. "Incredible! I don't mind having one less distraction, but I think you should really be concerned at Div 6's unwillingness to tolerate divergent views."

His post that "tipped the scale," according to Staddon, was titled "Hmm... Binary view of sex false? What is the evidence? Is there a Z chromosome?" Staddon told *Newsweek* he created the post on April 15.

"Science, real science, can and should be isolated from politics. Science has values, to be sure—curiosity, honesty, openness to debate, adherence to empirical facts, and so on—but they are not, and should not be, political," he wrote to *Newsweek*. "Most of my comments have been devoted to that fact. I might add that a sense of humor would help."

Staddon said he received the email that declared his removal from the division's group on April 23. It was written by Indiana University Bloomington provost Jonathan Crystal, who is a professor of psychological and brain sciences, on behalf of the division's presidential trio.

"The division leadership has received complaints about some of the posts that you have sent to the division listserv," Crystal wrote, who attached a link to SBNCP's 2019 code of conduct in the email.

"I do not want to get into the particulars of the range of complaints over the years, but I will note that a number of members of the executive committee and others have voiced concerns publicly on the listserv in an attempt to make you aware of how readers of the list might view some of the posts," Crystal added before writing that the executive committee voted to remove Staddon's email address from the listserv.

"I can find nothing that should be considered personally offensive," Staddon said after perusing through old emails.

*Newsweek* reached out to Crystal for comment, but did not hear back in time for publication.

"This incident just illustrates the current inability of some scientific communities to tolerate dissent about issues related to sex and race. Psychology and sociology seem to be especially flawed in this respect." Staddon wrote in an email to the College Fix.

Staddon admitted that he might have acted "flippant on occasion" in his reply to Crystal after stating "I wondered how long this would take! I have never insulted anyone; no ad hominem criticism (unlike those to whom you are responding—rather cravenly, I must add)."

He concluded by firing at the APA for "going downhill for some time." On April 22, he wrote an article for *Psychology Today* that discussed APA guidelines and criticized the organization for compromising "both scientists and practitioners."

"For the scientists, freedom of speech and inquiry are prerequisites. The APA should certainly advocate for those and for the highest research standards," he wrote in the article.

NAS published the emails between Staddon and Crystal under "Cancel Culture in the Sciences: A Case Study," as part of the organization's broader effort "to counter cancel culture in higher education," according to the editor's note.

The expected behavior of SBNCP's Division 6 code of conduct is to "treat everyone with respect and consideration."

"It is acceptable in a scientific organization and at scientific meetings for members to have strong differences of opinion or different theoretical perspectives on aspects of psychological science," the code of conduct states. "However, those differences and disagreements can be conveyed in ways that do not make other people feel threatened, demeaned, discriminated against, or harassed. Communicate openly and thoughtfully with others and be considerate of views and opinions that are different than your own."



## HZS C<sup>2</sup>BRNE DIARY – May 2021

Staddon has done recent theoretical research on operant conditioning, memory, timing and psychobiological aspects of ethical and economic philosophy, according to his Duke University scholar page.

He has authored six books and written more than 200 research papers.

**EDITOR'S COMMENT:** APA was right! There are three genders: men, women and idiots!

## Life in multicultural capitals!



If you want to watch a miracle live visit: <https://www.tribune.gr/world/news/article/748490/sok-i-chamas-vazei-zontanoy-napristanoy-n-ta-thymata-ptoma-koynithike-vinteo.html> (site in Greek - just watch the video)

## Strike squad of just 100 Brit Marines smashed 1,500 US troops in war games drill

Source: <https://www.thesun.co.uk/news/14397623/100-brit-marines-smashed-1500-us-troops-war-games/>

Mar 19 – A strike squad of just 100 Marines smashed 1,500 US troops in a war games drill.

The shock victory has revolutionised military thinking.

Our Future Commando Force attacked in the urban warfare exercise. Conventional tactics suggest they would need to heavily outnumber the defending Americans.

But working in eight teams of 12, they outmanoeuvred their rivals and used helicopter drones linked to screens on their chests to pinpoint weak spots.

The £400million drill in California had to be cut short because the British victory was so swift and unexpected.

Chief of the Defence Staff, General Sir Nick Carter, told The Sun yesterday: “This has overturned the principles of war. Mass is no longer the asset it once was — it is all about effect. If you concentrate your force, you are vulnerable.

**AMAZING!**



## HZS C<sup>2</sup>BRNE DIARY – May 2021

“On the modern battlefield you want maximum dispersion to give your opponent maximum doubt.

“Then apply disposable technology that you don’t mind losing.”

Working in eight teams of 12, the Brits outmanoeuvred their rivals and used helicopter drones linked to screens on their chests to pinpoint weak spots. Credit: The Sun

Brigadier Dan Cheeseman, head of the Royal Navy’s hi-tech weapons wing, added: “This has turned around traditional thinking.” Yesterday, the Future Commando Force and the new “tier two” special forces’ Rangers Regiment — similar to the US’s Green Berets — unveiled hi-tech weapons at the MoD’s Bovington Camp in Dorset. Troops are experimenting with flying grenades, remote-controlled mortar bombs and “throwbots” which can be lobbed into



buildings before soldiers conduct dangerous room-clearance operations.

Dave Young, regimental sergeant-major of 3 Commando Brigade, said: “If we’d had this kit in Afghanistan, there is no doubt it would have saved lives.”

[Larger quadcopter drones are being used to drop off ammo and recover wounded soldiers](#) from the battlefield.

The Navy is planning an exercise this year to see if [Marines](#) in jet suits can board a ship.

The Rangers Regiment will fight alongside rebels and freedom fighters in other countries’ wars.

Defence Secretary Ben Wallace said: “They will be at the vanguard of a more active and engaged Armed Forces.”

They are expected to defend British interests globally, as well as fight al-Shabaab in Somalia, and IS-backed militants in northern Mozambique.

Russia’s Wagner group — a private military company — has helped to tip conflicts in Moscow’s favour by working with rebel groups in Libya, Syria and the Central African Republic.

**EDITOR’S COMMENT:** This drill reminded me the *Millennium Challenge 2002* (MC02) drill where a retired Marine Corps Lieutenant General adopted an asymmetric strategy using WW2 methods and defeated the enemy force in two days!



ICI

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**CBRNE**  
INSTITUTE



HOTZONE  
SOLUTIONS  
GROUP



**C<sup>2</sup>BRNE**  
DIARY



# CHEM NEWS



## Decontamination Control – Dream and Reality

By Dr. Nikolaus Schneider

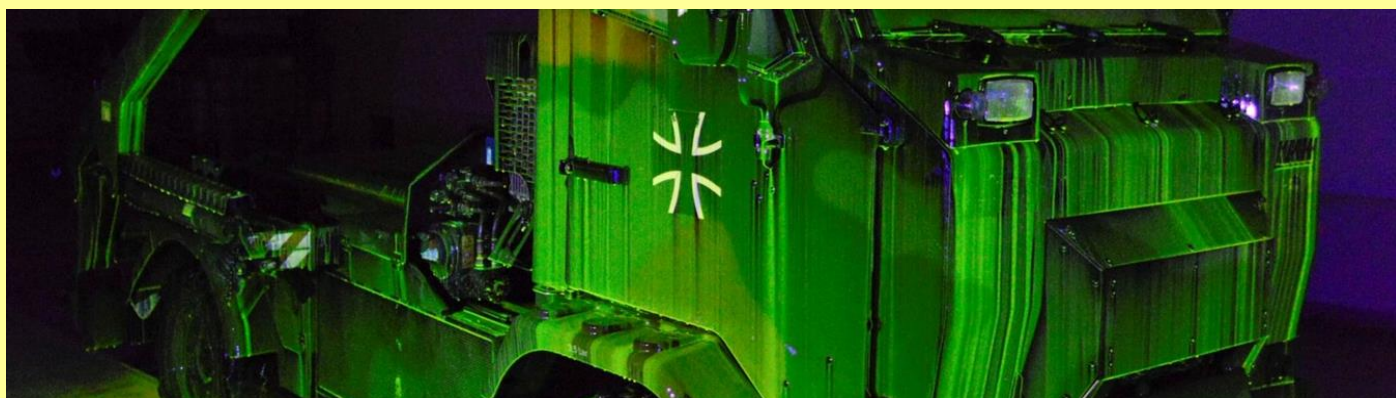
NCT Magazine | Ib consultancy – April 2021

Source: <https://nct-magazine.com/nct-magazine-april-2021/decontamination-control-dream-and-reality/>

“How clean is clean” or “Is clean, clean enough”? Get a thorough answer to these questions and take a look into various decontamination techniques, challenges, and solutions with Dr. Nikolaus Schneider. Dr. Schneider is also a long-term member and Secretary of the Hazard Management Panel under NATO Joint CBRN Defence Capability Development Group.

### Decontamination Levels

Active decontamination operations reduce hazard levels by removing or neutralizing liquid or solid contamination. For military operations, NATO defines three levels of decontamination: immediate, operational and thorough. Immediate decontamination is carried out by individuals right after becoming contaminated. Whereas operational decontamination is carried out by an individual and/or a unit and is restricted to specific parts of operationally essential equipment or materiel in order to minimize contact and transfer hazards and to sustain operations. Thorough decontamination is the level of decontamination where risk assessment becomes essential. Thorough decontamination is conducted by a unit to reduce contamination on personnel, equipment, materiel and/or working areas to the lowest possible levels, to permit the partial or total removal of individual protective equipment and to



maintain operations with minimum degradation. NATO Standards like AEP-58 or AEP-7 define residual limits for different agents that have to be achieved by thorough decontamination.

A fourth level, clearance decontamination, is defined as “decontamination of materiel to a standard sufficient to allow unrestricted transportation, maintenance, employment or disposal” (STANREC 4784, currently under ratification). It is a post-conflict measure and not part of a military operation. There are no current agreed standards or levels for clearance decontamination of Chemical Agents. Available guidelines for “negligible risk” are up to a factor of  $10^3$  below thorough decontamination. Clearance decontamination will not be considered in this article.

►► **Read the full article at the source’s URL.**

*Dr. Nikolaus Schneider has studied chemistry at the University of Saarland, Saarbrücken and earned his PhD with a thesis on the separation of radioactive Cesium from nuclear waste. He is the Head of the CBRN Decontamination Branch at Bundeswehr Research Institute for Protective Technologies and CBRN Protection (WIS) in Munster, Germany. He started his career at WIS as an expert for radiological/nuclear decontamination but soon widened his fields of work to the development and testing of decontamination equipment with regard to C-, B- and RN Decontamination. He is a long-term member and Secretary of the Hazard Management Panel under the NATO Joint CBRN Defence Capability Development Group.*



## Perspectives of Hospital Decontamination Preparedness

By Mr. Jerry Crow

NCT Magazine | Ib consultancy – April 2021

Source: <https://nct-magazine.com/nct-magazine-april-2021/perspectives-of-hospital-decontamination-preparedness/>

Most people know that in times of need their local hospital emergency room will be ready and available to handle their needs at any hour day or night. However, after a mass casualty terrorist attack, contaminated victims will quickly realize that the normal pathway of admission to the hospital has been altered. They may encounter a facility that has shut down and locked all the doors to prevent contaminated victims from endangering the unprotected workers inside. Medical care will be delayed due to a surge of victims. Confusion and panic may ensue, unaware that their hospital has activated a disaster plan and has trained for such an event. Before September 11, 2001, hospital decontamination capability was limited to one shower in preparation for a small industrial event.



If a hospital was confronted with more than one victim, their plans may have called for the fire department to assist with washing victims. Now that terrorism is upon us, the realization is that fire department personnel and equipment may not be available since these resources may be on scene providing care to possibly hundreds of victims. In Los Angeles County, there are close to one hundred hospitals and most of them have a decontamination team and the appropriate personal protective equipment (PPE). Hospital Decontamination Team Training has been provided to these facilities by Emergency Medical Services (EMS) Agency personnel. Many hospitals have had multiple team training over the years due to the need to refresh and due to staff moving on.

►► [Read the full article at the source's URL.](#)

*Jerry Crow, RN, is a Disaster Program Manager Mobile Medical System, Pharmaceutical Cache and CHEMPACK at Los Angeles County Emergency Medical Services Agency. He has worked as a Hazardous Materials Technician and Reserve LA County Sheriff Deputy for 5 years. In addition to practicing as a Registered nurse for 40 years, of which he spent 18 years as an ER nurse/critical care transport nurse. The author also managed 18 caches of nerve agent antidote as part of the Federal Strategic National Stockpile (SNS), and two 32 ft. decontamination trailers which can be deployed to a hospital as an addition decon resource or to the field for fire department use.*

## The Defense CBRN Center (Netherlands)

By Captain (R) P. (Pepijn) Kuyper

NCT Magazine | Ib consultancy – April 2021

Source: <https://nct-magazine.com/nct-magazine-april-2021/the-defense-cbrn-center-shaping-the-dutch-response-to-cbrn-threats/>

Located in Vught, The Netherlands, the Defense CBRN Center (DCBRNC) provides knowledge, education, training, and operational support in the CBRN domain for military personnel and first responders. This way, the center plays an essential role in preparing CBRN specialists and other first responders to the occurrence of chemical, biological,



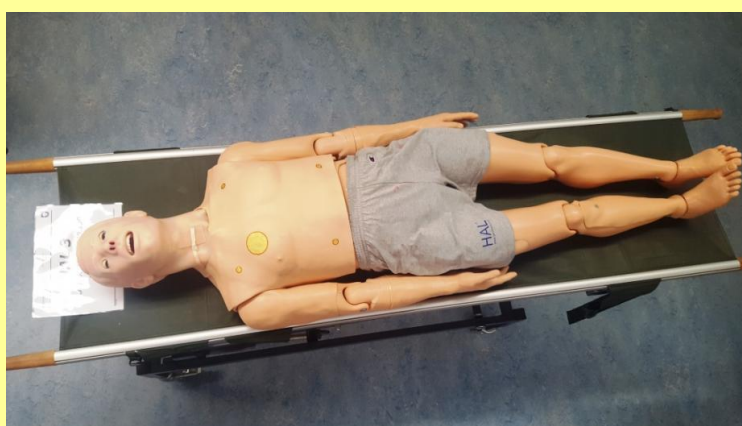


## HZS C<sup>2</sup>BRNE DIARY – May 2021

radiological and nuclear incidents. Moreover, by providing support and advice for emergency services and other impacted actors, mistakes can be avoided, and lives can be saved in the heat of the moment.



In order to provide these services, the center has a multi-disciplinary team of specialized military and civilian personnel. Besides the Dutch military, representatives of the police, health services, safety regions and fire departments are present to enhance civil-military cooperation. Moreover, the center employs several civilian CBRN specialists and academics, including from TNO (the Netherlands Organisation for applied scientific research) to improve research on CBRN-related topics. Finally, the Defense CBRN Center has military liaisons from Germany and Belgium to improve international cooperation and exchange know-how and knowledge.



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

*Pepijn Kuyper is a communications officer at the Defense CBRN Center. Prior to this fulfilling job, he was a corporal in the army reserves. He holds a master's*



*degree in crisis and security management and a bachelor's degree in political science with a focus on security and intelligence studies.*

**EDITOR'S COMMENT:** I have recently been in the DCBRNC – it is a functional excellent center with its own CBRN city and metro (photo above) that provides the realistic environment required for a variety of scenarios and levels of training.

## DARPA seeks lighter, more effective military biochem protection suits

Source: <https://newatlas.com/military/darpa-lighter-more-effective-military-biochem-protection-suits/>



Apr 27 – DARPA has awarded contracts to FLIR Systems, Leidos, and Charles River Analytics to develop new kit to protect soldiers and responders against chemical and biological (CB) threats. The Personalized Protective Biosystem (PPB) program seeks to produce improved personal protective equipment (PPE) suits that are lighter, more comfortable, and able to deal with a wider variety of hazards.

As anyone who has participated in or watched footage of a major NATO military exercise knows, running about in standard Nuclear, Biological and Chemical (NBC) suits is one of the most unpleasant aspects of a soldier's job

These suits are made out of either an impermeable rubber-like material with vents to prevent condensation, or a breathable material infused with activated charcoal. Either way, they're designed to fit over the soldier's regular uniform and, along with a gas mask, allow him or her to fight or carry out general duties for days at a time, while protecting against radioactive, chemical, or biological weapon threats.

Unfortunately, NBC suits are very uncomfortable, heavy, and are becoming less able to handle emerging chemical or biological threats. To counter this, DARPA wants the contracted companies to develop new lightweight materials and molecular technologies that can handle a broad spectrum of threats on demand for long periods.



This will not only involve a protective suit, but also ways to specifically defend the parts of the human body that interact directly with the environment, including the skin, eyes, and airway. In addition, the new equipment will work with commensal organisms, that is, organisms naturally found on the skin or in the body that help to protect it against infections and other threats.

The five-year PPB program will operate in two technical areas, or TAs. TA1 will work to protect the soldier by means of a 100-percent effective barrier against 10 CB agents. TA2 will aim at neutralizing threats to living tissue barriers, like the skin or eyes, with countermeasures that can be configured to meet specific threats.

"PPB aims to address PPE limitations, including threat-specific vulnerabilities, thermal/logistical burdens, and potential exposure risks," says Eric Van Gieson, PPB program manager. "The capability to provide unburdened CB protection will be invaluable in maximizing time on target, providing operational flexibility, extending mission duration, and enabling operations in austere environments, regardless of the threat.

"Successful PPB technologies have the potential to revolutionize how the military and public health communities perform in unpredictable threat environments, while also offering prophylactic and therapeutic solutions to known and emerging infectious diseases."



## Turkey accused of chemical weapons attacks in Iraqi Kurdistan

By Steve Sweeney (in Slemani, Iraqi Kurdistan)

Source: <https://morningstaronline.co.uk/article/w/turkey-accused-of-chemical-weapons-attacks-in-iraqi-kurdistan>

Apr 27 – Turkey has used chemical weapons three times in the autonomous Kurdish region of Iraq in the past three days, a senior Kurdish official told the Morning Star today.

Kurdistan Communities Union (KCK) spokesman Zagros Hiwa claimed that chemicals had been used during the Turkish bombing of the **Amedi district**, in the mountainous region of **Duhok**, which borders Turkey.

**"They used chemical weapons in the Mamresho hills overlooking Basyan river, and Marvanos hills overlooking the Avashin river," he said.**

"They have used the chemicals against the tunnels there," Mr. Hiwa added, referring to the underground system used by Kurdistan Workers' Party (PKK) guerilla fighters. Some 76 villages in the Amedi district were cut off from electricity due to Turkish bombing today, which has also destroyed acres of forest land as the invasion intensifies.

Mr. Hiwa said that "at least 38 Turkish soldiers have been killed" in confrontations with PKK fighters since it launched a ground invasion on April 24.

"It is part of a genocidal campaign against the Kurds deliberately timed to coincide with the 106th anniversary of the Armenian genocide," he said.

**"The message to Kurds is clear. We will kill you just as we killed the Armenians at the beginning of the 20th century. Now it's your turn."**

Turkey has a long history of using chemical weapons against Kurds. In the 1930s Sabiha Gokcen, the adopted daughter of former president Mustafa Kemal Ataturk, dropped gas on Kurds in Dersim during the uprising there. In February 2018 its forces were suspected of using chlorine gas during Operation Olive Branch, the illegal invasion and occupation of Afrin.

And in October 2019 Turkey was accused of using white phosphorus in an attack on the town of Sere Kaniye in the northern Syrian enclave known as Rojava.

The Morning Star reported from the site of an alleged chemical attack on the UN-administered Makhmour refugee camp in northern Iraq last year. The international community has refused to investigate the allegations, leaving Turkey to act with impunity.

At least 55 people have now been detained since a protest called by the Tevgara Azadi group in the city of Slemani on Sunday. Spokesman Nerman Ehmed said today that local Asayish officials were instructed to detain everyone who took part in the action.

A source told the Star that "this was the work of Turkey and the Kurdistan Democratic Party (KDP)" who are afraid of the PKK.



## Unlocking Unique Chemical Signatures in Tires

Source: <http://www.homelandsecuritynewswire.com/dr20210428-unlocking-unique-chemical-signatures-in-tires>

Apr 28 – Skid marks left by cars are often analyzed for their impression patterns, but they often don't provide enough information to identify a specific vehicle. A new approach could provide law enforcement new tools to track down those who flee a crime scene.

## Defending Against Chemical, Biological Threats from Inside and Out

Source: <http://www.homelandsecuritynewswire.com/dr20210430-defending-against-chemical-biological-threats-from-inside-and-out>

Apr 30 – Chemical and biological (CB) threats have become increasingly ubiquitous and diverse, presenting significant risks to soldiers in theater and stability operators during pandemic outbreaks. State-of-the-art personal protective equipment (PPE) can be bulky, heavy, and cumbersome, often severely limiting user mobility and performance. The Personalized Protective Biosystem (PPB) program aims to develop technology that reduces the need for burdensome protective equipment while increasing individual protection against CB threats.

[DARPA](#) recently awarded contracts to the following performers, FLIR Systems, Leidos, and Charles River Analytics, to develop lightweight materials and adaptable, tissue-protective countermeasures to provide on-demand, broad spectrum, and rapid long-term protection. Performers will seek to leverage molecular technologies and commensal organisms to unburden protective equipment demands from the user.

"PPB aims to address PPE limitations, including threat-specific vulnerabilities, thermal/logistical burdens, and potential exposure risks," noted Eric Van Gieson, PPB program manager. "The capability to provide unburdened CB protection will be invaluable in maximizing time on target, providing operational flexibility, extending mission duration, and enabling operations in austere environments, regardless of the threat."

The five-year program is divided into two technical areas (TAs). TA1 technologies aim to prevent external contact between the threat and the body, providing 100% survival against more than 10 CB agents with smart, lightweight materials. TA2 technologies will neutralize threats at vulnerable internal tissue barriers (i.e. skin, airway, ocular) using a configurable countermeasure.

The PPB program team is collaborating with government and industry stakeholders – including the Joint Program Executive Office for Chemical, Biological, Radiological, and Nuclear Defense (JPEO-CBRND), Biomedical Advanced Research and Development Authority (BARDA), U.S. Center for Disease Control /National Personal Protective Technology Laboratory (NPPTL), and World Health Organization International (WHO) – to serve as potential transition partners.

"Successful PPB technologies have the potential to revolutionize how the military and public health communities perform in unpredictable threat environments, while also offering prophylactic and therapeutic solutions to known and emerging infectious diseases," added Van Gieson.

DARPA's PPB team and performers will be working with the U.S. Food and Drug Administration to ensure all relevant guidelines are adhered to and regulatory standards are met, with the expectation of Investigational New Drug (IND) approval by the conclusion of the program, for relevant components.

## Germany Prepares to Ferry 'Hazardous Materials' out of Beirut port

Source: <http://www.naharnet.com/stories/en/281261-germany-prepares-to-ferry-hazardous-materials-out-of-beirut-port>

May 01 – A ship prepared Friday to ferry dozens of containers of hazardous materials from Lebanon's capital to Germany, managers of a cleanup project said, months after disaster struck on the dockside.

German firm Combi Lift was tasked with removing dangerous substances from the port after the explosion of hundreds of tonnes of fertiliser there on August 4 last year killed more than 200 people and ravaged large parts of Beirut.

The last of 59 containers was lifted onto the ship on Friday.

Heiko Felderhoff, CEO of Combi Lift, said they would be disposed of in Germany.

"The ship is here and so on the weekend we are leaving" for Germany, he said at a ceremony on the docks.

Elias Assouad, the head of the Lebanese-German Business Council, said the project had cleared the port of "all toxic, cancerous, flammable and highly reactive chemicals that have been stored here for decades".





The German firm had been expected "to deal with only 49 containers of hazardous material," he said.

But they ended up "handling more than 75, of which 59 will be shipped".

He said 15 others would be "disposed of within safe and environmentally sound procedures in situ", without providing more details.

A chemical expert managing the operation told AFP after finishing the job in February that Beirut only avoided a second chemical inferno by chance.

Michael Wentler said he had "never seen a situation like this before" in his life, describing festering chemical mixtures so

corrosive they burned gaping holes right through massive shipping containers.

**Hydrochloric acid, a corrosive and toxic substance, made up 60 percent of the chemicals Combi Lift came across, he said.**

## N. Korea continues to build up chemical, biological weapons: U.S. official

Source: <https://en.yna.co.kr/view/AEN20210505000200325>

May 05 – North Korea continues to build up its chemical and biological weapons, in addition to its other weapons of mass destruction (WMD) such as nuclear weapons that pose a serious threat to U.S. forces and South Korean allies, a ranking U.S. official said Tuesday.

Jennifer Walsh, principal deputy assistant secretary of defense for homeland defense and global security, also said North Korean leader Kim Jong-un may actually use such weapons in case of a conflict on the Korean Peninsula.

"North Korea's continued pursuit of nuclear, chemical, and biological weapons jeopardizes international stability and weakens the global nonproliferation regime. These capabilities pose a threat to U.S. forces, allies," said Walsh in a statement submitted to the House Subcommittee on Intelligence and Special Operations.

"Given the risk that Kim Jong Un could seek to employ WMD in the course of or to stave off a conflict on the Korean Peninsula, the Joint Force must be ready for any number of WMD-related contingencies that require operating in a CBRN contaminated environment," she added.

Noting Pyongyang used chemical weapons in its successful assassination of leader Kim's brother, Kim Jong-nam, in Malaysia in 2017, Walsh noted the North, along with countries such as China, Russia and Iran, continue to advance chemical and biological weapons capabilities.

"The COVID-19 pandemic continues to demonstrate the threat posed by biological incidents. And scientific advances in biotechnology are creating new types of challenges while also lowering the barriers to entry for WMD development, proliferation, and use," she wrote.

The Department of Defense official named China as one of the largest sources of chemical and biological weapons materials for North Korea and others.

"Chinese entities and individuals continue to transfer proliferation-sensitive materials to North Korea, Iran, and other threat actors, and China has demonstrated lax enforcement of domestic export controls and multilateral sanctions regimes intended to prevent such transfers," said Walsh.

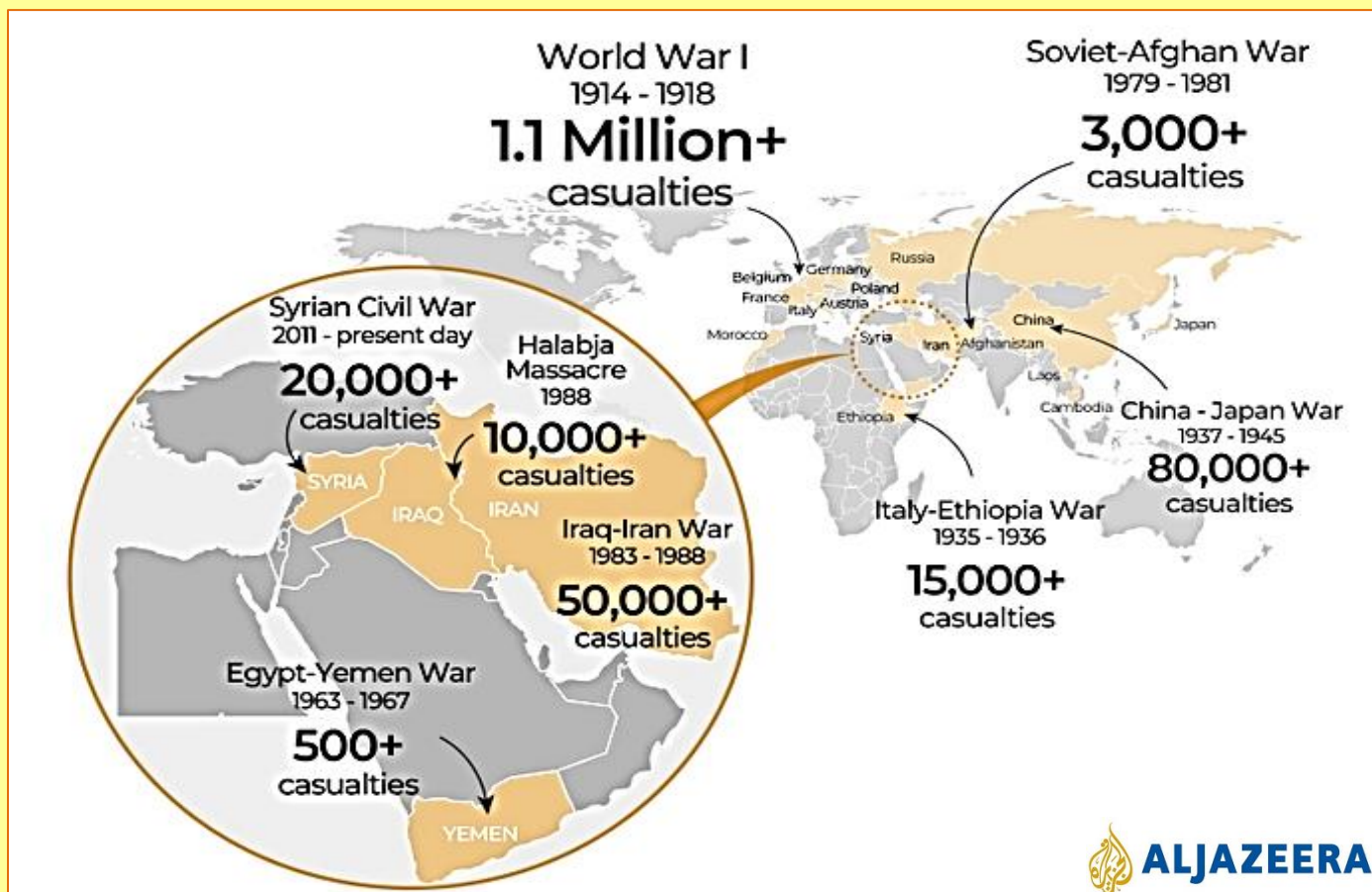
**In 2020, the U.S. Army estimated the North had up to 5,000 tons of chemical weapons of approximately 20 different types, making it the third-largest possessor of chemical agents in the world.**

**EDITOR'S COMMENT:** Since Russia have already destroyed its chemical weapons (Sept 27, 2020) and the US is about to follow (PUDA facility – 2022), is Iraq still the third largest possessor? But in November 2017 and February 2018, OPCW's Technical



Secretariat [confirmed](#) that the four former chemical weapons production facilities in Iraq were completely destroyed. One former chemical weapons production facility in Iraq remains subject to inspection until 2028. In 2012, OPCW approved a detailed plan, submitted by Iraq, for this facility's conversion for purposes not prohibited under the Chemical Weapons Convention.

## Do not forget!



## How the Pentagon Got Inside ISIS' Chemical Weapons Operation—and Ended It

By Joby Warrick

Source: <https://www.politico.com/news/magazine/2021/02/27/red-line-book-excerpt-chemical-weapons-syria-471784>

Feb 27 – The Kurdish fighters dug in along Highway 47 in Kesik Kupri, Iraq, on January 23, 2015, could hear the truck from far off and knew the attack was coming. The defenders crouched behind their vehicles or squatted along a low ridge, rifles trained on the narrow road. From the ridge to the earthen barrier across the highway were perhaps 500 men, skilled veterans of Iraq's Kurdish Peshmerga brigades as well as teenagers and elderly volunteers from neighboring villages who had come in their civilian coats, sneakers and checkered scarves to reclaim their homes from the men of ISIS. In two hard days of combat, they had seized a strategic crossroads and now effectively controlled the main route between the Iraqi city of Mosul and the Syrian frontier. The Islamists would do whatever they could to take it back.

The afternoon was nearly spent when the suicide vehicle appeared. The Kurds positioned along the ridge could see it clearly: a red farm truck with steel plates welded to the front for ramming and a trailer bed stacked high with metal tanks. The truck picked up speed as it approached the Kurdish line, and from the ridge the defenders unleashed a volley of rifle fire aimed at the passenger cabin. The fusillade kicked up rows of dust spouts in the nearby field, but some bullets found their mark,



pinging against the cab and punching holes in some of the metal tanks. From the back of the truck came a ribbon of greenish smoke, like the contrail of a distant jet.

The dirt berm in the middle of the highway forced the driver to slow for a moment, and that was all the defenders needed. Two Kurdish fighters were waiting with a 35-pound antitank rocket, and they fired the projectile directly into the truck's side. The vehicle disintegrated in an instant. When the smoke cleared, the truck's twisted undercarriage lay on the asphalt 50 yards from the impact crater, and metal fragments and bits of the driver's remains were scattered across the nearby fields.

The commanding officer, a Peshmerga colonel named Sabri, cautiously inspected the debris with a few of his aides. The men discovered that the metal tanks in the truck's rear had blown clear of the vehicle when it exploded and landed haphazardly in the dirt. Some of the containers were leaking the same pale-green smoke the men had seen earlier. All around the leaking tanks the soil and grass bore a yellow coating, as though someone had spilled a jar of watery paint. A few men who ventured close to the damaged tanks detected a pungent odor and immediately fell ill.

Sabri could offer his men no protection other than surgical masks, which were useless, so he moved everyone back and radioed for help. Soon afterward, other Kurds arrived carrying respirators and sampling kits, the latter being used to scoop up a few grams of contaminated soil from around the leaking tanks. Weeks passed before the colonel learned precisely what had happened on that late January afternoon. ISIS had tried to break his line by means of a chemical bomb: a suicide truck loaded with 20 canisters of deadly chlorine gas.

The attack near the crossroads village of Kesik Kupri represented the first known attempt by the newly resurgent ISIS to use a chemical weapon in combat. It was a modest effort, causing no serious casualties and barely drawing notice outside northern Iraq. But its leaders had signaled their intentions to the Kurds, and to the world.

ISIS was officially in the business of using chemical weapons. And the United States, watching from afar, was just starting to think about how it should, or even could, respond.

**From outside Iraq**, it was hard to know what to make of reports of these apparently isolated incidents of chemical weapons. Was it really possible that the Islamic State was using poison gas on the battlefield? No army had used chemicals against troop formations since the Iran-Iraq War in the 1980s. No militia or terrorist group had done so, ever. Even if the accounts were true, where had the chemicals come from, and how did ISIS manage to get them?

The Kurds could not say. Obtaining chlorine was no problem, as the industrial chemical could be found in Iraqi factories the terrorists now controlled. But what about sulfur mustard? Had the terrorists stumbled upon abandoned munitions from Saddam Hussein's time? Had they managed to steal something from Syria's stockpile of poisons?

Some answers began to emerge in the following months, as delegations from the Organization for the Prohibition of Chemical Weapons (OPCW) arrived in Baghdad to investigate the reported attacks on Kurdish forces at the Iraqi government's request. The investigators swabbed yellow residue from recovered mortar fragments and tested the greasy soil in the spots where the projectiles had landed. They interviewed Kurdish soldiers and examined the ugly scars left behind wherever the foul-smelling liquid had touched human skin. They examined one soldier whose legs were utterly covered with chemical burns, from his waist to the crisp line at mid-calf where his army boots had offered some protection.

The lab tests and interviews yielded a confirmation, and also a surprise. The oily liquid in the mortar shells was sulfur mustard, no doubt, but it differed from the kinds of military-grade blister agents the OPCW's experts were familiar with. Its formula was relatively simple, even crude. It lacked enhancers and stabilizers that military weaponeers typically use, which meant that it tended to break down more quickly when exposed to the environment. It was neither Syrian nor Iraqi, judging from its chemical composition, yet it clearly had been made by someone with access to modern laboratory equipment, a working knowledge of toxic weapons, and a grasp of basic chemistry.

All the signs pointed in the same alarming direction. Somewhere in Iraq or Syria, ISIS was manufacturing its own chemical weapons. The terrorists had not yet mastered all the elements. But they were learning. And the U.S. government was on their tail.

**Suleiman al-Afari** woke up on the morning of February 8, 2016, with an unusually long to-do list, which put the 49-year-old ISIS weapons-maker in a peevish mood. As a scientist and lifelong bureaucrat, he liked keeping a routine, even in wartime, but on this morning there were errands and obligations that would keep him on the road and out of the office for half the day. His mother was ill, which meant an hour's drive to her village to visit with her, and perhaps to try to negotiate medical care with the jihadists who now ran the local hospital. He also had to drop his wife off at work, pick up cakes and navigate a gantlet of checkpoints that clogged the highways all around Mosul, Iraq, forcing motorists to wait in lines while bearded militiamen peered



suspiciously inside their vehicles. As a final chore, he had to stop at an industrial supply warehouse to load up his car with jugs of liquid soap.

For the peculiar kind of factory he ran, soap is considered essential safety equipment. His workers made sulfur mustard for the Islamic State's artillery rockets and bombs, and in case of a spill, the lye in the soap could help neutralize the chemical toxins and lessen the number of severe burns and disfiguring scars.

In his former life, Afari never dreamed of having such a job, and he certainly never asked for it. In that fateful summer of 2014 when ISIS took over his city, he had worked as a geologist and midlevel functionary in the Mosul office of Iraq's Ministry of Industry and Minerals.

He was a family man, gregarious and gray-haired, who had spent his entire life in Mosul and had chosen not to flee, as thousands of his neighbors did, when an Islamic State army swept through the city, defeating an Iraqi troop garrison that was at least 15 times larger.

When the men from Islamic State demanded that he help them make chemical weapons, Afari was reluctant to refuse. Thus Afari the geologist became Afari the chemical weaponer.

On February 8, when he was out looking for soap, four helicopters descended on him.

He was still trying to make sense of it when he felt something hit the car. There was a loud bang, then a series of pops as bullets hit the side panels and hood. A searing pain shot through his left leg, and he felt the car veer sharply as one of its tires blew. Afari pulled off the road and cut the engine, and with uplifted hands he climbed out of the car and into a whirl of sand and rotor wash. A huge dog suddenly appeared from nowhere and seized him by the arm.

"I wasn't afraid that they would kill me," Afari said afterward of the lunging canine and its handler, an American commando in body armor who grabbed his other arm to cuff him as he lay on the ground. "I never saw myself as an important figure. Anyway, at the moment, I was busy with the dog."

Another soldier shoved a picture—an ID photo—in Afari's face and asked in English if he was the man in the photograph.

"That you?"

"Yes," Afari replied.

Then a cloth bag was slipped over his head and the world went dark.

**When the blindfold was removed** about a half-hour later, he was surrounded by U.S. and Kurdish soldiers at an Iraqi detention camp, many miles away. It was day one in Afari's yearslong ordeal in prison, and a breakthrough day for the U.S. and Kurdish forces that had just netted one of the most important ISIS weapons-makers ever to be captured alive. It took only a few hours for Afari to fully grasp his choices, and then the words started to flow. The Iraqis ultimately would seek the death penalty for the ISIS weaponer, but with a stay of execution as long as he cooperated. So he cooperated.

The picture he painted over the following weeks was of a weapons program that was at once ambitious and amateurish; one that was often mismanaged and disorganized, but malevolent in its intention. The group's propaganda machine had never uttered a word about chemical weapons, but beginning in the fall of 2014, the United States learned, ISIS had been working diligently to make them. The interrogations took place in Iraq, inside the fortresslike headquarters of the Kurdistan Regional Government's Counterterrorism Department. Afari, sipping tea and wearing prison-issued sweat clothes and sandals, recounted in matter-of-fact detail the terrorist group's attempts to make mustard gas, part of what he described as a broader effort to create novel weapons and delivery systems to defend the caliphate and terrorize its opponents.

Over several weeks the interrogation of Afari yielded a trove of precious details, including specific locations of chemical facilities and the names of the scientists and functionaries who ran them. Each day's summaries were transmitted to analysts at the CIA and the Pentagon, and then back across the Atlantic to the Baghdad operations room from which Lieutenant General Sean MacFarland, leader of military forces in the anti-ISIS coalition, managed the war.

MacFarland read the reports carefully. The CIA and the Defense Department were now working to disrupt the Islamic State's weapons program, and they already had achieved a crucial success: the killing of Abu Malik, Afari's ISIS boss. Alarmed by the engineer's talk about gassing Western cities, the Pentagon quietly dispatched special-forces teams into Iraq to find him, and then ordered an airstrike that obliterated his Mosul office. Abu Malik was dead, but as Afari's confessions revealed, ISIS had not given up. Newcomers, including foreign scientists, had been tapped to fulfill Abu Malik's terrible vision. MacFarland parsed the latest intelligence in daily conference calls with other Pentagon officials who separately arrived at the same grim conclusion: Given enough time, the ISIS weaponers would eventually succeed.

"We began to recognize that ISIS was pulling in not just fighters but people with unique skills: technical skills, scientific skills, financial skills," said General Joseph Votel, the Pentagon's special-operations chief at the time and a regular participant in the discussions. "That gave





us pause. We all witnessed the horrific things they were doing. You had to make the presumption that if they got their hands on a chemical weapon, they would use it.”

By early 2016, under pressure from the U.S.-led military campaign, the caliphate’s soldiers were retreating everywhere, but the chemical threat appeared ever more significant. The worry among both American and Iraqi commanders was that a collapsing ISIS would try to avenge its losses by unleashing its chemical weapons, either on the battlefield or in terrorist attacks in Western cities, delivered perhaps by one of the scores of small drones the militants had gone to great effort to acquire. “They were hoping for some kind of a wonder weapon,” MacFarland said later, “one that might save the caliphate.”

MacFarland faced enormous pressure to act. In Washington, President Barack Obama’s national security advisers now were well aware of how a poison-gas weapon could transform the terror campaign that ISIS had already unleashed in European cities. Even a relatively minor attack in New York or Los Angeles would generate such an outcry that the White House would be compelled to expand the war and send another generation of U.S. ground forces into battle in Iraq and perhaps Syria. In Baghdad, Prime Minister Haider al-Abadi’s government was equally anxious. Iraq’s frontline troops already were jittery about the possibility of chemical attacks, so much so that senior commanders worried about the effect on morale. In MacFarland’s visits with Iraqi counterparts, the subject almost always came up. The older officers had seen the effects of sarin and mustard gas during the Iran- Iraq War, and the memory was seared into their brains.

“They would talk about it, and the Iraqi press would make a big deal about it,” MacFarland said. “They all knew how terrible it can be.”

Taking out the group’s capability would not be easy. The weapons facilities described by Afari were not hidden away on military bases or in underground bunkers, as they had been in Syria. The most important ones were in cities, inside lightly protected civilian facilities in the middle of residential neighborhoods. The Islamists had hidden a sizable production center inside a wing of a civilian hospital in Hit, a city of 60,000 people. Another was on the grounds of Mosul University, in the heart of Iraq’s second most populous city. Any airstrike against sites such as these carried a risk of releasing clouds of dangerous chemicals that could drift through homes, schools and playgrounds. If civilians were killed, the U.S. military and its partners would be blamed.

But MacFarland was out of time. Waiting for Iraqi troops to recapture the sites would mean a delay of many weeks, perhaps months. ISIS would surely use the time to build more weapons, or better ones. Or it might simply move its factories somewhere else.

A strike package was carefully assembled, with special kinds of bombs selected for the unusual mission. Beginning in March, just over a month after Afari’s arrest, MacFarland’s team was ready to act.

**The spring’s rolling airstrikes** began without fanfare and gained little notice in U.S. newspapers. The first target was the Iraqi city of Hit, where hundreds of government troops and tribal militiamen already were waiting on the outskirts to liberate the town from its ISIS occupiers. U.S. warplanes swooped in on March 25, 2016, to attack strategic targets around the city ahead of the ground assault, and over the next five days, the Americans struck 17 sites, one of which was blandly listed by the Pentagon as an “improvised weapons facility.” On April 12, Iraqi forces fought their way into central Hit, capturing the hospital and its now-ruined chemical lab. Next on the list was Mosul. The Islamic State’s Iraqi capital was, even in wartime, a densely populated city of more than a million people, and the terrorists had positioned their most important laboratories at Mosul University, on the east bank of the Tigris River and smack in the middle of town. Mindful of the high risk of civilian casualties, the mission’s planners selected special incendiary bombs designed to generate a small blast radius but intense heat, to vaporize weapons, supplies and any residual gases that might otherwise escape. Then they waited for conditions to be just right. The time of day, the wind’s speed and direction, the humidity level—any one of these could be the margin between a clean strike and a calamity for an innocent Iraqi family.

The strikes occurred sporadically as conditions allowed and new targets emerged, beginning in late spring and continuing through fall. The biggest strike, on September 13, involved a dozen U.S. aircraft and more than 50 bombs and missiles that tore apart a large manufacturing complex for pharmaceuticals on Mosul’s outskirts.

Then it was over. By late 2016, U.S. military commanders were confidently asserting that the Islamic State’s industrial capacity for making chemical weapons had been eliminated. On January 14, 2017, six days before the end of the Obama presidency, Iraqi troops captured Mosul University, the heart of eastern Mosul and the epicenter of the Islamic State’s chemical weapons program.

The impact of the Pentagon’s bombing campaign was direct and measurable. Researchers ultimately would attribute more than 70 poison-gas attacks to ISIS forces in Iraq and Syria. After the liberation of eastern Mosul, the number of incidents dropped to zero.

Yet in the assessment of MacFarland and the other generals behind the bombing campaign, there was little doubt about the threat that remained. Several key ISIS figures were known to have escaped to Syria, including a French national named Joe Asperman, one of the Europeans recruited by ISIS for his scientific expertise. The caliphate’s leaders were so protective of Asperman and his projects that they issued a statement falsely claiming that



the Frenchman had been “martyred.” Now dispersed across the Middle East and perhaps beyond, Asperman and other operatives would simply be harder to find.

“They had all this capability and technical knowledge. Where did it go?” asked Votel, the former special operations commander who would soon become CENTCOM chief. “We know that some of their people were killed and others went home. But some may still be out there.”

Indeed, ISIS itself issued a rare warning that a chemical attack would be coming, at a time of its choosing. Months after Kurdish fighters overran the caliphate’s last enclaves in Syria in 2019, the group’s leaders issued an official pronouncement declaring a “new stage” in the group’s terror campaign against its enemies, especially Israelis. The message promised new tactics and weapons, and included, for the first time, an explicit call for the use of poison gas.

“O soldiers of the caliphate everywhere,” it said, “below you are the settlements and markets of the Jews. So make them a testing ground for your weapons: our chemical-bearing rockets.”

*Joby Warrick is a national security reporter at the Washington Post.*

## Intel: UN finds undeclared chemical weapons stockpile in Syria

Source: <https://www.al-monitor.com/originals/2021/05/intel-un-finds-undeclared-chemical-weapons-stockpile-syria>

May 07 – United Nations investigators uncovered previously undisclosed stockpiles of [Syria’s chemical weapons](#), the UN’s top official for disarmament revealed to the Security Council on Thursday.

The discovery is the latest sign that the Syrian government of President Bashar al-Assad has not fully complied with an US and Russia-brokered agreement in 2013 to destroy the country’s stockpiles.

Analysis of samples from storage containers at a previously declared chemical weapons facility revealed a “[large volume](#)” of a chemical warfare agent, the UN’s disarmament chief Izumi Nakamitsu said yesterday.

Syria’s government recently denied the site was used to produce chemical warfare agents, a claim rejected by the [Organization for the Prohibition of Chemical Weapons](#), she added. The OPCW found that a written explanation from the Syrian government in March following the detection was “not sufficient to explain” the chemicals’ presence at the site.

Evidence collected at the site since 2014 by OPCW investigators indicate that “production and/or weaponization of chemical warfare nerve agents did, in fact, take place at this facility,” she said yesterday.

Nakamitsu also added that the investigators concluded that “there are reasonable grounds to believe” a Syrian Air Force helicopter was behind a [chemical weapons attack](#) on the town of Saraqib in opposition-held Idlib province on Feb. 4, 2018.

The helicopter was under the command of the Syrian army’s Tiger Forces, she said. “The number of outstanding issues and their nature is concerning,” Nakamitsu said.

### Why it matters

Syria’s government under President Bashar al-Assad has maintained since 2014 that it surrendered its entire chemical weapons stockpile for destruction after prompted by Russia to give up its cache in 2013.

But subsequent chemical weapons attacks attributed by UN investigators to the Syrian regime and a running list of what investigators say are incomplete and inaccurate disclosures have left [Western officials](#) in doubt of the Assad regime’s compliance.

Russia’s government, which has militarily and diplomatically backed Assad in his country’s decade-long civil war, continues to attack the OPCW’s credibility.

Moscow’s Deputy Ambassador to the UN Dmitry Polyanski accused the OPCW on Thursday of being a “[tool](#)” of Western governments “to punish those that have fallen out of favor by using unfounded accusations of the use of weapons of mass destruction.”

### What’s next

The UN’s investigation into Syria’s compliance continues.

A report on the OPCW’s inspection last year of the Barzah and Jamriyah facilities of the Syrian Scientific Studies and Research Center is expected to be presented soon.

The United States targeted the Barzah site with limited airstrikes in 2018 following the Douma chemical attack. US officials have said the site is part of Damascus’ chemical weapons facilities network.



## Cell Phone Device will Detect and Identify Hazardous Materials

Source: <https://i-hls.com/archives/108476>

May 06 – The detection, recording, and identification of chemicals, drugs, and biological molecules often requires cumbersome devices. Now, an ordinary cell phone can detect hazardous materials.

Cell phones come with high-quality cameras that can detect low levels of light and remove digital noise from captured images through software processing. Texas A&M University researchers have utilized this sensitivity to create cell phone cameras that can act as microscopes in the past. They have created an extension for a standard smartphone that transforms it into a powerful **chemical detector**.

The researchers believe that their device provides a reliable method for detecting chemicals and pathogens in the field, all the while being low-cost. **All the additional parts cost just around \$50 more than a normal smartphone.**

The breakthrough was created using two kinds of spectroscopy (the study of the absorption and emission of light and other radiation by matter) methods: Fluorescence spectroscopy, which measures fluorescent light emitted by a sample, and Raman spectroscopy, which can detect molecules that do not fluoresce or emit light at extremely low intensities.

The scientists ran experiments in which they examined different samples such as ethanol, acetone, isopropyl alcohol, and methanol using the homemade cell phone detector. They also measured the Raman spectra of various solid materials, such as a carrot, which was picked thanks to its high concentration of pigment carotene, and a bacterial pellet. This pigment and bacteria pigments readily absorb the wavelength of the laser light used in the device.

When they compared the sensitivity of the system to the most sensitive industrial Raman spectrometers available, the researchers saw that the ratio of signal to noise for the commercial instrument was about 10 times higher than their system.

The researchers note that the sensitivity of the cell phone detector could be doubled by making use of a single RGB channel for analysis, according to [interestingengineering.com](http://interestingengineering.com).

## Ancient Roman 'Gate to Hell' Killed Victims With Its Deadly Lake

Source: <https://www.sciencealert.com/ancient-roman-gate-to-hell-killed-victims-with-its-deadly-lake>

May 10 – A cave ancient Romans believed to be a gate to the underworld was so deadly that it killed all animals who entered its proximity, while not harming the human priests who led them.

Millennia later, scientists believe they have figured out why - a concentrated cloud of carbon dioxide that suffocated those who breathed it.

Dating back 2,200 years, the cave was rediscovered by archaeologists from the University of Salento back in 2011.



It was located in a city called Hierapolis (Greek: iera [sacred] + polis [city]) in ancient Phrygia, now Turkey, and it was used for animal sacrifices of bulls led through the Plutonium - or Pluto's Gate, for the Classical ancient Greek god of the underworld - by castrated priests.

As the priests led the bulls into the arena, people could sit on raised seats in an arena and watch as the fumes emanating from the gate brought the animals to their death.

[An inscription at the site to underworld gods Pluto and Kore.](#) (Francesco D'Andria/University of Salento)

"This space is full of a vapour so misty and dense that one can scarcely see the ground. Any animal that passes inside meets instant death. I threw in sparrows and they immediately breathed their last and fell," [wrote Greek historian Strabo](#) (64 BCE - 24 CE).



## HZS C<sup>2</sup>BRNE DIARY – May 2021

It was this phenomenon that alerted the archaeology team to the cave's location. Birds flying too close to the cave's entrance suffocated and dropped dead - showing that, thousands of years later, it's still just as deadly as ever.

The culprit is seismic activity under the ground, according to volcanologist Hardy Pfaniz of the University of Duisburg-Essen in Germany, who led research into the cave's seeping gas back in 2018. A fissure running deep beneath the region emits large amounts of volcanic carbon dioxide.

The team took measurements of the carbon dioxide levels in the arena connected to the cave, and found that the gas - slightly heavier than air - formed a 'lake' that rose 40 centimeters (15.75 inches) above the arena floor.

This gas is dissipated by the Sun during the day, they found, but it's at its deadliest at dawn after a night of accumulating. The concentration reaches above 50 percent at the very bottom of the lake, rising to around 35 percent at 10 centimeters, which could even kill a human - but, above 40 centimeters, the concentration drops rapidly.

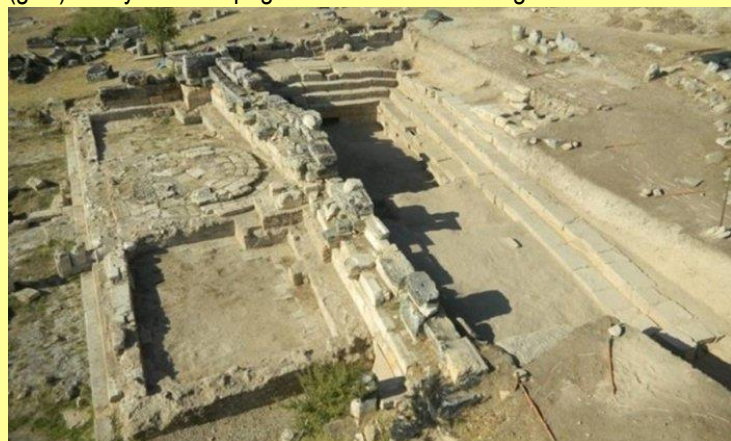
During the day, there's still some carbon dioxide extending about 5 centimeters, evidenced by dead beetles found by the research team on the floor of the arena. And inside the cave, they estimated CO<sub>2</sub> levels ranged between 86 and 91 percent at all times, since neither Sun nor wind can enter.

The team notes in their paper that there was a strong tourism element to the cave's properties. Tourists could be sold small animals and birds that they could throw to the floor of the arena to be sacrificed, and on feast days, larger animals would be sacrificed by priests.

"While the bull was standing within the gas lake with its mouth and nostrils at a height between 60 and 90 cm, the large, grown priests (galli) always stood upright within the lake caring that their nose and mouth were way above the toxic level of the Hadean breath of death," [the team wrote in their 2018 paper](#).

"It is reported that they sometimes used stones to be larger."

[The site as it looks today.](#) (Francesco D'Andria/University of Salento)



The spectators would see large, strong bulls succumbing to the fumes within minutes, while the priests remained strong and hale - a testament to the power of the gods or the priests, supposedly.

However, the researchers believe that the priests were well aware of the properties of the grotto and its arena, and probably conducted major sacrifices at dawn or dusk on calm days for maximum effect.

They could also have put their heads inside or entered the cave itself at midday ceremonies to demonstrate their own potency, holding their breath to survive.

But the presence of oil lamps also suggests that the priests went near the cave at night, according to the researcher who found it, Francesco D'Andria. However they conducted their ceremonies, the discovery could help reveal the locations of other Plutoniums by studying seismic activity.

►► The research was published in the journal [Archaeological and Anthropological Sciences](#).

## GammaEx project: A solution for CBRN remote sensing using Unmanned Aerial Vehicles in maritime environments

By Mario Monteiro Marques, Rodolfo Santos Carapau, Alexandre Valério Rodrigues, et al.

2017, OCEANS 2017 - Anchorage Proceedings

Source: [https://www.academia.edu/36921997/GammaEx\\_project\\_A\\_solution\\_for\\_CBRN\\_remote\\_sensing\\_using\\_Unmanned\\_Aerial\\_Vehicles\\_in\\_maritime\\_environments](https://www.academia.edu/36921997/GammaEx_project_A_solution_for_CBRN_remote_sensing_using_Unmanned_Aerial_Vehicles_in_maritime_environments)

Nowadays Chemical, Biological, Radiological and Nuclear (CBRN) agents are real threats, and they can be released from intentional and non-intentional sources. Intentional sources include weapons of mass destruction, and they can inflict serious amount of damage. CBRN non-intentional sources can go from disease outbreaks or even incidents, such as a nuclear



accident. The interest for unmanned vehicles is growing more and more, either in military or civilian applications. In this scenario, they can be applied, especially Unmanned Aerial Vehicles (UAVs). The response to CBRN releases should follow several steps, such as reconnaissance of the affected area, detection of the agent, sampling, decontamination, victim screening, medical evacuation, identification of the type of agent and medical treatment. Therefore, UAVs can be an important asset in this scenario, as they bring many advantages, such as the access to inhospitable or inaccessible spaces, incorporation of sensors that can be used to identify the agent, and many other factors that increase the speed of the task, reducing at the same time the risk to personnel. In this paper, an UAV system is presented to fulfill the requirements of this issue, including the vehicle, sensors and control station. This system was tested and the validation tests are also represented. It proved to be an asset in CBRN releases, either intentional or non-intentional.

## The Dark Side of the Chemical Weapons Convention: Case Studies in Urban Warfare

By Ryan N. Mannina

Source: <https://smallwarsjournal.com/jml/art/dark-side-chemical-weapons-convention-case-studies-urban-warfare>

May 11 – Does humanitarianism have a dark side? International humanitarian law (IHL) is devised with the ostensible aim of advancing humanitarian interests; that is, to constrain the use of force in war in order to save human lives and alleviate suffering. Yet, even dedicated humanitarians acknowledge that they are often better at devising new law than at assessing the performance of existing accords.<sup>[1]</sup> Such an assessment is both worthwhile and necessary. This article examines how IHL performs in an urban warfare context. This is an important question because, as the world rapidly urbanizes, there is an increasing sense of urgency in the U.S. Army to study urban warfare and consider how it might be fought in the future. In addition to considering how the Army should prepare itself, policymakers need to think about how national policy and IHL contribute to the military's success in urban warfare.

Existing humanitarian law was largely influenced by—and designed for—the wars of the nineteenth and twentieth centuries. How will these treaties perform in the changing context of twenty-first century warfare? In the past two decades, the United States and its allies have fought several destructive urban battles to liberate cities like Fallujah, Mosul, and Raqqa from armed nonstate groups. These battles resulted in large numbers of noncombatant casualties and left vast areas of the urban landscape uninhabitable. Urban warfare imposes high costs in lives, political capital, and national treasure. The Battle of Mosul alone displaced more than 826,000 Iraqi citizens and destroyed over 40,000 homes. The cost of rebuilding Iraq after the campaign to eject the Islamic State will cost more than \$88 billion.<sup>[2]</sup> These costs can make policymakers and military leaders hesitant to undertake such operations, thereby restricting military options in war. Identifying less destructive methods could allow the military to wage urban warfare more humanely and reduce the associated costs.

This article contributes to the study of urban warfare by examining the implications of the United States' membership in the Chemical Weapons Convention. It asks whether the CWC's prohibition of riot control agents (RCAs) as a method of warfare has saved human lives and alleviated suffering in urban warfare. The answer, unfortunately, is that the prohibition has caused the military to adopt alternative weapons and tactics that are more lethal and less discriminate than riot control agents, and thus cause greater collateral damage and human suffering in urban warfare.

A comparative analysis of the Battle of Hue (1968) and the Second Battle of Fallujah (2004) allows us to examine variations in the types of weapons and tactics that U.S. forces employed during urban combat before and after the prohibition of RCAs. In both cases, the unique characteristics of urban terrain often advantaged the defender and limited the attacker's maneuver. The Marines in Hue relied heavily on CS, a form of concentrated tear gas, to provide freedom of maneuver. The use of CS reduced the need to employ high explosive munitions—which are inherently indiscriminate—delivered by aircraft and artillery, and provided a nonlethal option for escalation of force that undoubtedly prevented unnecessary civilian deaths.

In contrast, U.S. forces did not use RCAs during the battle of Fallujah. Due to the prohibition established in the CWC, they lacked a nonlethal method of escalation when they found



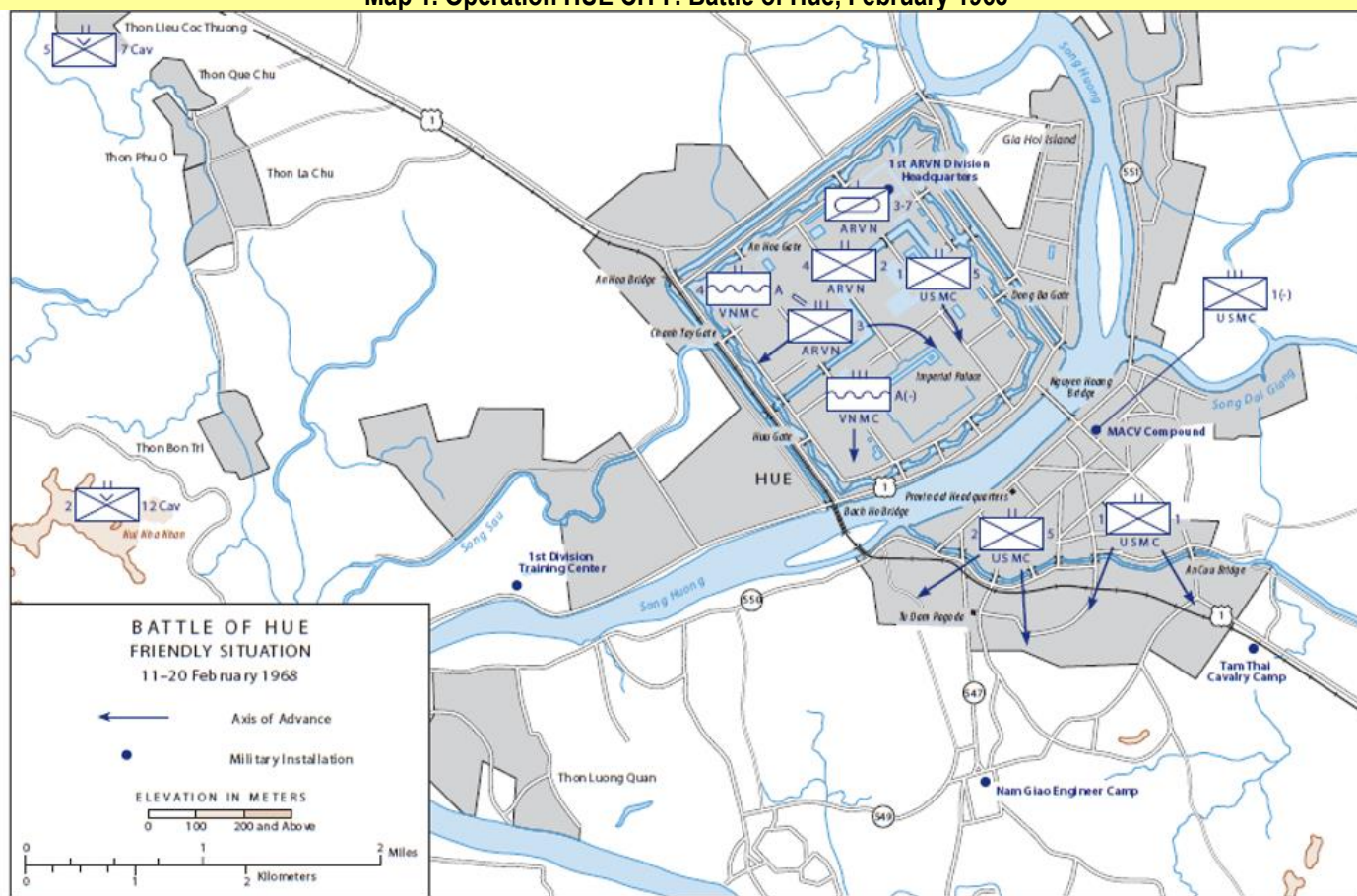
themselves unable to maneuver. They relied instead on high explosive munitions delivered by tanks, artillery, mortars, and air support, often destroying entire buildings to suppress or destroy a single enemy sniper.<sup>[3]</sup> In some instances, U.S. forces allegedly forced insurgents out of their fighting positions by employing the toxic and caustic properties of white phosphorus smoke. Some consider this a flagrant violation of the CWC.<sup>[4]</sup> Yet, perversely, it is the CWC’s prohibition of RCAs that served to bring about this adaptation.

**The Battle of Hue (31 January – 3 March 1968)**

In 1968, Hue was a modern European-style city with a population of 140,000.<sup>[5]</sup> It was located on the Huong River, a major waterway that bisected the city. The majority of the city was inside the Citadel, a stone fortress constructed by the French during the nineteenth century that was situated on the north bank of the river. The Citadel dominated the southern portion of Hue, which was an area nearly as large and spread along the river’s south bank.<sup>[6]</sup>

On 31 January 1968, more than fourteen battalions of North Vietnamese Army (NVA) and Viet Cong (VC) attacked to seize the city, which was only lightly defended by U.S. and Army of the Republic of Vietnam (ARVN) forces.<sup>[7]</sup> The attackers seized most of the city within the first few hours. On 1 February, U.S. and ARVN units began fighting to recapture the city.<sup>[8]</sup> ARVN forces were responsible for clearing the Citadel, while U.S. Marines were responsible for the southern portion of the city.<sup>[9]</sup> The Marines successfully cleared and secured the southern portion of the city by 10 February, then assisted ARVN forces in clearing the Citadel.<sup>[10]</sup> They declared the city secure on the morning of 25 February, although clearing operations continued until 2 March.<sup>[11]</sup> U.S. and ARVN casualties were 637 killed, 3,732 wounded, with North Vietnamese casualties between 2,500 and 5,000.<sup>[12]</sup>

**Map 1. Operation HUE CITY: Battle of Hue, February 1968**



Map source: Villard, *Staying the Course*, 417.

The majority of the Marines who fought in Hue had no previous experience with the type of large-scale urban combat they encountered.<sup>[13]</sup> They learned quickly that some characteristics of the urban environment provided significant advantages to the defending



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forces. The Citadel was a densely populated area with heavy stone and masonry buildings in close proximity to one another.<sup>[14]</sup> The streets were narrow, and most of the structures were separated by high walls or hedgerows laced with barbed wire and embedded with broken glass and other sharp objects.<sup>[15]</sup> In the southern portion of the city, the structures were not as closely spaced and the streets were wider. Most houses were made of softer material than those in the Citadel and were thus easier to breach.<sup>[16]</sup> The presence of civilians was another important feature of the battlefield. Although Hue's population was "essentially passive," the Viet Cong forced them to assist in a variety of ways such as carrying wounded and supplies, and digging fortifications.<sup>[17]</sup> The NVA used nearby villages to manage resupply, medical evacuation, and prisoner of war processing and detention.<sup>[18]</sup>

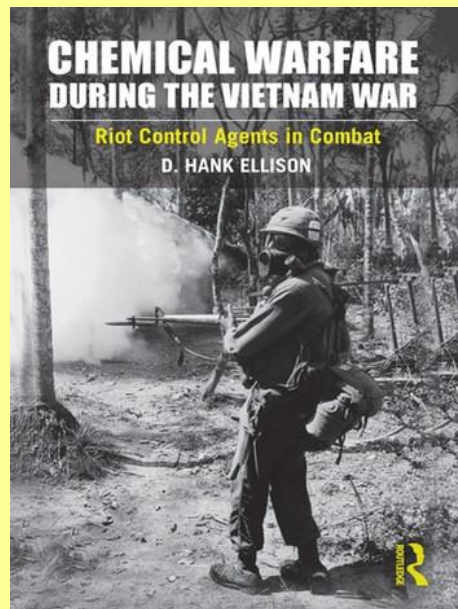
The NVA were adept at fortifying and camouflaging themselves in Hue's urban terrain. They created strong points in multi-floor buildings surrounded by courtyards. They placed snipers in the upper floors and automatic weapons in the lower floors. Foxholes surrounded the courtyards, each manned by an NVA soldier equipped with an assault rifle and rocket launcher. The city's treasury was strongly fortified.<sup>[19]</sup> The urban terrain provided several advantages to the defending force. First, buildings provided cover and concealment from aerial and ground reconnaissance, as well as direct and indirect fire weapon systems. Second, narrow streets lined with linear obstacles canalized the movements of the attacking forces along a limited number of avenues of approach and made enemy positions difficult to breach. Third, elevated positions, such as rooftops and upper story windows, provided defenders excellent observation and fields of fire as attackers moved through the city. Fourth, the desire to spare civilian lives and infrastructure led to restrictive rules of engagement on the U.S. side. Finally, the NVA's use of neighboring villages for combat service support highlights the difficulty of isolating a city and cutting off support to the defending forces.

The 1<sup>st</sup> Marine Division's after action report discussed special equipment and techniques that involved extensive use of CS gas, also known as tear gas.<sup>[20]</sup> CS gas causes irritation to the eyes, nose, and throat and—in sufficiently high concentration—incapacitation due to the inability to see and preoccupation with the agent's effects.<sup>[21]</sup> The Marines used the E8 launcher and 35mm Tactical CS Cartridge to "break strong points or soften enemy positions prior to an assault."<sup>[22]</sup> Because it relied on the infiltration of gas from outside the building, the E8 launcher was often ineffective against buildings with few openings or those with high, solid walls surrounding them. In these instances, Marines employed the M630 mortar CS cartridge.<sup>[23]</sup> The M630 cartridge could penetrate the tile roofs typical of Hue's buildings, which allowed the gas to be fully concentrated inside the building.<sup>[24]</sup> A third technique was the use of CS gas grenades. These provided an important nonlethal escalation option, especially when clearing bunkers and buildings where civilians might be present. The Marines would often throw the grenades into structures in an attempt to force their occupants to surrender or flee before escalating to lethal munitions.<sup>[25]</sup>

The CS gas disorganized NVA soldiers who had fortified themselves in urban structures, and allowed assaulting Marines to seize their objectives with fewer casualties.<sup>[26]</sup> CS was critical for 1<sup>st</sup> Battalion, 5<sup>th</sup> Marines as they cleared the dense urban terrain inside the Citadel. The battalion began its assault on the Citadel on 13 February. After two weeks of heavy street fighting, it had secured only sixteen city blocks while suffering nearly 50% casualties. On 25-26 February, by employing E8-launched tear gas canisters, they cleared the remaining twelve city blocks without taking a single casualty.<sup>[27]</sup> Noting that the NVA were not equipped to withstand a tear gas attack, officers lamented the fact that they had been unable to employ tear gas earlier in the battle, and recommended "the judicious use of chemical weapons, such as tear gas, etc. for [future] urban combat operations."<sup>[28]</sup>

Certainly, the Marines also relied heavily on lethal munitions to suppress the enemy and provide freedom of maneuver. Air support played a decisive role at key points, but adverse weather conditions often limited the employment and effectiveness of both fixed-wing and rotary-wing aircraft.<sup>[29]</sup> Due to the desire to avoid unnecessary damage to civilian structures, the rules of engagement restricted the use of heavy artillery in the early stages of the battle. This restriction was eased in the later stages as the Marines' casualties mounted and the strength of the enemy force within the city became clearer.<sup>[30]</sup> Throughout the battle, they employed 5,304 rounds of naval gunfire, more than 235,000 pounds of ordnance from 85 fixed-wing close air support sorties, 30 helicopter gunship missions, and countless mortar and artillery rounds.<sup>[31]</sup>

Three challenges emerged regarding artillery employment in the urban environment. First, most fire missions targeted enemy positions one hundred meters or less from friendly forces.<sup>[32]</sup> The U.S. military describes such missions as "danger-close," indicating increased risk to friendly troops.<sup>[33]</sup> In some cases, the distance between friendly and enemy troops was too close to allow the use of artillery.<sup>[34]</sup> Second, the NVA used civilians as human



shields, forcing Marines to account for increased risk to noncombatants.<sup>[35]</sup> Third, due to the low-angle trajectory of artillery fire, its effectiveness was often limited by the height of buildings and their close proximity to each other. In such cases, the Marines preferred to use mortars because their high-angle trajectory allows them to be fired over and in between buildings with greater precision and accuracy.<sup>[36]</sup>

Figure 1. Artillery and Mortar Dead Space in Urban Terrain

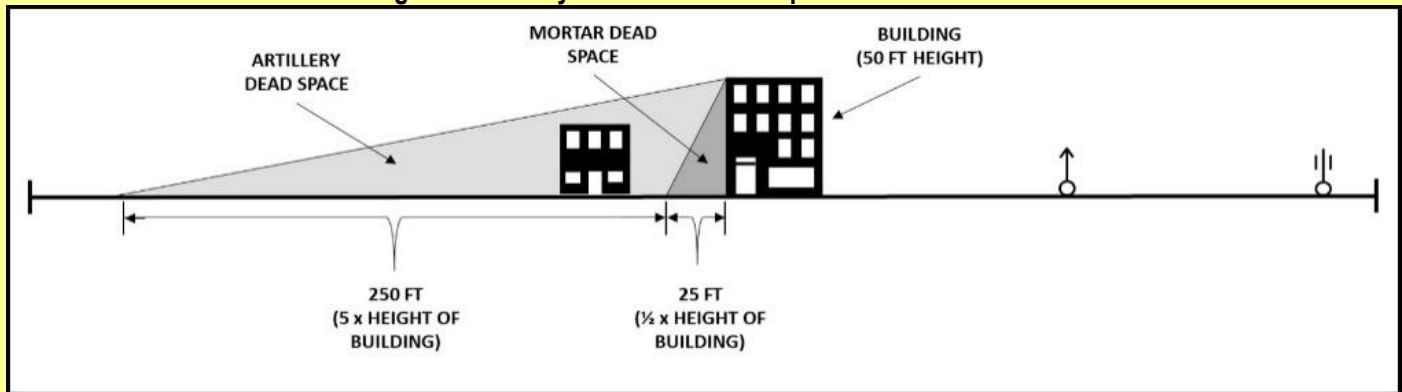


Image adapted from Department of the Army, *FM 3-90.2*, Figure 7-7.

Another tactic, called “mouse-holing,” allowed Marines to minimize their exposure to enemy observation and fire while moving through the urban environment. They blew holes in the sides of buildings (mouse holes) with satchel charges, rockets, tank cannons, or recoilless rifles, and used them to move between and through buildings without exposing themselves to enemy observation and fire.<sup>[37]</sup> Heavy weapons like tanks and recoilless rifles provided the added benefit of shocking defenders inside buildings and rendering them temporarily less capable of defending their positions.

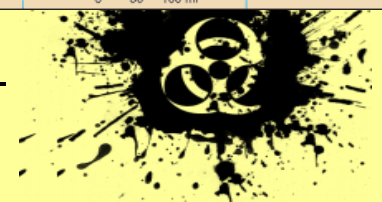
Officers from the 1<sup>st</sup> Infantry Division Advisory Detachment summed up the humanitarian costs of the battle in an after-action report: “The City of Hue is virtually in ruins. Refugees and homeless from the civilian population, the civilian wounded, the enemy dead, and the lack of utilities present a serious problem.”<sup>[38]</sup> Approximately 80% of the houses inside the Citadel were completely destroyed during the battle.<sup>[39]</sup>

Despite the extensive destruction, noncombatant deaths due to collateral damage appear to have been relatively low. Estimates of the number of civilians killed during the battle vary between 4,000 and 7,000.<sup>[40]</sup> The South Vietnamese government estimated 7,600 total casualties. Of those, they attributed 1,900 wounded and 944 deaths to “accident of battle,” or collateral damage. Other sources put that number at 1,200.<sup>[41]</sup> In total, collateral damage resulted in civilian mortality rates between 7:1,000 and 9:1,000. Widespread destruction left about 115,000 of the city’s residents temporarily homeless.<sup>[42]</sup> An ARVN colonel later described the psychological trauma suffered by countless more caused by shortages of food and water, not to mention living “among decaying corpses that could not be buried and whose stink could drive everyone to hysteria.”<sup>[43]</sup> These statistics and accounts illustrate one of the most significant characteristics of urban warfare: civilian death and suffering are unavoidable consequences of war in such environments.

### The Second Battle of Fallujah (November – December 2004)

Fallujah, Iraq was the setting of two major battles between the U.S.-led coalition and Iraqi insurgents in 2004. The city had a land area of approximately 21 square kilometers and a population of about 250,000 people. The U.S. military had easily occupied Fallujah soon after the invasion of Iraq in March 2003, but resistance to the occupation grew in Sunni-dominated areas of the country over the following year. In April 2004, the coalition launched the first battle of Fallujah, Operation Vigilant Resolve, in response to the ambush and mutilation of four U.S. private military contractors by Sunni militants.<sup>[44]</sup> After only two days of fighting, coalition forces withdrew from the city under pressure from Arab media outlets and Sunni politicians resulting from high levels of collateral damage.<sup>[45]</sup>

Fallujah became an insurgent stronghold in the following months. Insurgents immediately began violating the ceasefire by attacking U.S. and coalition troops. By forcing the coalition to abandon its assault on the city, the insurgents gained a valuable





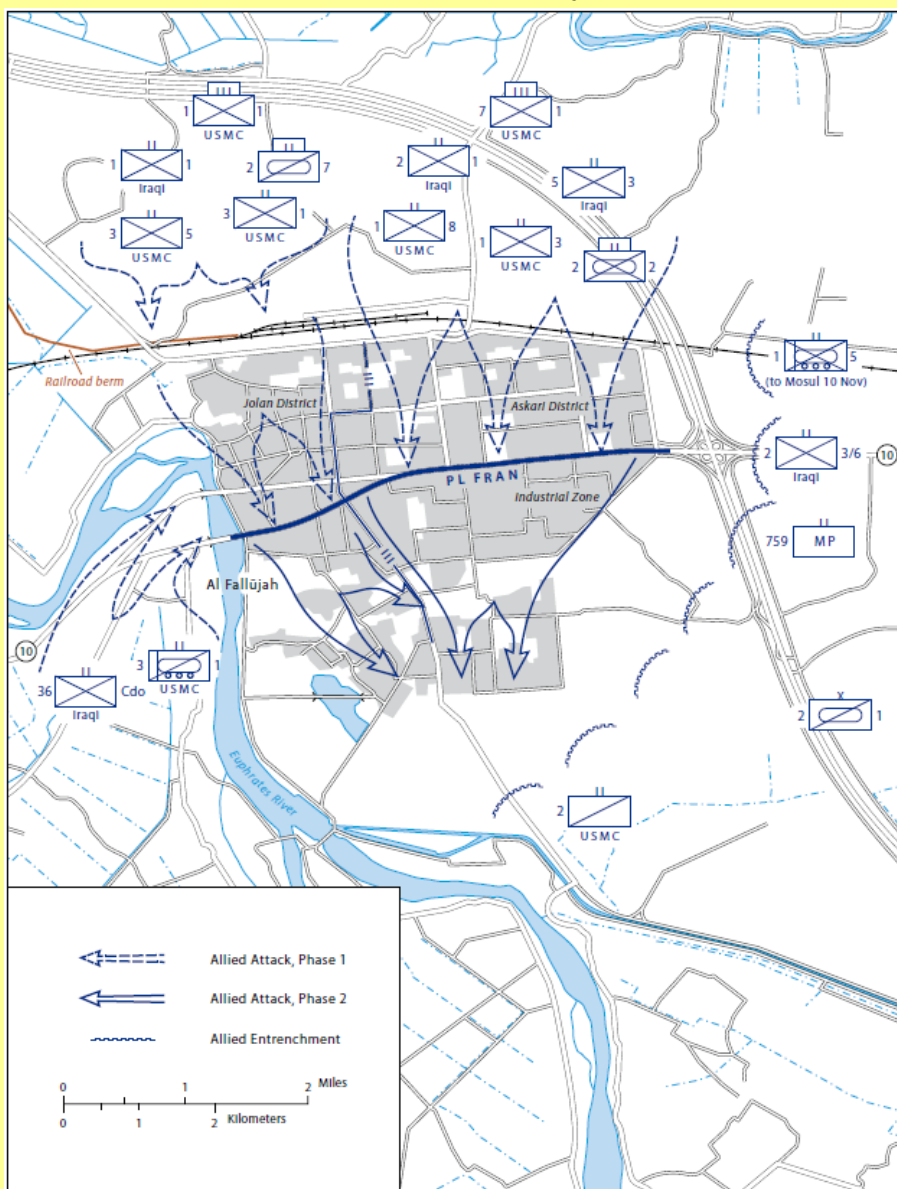
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propaganda and recruiting narrative that drew thousands more insurgents from all over the country, as well as foreign fighters from outside of Iraq. By October, the coalition estimated that 4,500 insurgents had occupied the city. In order to facilitate upcoming national elections, coalition leadership decided to assault the city for a second time to clear it of insurgents.<sup>[46]</sup>

The second battle was a three-phase operation named Operation Al Fajr (“New Dawn” in Arabic). In the first phase, the coalition prepared the battlefield by employing air strikes, special operations raids, and psychological and information operations to confuse the insurgents and kill key leaders. This phase also included leaflet drops and radio broadcasts warning Fallujah’s civilian population to evacuate the city. In the second phase, U.S. forces isolated Fallujah by seizing key ingress and egress routes, jamming communications, and cutting off the city’s electricity. The third phase was the actual assault on the city.<sup>[47]</sup>

The attacking force comprised two Marine Regimental Combat Teams (RCT), RCT 1 and RCT 7. Each was reinforced with one U.S. Army battalion: 2<sup>nd</sup> Battalion, 7<sup>th</sup> Cavalry Regiment, and 2<sup>nd</sup> Battalion, 2<sup>nd</sup> Infantry Regiment, respectively. In addition, six Iraqi battalions participated in the operation. The coalition began its assault on November 8 and defeated all organized resistance by November 13, although fighting continued for several weeks as the coalition cleared small cells of insurgents in sustained search and attack missions.<sup>[48]</sup> U.S. forces suffered 63 killed and more than 600 wounded. Coalition troops reported 2,175 insurgents killed and 2,052 captured.<sup>[49]</sup>

Map 2. Operation AL FAJR: Second Battle of Fallujah, November 2004



Map source: Rayburn, *The U.S. Army in Iraq*, 350.

In 1975, the United States ratified the 1925 Geneva Protocol, which prohibited “the use in war of asphyxiating, poisonous or other gases, and of analogous liquids, materials or devices.”<sup>[50]</sup> Although he ratified the treaty, President Gerald Ford issued Executive Order 11850, which reserved the United States’ right to use RCAs in specific circumstances.<sup>[51]</sup> The United States later signed and ratified the CWC, which entered into force in 1997. The CWC prohibits the use of chemical weapons in any circumstances. It further prohibits the use of RCAs—defined as “any chemical... which can produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure”—as a method of warfare.<sup>[52]</sup>

When it ratified the CWC, the U.S. Senate specified that E.O. 11850 would remain in effect as the primary document governing the United States’ use of RCAs.<sup>[53]</sup> Apparently relying on the language of the Executive Order, President George W. Bush authorized the U.S. military to use RCAs in Iraq under “specific, well-defined



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circumstances.”<sup>[54]</sup> Those well-defined circumstances refer to four defensive scenarios outlined in E.O. 11850. Since Al Fajr was an offensive operation, it was not covered by E.O. 11850 and coalition forces were not armed with RCAs during the battle.

### The Urban Environment

The urban environment in Fallujah resembled that of Hue in many ways. The streets were narrow and generally lined by walls. The urban terrain was dense, with structures generally built so close together that they were touching, or nearly so. This canalized troops as they moved through the city and restricted their maneuver. The houses were typically surrounded by enclosed courtyards, which were in turn overlooked by rooftops and upper story windows and provided insurgents with excellent observation and fields of fire. Houses were generally constructed of brick, and their roofs were made of thick mortar, which provided cover and concealment from small arms and explosives. Exterior doors were usually metal or wood, with a metal gate on the exterior and several locking points, making them especially difficult to breach.<sup>[55]</sup>

As in Hue, the advantage in this urban environment often went to the defenders. Once again, U.S. forces found that the urban terrain necessitated special adaptations in weapons and tactics. Unlike in Hue, however, troops in Fallujah did not have access to RCAs. Whereas the Marines in Hue used CS gas to force enemy soldiers out of fortified buildings, troops in Fallujah often resorted to more lethal and destructive means.

### Weapons and Tactics

Coalition troops relied heavily on artillery, mortars, and air support. They employed 386 close air support strikes and more than 14,000 artillery and mortar rounds throughout the battle.<sup>[56]</sup> One significant advancement since the battle of Hue was the advent of precision-guided munitions (PGMs) and advanced targeting systems. By 2004, the U.S. military had developed a multitude of air-delivered PGMs. For target location and identification, U.S. forces used hand-held and vehicle-mounted laser target designators and rangefinders that could mark targets or provide exact GPS coordinates once a target was identified.<sup>[57]</sup> The PGMs used in Fallujah were predominantly either laser-guided or GPS-guided. Laser guidance relies on an observer to mark the target with a laser designator system. The bomb's onboard electronics then track the laser's energy and guide the bomb onto the target.<sup>[58]</sup> GPS guidance relies on the observer or aircrew loading accurate GPS coordinates to the target into the bomb's navigation control system. Table 1 depicts the characteristics of some of the PGMs most commonly used in Fallujah.<sup>[59]</sup>

**Table 1. Risk Estimate Distances for Precision-Guided Munitions Commonly Used in Fallujah**

Munition	Description	Risk Estimate Distances (PI = Probability of Incapacitation)	
		0.1% PI	10% PI
<b>GBU-12</b>	500-lb laser-guided bomb	170m / 558ft	50m / 164ft
<b>GBU-31 JDAM</b>	2,000-lb GPS-guided bomb	265m / 869ft 305m / 1001ft (airburst)	80m / 263ft 105m / 345ft (airburst)
<b>GBU-32 JDAM</b>	1,000-lb GPS-guided bomb	210m / 689ft 275m / 902ft (airburst)	75m / 246ft 100m / 328ft (airburst)
<b>GBU-38 JDAM</b>	500-lb GPS-guided bomb	185m / 607ft 230m / 755ft (airburst)	55m / 180ft 80m / 263ft (airburst)

Because of the widespread employment of PGMs, Fallujah was hailed as a military operation of unprecedented precision. However, there are a variety of factors that affect precision. One typical measure of a bomb's precision is 50% circular error probable (CEP). CEP describes “the radius of a circle around the target within which 50% of the weapons should fall. The remaining 50% fall outside the CEP.”<sup>[60]</sup> In 2003, the JDAM's published CEP was “5 meters or less during free flight when GPS data is available.”<sup>[61]</sup> In other words, 50% of JDAMs could fall more than 15 feet off-target under ideal conditions. In dense urban terrain, where buildings are often touching, or nearly so, that can result in bombs destroying the wrong buildings and killing or seriously injuring any noncombatants caught inside. Other sources of error include atmospheric conditions, pilot proficiency, and target location error.<sup>[62]</sup>

Furthermore, the data in Table 1 demonstrate that even when a bomb impacts exactly where intended, there is a high risk of collateral damage to anyone standing nearby due to blast overpressure and fragmentation. For example, there is a 10% probability that a soldier standing within 50 meters of a target hit by a GBU-12 would be incapacitated.<sup>[63]</sup> Structures in the urban environment mitigate some of the risk by absorbing the bomb's effects; however, overpressure can also cause buildings to collapse dozens of meters from the point of impact. Unreinforced masonry buildings like those found



in Fallujah are the most vulnerable to collapse from blast overpressure.<sup>[64]</sup> Therefore, it is clear that bombs, no matter how accurate and precise, are inherently indiscriminate.

Despite the heavy reliance on indirect fire and air support, their utility remained limited in some situations. Fixed-wing close air support could take too long and was often judged too dangerous to be employed in the close quarters fighting that characterized the battle.<sup>[65]</sup> Artillery and mortars were much more responsive. Troops often preferred to use mortars due to their high angle of trajectory. However, their high trajectory sometimes endangered supporting aircraft, thereby restricting their employment.<sup>[66]</sup>

Due to limitations of indirect fire and air support, infantry troops in Fallujah often found the heavy firepower provided by tanks and combined anti-armor teams (CAAT) more effective for dealing with insurgents fighting from fortified buildings. Marines used the Abrams tank's 120mm cannon to neutralize enemy snipers and the CAAT's .50 caliber machine guns and Mk19 grenade launchers to destroy buildings that the insurgents were using as fighting positions.<sup>[67]</sup> The Army relied perhaps even more heavily on combined arms teams. "Soldiers did not hesitate to level a building from which they received hostile fire before they occupied it. With only a few exceptions, they also did not hesitate to destroy buildings simply suspected of holding insurgents."<sup>[68]</sup> While necessary to facilitate movement and maneuver in the city, these tactics were inherently indiscriminate.

The employment of white phosphorus (WP) munitions became a point of major controversy.<sup>[69]</sup> White phosphorus is an incendiary and toxic chemical that burns when exposed to air at certain temperatures. It glows in the dark and produces white smoke when burned, making it a versatile munition.<sup>[70]</sup> It can be used as an antipersonnel weapon, or for obscuring the movement of friendly troops, illuminating the battlefield, signaling, or marking targets.

According to the OPCW, the CWC forbids the use of white phosphorus if the chemical's toxic or caustic properties are "specifically intended to be used as a weapon."<sup>[71]</sup> Therefore, the United States has officially rejected the use of white phosphorus as an antipersonnel weapon since the entry into force of the CWC.<sup>[72]</sup> Nevertheless, the Army and Marines used white phosphorus extensively in Fallujah. U.S. officials denied that it was used as a chemical weapon, but soldiers and Marines provided accounts that cast doubt on those claims.<sup>[73]</sup> One artillery officer described using white phosphorus as a psychological weapon against dug-in insurgents: "We fired 'shake and bake' missions at the insurgents, using WP to flush them out and [high explosive munitions] to take them out."<sup>[74]</sup> A Marine described using improvised bombs made from white phosphorus mortar rounds to force insurgents out of fortified buildings.<sup>[75]</sup>

If these methods relied primarily on the toxicity of the white phosphorus smoke, then white phosphorus essentially served as a substitute for nonlethal chemical munitions like the CS gas used in Hue and might have been interpreted as a violation of the CWC. However, unlike CS gas, white phosphorus has lethal effects. It sets fire to any combustible material with which it comes into contact, causing secondary fires and additional property destruction. Acute white phosphorus exposure causes systemic toxicity in humans that can result in death.<sup>[76]</sup>

As in the battle of Hue, it is difficult to find reliable data on the number of civilians killed as a result of collateral damage in Fallujah. Around 80% of the population evacuated Fallujah prior to the assault, leaving between 30,000-50,000 remaining in the city.<sup>[77]</sup> Of those, about 800 died during the battle.<sup>[78]</sup> Those numbers indicate a mortality rate between 16:1,000 and 26:1,000.<sup>[79]</sup> There is no data available on the number of civilians injured during the battle. Up to 40% of the buildings and homes in Fallujah were completely destroyed, while the rest sustained "significant" or "major" damage.<sup>[80]</sup> The battle left up to 200,000 residents temporarily homeless, and only 30% had returned to the city by March 2005.<sup>[81]</sup> In 2010, researchers found that residents experienced increases in birth defects, infant deaths, and cancer following the battle, as well as a "remarkable reduction in the sex ratio" in the cohort born one year later.<sup>[82]</sup> Researchers attributed those effects to environmental contamination, and speculated that it may have been caused by depleted uranium found in certain munitions employed by the U.S. military. Others suspected they may have been due to white phosphorus exposure.<sup>[83]</sup>

Based on the two case studies presented above, what generalizations can we make about military necessity in urban warfare? The DoD defines military necessity as "the principle that justifies the use of all measures needed to defeat the enemy as quickly and efficiently as possible that are not prohibited by the law of war."<sup>[84]</sup> In both Hue and Fallujah, the urban terrain was itself the military objective. In order to defeat the enemy, U.S. and partner forces had to clear the cities of enemy fighters. However, the urban terrain advantaged the defenders in both cases. The myriad challenges of the urban environment presented a constant dilemma for U.S. forces. They had to figure out how to defeat enemy forces as quickly and efficiently as possible, while suffering as few casualties and causing as little collateral damage as possible. These two goals are more directly opposed in urban combat than any other kind. In both cases, U.S. forces employed destructive firepower to achieve freedom of maneuver. In Hue, however, they had another nonlethal option for escalation. They used CS gas extensively to overcome the military advantage that the urban terrain provided enemy fighters in the defense.



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Table 2 shows a comparison between the casualty rates for civilians in Hue and Fallujah as a result of collateral damage. While the battle caused extensive destruction in Hue, RCAs almost certainly reduced civilian casualties. By prohibiting the use of RCAs as a method of warfare, the CWC caused military forces to resort to more destructive means of achieving their military objectives. In Fallujah, U.S. troops employed artillery, mortars, and close air support more heavily and caused massive collateral damage, notwithstanding advancements in precision-guided munitions. Additionally, they allegedly used the toxic properties of white phosphorus to force enemy fighters out of their fighting positions, essentially the same tactical effect achieved through the use of RCAs in Hue but with far more lethal and destructive effects on combatants and the urban environment.

**Table 2. Battle Damage Statistics**

	Hue	Fallujah
Land area of city	13 km <sup>2</sup>	21 km <sup>2</sup>
Civilian population (during battle)	140,000*	30,000-50,000
Population density (during battle)	10,769/km <sup>2</sup>	1,428-2,380/km <sup>2</sup>
Defending forces (enemy)	5,000+ NVA and Viet Cong	4,500-5,000 Insurgents
Density of enemy fighters	384/km <sup>2</sup>	238/km <sup>2</sup>
Length of battle	25 days	6 days
Close air support sorties	85	386
Close air support ordnance expended	235,750 pounds	Unknown
Artillery and mortar rounds expended	Unknown	14,000+
Civilian deaths resulting from collateral damage	944-1,200	800
Civilian mortality rate	7:1,000 to 9:1,000	16:1,000 to 26:1,000
Civilian injury rate	14:1,000	Unknown

The data in Table 2 illustrate that U.S. forces caused nearly as many civilian casualties during the six-day battle in Fallujah (800) as they did over the course of 25 days in Hue (944-1,200). This is despite the fact that the vast majority of Fallujah's civilian population had evacuated the city prior to the battle, a luxury not afforded to the residents of Hue. In fact, when accounting for relative population size, the civilian mortality rate was between two and four times higher in Fallujah. Had noncombatants not had the opportunity to evacuate Fallujah prior to the battle, civilian casualties would have been much higher still.

In terms of physical destruction, Fallujah appears at first to have been fought more discriminately than Hue. Only about 40% of Fallujah was completely destroyed, while Hue suffered more extensive destruction of nearly 80%. Some have praised the precision and discrimination displayed through the use of "surgical air strikes" and precision-guided munitions in Fallujah.<sup>[85]</sup> However, it might be more appropriate to attribute the relatively moderate physical destruction to the lower density of enemy fighters occupying Fallujah (238/km<sup>2</sup>) as compared to Hue (384/km<sup>2</sup>). In absolute terms, the destruction of Fallujah was almost certainly more extensive; between 7,000-10,000 of the city's 50,000 homes were completely destroyed, as many as two homes for every enemy fighter in the city.<sup>[86]</sup> In terms of displaced persons, a similar percentage of residents were left homeless in both cities: up to 82% in Hue, and up to 80% in Fallujah. These numbers defy the notion that the precision afforded by PGMs is an adequate substitute for the discrimination afforded by RCAs.

When it comes to the use of RCAs in urban warfare, military necessity and humanitarian interests overlap. On the urban battlefield, military necessity dictates that troops must find a way to maneuver freely through cities from a position of great disadvantage. In both Fallujah



and Hue, U.S. forces often did this by destroying occupied structures with high explosives, but the lack of a nonlethal alternative in Fallujah meant that they resorted to destructive tactics more quickly and more frequently. Furthermore, it probably led U.S. forces to adapt a lethal munition—white phosphorus—to achieve tactical effects that might otherwise have been achieved with nonlethal RCAs. Before their prohibition, RCAs employed this way certainly mitigated humanitarian costs in urban combat. This convergence of military necessity and humanitarian interests demonstrates that there is a role for RCAs that policymakers, military leaders, and humanitarians have a duty to consider when contemplating the future of urban warfare and the laws that govern it.

### Policy Implications

If the prohibition of riot control agents does indirect harm in the context of urban warfare, the trend toward increased levels of destruction and civilian casualties will continue as the world continues to urbanize. Recent urban battles seem to confirm that forecast. In the nine-month battle to liberate Mosul from the Islamic State, the U.S.-led coalition killed at least 3,200 civilians with airstrikes, artillery, and mortar fire.<sup>[87]</sup> This level of human suffering demands that policymakers and military leaders take action to render urban warfare more humane.

The United States must take action to revise the CWC's prohibition against the use of RCAs as a method of warfare and reintroduce RCAs into the military's arsenal. Executive Order (E.O.) 11850 reserves the United States' right to use RCAs "in defensive military modes to save lives," including four specified situations:

- (a) Use of [RCAs] in riot control situations in areas under direct and distinct U.S. military control, to include controlling rioting prisoners of war.
- (b) Use of [RCAs] in situations in which civilians are used to mask or screen attacks and civilian casualties can be reduced or avoided.
- (c) Use of [RCAs] in rescue missions in remotely isolated areas, of down aircrews and passengers, and escaping prisoners.
- (d) Use of [RCAs] in rear echelon areas outside the zone of immediate combat to protect convoys from civil disturbances, terrorists and paramilitary organizations.<sup>[88]</sup>

Why is it permissible to use RCAs when civilians are used to mask or screen attacks, or against prisoners of war who have already been rendered *hors de combat*, but not against fortified enemy combatants using human shields in the defense?<sup>[89]</sup> The President should amend E.O. 11850 to reflect the changing context of modern war. The amendment should authorize the use of RCAs during military operations in urban terrain when civilians are being used to shield enemy combatants, or when it is difficult or impossible to discriminate between combatants and noncombatants. Such an order is likely to spark intense criticism from some in the international community, such as the Organisation for the Prohibition of Chemical Weapons (OPCW). However, the order itself would not violate the CWC, and would be an important first step in the process of revising current humanitarian norms.

Furthermore, the military should study how the use of RCAs can benefit both humanitarian interests and military necessity in an urban warfare context. This article provides a starting point, but should be expanded to include additional case studies. Researchers should also seek to incorporate quantitative methods to confirm or deny the findings in this paper. The U.S. Army War College, the Marine Corps War College, and the National Defense University would be ideal proponents for this research. DoD simulations centers could employ advanced modeling and simulation technologies to test whether the employment of RCAs might improve tactical effectiveness while reducing civilian deaths and collateral damage in densely populated urban terrain. Simulations should recreate historical urban battles and experiment with the use of RCAs as an alternative to artillery and air strikes. Researchers should compare simulated collateral damage and friendly casualties with the historical record to determine whether RCAs might have provided benefits on the battlefield.

If further research and simulations produce positive results, researchers and the military should widely publicize their findings and engage humanitarian organizations in an effort to attract support for an eventual amendment to the CWC. Passing an amendment requires the approval of a majority of the 193 states parties, with no states parties voting against. Furthermore, amendments must be considered by an Amendment Conference immediately following a regular session of the Conference of States Parties that takes place every five years.<sup>[90]</sup> The next regular session is scheduled for 2023, giving the United States two years to engage in the process of revising existing humanitarian norms surrounding RCAs. In the meantime, executive branch agencies should engage allies and partners around the world on this important topic. Ideally, the amendment would simply remove the prohibition of riot control agents as stated in Article 1, paragraph 5. However, member states may find reason to keep the prohibition and add some caveat that allows for the use of RCAs in urban warfare or when combatants and noncombatants are intermixed, rendering the appropriate level of discrimination impossible.

There may be chemical agents other than CS gas that could be adapted to urban warfare, such as fentanyl. In 2002, the Russian military used a fentanyl derivative to end a hostage crisis at a theater in Moscow. Russian commandos freed 851 of the 979 hostages from a



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theater held by heavily armed Chechen terrorists. Russian authorities made a number of mistakes during the operation, including miscalculating the dosage required to neutralize the terrorists, which caused the deaths of 128 hostages.<sup>[91]</sup> The incident demonstrated that fentanyl gas is probably not ideal for law enforcement operations.

Nevertheless, fentanyl might be more appropriate in an urban warfare context that requires a different set of calculations regarding necessity and risk. Consider the incident during the battle of Mosul in 2017, when a U.S. airstrike killed more than 100 civilians taking shelter from the fighting in a residential neighborhood. Responding to a request for air support from Iraqi forces who were pinned down by sniper fire, the U.S. Air Force dropped a GBU-38 JDAM on the structure the snipers were occupying. The bomb impacted exactly where intended, but triggered a secondary explosion that caused the building to collapse and killed most of the civilians inside.<sup>[92]</sup> A mortar shell capable of releasing concentrated fentanyl gas might have neutralized the snipers without collapsing the building. More research is required to assess fentanyl's potential use as a riot control agent.<sup>[93]</sup>

### Conclusion

This article does not constitute unimpeachable evidence that the prohibition of riot control agents as a method of warfare is unequivocally harmful; nor does it intend to. Its purpose is to start a conversation about the potential unintended consequences of humanitarianism, and of the Chemical Weapons Convention in particular. The evidence presented herein simply illustrates the possibility that international humanitarian law, though written with the best of intentions, may not be capable of adapting at the speed of warfare. Treaties and conventions written in the 20<sup>th</sup> century may have unforeseen and unintended consequences in 21<sup>st</sup> century conflict. Too much is at stake in war to conduct it with blind faith in the laws that constrain its means. Cities are growing ever larger and more densely populated, and wars are more often being fought in cities. Humanitarians, policymakers, and military leaders thus have a duty to consider how international laws perform on the modern battlefield, and try to predict how they will perform in the future. Those that do not fulfill their intended purpose should be revised or discarded.

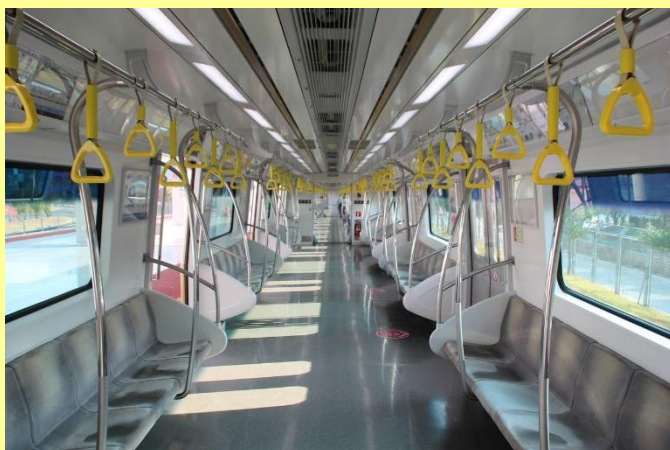
►► References and bibliography are available at source's URL.

*MAJ Ryan N. Mannina is an infantry officer in the U.S. Army and currently serves in the 2d Cavalry Regiment at Rose Barracks, Germany. His previous assignments include the 3rd Infantry Division, the 75th Ranger Regiment, and the 4th Infantry Division. He holds a Bachelor of Science degree from the United States Military Academy at West Point and a Master of Arts in Security Studies from Georgetown University's Walsh School of Foreign Service.*

## This Drone will 'Sniff' Hazardous Gas in Subway Trains

Source: <https://i-hls.com/archives/108633>

May 21 – A drone-based micro-sensor technology will identify explosives from the air. Professor Otto Gregory of the College of Engineering at the University of Rhode Island has developed drone deployed sensors that can identify explosive materials, particles



from a potentially deadly virus, and illegal drugs at the part-per-quadrillion level – single-molecule detection.

“The platform is broad-based, so you can apply it to lots of different venues, with lots of different end-users,” said Gregory.

The research is largely funded by the Department of Homeland Security, as well as by other government agencies. “This project started as a DARPA-funded project mainly to look at toxic gases — threats that would be used in gas warfare, and when I say gases, chemical weapons,” said Gregory on GoLocal LIVE (golocalprov.com).

Gregory said the directive from the federal funding agencies was to look at “threats that could be put on airplanes, put in public transportation venues, subway trains

— all those venues that

were targets.”

Gregory said the Department of Defense may be interested in using it to monitor wounds in soldiers. If a soldier or first responder suffered an open wound from shrapnel, Gregory's



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sensors could help determine if the wound became infected. The development can also detect roadside improvised explosive devices (IEDs).

According to Gregory, the U.S. Coast Guard has shown an interest in using the technology to “sniff out” illegal drugs being smuggled into the United State aboard ships.

“By decreasing the thermal mass of the sensor, we’ve decreased the amount of power required to run the sensor,” said Gregory. “We started with a thermal mass on the order of grams. Now the thermal mass of our sensor is on the order of micrograms.”

He says one of the keys to making a device as small and powerful as Gregory’s is to find the right battery. “We have partnered with a company that makes very thin, low-mass batteries in Colorado called ITN Energy Systems,” Gregory said. “They make lithium batteries that are no thicker than a piece of paper. The process has been about finding the right partners, which helps us improve our catalysts and improve our sensor platform.”

## BARDA researching treatment for sulfur mustard corneal injury

Source: <https://homelandprepnews.com/stories/66237-barda-researching-treatment-for-sulfur-mustard-corneal-injury/>

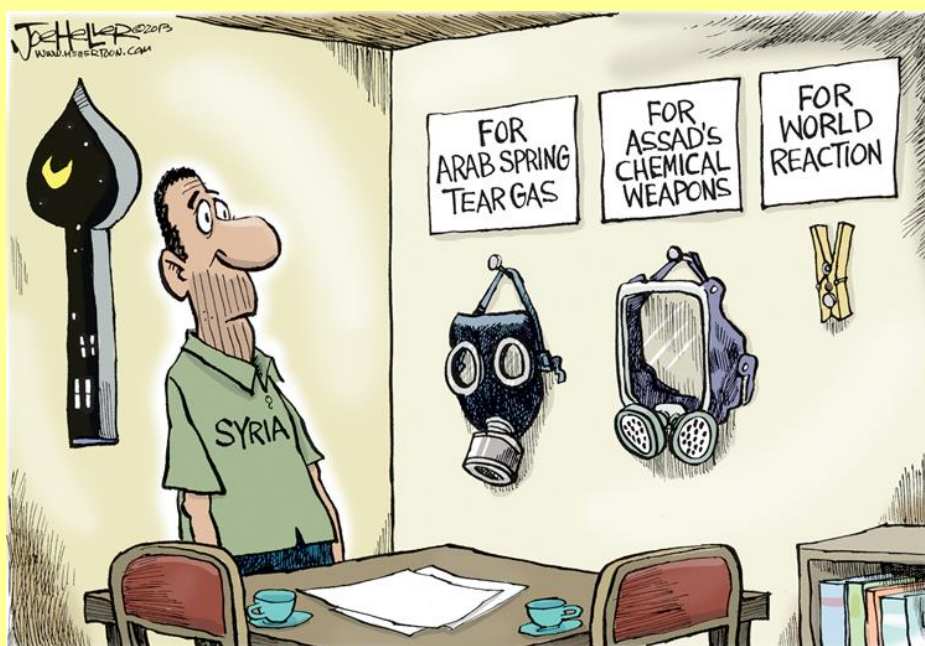
Apr 01 – Biomedical Advanced Research and Development Authority (BARDA) officials said the agency has provided funding for studies evaluating the therapeutic potential of aCT1 eye drops in models of sulfur mustard corneal injury.

BARDA officials said the effort is via its Division of Research, Innovation and Ventures (DRIVE) Repurposing Drugs in Response to Chemical Threats (ReDIRECT) program, indicating aCT1 eye drops is the second compound to be investigated as a repurposing candidate under the ReDIRECT program, which is a partnership between DRIVE and the Chemical, Biological, Radiological and Nuclear (CBRN) medical countermeasures Branch.

Researchers maintain aCT1 is a synthetic peptide shown to promote wound healing while tempering pathological inflammation in the skin and eye. A topical formulation of aCT1, called Granexin gel, is in late-stage trials (Phase 2/3) for cutaneous radiation injury, cutaneous scarring from breast reduction surgery, and thermal burns.

The study is slated to probe the therapeutic potential of an ophthalmic formulation for long-term ocular injuries caused by blister agents, specifically sulfur mustard, per BARDA, adding repurposing aCT1 as a medical countermeasure (MCM) against mustard gas keratopathy has the potential to improve the quality of life after chemical exposure by preventing the vision loss.

The studies would assist efforts to establish deployable capabilities to be used to reduce adverse health effects following ocular exposure to sulfur mustard.



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# BIO NEWS





## Greek nano-test that will measure viral loads

Source: <https://www.newgreektv.com/news-in-english-for-greeks/greece/item/33357-greek-nano-test-that-will-measure-viral-loads>

Apr 21 – The project for the innovative rapid test is in the final phase of development, which in addition to the detection of COVID will quantify the viral load, while also calculating the time of infection of the user. And it will have a Greek signature.

It is the result of a research effort by Greek scientists in the field of nanotechnology and organic electronics and is part of the European research program Real Nano, which is coordinated by the LTFN Nanotechnology Laboratory of the Aristotle University of Thessaloniki.

The specific test, according to [iatronet.gr](http://iatronet.gr) will be a valuable diagnostic tool in the hands of health services and an additional weapon in the fight against the pandemic, as it will add critical additional information, in addition to confirming that someone is carrying the coronavirus.

According to the director of the Laboratory, Professor of Nanotechnology at Thessaloniki University, Stergios Logothetidis, "an effort is being made to complete the next period, with the aim of being ready and presenting results at the annual international conference Nanotechnology 2021 to be held in early July in Thessaloniki."

He added that "the rapid test that will inform about the amount of viral load in our body was added last to the European project and mainly Greek scientists from the LTFN Laboratory, the companies BL NanoBioMed and Organic Electronics Technologies, as well as the Association of Greek Organic & Printed Electronics Companies (HOPE-A) are participating in its development."

The exhibition that will accompany the conference is expected to present a series of innovative products and applications that have been developed under the "umbrella" of the Laboratory, such as high protection masks with nanofilters, face shields, biosensors, etc.

## Vaccine Takis / Rottapharm: how does it work and why is it different from others?

Source: <https://www.takisbiotech.it/index.php/news>

Apr 2021 – The **clinical trial** for the **second Italian vaccine**, developed by the Roman company Takis in collaboration with Rottapharm biotech, has started last week. The first volunteer vaccinated with COVID-eVax is **Luca Rivolti**, a 21-year-old man from Monza. **COVID-eVax**, is a **DNA-based vaccine**, different from all the others already authorized. It is the very first vaccine of this type to reach clinical stage in Europe. **Eighty** volunteers will participate in the first phase of the experimentation between the **San Gerardo** hospital in **Monza** and the **Pascale** hospital in **Naples**. The aim is to test the **safety** of the vaccine and establish the **dose** and **number** of administrations.

### Genetic vaccines against the pandemic

**Takis** was one of the first companies to understand the danger of the new coronavirus and to start the search for a vaccine. The company, specialized in the research of anticancer vaccines, immediately made available its skills and a technology – that of DNA-based genetic vaccines – with the potential to respond quickly to an epidemic that would soon become a worldwide emergency.

**Genetic vaccines** were the first to reach testing and then authorization from regulatory authorities, as they are the fastest to produce. Thanks to modern technologies, synthesis of genetic material in the laboratory takes little time and is also relatively inexpensive. The genetic sequence of the virus was disclosed in January 2020, a few weeks after the news of the first case of COVID-19. It was therefore possible to produce a synthetic version of it in the laboratory in record time. This is the starting point for a genetic vaccine, which does not need the whole virus.

### The DNA vaccine

The Takis vaccine is therefore similar, but at the same time different, compared to the others already authorized. Let's start with the similarities: all vaccines have a common target: the Spike protein, which the coronavirus uses to infect human cells. These are, in fact, genetic vaccines: they do not contain the whole virus, but only a portion of its genetic material, which can be in the form of messenger RNA, encapsulated in fat particles (Pfizer, Moderna) or inside a viral vector harmless to the organism (Astra Zeneca, Reithera, Johnson & Johnson). Or, in Takis case, it can be based on DNA.

The **COVID-eVax** vaccine contains only a fragment of Sars-Cov-2 DNA that encodes a portion of the Spike protein responsible for binding to the ACE-2 receptor on human cells. The purpose of the vaccine, therefore, is to stimulate the production of antibodies that block the entry of the virus into cells, and of lymphocytes that destroy infected cells.



### Why is it different from the others?

DNA is more stable than RNA: it can be stored at the normal temperature of a refrigerator or freezer, and in freeze-dried form even at room temperature, and can be transported without the need for maintaining the cold chain. However, it is a larger molecule: unlike RNA, which is made up of a single strand, DNA has two strands and the classic double helix structure. In other words, to enter cells it needs a procedure called "**electroporation**", which consists of administering a tiny electric shock that temporarily opens pores on the cell membrane, allowing DNA to enter.

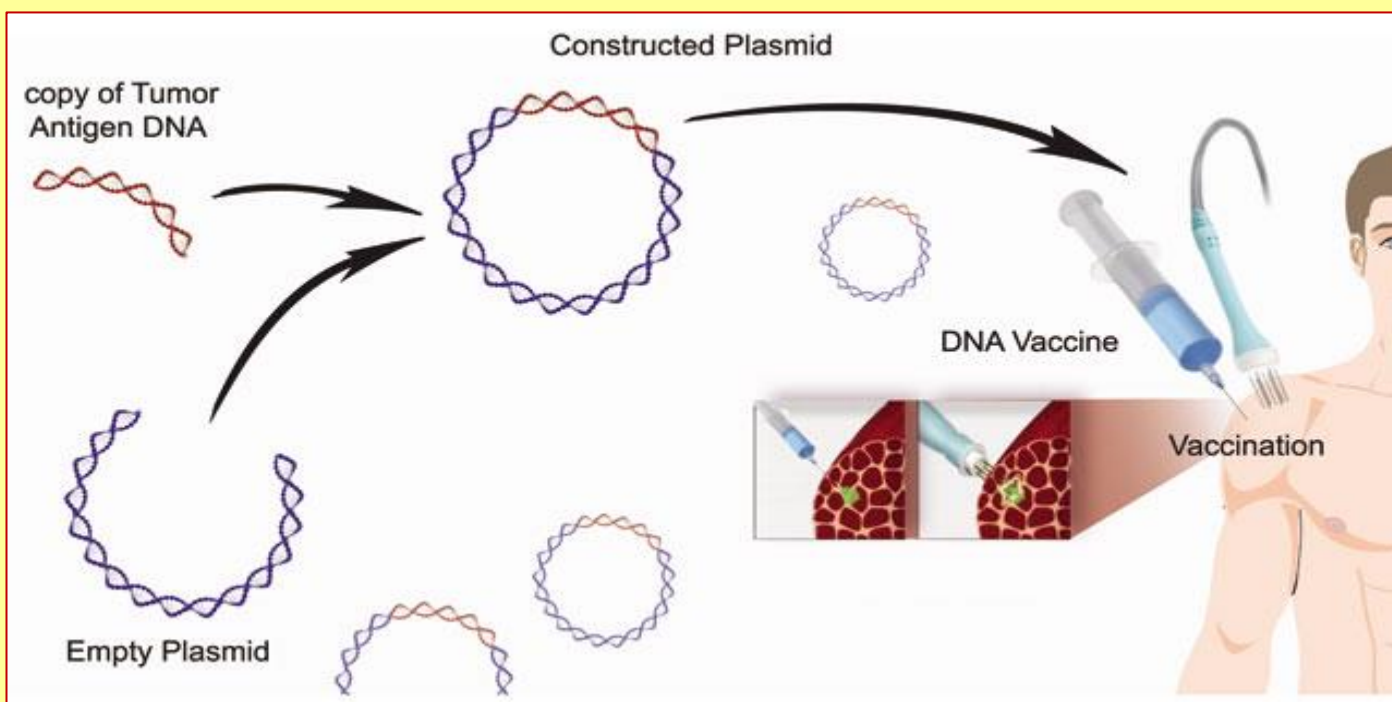
### The vaccine with the gun

This vaccine is not administered with the classic syringe, but with a tool similar to a **gun**. The gun contains the needle to inject the DNA, but also needles with the function of electrodes that transmit an electrical impulse of a few volts - comparable to those of a light bulb - at the injection site. The procedure takes a total of 35 milliseconds and is not painful for the patient, who typically only feels pressure on the arm and a small involuntary contraction of the muscle. It has no permanent effects: its function is only to open transient pores on the cell membrane, which close immediately after the cell's DNA enters. Side effects are likely similar to those of other vaccines, or perhaps even milder, since this type of vaccine does not contain an inactivated virus or excipients that can cause allergic reactions. However, there may be a small bruise at the injection site and pain in the arm.

### The vaccine does not modify the human genome

The vaccine instructs the cell to synthesize a portion of the Spike protein, but **does not modify the DNA** of human cells. The fragment, in fact, is contained in a larger and circular DNA molecule, a plasmid. The plasmid is what in biology is called expression vector: it contains sequences that signal the beginning and the end of the gene to be expressed. The cellular enzymes responsible for reading the DNA recognize these sequences and start producing the corresponding protein. The plasmid, therefore, always remains separate from the human genome.

The theoretical possibility of integration exists, but it has a negligible frequency: in fact it has never been observed in preclinical and clinical evaluations of DNA-based products. Furthermore, plasmid DNA does not remain forever inside the cell, but is lost after a certain number of cell divisions. The probability that a DNA vaccine will integrate into the human genome, in short, is many orders of magnitude lower than the frequency of spontaneous mutations, which can emerge randomly, at any time in the human genome.



### The mechanism of the vaccine

The muscle cells and immune cells residing at the injection site then begin to produce the Spike protein and present it on the surface, mimicking what would happen if there was really an infection in progress. But the vaccinated person **is not infected** and **cannot infect** anyone: the vaccine, in fact, cannot generate the whole virus. The Spike protein, on the other



hand, is like a fingerprint, which teaches the immune system to recognize infected cells and above all stimulates it to produce antibodies capable of neutralizing Sars-Cov-2 infection.

### The preclinical results

The preclinical data of the Takis vaccine were promising: the drug stimulated a good production of antibodies in animal models, which remain in blood circulation for months even after a single injection. Furthermore, the antibodies were able to neutralize the virus in vitro, which means that they prevent the infection of human cells. Some experiments have confirmed that the vaccine prevents the symptoms of the disease in animals that express the ACE-2 receptor, which allows the coronavirus to enter human cells.

### The future of the fight against the pandemic

If the data is confirmed in humans in the **phase I / II trial**, first on 80 and then on 240 patients, the company will prepare for **phase III**, which could start in the autumn. It will also be crucial to monitor coronavirus variants that continue to emerge. Experiments are already underway to test the effectiveness of the vaccine on the main variants isolated to date: the English, South African and Brazilian ones. The Takis vaccine has one major advantage, however: it can be quickly updated based on emerging virus mutations by replacing only a few letters in its sequence, a process that takes a few weeks at most.

The COVID-19 pandemic has accelerated the development of genetic vaccines and provided important proof of concept that this type of approach works. In fact, they represent effective tools for responding quickly to pandemics that could affect us in the future and for viruses with a high mutation rate.

**EDITOR'S COMMENT:** The name of the company "Takis" comes from the Greek word "tachis" (ταχύς) meaning "fast; speedy" – indicating the urgency to have an effective vaccine to fight the pandemic.

## Nutritional supplementation in the midst of pandemic

Source: <https://www.globalresearch.ca/vaccine-makers-destroy-covid-vaccine-safety-studies/5743122>

Among the most important are:

- [Vitamin D](#) — Vitamin D supplements are readily available and one of the least expensive supplements on the market. All things considered, vitamin D optimization is likely the easiest and most beneficial strategy that anyone can do to minimize their risk of COVID-19 and other infections, and can strengthen your immune system in a matter of a few weeks.
- [N-acetylcysteine \(NAC\)](#) — NAC is a precursor to reduced glutathione, which appears to play a crucial role in COVID-19. According to one literature analysis,<sup>20</sup> glutathione deficiency may actually be associated with COVID-19 severity, leading the author to conclude that NAC may be useful both for its prevention and treatment.
- [Zinc](#) — Zinc plays a very important role in your immune system's ability to ward off viral infections. Like vitamin D, zinc helps regulate your immune function<sup>21</sup> — and a combination of zinc with a zinc ionophore, like hydroxychloroquine or quercetin, was in 2010 shown to inhibit SARS coronavirus in vitro. In cell culture, it also blocked viral replication within minutes.<sup>22</sup> Importantly, zinc deficiency has been shown to impair immune function.<sup>23</sup>
- [Melatonin](#) — This boost immune function in a variety of ways and helps quell inflammation. Melatonin may also prevent SARS-CoV-2 infection by recharging glutathione<sup>24</sup> and enhancing vitamin D synthesis, among other things.
- [Vitamin C](#) — A number of studies have shown vitamin C can be very helpful in the treatment of viral illnesses, sepsis and ARDS,<sup>25</sup> all of which are applicable to COVID-19. Its basic properties include anti-inflammatory, immunomodulatory, antioxidant, antithrombotic and antiviral activities. At high doses, it actually acts as an antiviral drug, actively inactivating viruses. Vitamin C also works synergistically with quercetin.<sup>26</sup>
- [Quercetin](#) — A powerful immune booster and broad-spectrum antiviral, quercetin was initially found to provide broad-spectrum protection against SARS coronavirus in the aftermath of the 2003 SARS epidemic,<sup>27,28,29</sup> and evidence suggests it may be useful for the prevention and treatment of SARS-CoV-2 as well.
- [B vitamins](#) — B vitamins can also influence several COVID-19-specific disease processes, including<sup>30</sup> viral replication and invasion, cytokine storm induction, adaptive immunity and hypercoagulability.
- [Type 1 interferon](#) — Type 1 interferon prevents viral replication and helps degrade the RNA. It's available in spray form that you can spray directly into your throat or nose. You can try taking a couple of sprays per day prophylactically, and more if you have a cough, fever or headache.



## Type 1 interferons as a potential treatment against COVID-19

By Erwan Sallard, François-Xavier Lescure, Yazdan Yazdanpanah, and France Mentre

*Antiviral Research*, April 2020; 178:104791

Source: [https://www.researchgate.net/publication/340494206\\_Type\\_1\\_interferons\\_as\\_a\\_potential\\_treatment\\_against\\_COVID-19](https://www.researchgate.net/publication/340494206_Type_1_interferons_as_a_potential_treatment_against_COVID-19)

Type 1 interferons have a broad antiviral activity *in vitro* and are currently evaluated in a clinical trial to treat MERS-CoV. In this review, we discuss preliminary data concerning the potential activity of type 1 interferons on SARS-CoV-2, and the relevance of evaluating these molecules in clinical trials for the treatment of COVID-19.

**In conclusion**, IFN $\beta$ 1 may account for a safe and easy to use scale treatment against COVID-19 in the early stages of infection. Similar treatments had a mixed efficiency against MERS-CoV and SARS-CoV viruses, but *in vitro* studies suggest that SARS-CoV-2 could be substantially more sensitive to IFN-I than other coronaviruses. The current lack of animal model for COVID-19 should not prevent the clinical evaluation of IFN-I treatment, since its safety has already been assessed in numerous independent clinical trials. Publications of data about IFN-based COVID-19 treatment performed in China in early 2020, expected in a near future, should give more accurate information on the re-leverance of this therapy.



► **NOTE:** The photo was added by the Editor as an example of an interferon drug available in the market.

## Clinical Trial Confirms Breakthrough Treatment for COVID-19

Source: <https://www.globalresearch.ca/clinical-trial-confirms-breakthrough-treatment-covid-19/5743173>



Apr 21 – Patients with a self-administered nasal spray application found to have **reduced SARS-CoV-2 log viral load by more than 95% in infected participants within 24 hours of treatment, and by more than 99% in 72 hours.**

Trial concluded that treatment accelerated clearance of SARS-CoV-2 by a factor of 16-fold versus a placebo

Randomized, double-blind, placebo-controlled trial evaluated 79 confirmed cases of COVID-19, the majority heavily-infected with the UK variant

No adverse events were recorded in the group

Submission for Emergency Use in the UK and Canada for the treatment and prevention of COVID-19 is planned immediately

Biotech company SaNOtize Research & Development Corp.,

([SaNOtize](#)), Ashford and St Peter's Hospitals NHS Foundation Trust in Surrey, UK, and Berkshire and Surrey Pathology Services, UK, on

Thursday announced results of clinical trials indicating that

**SaNOtize's Nitric Oxide Nasal Spray** (NONS) represents a safe and effective antiviral treatment that could prevent the transmission of COVID-19, shorten its course, and reduce the severity of symptoms and damage in those already infected.

In a randomized, double-blind, placebo-controlled Phase 2 trial that evaluated 79 confirmed cases of COVID-19, SaNOtize's early treatment for

[COVID-19](#) significantly reduced the level of SARS-CoV-2, including in patients with high viral loads. The average viral log reduction in the first 24 hours was 1.362, which corresponds to a decline of about 95%. Within 72 hours, the viral load dropped by more than 99%. The majority of these patients had been infected with the UK variant, which is considered a variant of concern. There were no adverse health events recorded in the UK trial, or in over 7,000 self-administered treatments given in earlier Canadian clinical trials.

NONS is the only novel therapeutic treatment so far proven to reduce viral load in humans that is not a monoclonal antibody treatment. Monoclonal antibodies are highly specific, expensive and must be administered intravenously in a clinical setting.



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"I expect this to be a major advance in the global battle against the devastating human impacts of the COVID-19 pandemic," said Dr. Stephen Winchester, Consultant Medical Virologist and Chief Investigator of this NHS Clinical Trial. "This simple portable nasal spray could be highly effective in the treatment of COVID-19 and reducing onward transmission. Our trial included patients with a variant of concern and high viral loads yet still demonstrated significant reductions in the levels of SARS-CoV-2, which could be critical in supporting vaccines, preventing future outbreaks and safely reopening economies. Simply stated, I think this could be revolutionary." The SaNOtize treatment is designed to kill the virus in the upper airways, preventing it from incubating and spreading to the lungs. It is based on nitric oxide (NO), a natural nanomolecule produced by the human body with proven anti-microbial properties shown to have a direct effect on SARS-CoV-2, the virus that causes COVID-19. The pharmacology, toxicity, and safety data for NO use in humans has been well-established for decades. The NO molecule released from NONS is identical to the one delivered in its gaseous form to treat persistent pulmonary hypertension, or Blue Baby Syndrome, in newborn babies.

### SaNOtize Seeking Emergency Use Authorization in UK and Canada

SaNOtize is applying to regulatory authorities in the UK and Canada for Emergency Use authorization. Swift approval and ramp-up of manufacturing could facilitate an almost immediate safe return to work, school and society, and spur an economic recovery that is months – if not years – ahead of full global vaccination.

## 6000% Increase in Reported Vaccine Deaths 1st Quarter 2021 Compared to 1st Quarter 2020

Source: <https://www.globalresearch.ca/6000-increase-reported-vaccine-deaths-1st-quarter-2021-compared-1st-quarter-2020/5741588>

## SARS-CoV-2 tests

Source: [https://www.who.int/publications/i/item/WHO-2019-nCoV-vaccines-SAGE\\_recommendation-AZD1222-2021.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-vaccines-SAGE_recommendation-AZD1222-2021.1)

Prior receipt of the vaccine will not affect the results of SARS-CoV-2 nucleic acid amplification or antigen tests for diagnosis of acute/current SARS-CoV-2 infection. However, it is important to note that currently available antibody tests for SARS-CoV-2 assess levels of IgM and/or IgG to the spike or the nucleocapsid protein. The vaccine contains the spike protein; thus, a positive test for spike protein IgM or IgG could indicate either prior infection or prior vaccination. To evaluate for evidence of prior infection in an individual who has received the vaccine, a test that specifically evaluates IgM or IgG to the nucleocapsid protein should be used. A positive nucleocapsid protein-based assay indicates prior infection, while a negative nucleocapsid protein-based assay is expected after vaccination (unless a natural infection has occurred). Antibody testing at an individual level is currently not recommended to assess immunity to COVID-19 following ChAdOx1-S [recombinant] vaccination.

### A touch of history

## Dr Rife's oscillating beam ray

Source: <https://www.theguardian.com/science/2003/apr/03/research.science1>

In the early 1930s, Dr Royal Raymond Rife, an American optics engineer, claimed to be achieving theoretically impossible optical magnifications of over 30,000 times - 10 times more powerful than today's best microscopes. Soon after, Rife announced that he could destroy bacteria by blasting them with electromagnetic waves oscillating at frequencies specific to each target organism. According to his supporters, Rife cured significant numbers of people infected with a number of common but dangerous infections, including typhoid, salmonella and influenza. But his most controversial claim was that his device could kill the virus-like organisms, which he dubbed "BX", responsible for cancer. Rife and his team claimed to have cured 15 "hopeless" cancer patients after 60 days' treatment.

Rife's ray tube system was installed in several clinics and his results were corroborated by numerous scientists and doctors. In 1939 he was invited to address the Royal Society of Medicine, which had also approved his findings, and he subsequently formed the Rife Ray Beam Tube Corporation, to build models for hospitals and clinics.



But with the death of one of his key supporters, Rife found himself under sudden and prolonged assault from the American Medical Association, who banned use of his beam ray to treat patients. Within a year the dream was over, Rife a broken man. To this day it remains unclear why the AMA turned on Rife, a pharmaceutical conspiracy being an obvious, if paranoid conclusion.

Rife died in 1971 but remains one of the heroes of the fringe science underground, and blueprints for his microscopes and beam rays are highly prized. Last year, an English group claimed to have found a 1939 beam ray walled up in a doctor's surgery and, while making no medical claims for the device, they intend to replicate Rife's experiments.

Meanwhile, mainstream scientists are re-examining the links between certain viruses and cancers. The papilloma virus, for example, is known to cause cervical cancer, while breast cancer has been linked to an HIV-like virus. If the UK team can get the Rife device operational, we may yet see a beam ray in every home and Royal Rife will get the place in history he thought he deserved.

## China nixed meeting on biowarfare concerns as coronavirus queries increased

By Bill Gertz (The Washington Times)

Source: <https://www.washingtontimes.com/news/2021/apr/25/china-nixed-biowarfare-meeting-coronavirus-queries/>

Apr 25 – [China](#) canceled an online meeting with American officials last year to discuss mounting concerns regarding secret Chinese biological weapons work in possible violation of an international treaty, according to a new report.

The meeting between [State Department](#) arms control officials and their Chinese counterparts was planned as a video conference rather than in person because of COVID-19 travel curbs. Chinese officials, citing unspecified technical problems, failed to show for the session, according to an account published this month in the [State Department](#)'s annual report on compliance with arms agreements.

It was the first time in four years that [Beijing](#) refused to meet with U.S. officials to discuss suspected Chinese violations of the 1975 Biological and Toxin Weapons Convention, known as the BWC, fueling concerns that [Beijing](#) is working on weapons that kill with microbes or toxins.

The latest arms compliance report also contains a slight but significant change in wording from last year's report, suggesting U.S. intelligence agencies have clarified some questions about [China](#)'s covert biological warfare work. The 2020 report said [China](#) had engaged in activities with potential military applications. The 2021 report omits the word "potential," indicating that the finding is based on new intelligence regarding the research.

One possible source for the new information is a People's Liberation Army doctor who defected to a European nation last year with details on [Beijing](#)'s biowarfare program. The Washington Times reported the defection in September.

[China](#)'s cancellation of the biological warfare meeting was revealed as the COVID-19 pandemic raised new questions about whether the virus behind the disease leaked from a Wuhan laboratory linked to secret [Chinese military](#) research.

The annual compliance report examines the records of the U.S. and a number of other states complying with international agreements on nuclear proliferation, chemical and biological weapons, and missile testing. This year's report had critical remarks on [China](#), [Iran](#), [North Korea](#), Syria, Russia and other countries.

A virus lab leak is one of two theories about the origin of the coronavirus that causes COVID-19, Director of National Intelligence Avril Haines told Congress this month. The second is a leap of the virus from a bat to a host animal and then to humans, although no animal host has been identified so far.

Many scientists have ruled out the idea that the virus was engineered as a biological weapon, but other scientists and some American officials say that prospect should not be dismissed, based on mounting evidence of a covert [Chinese military](#) biological warfare program.

Retired Israeli Lt. Col. Dany Shoham, an expert on [China](#)'s biological warfare program, stated in an article published in December that the probability of human intervention in creating the coronavirus in a lab is higher than a naturally occurring, spontaneous evolutionary virus adaptation.

A Chinese Embassy spokesman did not return an email seeking comment, though [Beijing](#) has long rejected the idea that the Wuhan lab could have been the source of the virus behind the global pandemic.

The compliance report said [China](#) appears to be engaged in secret work on germ weapons while keeping details of the work secret. According to the report, the [Chinese military](#) carried out biological activities with dual-use, military-civilian applications. The activities "raise concerns regarding [[China](#)]'s compliance with Article I of the [Biological Weapons Convention]," the report said.



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Article 1 of the convention binds signatories to “never in any circumstances” produce microbial or biological agents that are not for peaceful use. It also prohibits signatories from making weapons or delivery systems for biological agents or toxins.

[China](#) signed the convention in 1984 and under its terms was to disclose all current and past germ weapons efforts.

“The United States has compliance concerns with respect to [Chinese military medical institutions](#)’ toxin research and development because of the dual-use applications and their potential as a biological threat,” the report states.

[China](#) has more than 40 military research institutes run by the People’s Liberation Army that are said to be engaged in covert biological weapons work.

A senior [State Department](#) official disclosed last year that secret Chinese biological warfare work includes engineered weapons designed to attack specific ethnic groups with pathogens. “We are looking at potential biological experiments on ethnic minorities,” the official said in May.

### ‘Genetic attacks’

Statements by [Chinese military](#) officials have backed the intelligence on ethnic biological warfare weapons.

Retired Chinese Gen. Zhang Shibo wrote in a 2017 book that biotechnology progress had increased the danger of the use of offensive bioweapons, including those capable of “specific ethnic genetic attacks.”

At a United Nations conference in 2011, a Chinese official made a formal submission for the first time revealing [Beijing](#)’s concerns about population-specific bioweapons capable of attacking ethnic groups. The concerns were laid out in a U.N. guidebook based on a 12-nation conference on the BWC in 2011.

U.S. government analysts also do not believe that [China](#) has totally eliminated its biological warfare program as required by the convention, the report said. [China](#)’s offensive biological weapons program began in the 1950s and continued through the 1980s. [Beijing](#), critics contend, has failed to disclose details as required by the convention.

“As part of its historical BW program, [China](#) had probably weaponized ricin, botulinum toxins and the causative agents of anthrax, cholera, plague and tularemia,” said the report, noting continued biotechnology infrastructure and cooperation with unspecified “countries of concern.”

U.S. intelligence analysts contend that the Chinese activities may run counter to the convention’s restrictions that prohibit development, production or stockpiling of biological agents or toxins that are not for peaceful purposes. The canceled online meeting would have clarified some of the questions. The U.S. had been holding annual meetings with the Chinese on the topic from 2017 to 2019.

The [State Department](#) in January provided the first public information about [Chinese military](#) biological weapons research.

It included a fact sheet on the Wuhan Institute of Virology, a complex with secure laboratories that is known to be engaged in research on bat coronaviruses like the one that causes COVID-19. According to the fact sheet, [China](#)’s “deadly obsession with secrecy and control comes at the expense of public health in [China](#) and around the world.”

The fact sheet revealed for the first time that several researchers at the Wuhan Institute of Virology became sick in the autumn of 2019 with COVID-like symptoms.

“This raises questions about the credibility of WIV senior researcher Shi Zhengli’s public claim that there was ‘zero infection’ among the WIV’s staff and students of SARS-CoV-2 or SARS-related viruses,” the fact sheet said. “Accidental infections in labs have caused several previous virus outbreaks in [China](#) and elsewhere, including a 2004 SARS outbreak in [Beijing](#) that infected nine people, killing one.”

The report also revealed that Chinese researchers at the WIV had been carrying out experiments on a virus called RaTG13, a bat coronavirus that is highly similar to the COVID-19 virus, since 2016.

“The WIV has a published record of conducting ‘gain-of-function’ research to engineer chimeric viruses,” the report said. “But the WIV has not been transparent or consistent about its record of studying viruses most similar to the COVID-19 virus, including RaTG13, which it sampled from a cave in Yunnan Province in 2013 after several miners died of SARS-like illness.”

A World Health Organization-Chinese government investigation into the origin of the COVID-19 virus did not mention the [State Department](#) facts in its final report. It concluded that the lab leak theory was “highly unlikely” and not worth further scientific study for now.

### Thorough accounting

[China](#) has consistently and ardently denied that the virus came from a Wuhan laboratory.

Critics say [China](#) is spreading disinformation about the virus’ origin. Chinese officials have suggested that the virus originated in a U.S. laboratory and was brought to [China](#) by visiting



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American military troops. [Beijing](#) also has claimed the virus entered [China](#) on frozen food packaging, something experts dismissed as unlikely.

The [State Department](#) report said a thorough inquiry into the virus must include a full accounting of why the Wuhan lab apparently altered and removed online records of work on RaTG13 and other viruses. The fact sheet also contended that significant secret military research was being carried out at the Wuhan facility, including laboratory animal experiments on behalf of the [Chinese military](#) since at least 2017.

“Secrecy and non-disclosure are standard practice for [Beijing](#),” the report said. “For many years the United States has publicly raised concerns about [China](#)’s past biological weapons work, which [Beijing](#) has neither documented nor demonstrably eliminated, despite its clear obligations under the Biological Weapons Convention.”

The National Institutes of Health in 2015 provided over \$3 million in funding to the WIV through the New York-based EcoHealth Alliance. The Trump administration cut off the funding in April 2020.

The [State Department](#) said the United States and other donors that have funded or collaborated with WIV research “have a right and obligation to determine whether any of our research funding was diverted to secret [Chinese military](#) projects at the WIV.”

The report said the disclosures about the institute “just scratch the surface of what is still hidden about COVID-19’s origin in [China](#).”

The compliance report also dealt with other arms control issues and said [China](#) continued stepped up work at its Lop Nur nuclear weapons test site in western [China](#). The activities raise concerns that [Beijing](#) is secretly conducting nuclear weapons tests contrary to a non-testing moratorium.

“In recent years, [China](#)’s possible preparation to operate its Lop Nur test site year-round and lack of transparency on its nuclear testing activities have raised concerns regarding its adherence to the U.S. zero-yield standard,” the report said. “[China](#) continued work at its Lop Nur nuclear weapons test site throughout 2020.”

[China](#), the report said, also continued to sell missiles and related technology contrary to the 1987 Missile Technology Control Regime, an informal anti-proliferation accord, and failed to adhere to a 2000 commitment made to the United States not to assist any country in developing ballistic missiles capable of delivering nuclear weapons by selling missiles and equipment to [Iran](#) in 2020.

Few details were provided.

“Although the United States has asked that [China](#) investigate and put a stop to such activities, most of these cases remain unresolved,” the report said.

Sanctions were imposed last year on eight Chinese companies under the [Iran](#), [North Korea](#), and Syria Nonproliferation Act for transferring missile technology to [Iran](#).

A United Nations panel of experts reported several years ago that [China](#) provided [North Korea](#) with trucks that were converted into transporter-erector launchers for Pyongyang’s long-range nuclear missiles. [North Korea](#)’s mobile intercontinental ballistic missiles have been showcased in military parades carried on Chinese-designed road-mobile launchers.

**EDITOR’S COMMENT:** The chapter about “ethnic weapons” sounds a bit strange. An ethnic weapon is supposed to be directed against a specific population, not the entire planet. Such a weapon will ensure that the offender’s population would be sage or minimally affected. This hypothesis although it is not impossible, is not a very pragmatic one (at least with existing evidence).

## Facemasks in the COVID-19 era: A health hypothesis

By Baruch Vainshelboim

*Med Hypotheses*. 2021 Jan;146:110411

Source: <https://www.sciencedirect.com/science/article/pii/S0306987720333028?via%3Dihub>

### Abstract

Many countries across the globe utilized medical and non-medical facemasks as non-pharmaceutical intervention for reducing the transmission and infectivity of coronavirus disease-2019 (COVID-19). Although, scientific evidence supporting facemasks’ efficacy is lacking, adverse physiological, psychological and health effects are established. It has been hypothesized that facemasks have compromised safety and efficacy profile and should be avoided from use.





### Physiological and Psychological Effects of Wearing Facemask and Their Potential Health Consequences.

Physiological Effects	Psychological Effect	Health Consequences
<ul style="list-style-type: none"> <li>• Hypoxemia</li> <li>• Hypercapnia</li> <li>• Shortness of breath</li> <li>• Increase lactate concentration</li> <li>• Decline in pH levels</li> <li>• Acidosis</li> <li>• Toxicity</li> <li>• Inflammation</li> <li>• Self-contamination</li> <li>• Increase in stress hormones level (adrenaline, noradrenaline and cortisol)</li> <li>• Increased muscle tension</li> <li>• Immunosuppression</li> </ul>	<ul style="list-style-type: none"> <li>• Activation of “fight or flight” stress response</li> <li>• Chronic stress condition</li> <li>• Fear</li> <li>• Mood disturbances</li> <li>• Insomnia</li> <li>• Fatigue</li> <li>• Compromised cognitive performance</li> </ul>	<ul style="list-style-type: none"> <li>• Increased predisposition for viral and infection illnesses</li> <li>• Headaches</li> <li>• Anxiety</li> <li>• Depression</li> <li>• Hypertension</li> <li>• Cardiovascular disease</li> <li>• Cancer</li> <li>• Diabetes</li> <li>• Alzheimer disease</li> <li>• Exacerbation of existing conditions and diseases</li> <li>• Accelerated aging process</li> <li>• Health deterioration</li> <li>• Premature mortality</li> </ul>

The current article comprehensively summarizes scientific evidence concerning wearing facemasks in the COVID-19 era, providing proper information for public health and decisions making.

### Human-to-cat COVID-19 transmission affirmed in new study

A new study is offering the strongest evidence to date of COVID-19 transmission from human to cat. The research builds on anecdotal reports but experts stress there is no evidence so far of viral transmission from domestic cats to their owners. [Read more](#)

### COVID-19 Causes More Pregnancy Complications Than We Thought, Study Shows

Source: <https://www.sciencealert.com/study-finds-covid-causing-more-pregnancy-complications-than-we-thought>

Apr 26 – Like everything in this [pandemic](#), the knowledge we have about how [COVID-19](#) affects pregnancy has changed since we first learnt about the [virus](#) at the start of 2020.

Unfortunately, gathering information and research in this area has been slower than many doctors would like, and a new study has now found that pregnancy risks could be greater [than what we thought](#).

"We now know that the risks to mothers and babies are greater than we assumed at the start of the pandemic and that known health measures when implemented must include pregnant women," [said University of Oxford reproductive medical researcher](#) Stephen Kennedy, one of the study authors.

"The information should help families, as the need to do all one can to avoid becoming infected is now clear. It also strengthens the case for offering vaccination to all pregnant women."



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The researchers followed 2,130 pregnant women from 18 countries between March and October 2020, 706 of them having been diagnosed with COVID-19 and the rest without, as part of a study called [INTERCOVID](#).

For each pregnant woman who was infected with COVID-19, the team then enrolled two pregnant women from the same hospital at the same pregnancy stage and followed them all until the birth and discharge from hospital.

The study was [observational](#), so it can only inform us about the potential links between COVID-19 and pregnancy risks, but the results are consistently worse for those pregnant women with COVID-19.

"This is a great study," University of Montreal Hospital Research Centre epidemiologist Nathalie Auger, who was not involved in the study, [told Science](#).

"They followed women through pregnancy, which is a really great design, and helped confirm the previous studies that are much easier to critique."

The research found that pregnant women with a [SARS-CoV-2](#) infection were at a higher risk for severe infections, intensive care unit admissions, and even death. Babies were also significantly more likely to be preterm and have other complications.

"Women with COVID-19 during pregnancy were over 50 percent more likely to experience pregnancy complications (such as premature birth, pre-eclampsia, admission to intensive care and death) compared to pregnant women unaffected by COVID-19," [says Oxford fetal medicine researcher and study co-author Aris Papageorgiou](#).

"Newborns of infected women were also nearly three times more at risk of severe medical complications, such as admission to a Neonatal Intensive Care Unit – mostly due to premature birth."

"The good news," [he adds](#), "is that the risks in symptomless infected women and non-infected women were similar."

This is important information for those who currently are, or are looking to get pregnant. We've already seen the virus may sometimes be passed [from mother to baby](#), and this study adds to that body of research, finding 13 percent of babies with COVID-19 positive moms also tested positive in the first few days after birth.

Interestingly, the research team also found that caesarean delivery was associated with a higher risk of babies testing positive to the virus, while breastfeeding was not.

This is unlikely to be the last word on this topic, but the research provides much needed clarity for those expecting or considering becoming pregnant while the pandemic continues, and is also valuable information for the authorities managing vaccination programs.

And for those that do contract COVID-19 while pregnant, doctors will have more information to make sure they have a healthy pregnancy and delivery.

►► The research has been published in [JAMA Pediatrics](#).

## Doctors Explain What Happens if You Accidentally Mix COVID Vaccines

Source: <https://www.yahoo.com/lifestyle/doctors-explain-happens-accidentally-mix-143600602.html>

Apr 25 – More than [134 million Americans](#) have received at least one dose of the COVID-19 vaccine—exciting progress in the fight to end the pandemic. But remember: You need a *second* dose of an [mRNA vaccine](#), either from Pfizer or Moderna, in order to be considered [fully vaccinated](#) against the [novel coronavirus](#).

Recently, there have been reports of people getting their second dose from the wrong vaccine manufacturer. [A woman in Oregon said](#) she was accidentally given a dose of the Moderna COVID-19 vaccine after receiving her first shot of the Pfizer-BioNTech vaccine.

She said she received her Pfizer dose in mid-January, when she was seven months [pregnant](#). "I felt [horrible for a few days](#). I was light-headed, having chills, and being seven months pregnant, that worried me," she said. Burgess didn't want to experience that again while pregnant, so she [delayed getting her second dose](#) until April 5, after she had her baby.

Soon after, she realized she was given the wrong vaccine. "At that point, I immediately started Googling," she said. "In my head, I'm freaking now, like, that's not right."

Burgess said she called both her primary care doctor and the Centers for Disease Control and Prevention (CDC). Both told her they'd never seen this before. As a precaution, they recommended that she stop breastfeeding her three-week-old son.

Burgess's story (and [others like hers](#)) raise the question: What happens if you accidentally get two different COVID-19 vaccines? Here's what you need to know.



**First, a recap on how the Pfizer-BioNTech and Moderna vaccines work.**

The Pfizer-BioNTech and Moderna vaccines are similar—both are messenger RNA (mRNA) vaccines. An mRNA vaccine works by encoding a portion of the spike protein found on the surface of SARS-CoV-2, the virus that causes COVID-19, according to the [CDC](#). These vaccines use pieces of the encoded protein to prompt an immune response in your body, and antibodies to the virus are developed.

Here's the full list of ingredients in the Pfizer-BioNTech vaccine, per the [Food and Drug Administration](#) (FDA):

- mRNA
- Lipids
- Potassium chloride
- Monobasic potassium phosphate
- Sodium chloride
- Dibasic sodium phosphate dehydrate
- Sucrose

And here's the full list of ingredients for the Moderna vaccine, according to the [FDA](#):

- mRNA
- Lipids
- Tromethamine
- Tromethamine hydrochloride
- Acetic acid
- Sodium acetate
- Sucrose

"These vaccines are very similar," says [Jamie K. Alan, Pharm.D., Ph.D.](#), associate professor of pharmacology at Michigan State University. "They differ in the inactive ingredients, but the mode by which they work is nearly identical."

**Even though the Pfizer and Moderna vaccines are similar, mixing them is not recommended.**

The CDC specifically says in [interim guidance](#) that the COVID-19 vaccines are "not interchangeable," adding that, "the safety and efficacy of a mixed-product series have not been evaluated." Instead, the agency says, both doses of the vaccine series with an mRNA vaccine should be completed with the same product.

However, the CDC does say that in "exceptional situations," where the first dose of the vaccine can't be determined or is no longer available, "any available mRNA COVID-19 vaccine may be administered at a minimum interval of 28 days between doses to complete the mRNA COVID-19 vaccination series."

**What happens if you accidentally mix the vaccines?**

**It's unclear at this point**, but you probably won't have unusual side effects, says infectious disease expert [Amesh A. Adalja, M.D.](#), senior scholar at the Johns Hopkins Center for Health Security. Plus, you'll likely still get the benefits of being fully vaccinated, he says.

[William Schaffner, M.D.](#), an infectious disease specialist and professor at the Vanderbilt University School of Medicine, agrees that mixing vaccines is probably safe and effective. However, he also emphasizes that "mixing and matching has not been explicitly studied."

He also noted that accidentally getting the second dose from the wrong maker is likely to continue happening. "This won't be the first time, by any means—whether inadvertently or because somebody got their vaccine at one place and then wound up at a different place that had a different vaccine," he says.

**What should you do if you accidentally get different COVID-19 vaccines?**

If you end up getting doses of two different mRNA vaccines, you don't need additional doses of either one, the CDC says.

"Because the vaccines that are being interchanged use the exact same technology and are very close to being identical, people will have [very similar immunity](#) after they're fully vaccinated," Dr. Adalja says.

The [CDC notes](#): "In situations where the same mRNA vaccine product is temporarily unavailable, it is preferable to delay the second dose (up to six weeks) to receive the same product than to receive a mixed series using a different product."



### How to avoid accidentally mixing vaccines

In most cases, pharmacies, hospitals, and doctors offices "should have protocols in place so that this doesn't happen," says [Richard Watkins, M.D.](#), an infectious disease specialist and a professor of internal medicine at the Northeast Ohio Medical University. They should be able to access your electronic health records to verify that you're receiving a second dose of the same vaccine.

Once you arrive for your second dose appointment, Dr. Schaffner recommends paying attention to the type of vaccine you're about to receive. Before the vaccine administrator injects you, ask them which vaccine you're about to get.

Can't remember which vaccine you got the first time and your electronic records aren't available? Dr. Adalja says to consult [your vaccination card](#). "The type of vaccine you received should be clearly listed on it," he says.

You can also sign up for [VaxText](#), a free text-message-based platform that records your vaccination date and COVID-19 vaccine name, plus sends out second-dose reminders.

Overall, accidentally getting the wrong vaccine for your second dose isn't something to stress about. "Most of the time, this doesn't happen," Dr. Adalja says.

***This article is accurate as of press time. However, as the COVID-19 pandemic rapidly evolves and the scientific community's understanding of the novel coronavirus develops, some of the information may have changed since it was last updated.***

**EDITOR'S COMMENT:** One important point is missing in this article. Before giving the jab, a detailed history should be taken. If this had been done then there is no chance to accidentally inject a different vaccine. Elementary medical practice! It reminds me of the story of the first patient with Ebola in the US. The nurse at the ED did not ask a simple question: Have you traveled abroad recently? She did not ask; he did not say! He died!

## Israel examining heart inflammation cases in people who received Pfizer COVID shot

Source: <https://news.yahoo.com/israel-examining-heart-inflammation-cases-170911197.html>

Apr 25 – Israel's Health Ministry said on Sunday it is examining a small number of cases of heart inflammation in people who had received Pfizer's COVID-19 vaccine, though it has not yet drawn any conclusions.

Pfizer said it has not observed a higher rate of the condition than would normally be expected in the general population.

Israel's pandemic response coordinator, Nachman Ash, said that a preliminary study showed "tens of incidents" of myocarditis occurring among more than 5 million vaccinated people, primarily after the second dose.

Ash said it was unclear whether this was unusually high and whether it was connected to the vaccine.

Most of the cases were reported among people up to age 30.

"The Health Ministry is currently examining whether there is an excess in morbidity (disease rate) and whether it can be attributed to the vaccines," Ash said.

Ash, who spoke about the issue in a radio interview and during a news conference, referred to it as a "question mark", and emphasized that the Health Ministry has yet to draw any conclusions.

Determining a link, he said, would be difficult because myocarditis, a condition that often goes away without complications, can be caused by a variety of viruses and a similar number of cases were reported in previous years.

Pfizer, asked by Reuters about the review, said it is in regular contact with Israel's Health Ministry to review data on its vaccine.

The company said it "is aware of the Israeli observations of myocarditis that occurred predominantly in a population of young men who received the Pfizer-BioNTech COVID-19 vaccine".

"Adverse events are regularly and thoroughly reviewed and we have not observed a higher rate of myocarditis than what would be expected in the general population. A causal link to the vaccine has not been established," the company said.

"There is no evidence at this time to conclude that myocarditis is a risk associated with the use of Pfizer/BNT COVID-19 vaccine."

Israel has been a world leader in its vaccination rollout, with close to 60% of its 9.3 million population having received the Pfizer vaccine. Its nationwide database has already shown the vaccine to be highly effective in preventing the symptoms and severe illness associated with COVID-19.

Since January, shortly after the vaccine campaign began, daily infections dropped from a peak of more than 10,000 to just 129 before the weekend.



Nadav Davidovitch, director of the school of public health at Israel's Ben Gurion University, said that even if a correlation between the myocarditis cases and the vaccine were established, it did not appear to be serious enough to stop administering the vaccine. "It's a situation that should be looked into, and we need to wait for a final report, but in an interim analysis it seems the risk of getting sick from COVID-19 is much higher than from the vaccine's adverse events, and the risk of peri/myocarditis following the vaccine is low and temporary," he said.

## Staying 6 feet apart indoors does almost nothing to stop the spread of COVID-19, MIT study finds

Source: <https://news.yahoo.com/staying-6-feet-apart-indoors-112732760.html>

Apr 26 – The widely used rule of staying 6 feet away from others does little to affect the risk of exposure to COVID-19 in indoor spaces, according to a new study out of MIT.

According to MIT researchers, the rule is based on an outdated understanding of how the coronavirus moves in closed spaces. They said other variables - like the number of people in a space, whether they wear masks, what they are doing, and the level of ventilation - were much more important.

The 6-foot rule is used in various forms around the world: The Centers for Disease Control and Prevention advises 6 feet of separation indoors and outdoors, while in the UK the figure is 2 meters. In much of Europe, the figure is 1 meter, which is also recommended as a minimum distance by the World Health Organization.

But while such distancing rules are easy to remember, and purport to suit any situation, the new study says they may not be that useful.

►The [study was released online ahead of its publication in the peer-reviewed journal PNAS on Tuesday](#).



It says a better way of controlling indoor exposure is to do individual calculations based on variables for that space.

In some cases, the exposure level might be the same at 6 feet as at 60 feet, [one of the study authors has said](#).

Martin Bazant and John Bush, both MIT professors in applied mathematics, [developed a formula](#) to estimate how long it would take for a person to hit dangerous levels of exposure from one infected person entering a room.

The calculation is more sophisticated version of the [traffic-light system previously proposed by MIT](#). It takes into account the number of people in the room, the size of the space, what they are doing, whether masks are being worn, and what kind of ventilation is in place.

Using this calculation, it could be that the level of exposure is high in some spaces even if people are more than 6 feet away. It could also be lower than expected.

"The distancing isn't helping you that much, and it's also giving you a false sense of security because you're as safe at 6 feet as you are at 60 feet if you're indoors. Everyone in that space is at roughly the same risk, actually," Bazant [told CNBC](#).

Scientific understanding of how the coronavirus moves in the air has challenged earlier assumptions about how best to adapt to minimize its spread.

At the beginning of the pandemic, it was widely believed that the virus traveled via heavier droplets ejected during exhalation, sneezing, or speaking.

But evidence [has long suggested that the virus instead floats around on lighter aerosol droplets](#) that can stay suspended in the air and travel much farther than first thought.

In their calculation, the MIT researchers took into account the effect of having people in the room, and their behavior, on how long the virus would stay suspended in the air.

In a calm environment, these particles would slowly drift to the ground, [the researchers said in their study](#).



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But in an environment in which the air is moving around the room and people are talking, eating, singing, and sneezing, the drops can be suspended in the airflow and mixed throughout the room longer.

The effect can be counteracted by ventilation or filtration to get the virus particles out of circulation in the room.

A [website](#) made available by the researchers shows how this model works in different scenarios.

**For example, if an infected person walks into a classroom hosting 25 people, none wearing masks and all speaking, everyone would be at risk from the coronavirus within 36 minutes, the website says. It doesn't matter if they follow the 6-foot rule.**

**By contrast, if all 25 people in that room were wearing a mask, the air would be safe to breathe for 20 hours, it said.**

**If they were all singing without a mask, they be at risk from the virus within three minutes.**

Public-health bodies have started to acknowledge that the 6-foot rule is not a catchall. In March, the CDC advised that the 6-foot rule [could be brought down to 3 feet in K-12 schools](#).

This weekend, the CDC also [updated social-distancing guidance for children in summer camps](#), saying [they can be within 3 feet of one another](#) except when eating or drinking.

It also suggested that disinfection of surfaces might not be necessary in public spaces, [urging an end to what some have called "hygiene theater."](#)

As for rules dictating social distancing outdoors, Bazant said they are "kind of crazy," [CNBC reported](#). The infected air "would be swept away," Bazant said, making the rule irrelevant.

Unless the space outdoors is crowded, Bazant said, he would feel comfortable being as close as 3 feet even without masks.

Experts have told Insider that when it is possible to stay more than 6 feet away from people, wearing [a mask outside is not always necessary](#).

**EDITOR'S COMMENT:** It is difficult to understand the original paper if you are not a mathematician but if you have what is called "common logic" you can easily realize that the 2m distance was a kind of joke from the very beginning. The virus is airborne and is using the currents in a confined space or in the open air to move around. It moves over the selves in supermarkets; from table to table in restaurants and classrooms. Imagine the example given in the blue box, to happen inside a packed public bus during rush hours! Imagine how easily the virus is spread in corona parties and similar public gatherings! Do not need to be an MIT expert. Just a man with a few grams of grey matter in your head!

**Keep this number in mind: PF-07321332<sup>1</sup>**

## From India: The Truth Behind COVID Numbers

Source: <https://www.ozy.com/news-and-politics/from-india-the-truth-behind-covid-numbers/430139/>

Dear OZY Reader,

I hope you've been well. I write this letter to you from an apartment that's a five-minute drive from where my wife and 2-month-old daughter are living. Yet I'm too scared to visit them, let alone hold my baby anytime soon. I tested negative for COVID-19 three days ago and have no symptoms. But I was recently on a plane. And, most crucially, I'm in India.

The world's largest democracy is battling a devastating COVID-19 wave that has left its hospitals short of oxygen, its government out of ideas and its people increasingly without any hope in sight. More than 350,000 people were infected on Sunday and more than 2,800 people died. But those numbers, like all statistics, tell only a part of the story. A severe shortage of testing kits means many Indians who are carrying the virus can't get tested. Meanwhile, hospitals are only admitting patients who have tested positive, creating conditions where many who are dying from COVID-19 simply aren't being counted.

<sup>1</sup> Expected Pfizer's per os tablet against SARS-CoV-2 virus.





Who will the pandemic take next? That's the question I've been pondering as I wait for the next WhatsApp message, text or Facebook alert with a cry for oxygen or worse, news of another death. Just last week, I lost a cousin and two friends, all in their 30s. I have uncles, aunts and other friends who are battling for life. These are all people who come from backgrounds of reasonable privilege. But even money and connections can't buy them basic health care at the moment. No one knows if their oxygen supply will be intact



by the time you read this. These are the experiences of millions of Indians like me. I can't take any risks with my wife or daughter, because right now, if you need critical care in India, you might as well start saying your final goodbyes.

So how did India, the world's largest manufacturer of vaccines and a pharma industry giant, turn into this picture of desperation, so woefully underprepared for this wave? Over the past year, the government of Prime Minister Narendra Modi failed to build oxygen plants and expand hospital facilities. Earlier this year, when cases were low, Modi's party even declared victory over COVID-19, crediting the prime minister for his leadership. Hubris has a way of biting back — though it invariably hurts not those guilty of it, but those most vulnerable.

Still, this isn't only about India. Michigan's hospitals are quickly filling up with younger patients amid a [surge](#) in infections there, even as America aggressively vaccinates its population. If this pandemic has taught us anything, it's that the virus knows no borders. The double mutant variant of COVID-19 that's wreaking havoc in India will, sooner or later, spread to other parts of the world. It's already been detected in Greece.

Yet I'm also spotting a silver lining. Complete strangers are helping each other source oxygen and hospital beds on social media platforms, showcasing the best of humanity in a time of shortage that could so easily have brought out our worst instincts. Ignoring the tensions between their countries, ordinary Pakistanis are offering aid and solace to Indians



in strife. In the U.S., the American Association of Physicians of Indian Origin is sending oxygen concentrator machines to India. You can contribute to their efforts [here](#).

**Over the next few weeks, OZY will continue to ask difficult questions:** How can countries partner better to break this cycle of deadly COVID-19 variants battering different nations yet threatening us all? Are there lessons to be learned from past efforts against polio or HIV/AIDS that brought the world together? Are there out-of-the-box solutions we're simply not thinking of? Please write to us with your thoughts. And if you have Indian friends, tell them you're thinking of them. There's only one way we can get past this. Together.

Sincerely,  
Charu Sudan Kasturi, Senior Editor

## Studies detail likely COVID-19 aerosol spread in vans, car

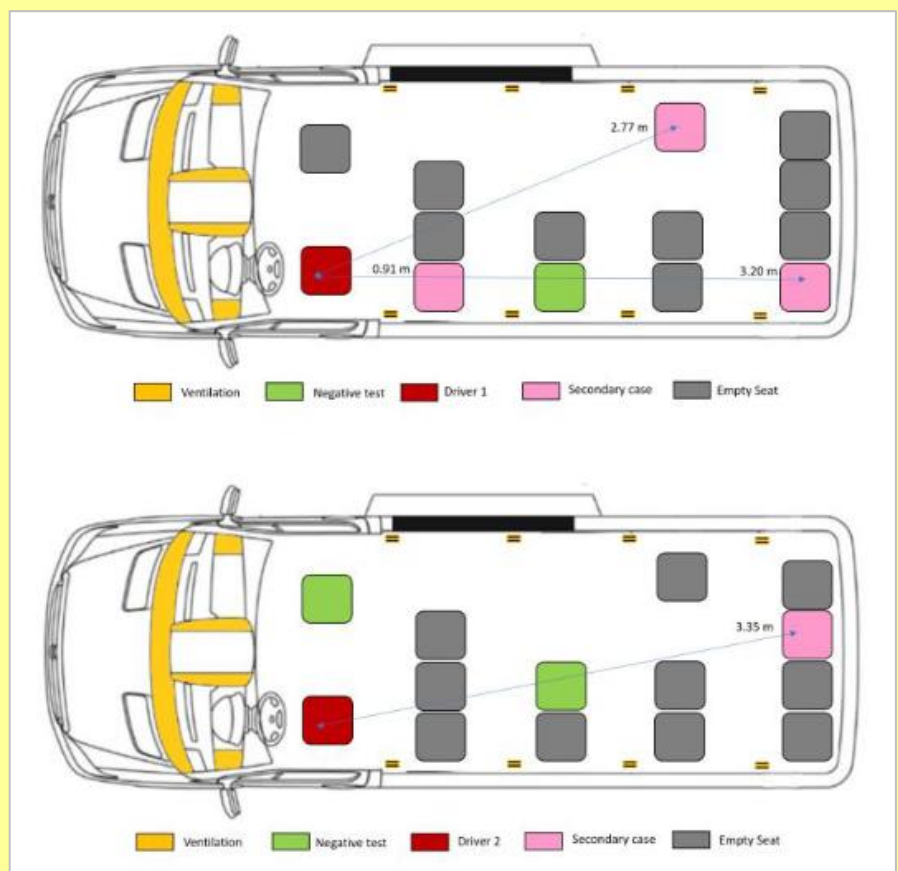
Two new studies suggest infectious COVID-19 aerosols can travel in passenger cars and vans.

The first study, from *Clinical Infectious Diseases*, found that two Cleveland-area van drivers traveling to a hospital 2 hours away from most likely spread COVID-19 to their passengers. SARS-CoV-2 strains between infected passengers and their respective drivers were closely related, and in a simulation using fluorescent microspheres, airflow transported both small and larger droplets greater than 3 meters from the front to the back of the van.

- Ventilation
- Negative test
- Driver
- Secondary case
- Empty seat

The same van was used in both trips, one on Dec 2, 2020, and one on Jan 23, 2021. Physical distancing was followed as closely as possible, but the van's windows were closed while the heaters were operating with a medium fan speed.

In December, the first driver transported four passengers one day before symptom onset, and three passengers tested positive for COVID-19 despite everyone using face masks. The second driver transported three passengers on the day of symptom onset and did not wear a face mask. One of his three passengers tested positive for COVID.



### Apr 24 *Clin Infect Dis* [study](#)

The second study, published in the *International Journal of Infectious Diseases*, found that a woman in her 20s with mild COVID-19—no fever or cough—transmitted infectious viral aerosols 0.25 to 0.5 micrometers in size while driving a car for 15 minutes. University of Florida researchers instructed her not to wear a mask, and she operated the car's air conditioning while the windows were closed. To measure SARS-CoV-2 particles, a personal cascade impactor sampler was clipped to the sun visor above the front passenger seat for the duration of the drive and 2 hours after.





"Our data highlight the potential risk of SARS-CoV-2 transmission by minimally symptomatic persons in the closed space inside of a car and suggest that a substantial component of that risk is via aerosolized virus," the researchers write. The scientists detected viral RNA in respiratory secretions of all sizes but were able to grow viable virus only from the smallest particles—those 0.25 to 0.5 micrometers in diameter.

Apr 23 *Int J Infect Dis* [study](#)

## Doctors Identify The Best Treatment For COVID-19 Smell Loss, And It's Not Steroids

Source: <https://www.sciencealert.com/experts-recommend-a-simple-way-to-recover-your-sense-of-smell-after-covid-19>



Apr 27 – A group of olfactory experts are advising against the use of steroids to treat a lingering loss of smell caused by [COVID-19](#). Instead, they suggest you try re-training your nose to sniff out certain scents.

It'll take time, possibly months, but if you try to get a whiff of at least four different aromas twice a day, it could help you recover faster and more fully, without any unwanted side effects.

The recommendation is based on a systematic evidence-based review, which concluded corticosteroids should not be the first treatment option for smell loss due to COVID-19.

These drugs are commonly prescribed to those with congested or inflamed noses, but this doesn't seem to be what's causing olfactory dysfunction in those with COVID-19, so it might not work.

Smell training, on the other hand, is a more evidence-based way to get your sniffer back up to snuff after a viral infection.

"As an expert group we strongly emphasize the initial consideration of smell training," [writes](#) the group.

"Smell training has no known side effects and is low cost. Moreover, it is the only available treatment... supported by a robust evidence base."

It's hard to compare steroids and smell training treatments for COVID-19 olfactory dysfunction specifically, as no controlled studies have been done.

That said, the idea of smell training has been around for a while. It's even been [used with great success](#) to help treat smell loss from other infections.

In 2020, for instance, a [systematic comparison](#) of potential treatments for post-viral smell loss - including olfactory training, systemic steroids, topical therapies, non-steroidal oral medications, and acupuncture - found smell training should be the number one recommendation based on current evidence.



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Today, we might need to implement this practice on a scale never before seen. Around [60 percent of those who contract COVID-19](#) experience a disturbance in smell, while about 10 percent have persistent symptoms lasting for weeks, even months. Luckily, it seems most people do get better, and smell training might have something to do with that. At the start of 2021, a [study](#) of 1,363 [coronavirus](#) patients with olfactory dysfunction found 95 percent of patients recovered their sense of smell after six months. These patients were advised to undertake two smell training sessions a day at home, although it was unclear how many people actually did this.

Corticosteroids have also been considered as a treatment option, but this medication isn't harmless. It can come with many unwanted side effects, including fluid retention, high blood pressure, and mood swings.

Plus, it might not even help. We just don't have enough evidence to say for sure. While some case reports suggest steroids may help people recover their lost sense of smell from COVID-19, without a control, it's unclear if these patients would have gotten better on their own - as, indeed, it seems many patients do.

Based on the current evidence, the authors join numerous other experts in calling for caution. Until randomized, placebo-controlled trials can be undertaken we should start with smell training, they say, and not steroids.

"[Smell training] has emerged as a cheap, simple and side-effect free treatment option for various causes of smell loss, including COVID-19," [says](#) Carl Philpott from the University of East Anglia in the UK.

"It aims to help recovery based on neuroplasticity - the brain's ability to reorganize itself to compensate for a change or injury."

This requires time, and not everyone is going to get better at the same rate. Older people, for instance, might take longer to get their sense of smell back [as they have fewer olfactory receptor neurons](#).

Traditionally speaking, smell training relies on four odors: clove, rose, lemon and eucalyptus, but it really doesn't matter what you choose.

There might even be a benefit to focusing on familiar smells, like perfumes, lemon rinds, vanilla or ground coffee, and reflecting on memories while you sniff them. For the best results, you should change the four smells every 12 weeks.

If you're interested in learning more, Philpott [suggests](#) checking out the charity website [Fifth Sense](#).

▶▶ The study was published in the [International Forum of Allergy & Rhinology](#).

## Increased hand sanitizer use blamed for rising in gastro outbreaks

Source: <https://newatlas.com/health-wellbeing/hand-sanitizer-use-gastroenteritis-outbreaks/>

Apr 27 – A number of countries are reporting increasing rates of viral gastroenteritis over recent months, and experts suggest greater use of hand sanitizers, known to have little effect on pathogens such as [norovirus](#), may be partly responsible.

New data released by health authorities in the Australian state of Victoria is reporting a four-fold increase in gastroenteritis outbreaks across childcare facilities over the first few months of 2021, compared to the five-year average. Other countries such as [New Zealand](#) and [Taiwan](#) have also reported spikes in norovirus outbreaks over recent months.



Gastroenteritis is commonly caused by a virus called norovirus. It is known to be spread by touching one's mouth after coming into contact with a contaminated surface or person. Parents of small children are certainly familiar with the illness as the virus is often spread by children, and child-care facilities are notorious hotbeds for clusters of infection.

"Norovirus causes vomiting and diarrhea," [explains Cathy Moir](#), chair of Australia's Food Safety Information Council. "Cases occur all year round but they peak during winter possibly because that is when we tend to be in closer contact indoors allowing the virus to

easily spread. Norovirus outbreaks are also common where people are in close living spaces, such as aged-care and child-care facilities, hospitals, cruise ships and community sporting events."

Exactly why norovirus clusters seem to be increasing is unclear, but some experts are suggesting the growth in use of alcohol-based hand sanitizers may be playing a role. As the COVID-19 pandemic took hold in early 2020 more people than ever started frequently using hand sanitizers. Some estimates suggested demand for the product [grew 16-fold](#) in the first few months of the pandemic.

"I suspect many of us have become a bit complacent with handwashing and instead are slapping on alcohol-based hand sanitizer when we can, although this is anecdotal,"



hypothesizes gastroenterologist Vincent Ho, in a recent article for [The Conversation](#). “However, even though hand sanitizer is convenient, it doesn’t work as well against norovirus as thorough handwashing does.”

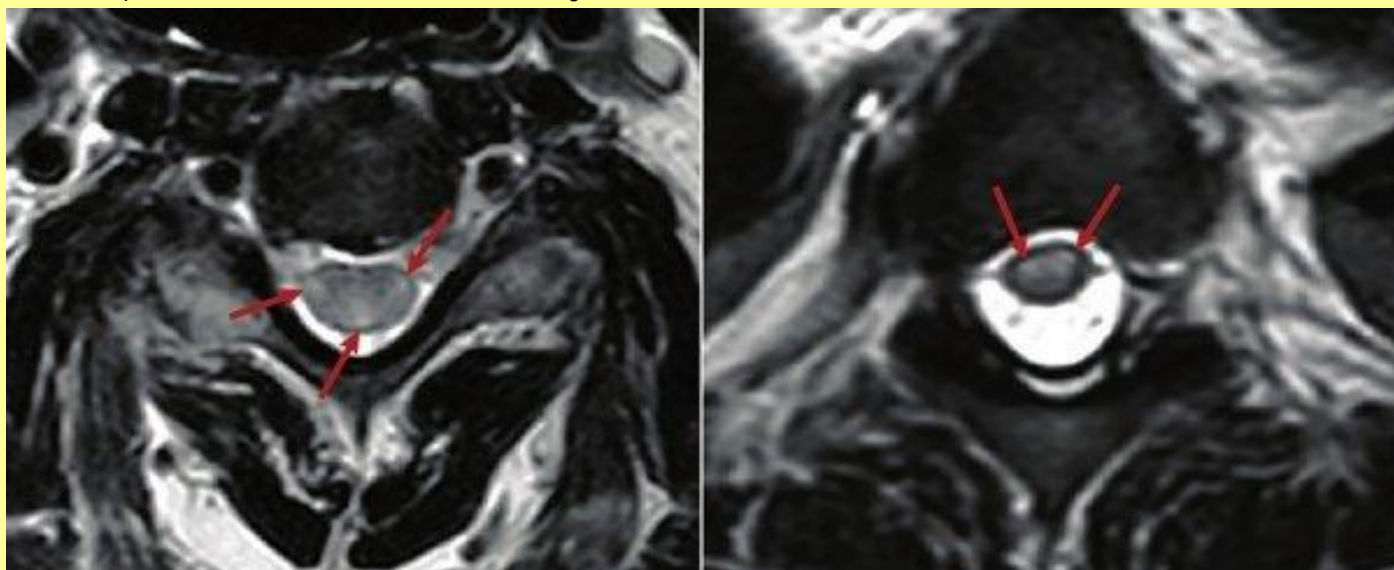
Researchers have long suspected alcohol-based hand sanitizers may not be as effective as soap and water handwashing in removing norovirus. A [compelling 2011 survey](#) of 161 long-term care facilities in the United States found those facilities using soap and water more often than hand sanitizers experienced less frequent norovirus outbreaks.

Peter Collignon, an infectious disease specialist from Australian National University, suggests hand sanitizers do not remove contaminants from soiled hands. He recommends people should not replace thorough hand washing with hand sanitizers, but instead says we should think about cleaning our hands before sterilizing them with alcohol-based solutions.

“Like all disinfecting, cleaning first is essential,” [says Collignon](#). “You can’t just dip something in a magic solution and make it sterile. Clean, then sterilize. Gastro is one of those examples of sanitizer not working quickly and taking a while to penetrate, so handwashing is important.”

## A Rare Neurological Condition Has Been Linked to COVID-19 in 21 Countries

Source: <https://www.sciencealert.com/a-rare-neurological-condition-has-been-linked-to-covid-in-21-countries>



MRI showing inflammation of the spinal cord. (Roman et al., *Frontiers in Immunology*, 2021)

Apr 28 – It feels like it’s been a lot longer, but the first case of [COVID-19](#) was officially recorded in December 2019. Researchers are continuing to investigate the full effects of this disease, including unusual ones, and a new analysis has now linked the infection to a rare neurological condition.

[Acute transverse myelitis](#) (ATM) – an inflammation of the spinal cord which can cause pain, paralysis and sensory problems – was identified in 43 adult [COVID-19](#) cases across 21 countries, with patient ages ranging from 21 to 73, and also 3 children aged 3 to 14 years old.

The review collects together [previous research](#) and case reports, and according to the team behind it, the data are enough to warrant further investigation. In any given year, the incidence of ATM is estimated to be just 1.34 to 4.6 cases per million people.

By contrast, during a 10-month period, the incidence of ATM amongst COVID-19 patients alone has ended up being around 0.5 cases per million, setting off red flags for the researchers.

“We found ATM to be an unexpectedly frequent neurological complication of COVID-19,” [write the researchers](#). “Most cases (68 percent) had a latency of 10 days to 6 weeks that may indicate post-infectious neurological complications mediated by the host’s response to the [virus](#).”

The new research adds to what we already know regarding COVID-19 and neurological complications: the disease has been associated with numerous nervous system issues, such as [a lingering 'brain fog' effect](#).



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In these 43 cases, spinal cord lesions were found to lead to [quadriplegia](#) and [paraplegia](#), with other associated problems including a loss of bladder control. The research was undertaken after a case was discovered in Panama.

Further cases were then collected from scientific literature published between March 2020 to January 2021.

"This review confirms that ATM is not uncommon as a neurological complication associated with COVID-19 infection around the world, responsible perhaps for 1.2 percent of all neurological complications caused by this [coronavirus](#)," [the team concludes](#).

Since ATM [is known](#) to be an [immune-mediated](#) condition (meaning the primary cause is unclear, but there's an involvement of our immune system and inflammatory processes in the body), the researchers indicate there are some potential immune mechanisms that could explain how [SARS-CoV-2](#) may lead to ATM.

Furthermore, the team also notes that three ATM cases occurred in AstraZeneca vaccine trials. While each was investigated, the researchers note in this study that they might provide a clue as to the immune mechanisms involved.

"The pathogenesis of ATM remains unknown, but it is conceivable that SARS-CoV-2 antigens – perhaps also present in the AZD1222 COVID-19 vaccine or its chimpanzee adenovirus adjuvant – may induce immune mechanisms leading to the myelitis," [they write](#).

Further studies should help find more answers and the antigens involved, but it's another reminder that we're still a long way from understanding everything that COVID-19 brings with it, even as [vaccines roll out](#) across the world.

[Previous research](#) has identified complications with pregnancies for people who contract COVID-19, and there's also the ongoing problem [of long COVID](#) – those who suffer with symptoms for many months after largely getting through the initial illness.

While the coronavirus might be coming under control in more countries in the world – despite [the threat of new strains](#) – research into the effects of COVID-19 are going to carry on for a long time after the [pandemic](#) is over.

►► The research has been published in [Frontiers in Immunology](#).

## 2 Simple Charts Show When You Don't Need to Wear a Mask Under New CDC Guidelines

Source: <https://www.sciencealert.com/these-2-simple-charts-tell-you-when-it-s-appropriate-to-wear-masks>

Apr 28 – The Centers for Disease Control and Prevention wants people to know there are clear, personal benefits to getting vaccinated.

On Tuesday, [the agency released new guidelines](#) for when fully vaccinated people – that is, those who've allowed their shot(s) two full weeks to take effect – can take off their masks.

"We all miss the things that we used to do before the [pandemic](#)," CDC Director Rochelle Walensky said, [announcing the new guidance](#).

"If you are fully vaccinated and want to attend a small outdoor gathering with people who are vaccinated and unvaccinated, or dine at an outdoor restaurant with friends from multiple households, the science shows – if you're vaccinated – you can do so safely, unmasked."

The chart below, from the CDC, shows which activities the agency considers safe to do unmasked outside.

You'll note that fully vaccinated people can do almost anything outdoors without a mask, with the notable exception of attending a crowded event, like a parade, game, or concert.

The CDC is loosening the reins a little bit for unvaccinated folks as well – suggesting it's OK to go outside without a mask on, as long as you're just:

- Venturing out for some exercise with members of your household (and not coming into close physical contact with others while you're walking, biking, or running).

	Unvaccinated People	Your Activity	Fully Vaccinated People
		Outdoor	
Safest		Walk, run, or bike outdoors with members of your household	
		Attend a small, outdoor gathering with fully vaccinated family and friends	
		Attend a small, outdoor gathering with fully vaccinated and unvaccinated people	
Less Safe		Dine at an outdoor restaurant with friends from multiple households	
Least Safe		Attend a crowded, outdoor event, like a live performance, parade, or sports event	



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- Or, going to a small outdoor gathering with fully vaccinated friends or family.

In all other cases, the CDC still stresses that masks should be worn, especially when people are indoors.



















During the briefing, Walensky reiterated that the science is clear now that the risks of catching the [coronavirus](#) are much lower outdoors, where there's near infinite ventilation than inside.

"There's almost a 20-fold increased risk of transmission in the indoor setting," she said.

"That, coupled with the fact that we now have [37 percent of people over the age of 18 fully vaccinated](#), and the fact that our case rates are now starting to come down, motivated our change in guidance."

Indoors, in public spaces, the CDC still says everyone should wear masks.

The chart below, with vaccinated people in green, and unvaccinated in yellow and red, is meant to demonstrate the relative risks of doing activities indoors during the pandemic, even with a mask on.

		Indoor		
Less Safe		Visit a barber or hair salon		Safest
		Go to an uncrowded, indoor shopping center or museum		
		Ride public transport with limited occupancy		
		Attend a small, indoor gathering of fully vaccinated and unvaccinated people from multiple households		
Least Safe		Go to an indoor movie theater		
		Attend a full-capacity worship service		
		Sing in an indoor chorus		
		Eat at an indoor restaurant or bar		
		Participate in an indoor, high intensity exercise class		

You'll note that singing, exercising, and eating indoors, all activities where people may potentially be emitting more infectious viral particles into the air, are considered less safe for unvaccinated people than vaccinated. The chart below has unvaccinated people on the left and vaccinated on the right.

### Effect of COVID-19 Antiviral Remdesivir Multiplied 10-Fold by Hepatitis C Drugs

When combined with drugs currently used to treat hepatitis C, the antiviral remdesivir is 10 times more effective in treating cells infected with SARS-CoV-2. This effect, observed in Vero and human cells, suggests that highly effective antiviral cocktails could be quickly developed to treat COVID-19 in cases where a vaccine isn't practical or effective. [+ MORE](#)

### AstraZeneca COVID Vaccine: Clotting Disorder Mechanism Revealed?

Source: <https://www.medscape.com/viewarticle/948560>

Apr 01 – The European Medicines Agency (EMA) continues to reassure the public about the safety of the AstraZeneca COVID-19 vaccine, although several countries have imposed new restrictions on the product, owing to its link to a rare clotting disorder.



Use of the vaccine has been suspended for individuals younger than 55 or 60 years in several European countries and in Canada after reports of a prothrombotic disorder and thrombocytopenia, mainly in younger individuals.

Now, more information on the prothrombotic disorder has become available. The vaccine appears to be linked to a condition that clinically resembles [heparin-induced thrombocytopenia](#) (HIT) and that occurs mainly in younger women.

Researchers have described clinical and laboratory details of nine patients from Germany and Austria who developed this condition 4 to 16 days after receiving the AstraZeneca vaccine in a [preprint article](#) published March 28 on *Research Square*.

They found that serum from four patients who were tested showed platelet-activating antibodies directed against platelet factor 4 (PF4), similar to what is seen in HIT.

They are proposing naming the condition "vaccine-induced prothrombotic [immune thrombocytopenia](#) (VIPIT)" to avoid confusion with HIT.

At a press conference March 31, the EMA said its ongoing review of the situation "has not identified any specific risk factors, such as age, gender or a previous medical history of clotting disorders, for these very rare events. A causal link with the vaccine is not proven but is possible, and further analysis is continuing."

A statement from the agency notes: "EMA is of the view that the benefits of the AstraZeneca vaccine in preventing COVID-19, with its associated risk of hospitalization and death, outweigh the risks of side effects."

But it adds: "Vaccinated people should be aware of the remote possibility of these very rare types of blood clots occurring. If they have symptoms suggestive of clotting problems as described in the product information, they should seek immediate medical attention and inform healthcare professionals of their recent vaccination."

### VIPIT Study

In the Research Square preprint article, a group led by Andreas Greinacher, MD, professor of transfusion medicine at the Greifswald University Clinic, Greifswald, Germany, report on clinical and laboratory features of nine patients (eight of whom were women) in Germany and Austria who developed thrombosis and thrombocytopenia after they received the AstraZeneca vaccine.

The researchers explain that they investigated whether these patients could have a prothrombotic disorder caused by platelet-activating antibodies directed against PF4, which is known to be caused by [heparin](#) and sometimes environmental triggers.

The nine patients were aged 22 to 49 years and presented with thrombosis beginning 4 to 16 days post vaccination. Seven patients had [cerebral venous thrombosis](#) (CVT), one had [pulmonary embolism](#), and one had splanchnic vein thrombosis and CVT. Four patients died. None had received heparin prior to symptom onset.

Serum from four patients was tested for anti-PF4/heparin antibodies, and all four tested strongly positive. All four also tested strongly positive on platelet activation assay for the presence of PF4 independently of heparin.

The authors note that it has been recognized that triggers other than heparin, including some infections, can rarely cause a disorder that strongly resembles HIT. These cases have been referred to as spontaneous HIT syndrome.

They say their current findings have several important clinical implications.

"Clinicians should be aware that onset of (venous or arterial) thrombosis particularly at unusual sites such as in the brain or abdomen and thrombocytopenia beginning approximately 5 to 14 days after vaccination can represent a rare adverse effect of preceding COVID-19 vaccination," they write. To date, this has only been reported with the AstraZeneca vaccine, they add.

They point out that enzyme immunoassays for HIT are widely available and can be used to investigate for potential postvaccination anti-PF4 antibody-associated thrombocytopenia/thrombosis. For such patients, referral should be made to a laboratory that performs platelet-activation assays.

Although this syndrome differs from typical HIT, the researchers note that at least one patient showed strong platelet activation in the presence of heparin. They thus recommend therapy with nonheparin anticoagulants, such as the direct oral anticoagulants.

They also write that high-dose [intravenous immunoglobulin](#) has been shown to be effective for treating severe HIT and could also be an important treatment adjunct for patients who develop life-threatening thrombotic events, such as cerebral vein sinus thrombosis (CVST), after being vaccinated.

### EMA Data to Date

Updated data, reported at the EMA press briefing on March 31, indicate that 62 cases of CVST have been reported worldwide (44 from the European Union). These data may not yet include all the German cases.

Peter Arlett, MD, head of pharmacovigilance and epidemiology at the EMA, said there were more cases than expected in the 2-week window after vaccination among patients younger than 60 and that healthcare professionals should be alert to features of this condition, including [headache](#) and blurred vision.



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He suggested that the higher rate of the condition among younger women may reflect the population that received this vaccine, because initially, the vaccine was not recommended for older people in many countries and was targeted toward younger healthcare workers, who were mainly women.

The German regulatory agency, the Paul Ehrlich Institute, reported this week that it has now registered 31 cases of CVST among nearly 2.7 million people who had received the vaccine in Germany. Of these patients, 19 also were found to have a deficiency of blood [platelets](#) or thrombocytopenia. Nine of the affected patients died. All but two of the cases occurred in women aged 20 to 63 years. The two men were 36 and 57 years old.

These data have prompted the German authorities to limit use of the AstraZeneca vaccine to those aged 60 years and older. Even before this decision, senior clinicians in Germany had been urging a change in the vaccination recommendations.

For example, Bernd Salzberger, MD, head of infectious diseases, University Hospital Regensburg, Regensburg, Germany, told the [Science Media Center](#): "In women, a complicated course of COVID disease is less common from the start and is so rare in younger women that the chance of avoiding a fatal course through vaccination in women without comorbidities is of the same order of magnitude as the risk of this rare side effect."

Sandra Ciesek, MD, a virologist at Goethe University, Frankfurt, Germany, told the journal *Science*: "The argument I keep hearing is that the risk-benefit ratio is still positive. But we do not have just one vaccine, we have several. So, restricting the AstraZeneca vaccine to older people makes sense to me, and it does not waste any doses."

### Concerns Put in Perspective

Commenting on the latest developments for *Medscape Medical News*, thrombosis expert Saskia Middeldorp, MD, head of internal medicine at Radboud University Medical Center, Nijmegen, the Netherlands, said it was vitally important that these concerns be put in perspective and that the vaccination program with the AstraZeneca product continue.

"There are some concerning reports about very rare blood clotting disorders and low platelet counts possibly associated with the AstraZeneca vaccine. Groups from Germany and Norway have identified a syndrome similar to HIT, which seems to explain the cause of this very rare side effect," Middeldorp noted.

"But with such a high pressure from the virus and many countries now going into a third wave of infection, anything that might slow down vaccination rates will cause much more harm than good," she warned.

Middeldorp believes the incidence of this HIT-type syndrome linked to the vaccine is about one or two per million. "These are estimates based on the number of reports of this side effect and denominators from the UK and EU populations," she explained. However, Germany has restricted the vaccine on the basis of German data, which appear to show higher rates of the condition. It is not known why the rates are higher in Germany.

"The European Medicines Agency is looking at this very closely. Their statement is quite clear. There is no foundation for changing policy on vaccination," Middeldorp stated.

She cautioned that these reports were reducing confidence in the AstraZeneca vaccine, particularly among young people, which she said was causing "a major setback" for the vaccination program.

Noting that everything must be viewed in the context of this severe pandemic, Middeldorp emphasized that the benefit of the vaccine outweighed any risk, even among young people.

"To those who may be hesitating to have the vaccine as they don't think they are at high risk of severe COVID infection, I would say there are a lot of young people in the ICU at present with COVID, and your chance of a severe COVID illness is far higher than the one or two in a million risk of a severe reaction to the vaccine," she stated.

## New Biosensor Detect Toxins and More

Source: <http://www.homelandsecuritynewswire.com/dr20210428-new-biosensor-detect-toxins-and-more>

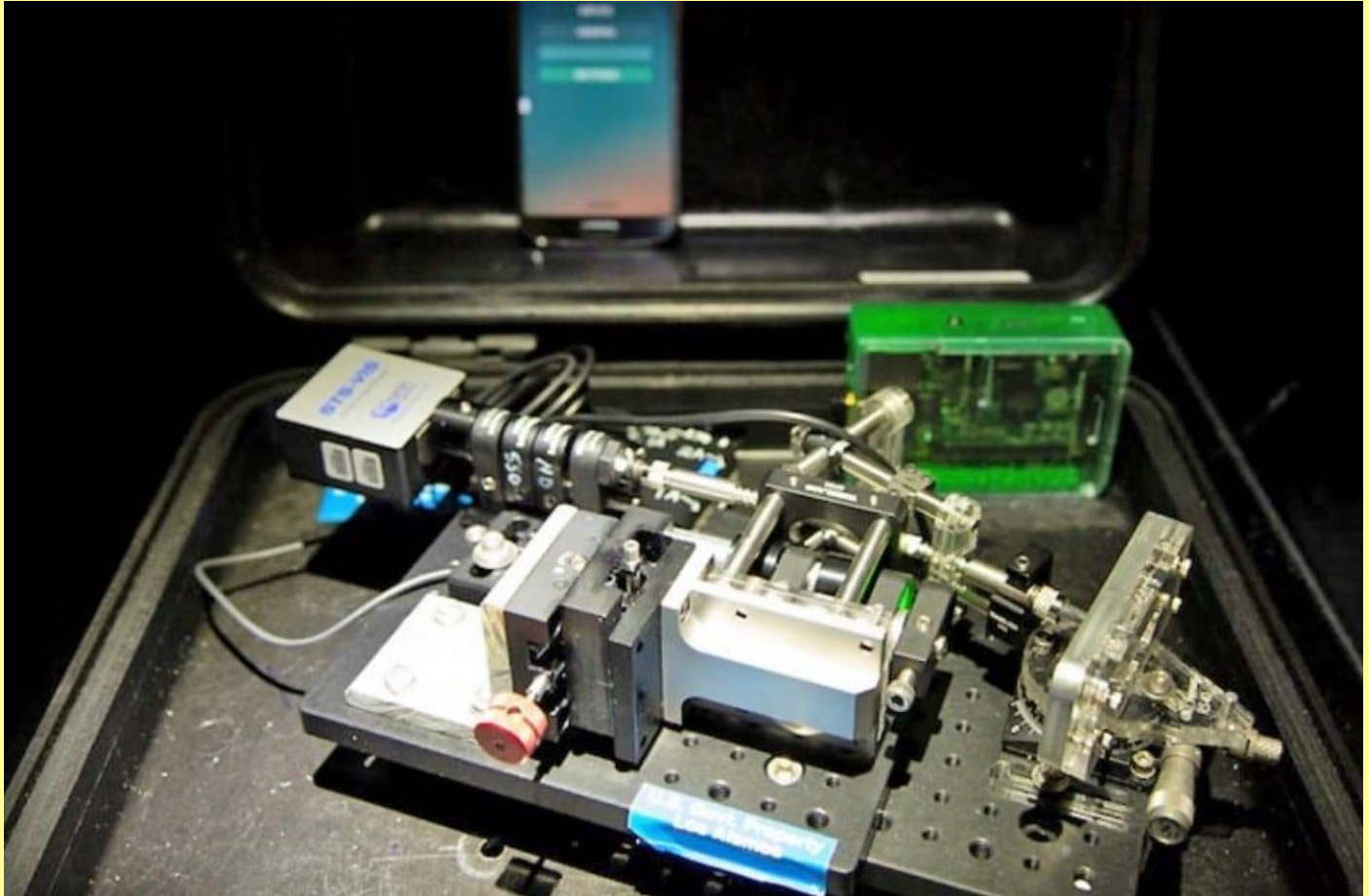
Apr 28 – A device from [Los Alamos National Laboratory](#) researchers is not quite the Star Trek "tricorder" medical scanner, but it's a step in the right direction. The **Portable EnGineered Analytic Sensor with aUtomated Sampling (PEGASUS)** is a miniaturized waveguide-based optical sensor that can detect toxins, bacterial signatures, viral signatures, biothreats, white powders and more, from samples such as blood, water, CSF, food, and animal samples.

"The ability to detect pathogens, biological threats or toxins, quickly and accurately, without prior knowledge of the agent, would lead to improved human and environmental health outcomes," said lead researcher Harshini Mukundan. "This is an important step toward



understanding what an emergency responder is dealing with, and providing them with quick results.”

PEGASUS does not require trained personnel or laboratory equipment to operate, which means it can be used easily in remote areas of the world. It can discriminate between bacterial and viral signatures, allowing for the proper choice of treatment, which should improve health outcomes of patients and decrease the spread of antimicrobial resistance, Mukundan said.



The sensor includes an integrated sample-processing device with minimal hands-on steps, aimed at ensuring every sample is of the quality needed for detection. “It can help to solve the problem of misidentification of biomolecules, especially in the field, allowing us to be prepared for any potential outbreak or biothreat event,” said Mukundan.

“Detection occurs in two major steps,” said Kiersten Lenz, a researcher on the project. “First, the sample is processed in a microfluidic device, which requires only a small sample volume. Next, the processed sample is loaded onto the miniaturized sensor, where detection occurs. The microfluidic device and sensor can be packaged up into a rugged briefcase that can be brought anywhere in the world, allowing for greater access to this sensing tool.”

“We are hoping for broad uses for this device,” Mukundan continued. “It can be used to detect bacterial infections in humans or animals, or outbreaks in the food supply, identify white powders, detect the presence of specific viruses in humans, animals, food, or water, identify potential biothreat agents, and more. For example, our technology can rapidly detect infection in a doctor’s office, a remote clinic, or a laboratory. In the case of bacterial infections, it can discriminate between Gram-positive, -negative, and indeterminate sources, without prior knowledge of the infection type, in 15-30 minutes,” she said. For such infections, once the class of bacteria is known, appropriate treatments can be chosen which will result in important benefits for the patient’s recovery. In addition, knowing the exact bacterium involved can also reduce the prescribing of broad-spectrum antibiotics, which can lead to the evolution of antibiotic-resistant organisms.

Another potential impact is in the field of biosurveillance. Since the biosensor can be used in remote areas of the world and can detect a variety of biological molecules from a variety of sources, it can have impact in monitoring the presence of potential biothreat agents or outbreaks. The sensor can detect the presence of biomolecules from food sources, the water supply, and can help to identify unknown white powders that are mailed in suspicious





packages or spilled on the highway. With better surveillance and monitoring, we can be better prepared for potential outbreaks, since we will have a better understanding of the specific agents at play.

### How It Works

The device's technology is based on a benchtop waveguide-based optical biosensor developed at Los Alamos. The sensing system detects analytes on a planar optical waveguide surface in a very small (~200nm) field. In order to produce the sensing field, a laser is coupled at a critical angle of incidence into the planar waveguide, and total internal reflection of light occurs between the layers of the waveguide, due to their different refractive indices. This causes an evanescent field to radiate off the surface of the waveguide, where fluorescent molecules are detected.

## Romark Announces Initial Results Of Phase 3 Clinical Trial Of NT-300 Tablets For The Treatment Of COVID-19

Source: <https://www.prnewswire.com/news-releases/romark-announces-initial-results-of-phase-3-clinical-trial-of-nt-300-tablets-for-the-treatment-of-covid-19-301268321.html>

Apr 14 – Romark announced today initial results of a Phase 3 clinical trial of its investigational new drug candidate NT-300 (nitazoxanide extended-release tablets, 300 mg) versus placebo as a treatment for mild or moderate COVID-19. Based on the findings, Romark is working with the U.S. Food and Drug Administration (FDA) and plans to seek Emergency Use Authorization (EUA).

In the analysis of the primary endpoint, median time to sustained response (a measure of recovery time) was similar for subjects treated with NT-300 compared with placebo (approximately 13 days). In the pre-defined subgroup of patients with mild disease, median time to sustained response was reduced by 3.1 days with NT-300 (10.3 days, n=116) versus placebo (13.4 days, n=129).

In the analysis of the key secondary endpoint, treatment with NT-300 was associated with an 85% (0.5% of NT-300-treated patients vs. 3.6% of patients treated with placebo) reduction in the progression to severe illness (shortness of breath at rest with SpO<sub>2</sub> ≤93% on room air or PaO<sub>2</sub>/FiO<sub>2</sub><300). Only one person treated with NT-300 progressed to severe COVID-19 disease. In the pre-defined subgroup at high risk of severe illness according to CDC criteria, 7/126 (5.6%) of placebo-treated subjects experienced severe illness compared to 1/112 (0.9%) of NT-300-treated subjects.

"Given the enormous toll of the COVID-19 pandemic and the continued public health risk, we are pleased that these clinical trial results show a compelling reduction in progression to severe COVID-19 with early NT-300 treatment," said Jean-François Rossignol, M.D., Ph.D., Chief Medical and Scientific Officer of Romark. "Along with vaccines and treatments for severe illness, oral treatments that can be administered outside of a hospital setting to effectively reduce disease progression are urgently needed. Our results compare favorably with therapeutics that have been granted Emergency Use Authorization for use in a hospital setting in patients at high risk of developing serious COVID-19."

The multicenter, randomized, double-blind trial ([NCT04486313](https://clinicaltrials.gov/ct2/show/study/NCT04486313)) studied 1,092 people ages 12 and older with respiratory symptoms consistent with COVID-19. Participants were enrolled at outpatient centers across the United States within 72 hours of symptom onset and treated either with two NT-300 tablets or placebo twice daily for five days. Efficacy analyses focused on the 379 participants who had laboratory-confirmed SARS-CoV-2 infection at baseline.

NT-300 was well tolerated. The only adverse event occurring in more than 2% of subjects was diarrhea (3.4% in the NT-300 group vs. 2.2% in the placebo group). There were no significant differences in adverse events between the two treatment groups.

Full findings from the study will be submitted for publication in a peer-reviewed journal. Results from an additional clinical trial for the prevention of COVID-19 and other viral respiratory illnesses in high-risk populations, including [healthcare workers](#), are expected by the middle of the year.

### About Nitazoxanide

Nitazoxanide, the active ingredient of NT-300, was originally developed for treating intestinal protozoan infections caused by *Cryptosporidium parvum* and *Giardia lamblia*. Laboratory studies demonstrating broad-spectrum antiviral activity led to the development of nitazoxanide as a broad-spectrum, host-directed antiviral drug.

In cell cultures, the active ingredient in NT-300, nitazoxanide, inhibits maturation of the SARS-CoV-2 spike protein, which in turn blocks SARS-CoV-2 syncytia formation. Nitazoxanide has also been shown to inhibit replication of SARS, MERS and other coronaviruses as well as influenza viruses, rhinoviruses, parainfluenza viruses, RSV and



other respiratory viruses in cell culture studies.<sup>14</sup> The broad-spectrum antiviral activity of nitazoxanide is attributed to its interference with human cellular pathways that the virus exploits to replicate, rather than to a virus-targeted mechanism.<sup>2,4</sup> Laboratory studies to evaluate the potential for resistance of influenza A virus to tizoxanide, the active circulating metabolite of nitazoxanide, have been unable to select for resistant viruses, suggesting a low potential for viral resistance. Other studies have shown tizoxanide suppresses secretion of pro-inflammatory cytokines that are upregulated by viral respiratory infections including IL-6.<sup>5</sup> The antiviral and anti-cytokine activities of nitazoxanide are attributed to modulation of mitochondrial function and consequential effects on cell signaling pathways.

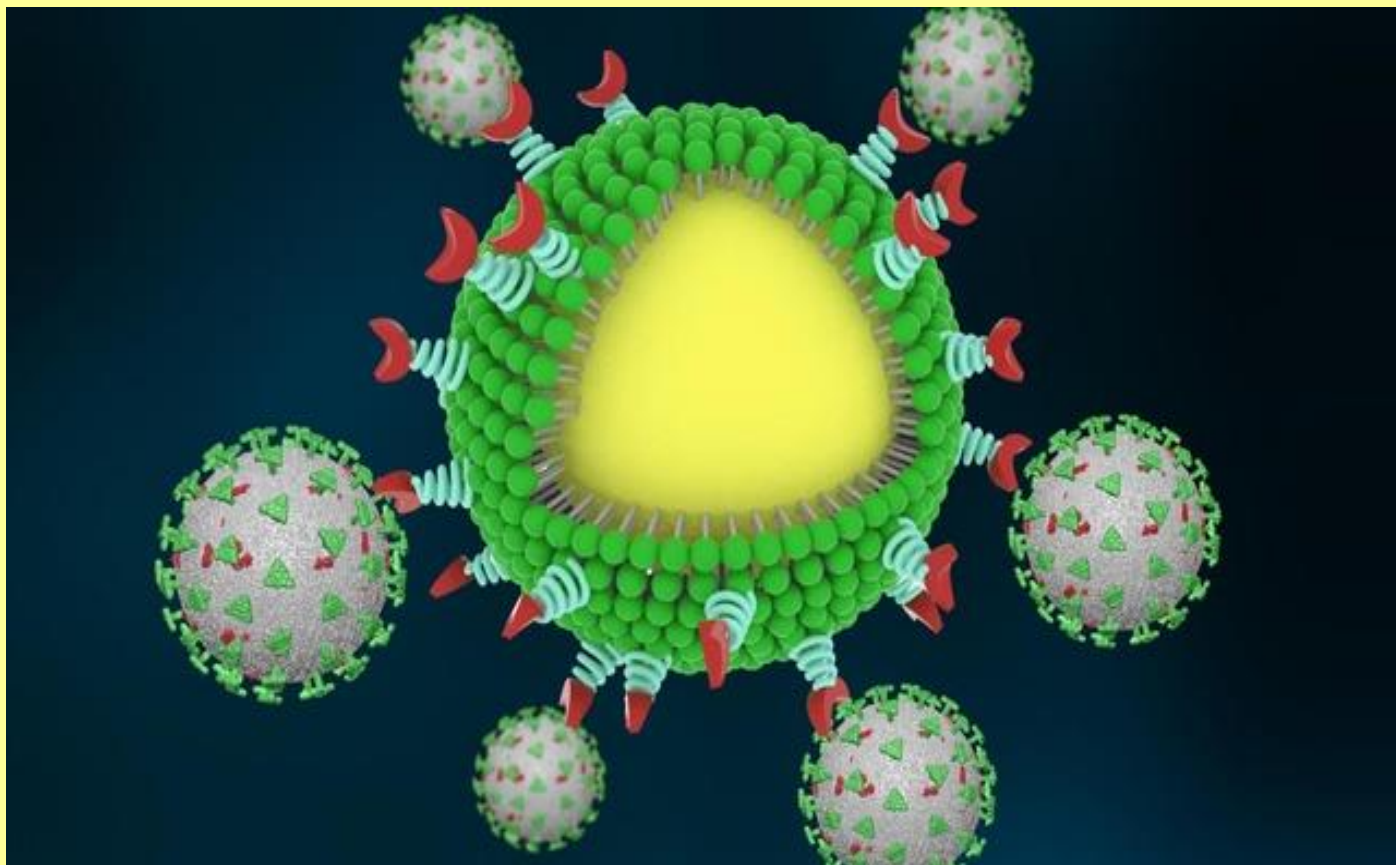
#### About NT-300

NT-300 (nitazoxanide extended-release tablets) is an investigational broad-spectrum antiviral drug undergoing Phase 3 clinical development for treating and preventing acute respiratory illnesses caused by a broad range of seasonal, emerging or drug-resistant respiratory viruses, including influenza viruses, rhinoviruses, other enteroviruses, coronaviruses, parainfluenza viruses, respiratory syncytial viruses (RSV), human metapneumovirus or bocavirus.

The NT-300 tablets, administered orally, are designed to deliver antiviral concentrations of drug to the respiratory tract throughout twice-daily dosing. The 600 mg dose was selected based upon a dose-range-finding clinical trial conducted in outpatients with influenza.<sup>6</sup> To date, clinical trials of NT-300 for treatment of viral respiratory illnesses have included more than 7,000 patients. The NT-300 clinical development program has been designed to provide robust evidence of effectiveness to support use of NT-300 and to ensure maximum benefit to the very large number of patients that experience these illnesses.

### "Nanotraps" Designed To Catch and Clear Coronavirus

Source: <https://www.technologynetworks.com/drug-discovery/news/nanotraps-designed-to-catch-and-clear-coronavirus-348207>



Cartoon rendering of Nanotrap binding SARS-CoV-2. Nanotrap is shown with a yellow core, green phospholipid shell, and red functionalized particles to bind the virus (either ACE2 or Neutralizing Antibody). Virus protein coats are shown in gray, and are decorated with the Spike protein (green) and glycoprotein (red). Credit: Huang Lab



Apr 28 – Researchers at the Pritzker School of Molecular Engineering (PME) at the University of Chicago have designed a completely novel potential treatment for COVID-19: nanoparticles that capture SARS-CoV-2 viruses within the body and then use the body's own immune system to destroy it.

These "Nanotraps" attract the virus by mimicking the target cells the virus infects. When the virus binds to the Nanotraps, the traps then sequester the virus from other cells and target it for destruction by the immune system.

In theory, these Nanotraps could also be used on variants of the virus, leading to a potential new way to inhibit the virus going forward. Though the therapy remains in early stages of testing, the researchers envision it could be administered via a nasal spray as a treatment for COVID-19.

The results were published April 19 in the journal *Matter*.

"Since the pandemic began, our research team has been developing this new way to treat COVID-19," said Asst. Prof. Jun Huang, whose lab led the research. "We have done rigorous testing to prove that these Nanotraps work, and we are excited about their potential."

### Designing the perfect trap

To design the Nanotrap, the research team - led by postdoctoral scholar Min Chen and graduate student Jill Rosenberg - looked into the mechanism SARS-CoV-2 uses to bind to cells: a spike-like protein on its surface that binds to a human cell's ACE2 receptor protein.

To create a trap that would bind to the virus in the same way, they designed nanoparticles with a high density of ACE2 proteins on their surface. Similarly, they designed other nanoparticles with neutralizing antibodies on their surfaces. (These antibodies are created inside the body when someone is infected and are designed to latch onto the coronavirus in various ways).

Both ACE2 proteins and neutralizing antibodies have been used in treatments for COVID-19, but by attaching them to nanoparticles, the researchers created an even more robust system for trapping and eliminating the virus.

Made of FDA-approved polymers and phospholipids, the nanoparticles are about 500 nanometers in diameter - much smaller than a cell. That means the Nanotraps can reach more areas inside the body and more effectively trap the virus.

The researchers tested the safety of the system in a mouse model and found no toxicity. They then tested the Nanotraps against a pseudovirus - a less potent model of a virus that doesn't replicate - in human lung cells in tissue culture plates and found that they completely blocked entry into the cells.

Once the pseudovirus bound itself to the nanoparticle - which in tests took about 10 minutes after injection - the nanoparticles used a molecule that calls the body's macrophages to engulf and degrade the Nanotrap. Macrophages will generally eat nanoparticles within the body, but the Nanotrap molecule speeds up the process. The nanoparticles were cleared and degraded within 48 hours.

The researchers also tested the nanoparticles with a pseudovirus in an ex vivo lung perfusion system - a pair of donated lungs that is kept alive with a ventilator - and found that they completely blocked infection in the lungs.

They also collaborated with researchers at Argonne National Laboratory to test the Nanotraps with a live virus (rather than a pseudovirus) in an in vitro system. They found that their system inhibited the virus 10 times better than neutralizing antibodies or soluble ACE2 alone.

### A potential future treatment for COVID-19 and beyond

Next the researchers hope to further test the system, including more tests with a live virus and on the many virus variants.

"That's what is so powerful about this Nanotrap," Rosenberg said. "It's easily modulated. We can switch out different antibodies or proteins or target different immune cells, based on what we need with new variants."

The Nanotraps can be stored in a standard freezer and could ultimately be given via an intranasal spray, which would place them directly in the respiratory system and make them most effective.

The researchers say it is also possible to serve as a vaccine by optimizing the Nanotrap formulation, creating an ultimate therapeutic system for the virus.

"This is the starting point," Huang said. "We want to do something to help the world."

The research involved collaborators across departments, including chemistry, biology, and medicine.

**Reference:** [Chen M, Rosenberg J, Cai X, et al. Nanotraps for the containment and clearance of SARS-CoV-2. \*Matter\*. 2021. doi: \[10.1016/j.matt.2021.04.005\]\(https://doi.org/10.1016/j.matt.2021.04.005\)](#)



## ▶▶ The Covid-19 “Experimental” mRNA Vaccine. Are You Being Told the Truth?

### Experts urge caution in bringing Mars samples to Earth

Source: <https://www.newscientist.com/article/dn17125-experts-urge-caution-in-bringing-mars-samples-to-earth/>

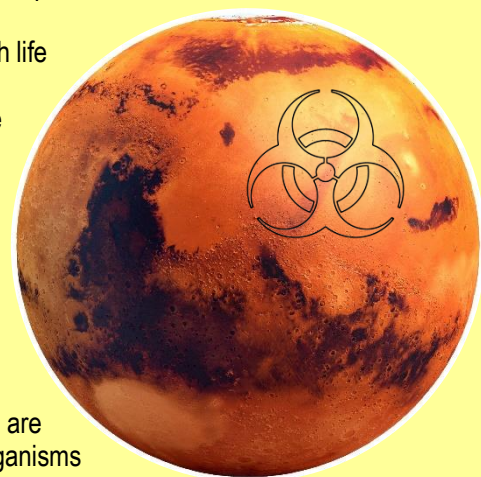
May 13 – If soil and rocks from Mars contain life, there is a small but non-zero chance that such life could be dangerous to terrestrial life (Illustration: Cary Bass/Wikimedia)

If NASA aims to bring Mars samples back to Earth, it should prepare for the possibility that the samples could include organisms that might endanger humans and other terrestrial life, a new report by the US National Research Council says. To prevent potential contamination by any Martian life, the report argues that early in the mission, NASA should begin building a secure facility on Earth to house the samples.

Within the next two decades, NASA hopes to launch a mission to Mars that could return the first pristine samples of Martian atmosphere, rocks and soil. These samples could be used to perform [tests](#) that may be impossible with lightweight robotic explorers, such as definitively measuring rock ages and, potentially, finding the first evidence of Martian life.

But the hazards such life might pose to terrestrial life are unknown. If self-replicating organisms are brought back to Earth, there could be a slim but non-zero chance that they could infect Earth organisms or compete with them in a way that could affect Earth’s ecosystems.

“Given that this is a very high-stakes game where we’re talking about a potentially global problem, we have to be inherently conservative,” says Jack Farmer of Arizona State University in Tempe, who chaired the committee of 10 experts behind the [report](#), which was commissioned by NASA.



#### Stringent controls

As a result, the new report updates a long-standing recommendation that Mars samples be kept in isolation in a special facility while they are examined for life. “I think the bottom line here is containment, containment, containment,” Farmer told New Scientist.

Such a facility would need to have stringent controls to contain agents that might be fatal to humans. It could take 7 to 10 years to build, so its design and construction should be considered “at the earliest stages of Mars sample return mission planning”, the committee writes.

This report helps update the agency on the issue of contaminating Earth with extraterrestrial samples, or “back-contamination”, says Cassie Conley, NASA’s planetary protection officer. She says it will be incorporated in future discussions at both NASA and the European Space Agency, which is also considering a sample return mission.

But others say worrying about contamination is premature. “I have serious problems with Mars sample return being the only option for answering important problems such as whether life did or still does exist on Mars,” says Jeffrey Bada of the Scripps Institution of Oceanography in La Jolla, California.

“It will be a long time . . . before we understand the planet well enough to know where to sample for material to be brought back to Earth,” Bada told New Scientist. The best approach, he argues, is to focus on more missions that can conduct science on the Martian surface.

### From Bioweapons to Super Soldiers: How the U.K. Is Joining the Genomic Technology Arms Race

By Yusef Paolo Rabiah

Source: <http://www.homelandsecuritynewswire.com/dr20210430-from-bioweapons-to-super-soldiers-how-the-u-k-is-joining-the-genomic-technology-arms-race>

Apr 30 – The U.K. government recently announced an £800 million, taxpayer-funded [Advanced Research and Invention Agency \(Aria\)](#). The brainchild of the British prime minister’s former chief adviser, [Dominic Cummings](#) and modelled on the U.S. [Defense](#)



## HZS C<sup>2</sup>BRNE DIARY – May 2021

[Advanced Research Projects Agency](#), DARPA, the organization will focus partly on genomic research.

Genome technology is becoming an increasingly important part of military research. So given that the U.K. boasts some of the best genomic research centers in the world, how will its new agency affect the wider genome technology warfare race?

In 2019, DARPA announced that it wishes to explore genetically editing soldiers. It has also invested over US\$65 million (£45 million) to improve the safety and accuracy of genome-editing technologies. These include the famous [Nobel prize-winning Crispr-Cas molecular scissor](#) – a tool that can edit DNA by cutting and pasting sections of it.

But the ease of accessibility and low cost of CRISPR-based technologies has caused concern around potential military genetic modification and [weaponization of viruses or bacteria](#). These include smallpox or tuberculosis, and could be extremely destructive.

The U.S. is not alone in its military pursuit of genome technology. Russia and China have either stated or been accused of using genomic technology to enhance military capabilities.

### The Super Soldier

[Universal Soldier](#) and [Captain America](#) are just a few Hollywood movies that have explored the concept of the super soldier. Despite its sci-fi nature, several countries are looking to explore the potential of such prospects. DARPA intends to explore genetically editing soldiers to [turn them into “antibody factories.”](#) making them resistant to chemical or biological attacks.

In December 2020, the then U.S. director of national intelligence, [John Ratcliffe](#), said there was evidence that the Chinese military [was conducting human experimentation](#) in an attempt to biologically boost soldiers. This followed a report by the [Jamestown policy thinktank](#) that highlighted reports suggesting that Crispr [would form a keystone technology](#) in China to “boost troops’ combat effectiveness.” No further details were given, however.

Not all countries are prepared to use gene editing or even genomic technology to enhance soldiers, however. The French military ethics committee has recently [approved](#) research on soldier “augmentation,” such implants that could “improve cerebral capacity.” However, the committee warned that certain red lines could not be crossed, including genome editing or eugenics. In the more [candid words of the French minister of the armed forces, Florence Parly](#), this amounted to “A yes to Ironman, but a no to Spiderman” (Ironman gets his superpowers from a suit whereas Spiderman is bitten by a radioactive spider).

In Russia, the military is looking to [implement genetic passports](#) for its personnel, allowing it to assess genetic predispositions and biomarkers, for example, for stress tolerance. This could help place soldiers in suitable military lines, such as navy, air force and so forth. The genetic project also aims to understand how soldiers respond to stressful situations both physically and mentally.

### The U.K. Position

There are signs that the UK will be bolder and less accountable in its genetic defense research than many other countries. For example, Aria won’t be [subject to freedom of information requests](#), in contrasts with DARPA.

The UK has also been at the forefront in enabling controversial, pioneering non-military genome technology, such as [three-parent babies](#). And there has been no shortage of government reports that have stressed the importance of genome technology in the domain of defense and security.

In 2015, [a UK national defense review](#) highlighted the influence that advances in genetic engineering can have for “security and prosperity.” In the recent 2021 [Security, Defense, Development and Foreign Policy review](#) the UK government once again stressed its significance for “defense and national security.”

The proposed lack of accountability of Aria, combined with the government’s general mission for genome technology to be expanded into security and defense applications, will create a hotpot of debate and discussion. In recent years, British scientists have received DARPA funding [for controversial genomic research](#), such as genetic extinction of invasive species



such as mosquitoes or rodents. Despite its promise, this could have disastrous potential to damage food security and threaten the wider ecosystems of nations.

Genome technology deployment needs to be managed in a universally, ethically and scientifically robust manner. If it isn't, the potential for a new arms race for advances in this research will only lead to more radical and potentially dangerous solutions. There are many unanswered questions about how Aria will help genome research within the military sphere. The pathway the UK chooses will have lasting consequences on how we perceive genome tech in the public space.

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## The Forgotten Panic of the Anthrax Attacks

Source: <https://slate.com/news-and-politics/2021/05/anthrax-attacks-2001-daschle-brokaw-cipro-slow-burn-transcript.html>

May 01 – On Oct. 4, 2001, a photo editor at the parent company of the National Enquirer was diagnosed with anthrax poisoning. That man, Robert Stevens, died a day later.

The spores that killed him had come through the mail.



As the news got out, authorities in Florida were inundated with calls about suspicious powder. The city of Miami ran out of hazmat suits. At first, it wasn't clear if the case in Florida was an isolated incident. But then, more letters laced with anthrax appeared in the mail, addressed to the offices of U.S. senators and news outlets.

[Hazardous materials experts decontaminate each other after leaving the Hart Senate Office Building on Capitol Hill in Washington, Nov. 1, 2001. Stephen Jaffe/AFP via Getty Images](#)

One of the anthrax letters was sent to NBC Nightly News anchor Tom Brokaw. Two NBC employees contracted anthrax poisoning: Brokaw's personal assistant, and the [staffer](#) who opened the mail. Brokaw

himself was never exposed to anthrax. But he was now at the center of a big story.

In 2001, Tom Daschle was the Senate majority leader. "Just that weekend, I had been in New York and Tom Brokaw, who's a friend, a fellow South Dakotan [...] his office had opened up one," Daschle recalls. "And lo and behold, just a couple of days later that it happened to me."

Grant Leslie was an intern in Sen. Daschle's office. After 9/11 was a strange time to be interning on Capitol Hill. One day was especially strange.

"I absolutely remember what I was wearing. Because it was a new outfit that I was very excited about," Leslie says. "And it was the first time I'd worn it. It was a gray wool skirt and a burgundy silk blouse."

On the day she wore the new wool skirt, there was a huge pile of mail. It was part of her job to open it. One letter in particular stood out because of the childish handwriting on the envelope.

"And I remember thinking, 'oh, this is gonna be a fun one to open,' because when kids send letters, they're always really cute," she says. "I cut a little bit into the top of the envelope. I didn't even open it the whole way. But immediately when I cut, a puff of white powder came out. Sort of think of baby powder, like if you squeezed a baby powder bottle and it would, you know, come up in your face in a puff and sort of land on your clothes. And basically that's what happened."

She remembers the white powder showing up brightly on her new dark skirt.

"Well, I thought immediately that it could be anthrax because we had certainly been briefed on it [...] I remember thinking immediately that I didn't want it to get on anyone else. So just reflexively, I held the letter down towards the floor, because I didn't want to spill any more out than what had already gone all over me."

Leslie thought it might be a hoax—that it could *actually* be baby powder. But she stood very still, so it wouldn't spread, and a coworker called Capitol Police. It turned out that the powder *was* anthrax. Twenty-eight people had been exposed.

Leslie took Cipro, an antibiotic used specifically for anthrax poisoning, to treat her exposure. And she was given the option of going to the hospital, or going home. She chose home.



A week after her exposure, two D.C. postal workers died from anthrax poisoning. No one realized until it was too late that they had been exposed.

“We were in probably the best place for it to happen to. And we got treatment right away,” Leslie says. “It’s so unfair that the postal workers and others who died were not in that position. So I think about that a lot.”

Tom Daschle wasn’t in the office when Leslie was exposed to the anthrax. And at first, he wasn’t allowed to come back to work. “Ultimately they did allow me to come over, and I hugged people and I began calling their families to tell them what the circumstances were,” Daschle says. “We were told the next day to bring the clothes that we were wearing. And because I had hugged everybody, the fear was that I had anthrax on my clothes to bring those clothes into the Capitol building in a garbage bag so they could be disposed. Incredibly naive and ill-informed, but that was what we were told. So I remember meeting with staff and giving them a pep talk with all these bags of clothes in one corner.”

For Daschle, the anthrax letter in his office was a turning point. It changed the way he thought about risk, and about America’s place in the world. He was scared.

“This created a new sense of appreciation of how technology and circumstances have erased whatever sense of invulnerability we had,” he says. “You know, there are so many ways to deliver anthrax—anthrax released in a subway system, anthrax released in a football field, the stadium [...] There were just so many different scenarios. And we understood that all those were possible. And frankly they’re still possible today.”

In total, five people died from the anthrax attacks, and 17 got sick. Those numbers might not sound huge, but after 9/11 America was on edge. “For the first time in a hundred years, American streets have become the frontlines of a battle, with civilians facing an enemy both visible and invisible,” the CBS Evening News reported on Oct. 19, 2001. In the broadcast, an unidentified New Yorker says, “checking your mail just took on a new meaning.”

More and more people were stockpiling Cipro. Officials worried that there wouldn’t be enough doses for those who were actually exposed to anthrax. On the same CBS broadcast, reporter Elizabeth Kaledin reported that “people are coveting prescriptions. Politicians exposed in the latest attack are exalting it by name.”

“I’ve already taken one Cipro pill,” Sen. Richard Lugar confirmed on-air.

Others tried to manage the very nervous public’s response. “Doctors like L.A. internist Samuel Fink report being harassed by patients for refusing to dole it out like candy,” Kaledin continued in her story. Fink tells her, “I’ve been met with hostility. They want to protect their themselves, their family, their dog, their other pets.”

Politicians, like New York Mayor Rudy Giuliani, had to contend with both the lethal attacks and the panic those attacks inspired.

“People should just not overreact to this,” Giuliani said at the time. “I know it’s hard to say this and you gotta keep saying it: That is to relax and deal and deal with it. Work with it.”

Government officials knew they were at especially high risk. Dick Cheney in particular became fixated on the threat of bioterrorism. [He began to bring a doctor with him when he traveled, and he carried a hazmat suit in a duffel bag.](#)

In the days after 9/11, there was so much concern about the safety of high-ranking public officials that Cheney spent weeks at an “undisclosed location.”

The undisclosed location became a public obsession. In October, Cheney joked about it in a speech at the Al Smith dinner, an annual event where politicians play comedian.

“There’s been a good deal of speculation about our whereabouts in recent days. I might as well address the rumors right here tonight. We have not actually been living in a cave. And, no, I did not sneak out for cosmetic surgery,” Cheney said to laughter. “Although I’m not prepared to rule that out as an option.”

The audience at the Al Smith dinner didn’t know it, but when Cheney made that joke, he actually thought he might have been exposed to a biological weapons attack.

White House sensors had picked up what seemed to be trace amounts of botulinum toxin, a bacterial protein so lethal that a single gram could kill a million people. If the sensors were right, Cheney would have been exposed.

When he got the news, the vice president was on Air Force Two, headed to New York. He was freaked out. But there was nothing he could do about it if he *had* been exposed.

So, while scientists tested the substance on lab mice, Cheney went to visit Ground Zero. Then delivered his bad comedy routine.

“At the White House, Karl Rove was overheard to say, ‘we’re sending Cheney to the Al Smith dinner,’ ” he cracked to more laughs, “ ‘and he’s going to bomb.’ ”

After the dinner, Cheney got word: The mice had *lived*. The sensors were wrong. There hadn’t been any botulinum toxin after all.

But the anthrax that had poisoned other people was real, and Cheney had some strong ideas about *who* was sending it.



## Is COVID-19 Here to Stay For Good? Here's What Experts Think

Source: <https://www.sciencealert.com/covid-19-is-likely-to-become-endemic-says-expert-consensus>

May 01 – Now, [over a year](#) since the [World Health Organization](#) (WHO) announced the beginning of the [COVID-19 pandemic](#), we are starting to look forward to a reduced spread of the virus. With the rollout of several effective vaccines and the enforcement of safety measures such as travel bans and quarantine, [coronavirus](#) cases are reducing in some parts of the world.

Will it be possible to eliminate COVID-19 at some point in the future, or will it always remain endemic in some regions? We asked eight experts in epidemiology whether COVID-19 will become endemic – [75 percent said 'yes'](#).

### What does endemic mean?

Endemic "means that there are always people who are infected, who pass the infection to somebody else and then recover. Over a long time, each person infects on average one other person, so that the number infected remains approximately the same," [says](#) Professor Graham Medley, an expert in disease modeling from the London School of Hygiene and Tropical Medicine.

This is very different from the high level of transmission we have seen during the pandemic.

Many common diseases are endemic, including the coronaviruses that cause colds. Prof Medley [says](#), "Endemic infections are usually in children causing mild symptoms. Endemic coronaviruses are not associated with significant disease. By the time children are adults they will have been exposed, and potentially infected, many times, and are immune."

### How have previous pandemics ended?

Professor James Wood, an expert in disease modeling and epidemiology from the University of New South Wales (UNSW) Sydney, [says](#), "When pH1N12009 (swine flu) emerged in 2009, it became endemic within a year of the initial pandemic and also pushed the existing H1N1 influenza strain circulating in humans to extinction."

Many [viruses](#) that were responsible for previous pandemics, including the [1918 flu pandemic](#), are still circulating today.

Completely eradicating a disease is not easy. To date, the WHO has only declared two diseases that have been eradicated worldwide: [smallpox](#) and rinderpest. Both required a large, worldwide vaccine campaign to reach herd immunity.

The two options for how a pandemic can end: either the virus is eradicated, or it becomes endemic.

### Could we eradicate COVID-19 using the new vaccines?

Smallpox and rinderpest were eradicated using vaccines; now that several COVID-19 vaccines exist, could we use them to wipe out this disease?

Dr Lee Riley from UC Berkeley highlights one key obstacle to eliminating COVID – the responsible virus could mutate to become resistant to the vaccines.

He [says](#) that "in places where there is a mixture of vaccinated and unvaccinated populations, the vaccines may exert selective pressures on the virus to undergo further mutations, and these variants will spread among the unvaccinated people. Some of the variants may also infect vaccinated people".

Another difficulty in reaching herd immunity is that some of the currently available vaccines do not offer 100 percent immunity against getting COVID-19.

Professor Jane Heffernan, an expert in epidemiology from York University, [says](#), "COVID-19 infection and vaccination can induce high levels of protective immunity in individuals. The immunity gained can protect against infection, or, if infected, will lessen the severity of disease".

There is also the challenge of vaccinating so many people across so many countries.

Professor Wood from UNSW, [highlights](#) that "the limitations in our ability to produce vaccine (15-20 million doses per day) mean that high global coverage with 2 doses will take well over a year even with relatively equitable supply of vaccines".

Dr David Hayman from Massey University [adds](#) that "there is enormous inequality in vaccine distribution, with just a few percent of the world currently vaccinated. This means that unless this is resolved the virus will likely become endemic in those countries."

Despite these challenges, it could still be theoretically possible to vaccinate enough of the world's population to reach herd immunity and eradicate COVID-19.

Interestingly, however, Professor Wood [points out](#) that "elimination and eradication may not remain as priorities if residual protection from vaccines against severe disease remains strong".





If we can protect people from becoming severely ill with COVID-19, there may be no reason to eradicate it completely.

### The takeaway

Whilst public health measures and vaccine campaigns will hopefully end the current COVID-19 pandemic, it is likely that it will remain endemic in some countries rather than being totally eradicated.

■ Article based on 8 expert answers to this question: [Will COVID-19 become endemic?](#)

## The healthy child who wouldn't wake up: the strange truth of 'mystery illnesses'

Source: <https://www.theguardian.com/books/2021/apr/12/the-healthy-child-who-wouldnt-wake-up-the-strange-truth-of-mystery-illnesses>

Apr 12 – I cannot resist a news headline that refers to a mystery illness and there is no shortage to keep me interested. “Mystery of 18 twitching teenagers in New York”; “[Mysterious sleeping sickness](#) spreads in Kazakhstani village”; “200 Colombian girls fall ill with a mysterious illness”; “The Mystery of the Havana Syndrome”. One medical disorder seems to attract this description more than any other: psychosomatic illness. That the body is the mouthpiece of the mind is evident in our posture, in the smiles on our faces, in the tremor of our nervous hands. But, still, when the body speaks too explicitly, when the power of the mind leads to physical disability, it can be hard to understand why. This perplexity is most apparent when psychosomatic disorders affect groups, spreading from person to person like a social virus, in a phenomenon often referred to as mass hysteria.

We are currently caught in a pandemic. We have been ordered to hide and to search our bodies for symptoms. If there was ever a time for a psychosomatic disorder to spread through anxiety and suggestion, this is it. The threat of a virus can affect health

in more ways than one. Since 2018 I have been visiting communities affected by suspected contagions of psychosomatic illness. I have seen what fear can do to our physical health. I have also seen the curative effect of hope.

My journey started with a 10-year-old girl called Nola. She was lying in bed when we met, her eyes closed and her thick black hair spread out on her pillow like a halo. She looked very much as if she was asleep, except that she was unrousable. When her father tried to sit her up she was limp like a rag doll. In fact, Nola had not moved, she had not even opened her eyes, for 18 months. She was being kept alive by her parents who fed her a liquid diet through a tube. They kept her joints mobile with passive exercises and massaged her skin to keep her in physical contact with the world. Belying Nola's deeply unresponsive state, scans and tests suggested her brain was awake.

Nola is one of hundreds of children who have fallen into a prolonged coma due to a newly coined medical condition called [resignation syndrome](#). This is a disorder that causes an impenetrable comatose state, but where there is no disease to explain it. Medical test results are always normal. It appears in specific geographical locations: until very recently, people with this syndrome came exclusively from families seeking asylum in Sweden.

When I visited Nola I was hoping to get some insight into what was prolonging her coma, but I left her bedside feeling frustrated about the opaque way in which resignation syndrome was being discussed. The doctor who facilitated my visit was desperate for me to propose a brain mechanism to explain why children like Nola can't wake up. Swedish scientists had invested considerable time in scans and blood tests to find an answer. The media, meanwhile, marvelled at the seeming impossibility of this “mystery illness”.

Resignation syndrome is certainly a highly unusual disorder – comas that are as deep and long-lasting as Nola's, where testing implies the brain is healthy, are very rare. But does this illness really deserve all the headlines? After all, we know what causes it – and how to treat it. In the face of being deported from Sweden, children such as Nola withdraw from society, becoming increasingly apathetic, until they cease to interact with the world. They pull down their physiological shutters. The cure for resignation syndrome is to offer the child asylum.

It seemed to me that resignation syndrome was a social disorder masquerading as a medical one. When the children display their need through physical symptoms, and others conceptualise it through neurotransmitters and brain connections, their suffering is given some substance. Physical disability attracts more help than psychological or social distress.



There are children seeking asylum all over the world but until they wash up on beaches, or become so overwhelmed that they withdraw into a coma, they are easy to neglect.

Having met Nola, it was clear to me that the Swedish children's plight would not be solved by a neurologist or a brain scan. Resignation syndrome is a language of distress. It made me wonder about all the other mystery illness outbreaks and what they might be trying to say.

When, in 2011, a group of American schoolgirls began twitching uncontrollably, their neurologists diagnosed them with a psychosomatic disorder, but a celebrity-driven media frenzy cast doubt over that diagnosis and sent their community on a fruitless hunt for an environmental toxin. In 2016 two dozen American diplomats in Cuba were struck down by a constellation of neurological symptoms, including headaches, dizziness and unsteadiness. A diagnosis of mass hysteria was widely mooted but, likening psychosomatic illness to malingering, the diplomats' doctors insisted their patients were not "pretending" to be ill. Despite the lack of evidence for it, the doctors attributed the outbreak to an attack by a sonic weapon.

"Mass hysteria" is an ambiguous term. It is used to describe any number of behaviours: excitement; rioting; stampedes; panic buying; mass shootings. As a medical disorder, under the name mass psychogenic illness (MPI), it refers to contagious symptoms that spread through a close-knit group of people, propagated by fear and anxiety.

The medical condition hysteria has had many incarnations. The name comes from the Greek word for womb. It was once thought to be found only in women, linked to childbirth and sexuality. In Freudian theory, hysteria became a psychological disorder caused by repressed trauma converted into physical symptoms. More recently, it has been presented as a biological problem, arising through the interplay between psychological mechanisms and physiological brain processes. With this latest formulation, people are starting to accept the reality of psychosomatic suffering. Although, many are still uncomfortable about talking openly about it.

The group phenomenon of mass hysteria is one of the most misrepresented disorders in medicine. It is inextricably linked to clichés and stereotypes, ogled at by the media and caricatured by art. All too often it is presented as a disorder found in emotionally overwrought girls. Books and films reduce it to a product of female sexual frustration. Allusion to witch-hunts, and references to [Arthur Miller's \*The Crucible\*](#), are never very far away. News reports liken modern outbreaks to centuries-old laughing and dancing epidemics, as if no time had passed. One newspaper headline referred to the twitching US schoolgirls as "The Witches of Le Roy". I know of no other medical disorder that still carries the burden of 17th-century beliefs.

The way in which the condition is discussed isn't much better among those with medical training. Many doctors still mistake hysteria for malingering, just as the diplomats' doctors did. They assume that it is a condition of the fragile and the female, and as such reject the diagnosis for men. Many still use Freudian theories, often linked to sexual abuse, to explain it. Is it any wonder that groups affected by this disorder will go to great lengths to distance themselves from it?

By presenting MPI as faked illness, the doctors left the diplomats no choice but to look elsewhere for answers. The history of the US embassy in Cuba was fraught enough to make an attack believable. Politicians told embassy staff they were in danger and advised them to hide. In New York, where doctors made a firm diagnosis of a psychosomatic illness, the media took that to mean the girls were troubled and began picking over their social problems. As honours students and cheerleaders, the teenagers simply did not experience their lives as bleak. If mass hysteria was caused by unhappiness and stress, then the diagnosis couldn't be right.

Once the psychosomatic explanation had been belittled and dismissed, both these communities were pushed into endless cycles of medical testing that led to repeated dead ends. The schoolgirls recovered, while five years on in Cuba, some are still looking for a sonic weapon. It makes you wonder, what suffering could have been prevented had the tropes associated with mass hysteria been cast aside.





























Mass psychogenic illness is also called mass sociogenic illness. It seems a more fitting name because it suggests it is a social disorder, more than a psychological or biological one. Sometimes doctors are so busy looking inside people's heads that they forget the social factors creating illness. Or, more likely even, they are afraid to look too closely at their patients' social worlds for fear that they will be accused of blaming the person, their family or their community for the illness. So, they avoid the frank conversation. Which is how resignation syndrome ceased to be the product of a worldwide immigration crisis and became a "mystery".

It is two years since I met Nola and I'm happy to report that she's awake now. Her feeding tube has been removed. She can eat and even goes to school sometimes. But she can't talk yet, so there's progress to be made. Her family has been granted permission to stay in Sweden, at least for the foreseeable future. Her cure did not come from medical doctors or psychologists, it came by offering her hope of a safe future.

**EDITOR'S COMMENT:** Only in Sweden? Only following asylum rejection? Certain recoveries after asylum approval? Strange! But human brain is a strange area yet to be fully discovered. And such a long history of similar cases. And no scientific explanation? And so many children with parenteral feeding? There is something fishy here. Very badly!



# Choosing Safer Activities

	Unvaccinated People	Your Activity	Fully Vaccinated People
		<b>Outdoor</b>	
Safest		Walk, run, or bike outdoors with members of your household	
		Attend a small, outdoor gathering with fully vaccinated family and friends	
		Attend a small, outdoor gathering with fully vaccinated and unvaccinated people	
Less Safe		Dine at an outdoor restaurant with friends from multiple households	
Least Safe		Attend a crowded, outdoor event, like a live performance, parade, or sports event	
		<b>Indoor</b>	
Less Safe		Visit a barber or hair salon	
		Go to an uncrowded, indoor shopping center or museum	
		Ride public transport with limited occupancy	
		Attend a small, indoor gathering of fully vaccinated and unvaccinated people from multiple households	
Least Safe		Go to an indoor movie theater	
		Attend a full-capacity worship service	
		Sing in an indoor chorus	
		Eat at an indoor restaurant or bar	
		Participate in an indoor, high intensity exercise class	

## Get a COVID-19 vaccine



**Prevention measures not needed**



**Take prevention measures**

Fully vaccinated people: wear a mask

Unvaccinated people: wear a mask, stay 6 feet apart, and wash your hands.

- Safety levels assume the recommended prevention measures are followed, both by the individual and the venue (if applicable).
- CDC cannot provide the specific risk level for every activity in every community. It is important to consider your own personal situation and the risk to you, your family, and your community before venturing out.

Safest

## Worldwide Vaccine Hesitancy Poses Risk to Ending Pandemic

By Steve Baragona

Source: <http://www.homelandsecuritynewswire.com/dr20210503-worldwide-vaccine-hesitancy-poses-risk-to-ending-pandemic>

May 03 – The results of a new poll show that vaccine hesitancy worldwide poses a risk to ending the COVID-19 pandemic for good. In 79 out of 117 countries [surveyed](#), the number of people who said they were willing to be vaccinated was below 70%, the minimum percentage of the population that scientists say needs to have immunity to stop the virus from circulating.

Attitudes shift when vaccines arrive, though, experts note, and many of the countries have not begun mass vaccinations yet.

But the numbers “give a glimpse of just how strong the headwinds are in some of these places,” said Julie Ray, managing editor for world news at polling company Gallup, which conducted the survey.

Gallup contacted about 1,000 people in each of the 117 countries, mostly late last year.

In 20 countries, most polled said they would not be vaccinated. In Russia, for example, 61% of people said they would refuse a vaccine; in Kosovo, 56% would refuse; and in Senegal, 55%.

Overall, based on the results, the survey estimates that more than 1 billion people of the 7.6 billion worldwide would not get vaccinated.

Health officials are aiming to get enough people vaccinated to reach “herd immunity,” a state in which the spread of the disease slows dramatically because the virus has a hard time finding new people to infect.

The more the virus circulates, the more opportunity it has to mutate into dangerous new variants that can undermine vaccines.

Scientists do not know exactly when a population reaches herd immunity, but the best estimate, often cited, is when 70% to 90% have protection.

In total, 68% of people surveyed said they would be vaccinated, just short of the lowest end of the threshold.

“It’s a big deal,” Ray said.

Vaccination is not the only factor in herd immunity. Natural infections also contribute. Some countries in which vaccine rollout is under way are seeing sharp declines in cases long before vaccines reach 70% of the population.

But questions remain about the strength of the immune response to natural infection, its length and whether emerging variants can overcome it. Many of these questions remain unanswered concerning the COVID-19 vaccines as well.

### The ‘Moveable Middle’

The survey was conducted before vaccines began to roll out anywhere. Attitudes have probably shifted somewhat already, Ray said, as hundreds of millions of shots have been given and media coverage has been widespread.

The United States is a good example of how opinions change once vaccination starts. But it also shows the limits of how much can change.

Gallup conducted the U.S. portion of the global poll between August and October. At the time, about 46% of Americans said they would not be vaccinated.

[Gallup’s](#) most recent survey, in March, shows that figure has fallen to 26%.

The biggest change, according to a separate poll, was among people who said they would “wait and see” whether they would get vaccinated.

According to the [Kaiser Family Foundation](#) COVID-19 Vaccine Monitor, in December, nearly 2 in 5 people said they would wait and see, while only 1 in 3 said they would get a vaccine as soon as possible.

By March, the “wait and see” group had shrunk to 17%, while more than half said that they had already gotten their shots or would as soon as possible.

Outright refusals did not change much, on the other hand, decreasing from 15% in December to 13% in March.

“We focus on this movable middle,” said behavioral scientist Rupali Limaye with the International Vaccine Access Center at the John Hopkins Bloomberg School of Public Health.

She said in every country, some people are ready to roll up their sleeves right away and some are dead set against it. But “a huge proportion of the population ... is just ambivalent (about vaccines), meaning they need a nudge in one direction or the other.”

### Trust

In some countries, people are hesitant because they do not trust the government, Gallup’s Ray said.



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Trust in government is low in the countries of the former Soviet Union, for example, and residents were far less likely to say that they would take the vaccine.

But that is not the whole story, she added. Among Russians who were confident in their government, 49% still said that they would not take it.

Some of the reluctance is about vaccines in general. Ray had worked on another poll, the 2018 Wellcome Global Monitor, that examined attitudes toward vaccines, among other things. Not surprisingly, there is a lot of overlap between those countries in which a low percentage of people in the Wellcome poll said that vaccines were safe and those countries in which a high percentage in the new survey said that they would refuse vaccines.

In Eastern Europe, for example, only 40% of people told the Wellcome poll that vaccines were safe. Ten of the 20 countries in which the majority of those polled would refuse the vaccine are in Eastern Europe.

Another factor: In Eastern Europe especially, “misinformation is through the roof,” Limaye said, “which has caused another whole wrench in the plan.”

Unfortunately, in much of the world, she said, “they’re not getting a lot of pro-vaccine messages right now ... (because) the vaccine is not available in the vast majority of the world.”

Creating demand for a product that is not available is not helpful, so “right now we’re in a bit of a weird holding pattern,” she said.

*Steve Baragona is a journalist covering science, environment and health.*



## Debunked: No, unvaccinated people can't get health problems from being around those who are vaccinated

Source: <https://www.thejournal.ie/debunked-no-vaccinated-people-cant-make-unvaccinated-people-sick-covid-vaccine-5422510-Apr2021/>

### Antigenic escape

Antigenic escape (alternatively called immune escape or immune evasion) occurs when the immune system of a host, especially of a human being, is unable to respond to an infectious agent, or in other words that the host's immune system is no longer able to recognize and eliminate a pathogen such as a virus. This process can occur in a number of different ways of both a genetic and an environmental nature. Such mechanisms include homologous recombination, and manipulation and resistance of the host's immune responses.

Different antigens are able to escape through a variety of mechanisms. For example, the African trypanosome parasites are able to clear the host's antibodies, as well as resist lysis and inhibit parts of the innate immune response. Another bacteria, *Bordetella pertussis*, is able to escape the immune response by inhibiting neutrophils and macrophages from invading the infection site early on. One cause of antigenic escape is that a pathogen's epitopes (the binding sites for immune cells) become too similar to a person's naturally occurring MHC-1 epitopes. The immune system becomes unable to distinguish the infection from self-cells.

Antigenic escape is not only crucial for the host's natural immune response, but also for the resistance against vaccinations. The problem of antigenic escape has greatly deterred the process of creating new vaccines. Because vaccines generally cover a small ratio of strains of one virus, the recombination of antigenic DNA that lead to diverse pathogens allows these invaders to resist even newly developed vaccinations. Some antigens may even target pathways different than those the vaccine had originally intended to target. Recent research on many vaccines, including the malaria vaccine, has focused on how to anticipate this diversity and create vaccinations that can cover a broader spectrum of antigenic variation.

## Sputnik Light Key Facts

Sputnik  
LIGHT

**79.4%**

overall efficacy  
against COVID-19

**91.7%**

of people vaccinated  
had **virus-neutralizing  
antibodies** on the 28th  
day after vaccination

**96.9%**

of people vaccinated  
had **antigen specific  
IgG antibodies** 28 days  
after vaccination

**100%**

of people vaccinated  
had **cell immune  
response to coronavirus  
S-protein**

**100%**

of people vaccinated with  
pre-existing immunity had their  
**antibody level increase** by more than  
**40 times 10 days after vaccination**



## Experimental Booster Protects Against New Coronavirus Variants, Early Trial Suggests

Source: <https://www.sciencealert.com/first-evidence-that-moderna-s-booster-could-protect-against-new-covid-strains>

May 06 – A new [COVID-19](#) booster being created by Moderna could protect against the [variants of SARS-CoV-2](#) first found in [Brazil](#) and [South Africa](#), according to the first results from a [small clinical trial](#).

The US biotech firm started developing variant-specific boosters earlier this year after [evidence](#) that several [coronavirus](#) variants can 'break through' current vaccines.

This is their first [clinical trial](#) in humans, after [early tests on mice](#), and so far the results are promising.

"We are encouraged by these new data, which reinforce our confidence that our booster strategy should be protective against these newly detected variants," Moderna CEO Stéphane Bancel [said in a press release](#).

To test the new booster, 40 people who'd already been fully vaccinated with two doses of the Moderna vaccine between six and eight months ago were tested for their levels of neutralizing [antibodies](#) - proteins made by immune cells that bind to [viruses](#).

At the outset of the trial, results showed that only about half of the participants had detectable levels of antibodies against two new variants: B.1.351, first detected in South Africa, and P.1. first discovered in Brazil.

They were then given one of three options: another dose of the original Moderna vaccine; a version tailored specifically to the B.1.351 variant; or a version that combined a 50/50 mix of the two.

Fifteen days later, among the people who received the original Moderna vaccine or the booster against B.1.351, the results showed both groups had improved antibodies against both B.1.351 and P.1. (Data is not yet available on the 50/50 mix group.)

On average, though, those given the new booster produced [over 150 percent](#) of the amount of variant-specific neutralizing antibodies compared to those who received the original shot.

To be clear, the results currently haven't been peer-reviewed. Moderna says the results have been submitted to pre-print server bioRxiv, but they're not yet online.

So, for now, we need to take things with a grain of salt and not get ahead of ourselves.

Side effects from this first trial were similar to those reported by people getting the second dose of Moderna's original vaccine, including headache, muscle and joint pain, and fatigue.

However, in a promising sign, these effects were slightly less common with the new booster. In the trial, 10.5 percent of people who got the variant-specific booster reported a grade-three adverse event, compared to 15 percent of those who got the third dose of the original Moderna vaccine.

Many other vaccine producers are currently working on variant-specific versions of their shots. [Two studies](#) published this week based on real-world data also show that the regular Pfizer-BioNTech vaccine is effective at protecting against the worst outcomes when it comes to B.1.351 and B.1.1.7, which was first identified in the UK.

Let's hope this is just the start of promising new advances to keep us safe from [SARS-CoV-2](#) as the virus continues to evolve.

## The origin of COVID: Did people or nature open Pandora's box at Wuhan?

By Nicholas Wade

Source: <https://thebulletin.org/2021/05/the-origin-of-covid-did-people-or-nature-open-pandoras-box-at-wuhan/>

May 05 – The COVID-19 pandemic has disrupted lives the world over for more than a year. Its death toll will soon reach three million people. Yet the origin of pandemic remains uncertain: The political agendas of governments and scientists have generated thick clouds of obfuscation, which the mainstream press seems helpless to dispel.

In what follows I will sort through the available scientific facts, which hold many clues as to what happened, and provide readers with the evidence to make their own judgments. I will then try to assess the complex issue of blame, which starts with, but extends far beyond, the government of China.

By the end of this article, you may have learned a lot about the molecular biology of viruses. I will try to keep this process as painless as possible. But the science cannot be avoided because for now, and probably for a long time hence, it offers the only sure thread through the maze.

The virus that caused the pandemic is known officially as SARS-CoV-2, but can be called SARS2 for short. As many people know, there are two main theories about its origin. One is



that it jumped naturally from wildlife to people. The other is that the virus was under study in a lab, from which it escaped. It matters a great deal which is the case if we hope to prevent a second such occurrence.

I'll describe the two theories, explain why each is plausible, and then ask which provides the better explanation of the available facts. It's important to note that so far there is *no direct evidence* for either theory. Each depends on a set of reasonable conjectures but so far lacks proof. So I have only clues, not conclusions, to offer. But those clues point in a specific direction. And having inferred that direction, I'm going to delineate some of the strands in this tangled skein of disaster.

### A tale of two theories

After the pandemic first broke out in December 2019, Chinese authorities reported that many cases had occurred in the wet market—a place selling wild animals for meat—in Wuhan. This reminded experts of the SARS1 epidemic of 2002, in which a bat virus had spread first to civets, an animal sold in wet markets, and from civets to people. A similar bat virus caused a second epidemic, known as MERS, in 2012. This time the intermediary host animal was camels.

The decoding of the virus's genome showed it belonged a viral family known as beta-coronaviruses, to which the SARS1 and MERS viruses also belong. The relationship supported the idea that, like them, it was a natural virus that had managed to jump from bats, via another animal host, to people. The wet market connection, the major point of similarity with the SARS1 and MERS epidemics, was soon broken: Chinese researchers found earlier cases in Wuhan with no link to the wet market. But that seemed not to matter when so much further evidence in support of natural emergence was expected shortly.

Wuhan, however, is home of the Wuhan Institute of Virology, a leading world center for research on coronaviruses. So the possibility that the SARS2 virus had escaped from the lab could not be ruled out. Two reasonable scenarios of origin were on the table.

From early on, public and media perceptions were shaped in favor of the natural emergence scenario by strong statements from two scientific groups. These statements were not at first examined as critically as they should have been.

"We stand together to strongly condemn conspiracy theories suggesting that COVID-19 does not have a natural origin," a group of virologists and others wrote in the [Lancet](#) on February 19, 2020, when it was really far too soon for anyone to be sure what had happened. Scientists "overwhelmingly conclude that this coronavirus originated in wildlife," they said, with a stirring rallying call for readers to stand with Chinese colleagues on the frontline of fighting the disease.

Contrary to the letter writers' assertion, the idea that the virus might have escaped from a lab invoked accident, not conspiracy. It surely needed to be explored, not rejected out of hand. A defining mark of good scientists is that they go to great pains to distinguish between what they know and what they don't know. By this criterion, the signatories of the Lancet letter were behaving as poor scientists: They were assuring the public of facts they could not know for sure were true.

It later turned out that the Lancet letter had been [organized and drafted](#) by Peter Daszak, president of the EcoHealth Alliance of New York. Daszak's organization funded coronavirus research at the Wuhan Institute of Virology. If the SARS2 virus had indeed escaped from research he funded, Daszak would be potentially culpable. This acute conflict of interest was not declared to the Lancet's readers. To the contrary, the letter concluded, "We declare no competing interests."

Virologists like Daszak had much at stake in the assigning of blame for the pandemic. For 20 years, mostly beneath the public's attention, they had been playing a dangerous game. In their laboratories they routinely created viruses more dangerous than those that exist in nature. They argued that they could do so safely, and that by getting ahead of nature they could predict and prevent natural "spillovers," the cross-over of viruses from an animal host to people. If SARS2 had indeed escaped from such a laboratory experiment, a savage blowback could be expected, and the storm of public indignation would affect virologists everywhere, not just in China. "It would shatter the scientific edifice top to bottom," an *MIT Technology Review* editor, Antonio Regalado, [said](#) in March 2020.

A second statement that had enormous influence in shaping public attitudes was a [letter](#) (in other words an opinion piece, not a scientific article) published on 17 March 2020 in the journal *Nature Medicine*. Its authors were a group of virologists led by Kristian G. Andersen of the Scripps Research Institute. "Our analyses clearly show that SARS-CoV-2 is not a laboratory construct or a purposefully manipulated virus," the five virologists declared in the second paragraph of their letter.

Unfortunately, this was another case of poor science, in the sense defined above. True, some older methods of cutting and pasting viral genomes retain tell-tale signs of manipulation. But newer methods, called "no-see-um" or "seamless" approaches, leave no defining marks. Nor do other methods for manipulating viruses such as serial passage, the repeated transfer of viruses from one culture of cells to another. If a virus has been manipulated, whether with a seamless method or by serial passage, there is no way of knowing that this is the case. Andersen and his colleagues were assuring their readers of something they could not know.

The discussion part of their letter begins, "It is improbable that SARS-CoV-2 emerged through laboratory manipulation of a related SARS-CoV-like coronavirus." But wait, didn't





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the lead say the virus had *clearly* not been manipulated? The authors' degree of certainty seemed to slip several notches when it came to laying out their reasoning.

The reason for the slippage is clear once the technical language has been penetrated. The two reasons the authors give for supposing manipulation to be improbable are decidedly inconclusive.

First, they say that the spike protein of SARS2 binds very well to its target, the human ACE2 receptor, but does so in a different way from that which physical calculations suggest would be the best fit. Therefore the virus must have arisen by natural selection, not manipulation.

If this argument seems hard to grasp, it's because it's so strained. The authors' basic assumption, not spelt out, is that anyone trying to make a bat virus bind to human cells could do so in only one way. First they would calculate the strongest possible fit between the human ACE2 receptor and the spike protein with which the virus latches onto it. They would then design the spike protein accordingly (by selecting the right string of amino acid units that compose it). Since the SARS2 spike protein is not of this calculated best design, the Andersen paper says, therefore it can't have been manipulated.

But this ignores the way that virologists do in fact get spike proteins to bind to chosen targets, which is not by calculation but by splicing in spike protein genes from other viruses or by serial passage. With serial passage, each time the virus's progeny are transferred to new cell cultures or animals, the more successful are selected until one emerges that makes a really tight bind to human cells. Natural selection has done all the heavy lifting. The Andersen paper's speculation about designing a viral spike protein through calculation has no bearing on whether or not the virus was manipulated by one of the other two methods.

The authors' second argument against manipulation is even more contrived. Although most living things use DNA as their hereditary material, a number of viruses use RNA, DNA's close chemical cousin. But RNA is difficult to manipulate, so researchers working on coronaviruses, which are RNA-based, will first convert the RNA genome to DNA. They manipulate the DNA version, whether by adding or altering genes, and then arrange for the manipulated DNA genome to be converted back into infectious RNA.

Only a certain number of these DNA backbones have been described in the scientific literature. Anyone manipulating the SARS2 virus "would probably" have used one of these known backbones, the Andersen group writes, and since SARS2 is not derived from any of them, therefore it was not manipulated. But the argument is conspicuously inconclusive. DNA backbones are quite easy to make, so it's obviously possible that SARS2 was manipulated using an unpublished DNA backbone.

And that's it. These are the two arguments made by the Andersen group in support of their declaration that the SARS2 virus was clearly not manipulated. And this conclusion, grounded in nothing but two inconclusive speculations, convinced the world's press that SARS2 could not have escaped from a lab. A technical critique of the Andersen letter takes it down in [harsher words](#).

Science is supposedly a self-correcting community of experts who constantly check each other's work. So why didn't other virologists point out that the Andersen group's argument was full of absurdly large holes? Perhaps because in today's universities speech can be very costly. Careers can be destroyed for stepping out of line. Any virologist who challenges the community's declared view risks having his next grant application turned down by the panel of fellow virologists that advises the government grant distribution agency. The Daszak and Andersen letters were really political, not scientific, statements, yet were amazingly effective. Articles in the mainstream press repeatedly stated that a consensus of experts had ruled lab escape out of the question or extremely unlikely. Their authors relied for the most part on the Daszak and Andersen letters, failing to understand the yawning gaps in their arguments. Mainstream newspapers all have science journalists on their staff, as do the major networks, and these specialist reporters are supposed to be able to question scientists and check their assertions. But the Daszak and Andersen assertions went largely unchallenged.

### Doubts about natural emergence

Natural emergence was the media's preferred theory until around February 2021 and the visit by a World Health Organization (WHO) commission to China. The commission's composition and access were heavily controlled by the Chinese authorities. Its members, who included the ubiquitous Daszak, kept asserting before, during, and after their visit that lab escape was extremely unlikely. But this was not quite the propaganda victory the Chinese authorities may have been hoping for. What became clear was that the Chinese had no evidence to offer the commission in support of the natural emergence theory.

This was surprising because both the SARS1 and MERS viruses had left copious traces in the environment. The intermediary host species of SARS1 was identified [within four months](#) of the epidemic's outbreak, and the host of MERS within nine months. Yet some 15 months after the SARS2 pandemic began, and after a presumably intensive search, Chinese researchers had failed to find either the original bat population, or the intermediate species to which SARS2 might have jumped, or any serological evidence that any Chinese population, including that of Wuhan, had ever been exposed to the virus prior to December



2019. Natural emergence remained a conjecture which, however plausible to begin with, had gained not a shred of supporting evidence in over a year.

And as long as that remains the case, it's logical to pay serious attention to the alternative conjecture, that SARS2 escaped from a lab.

Why would anyone want to create a novel virus capable of causing a pandemic? Ever since virologists gained the tools for manipulating a virus's genes, they have argued they could get ahead of a potential pandemic by exploring how close a given animal virus might be to making the jump to humans. And that justified lab experiments in enhancing the ability of dangerous animal viruses to infect people, virologists asserted.

With this rationale, they have recreated the 1918 flu virus, shown how the almost extinct polio virus can be synthesized from its published DNA sequence, and introduced a smallpox gene into a related virus.

These enhancements of viral capabilities are known blandly as gain-of-function experiments. With coronaviruses, there was particular interest in the spike proteins, which jut out all around the spherical surface of the virus and pretty much determine which species of animal it will target. In 2000 Dutch researchers, for instance, earned the gratitude of rodents everywhere by [genetically engineering](#) the spike protein of a mouse coronavirus so that it would attack only cats.

Virologists started studying bat coronaviruses in earnest after these turned out to be the source of both the SARS1 and MERS epidemics. In particular, researchers wanted to understand what changes needed to occur in a bat virus's spike proteins before it could infect people.

Researchers at the Wuhan Institute of Virology, led by China's leading expert on bat viruses, Shi Zheng-li or "Bat Lady," mounted frequent expeditions to the bat-infested caves of Yunnan in southern China and collected around a hundred different bat coronaviruses.

Shi then teamed up with Ralph S. Baric, an eminent coronavirus researcher at the University of North Carolina. [Their work](#) focused on enhancing the ability of bat viruses to attack humans so as to "examine the emergence potential (that is, the potential to infect humans) of circulating bat CoVs [coronaviruses]." In pursuit of this aim, in November 2015 they created a novel virus by taking the backbone of the SARS1 virus and replacing its spike protein with one from a bat virus (known as SHC014-CoV). This manufactured virus was able to infect the cells of the human airway, at least when tested against a lab culture of such cells.

The SHC014-CoV/SARS1 virus is known as a chimera because its genome contains genetic material from two strains of virus. If the SARS2 virus were to have been cooked up in Shi's lab, then its direct prototype would have been the SHC014-CoV/SARS1 chimera, the potential danger of which concerned many observers and prompted intense discussion.

"If the virus escaped, nobody could predict the trajectory," [said](#) Simon Wain-Hobson, a virologist at the Pasteur Institute in Paris.

Baric and Shi referred to the obvious risks in their paper but argued they should be weighed against the benefit of foreshadowing future spillovers. Scientific review panels, they wrote, "may deem similar studies building chimeric viruses based on circulating strains too risky to pursue." Given various restrictions being placed on gain-of function (GOF) research, matters had arrived in their view at "a crossroads of GOF research concerns; the potential to prepare for and mitigate future outbreaks must be weighed against the risk of creating more dangerous pathogens. In developing policies moving forward, it is important to consider the value of the data generated by these studies and whether these types of chimeric virus studies warrant further investigation versus the inherent risks involved."

That statement was made in 2015. From the hindsight of 2021, one can say that the value of gain-of-function studies in preventing the SARS2 epidemic was zero. The risk was catastrophic, if indeed the SARS2 virus was generated in a gain-of-function experiment.

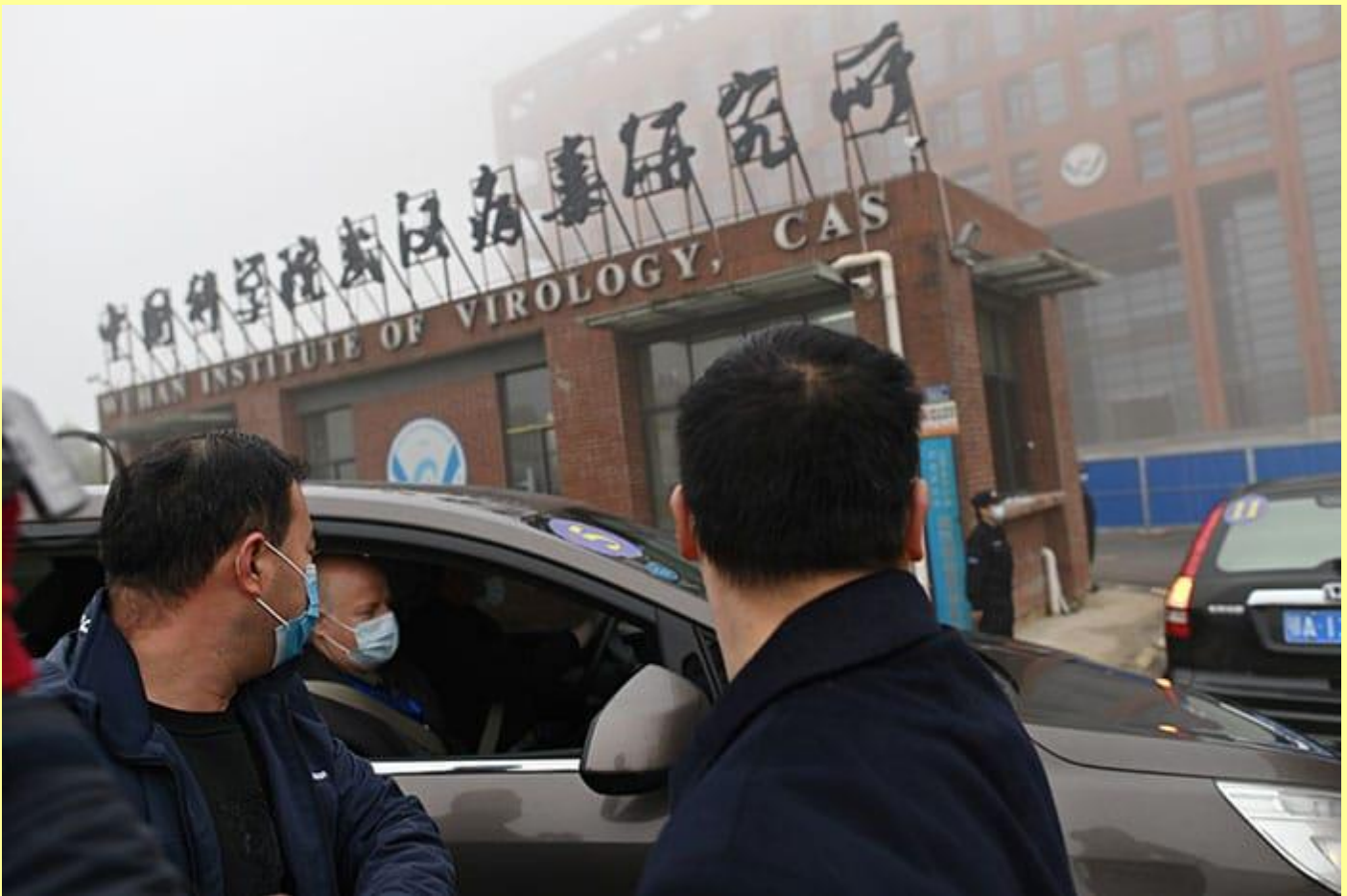
### Inside the Wuhan Institute of Virology

Baric had developed, and taught Shi, a general method for engineering bat coronaviruses to attack other species. The specific targets were human cells grown in cultures and humanized mice. These laboratory mice, a cheap and ethical stand-in for human subjects, are genetically engineered to carry the human version of a protein called ACE2 that studs the surface of cells that line the airways. Shi returned to her lab at the Wuhan Institute of Virology and resumed the work she had started on genetically engineering coronaviruses to attack human cells. How can we be so sure?

Because, by a strange twist in the story, her work was funded by the National Institute of Allergy and Infectious Diseases (NIAID), a part of the US National Institutes of Health (NIH). And grant proposals that funded her work, which are a matter of public record, specify exactly what she planned to do with the money.

The grants were assigned to the prime contractor, Daszak of the EcoHealth Alliance, who subcontracted them to Shi. Here are extracts from the grants for fiscal years 2018 and 2019. ("CoV" stands for coronavirus and "S protein" refers to the virus's spike protein.)





Members of the World Health Organization (WHO) team investigating the origins of the COVID-19 coronavirus arrive by car at the Wuhan Institute of Virology on February 3. (Photo by HECTOR RETAMAL/AFP via Getty Images)

“Test predictions of CoV inter-species transmission. Predictive models of host range (i.e. emergence potential) will be tested experimentally using reverse genetics, pseudovirus and receptor binding assays, and virus infection experiments across a range of cell cultures from different species and [humanized mice](#).”

“We will use S protein sequence data, [infectious clone technology](#), in vitro and in vivo infection experiments and analysis of receptor binding to test the hypothesis that % divergence thresholds in S protein sequences predict spillover potential.”

What this means, in non-technical language, is that Shi set out to create novel coronaviruses with the highest possible infectivity for human cells. Her plan was to take genes that coded for spike proteins possessing a variety of measured affinities for human cells, ranging from high to low. She would insert these spike genes one by one into the backbone of a number of viral genomes (“reverse genetics” and “infectious clone technology”), creating a series of chimeric viruses. These chimeric viruses would then be tested for their ability to attack human cell cultures (“in vitro”) and humanized mice (“in vivo”). And this information would help predict the likelihood of “spillover,” the jump of a coronavirus from bats to people.

The methodical approach was designed to find the best combination of coronavirus backbone and spike protein for infecting human cells. The approach could have generated SARS2-like viruses, and indeed may have created the SARS2 virus itself with the right combination of virus backbone and spike protein.

It cannot yet be stated that Shi did or did not generate SARS2 in her lab because her records have been sealed, but it seems she was certainly on the right track to have done so. “It is clear that the Wuhan Institute of Virology was systematically constructing novel chimeric coronaviruses and was assessing their ability to infect human cells and human-ACE2-expressing mice,” says Richard H. Ebright, a molecular biologist at Rutgers University and leading expert on biosafety.

“It is also clear,” Ebright said, “that, depending on the constant genomic contexts chosen for analysis, this work could have produced SARS-CoV-2 or a proximal progenitor of SARS-CoV-2.” “Genomic context” refers to the particular viral backbone used as the testbed for the spike protein.



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The lab escape scenario for the origin of the SARS2 virus, as should by now be evident, is not mere hand-waving in the direction of the Wuhan Institute of Virology. It is a detailed proposal, based on the specific project being funded there by the NIAID.

Even if the grant required the work plan described above, how can we be sure that the plan was in fact carried out? For that we can rely on the word of Daszak, who has been much protesting for the last 15 months that lab escape was a ludicrous [conspiracy theory](#) invented by China-bashers.

On December 9, 2019, before the outbreak of the pandemic became generally known, Daszak gave an [interview](#) in which he talked in glowing terms of how researchers at the Wuhan Institute of Virology had been reprogramming the spike protein and generating chimeric coronaviruses capable of infecting humanized mice.

“And we have now found, you know, after 6 or 7 years of doing this, over 100 new SARS-related coronaviruses, very close to SARS,” Daszak says around minute 28 of the interview. “Some of them get into human cells in the lab, some of them can cause SARS disease in humanized mice models and are untreatable with therapeutic monoclonals and you can’t vaccinate against them with a vaccine. So, these are a clear and present danger....”

“Interviewer: You say these are diverse coronaviruses and you can’t vaccinate against them, and no anti-virals—so what do we do?”

“Daszak: Well I think...coronaviruses—you can manipulate them in the lab pretty easily. Spike protein drives a lot of what happen with coronavirus, in zoonotic risk. So you can get the sequence, you can build the protein, and we work a lot with Ralph Baric at UNC to do this. Insert into the backbone of another virus and do some work in the lab. So you can get more predictive when you find a sequence. You’ve got this diversity. Now the logical progression for vaccines is, if you are going to develop a vaccine for SARS, people are going to use pandemic SARS, but let’s insert some of these other things and get a better vaccine.” The insertions he referred to perhaps included an element called the furin cleavage site, discussed below, which greatly increases viral infectivity for human cells. In disjointed style, Daszak is referring to the fact that once you have generated a novel coronavirus that can attack human cells, you can take the spike protein and make it the basis for a vaccine. One can only imagine Daszak’s reaction when he heard of the outbreak of the epidemic in Wuhan a few days later. He would have known better than anyone the Wuhan Institute’s goal of making bat coronaviruses infectious to humans, as well as the weaknesses in the institute’s defense against their own researchers becoming infected. But instead of providing public health authorities with the plentiful information at his disposal, he immediately launched a public relations campaign to persuade the world that the epidemic couldn’t possibly have been caused by one of the institute’s souped-up viruses. “The idea that this virus escaped from a lab is just pure baloney. It’s simply not true,” he declared in an April 2020 [interview](#).

### The safety arrangements at the Wuhan Institute of Virology

Daszak was possibly unaware of, or perhaps he knew all too well, the [long history](#) of viruses escaping from even the best run laboratories. The smallpox virus escaped three times from labs in England in the 1960’s and 1970’s, causing 80 cases and 3 deaths. Dangerous viruses have leaked out of labs almost every year since. Coming to more recent times, the SARS1 virus has proved a true escape artist, leaking from laboratories in Singapore, Taiwan, and no less than four times from the Chinese National Institute of Virology in Beijing.

One reason for SARS1 being so hard to handle is that there were no vaccines available to protect laboratory workers. As Daszak mentioned in the December 19 interview quoted above, the Wuhan researchers too had been unable to develop vaccines against the coronaviruses they had designed to infect human cells. They would have been as defenseless against the SARS2 virus, if it were generated in their lab, as their Beijing colleagues were against SARS1.

A second reason for the severe danger of novel coronaviruses has to do with the required levels of lab safety. There are four degrees of safety, designated BSL1 to BSL4, with BSL4 being the most restrictive and designed for deadly pathogens like the Ebola virus.

The Wuhan Institute of Virology had a new BSL4 lab, but its state of readiness considerably alarmed the State Department inspectors who visited it from the Beijing embassy in 2018. “The new lab has a serious shortage of appropriately trained technicians and investigators needed to safely operate this high-containment laboratory,” the inspectors wrote in a [cable](#) of January 19, 2018.

The real problem, however, was not the unsafe state of the Wuhan BSL4 lab but the fact that virologists worldwide don’t like working in BSL4 conditions. You have to wear a space suit, do operations in closed cabinets, and accept that everything will take twice as long. So the rules assigning each kind of virus to a given safety level were laxer than some might think was prudent.

Before 2020, the rules followed by virologists in China and elsewhere required that experiments with the SARS1 and MERS viruses be conducted in BSL3 conditions. But all other bat coronaviruses could be studied in BSL2, the next level down. BSL2 requires taking fairly minimal safety precautions, such as wearing lab coats and gloves, not sucking up liquids in a pipette, and putting up biohazard warning signs. Yet a gain-of-function experiment conducted in BSL2 might produce an agent more



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infectious than either SARS1 or MERS. And if it did, then lab workers would stand a high chance of infection, especially if unvaccinated.

Much of Shi's work on gain-of-function in coronaviruses was performed at the BSL2 safety level, as is stated in her publications and other documents. She has said in an [interview](#) with *Science* magazine that "[t]he coronavirus research in our laboratory is conducted in BSL-2 or BSL-3 laboratories."

"It is clear that some or all of this work was being performed using a biosafety standard—biosafety level 2, the biosafety level of a standard US dentist's office—that would pose an unacceptably high risk of infection of laboratory staff upon contact with a virus having the transmission properties of SARS-CoV-2," Ebright says.

"It also is clear," he adds, "that this work never should have been funded and never should have been performed."

This is a view he holds regardless of whether or not the SARS2 virus ever saw the inside of a lab.

Concern about safety conditions at the Wuhan lab was not, it seems, misplaced. According to a [fact sheet](#) issued by the State Department on January 21, 2021, "The U.S. government has reason to believe that several researchers inside the WIV became sick in autumn 2019, before the first identified case of the outbreak, with symptoms consistent with both COVID-19 and common seasonal illnesses."

David Asher, a fellow of the Hudson Institute and former consultant to the State Department, provided more detail about the incident at a [seminar](#). Knowledge of the incident came from a mix of public information and "some high end information collected by our intelligence community," he said. Three people working at a BSL3 lab at the institute fell sick within a week of each other with severe symptoms that required hospitalization. This was "the first known cluster that we're aware of, of victims of what we believe to be COVID-19." Influenza could not completely be ruled out but seemed unlikely in the circumstances, he said.

### Comparing the rival scenarios of SARS2 origin

The evidence above adds up to a serious case that the SARS2 virus could have been created in a lab, from which it then escaped. But the case, however substantial, falls short of proof. Proof would consist of evidence from the Wuhan Institute of Virology, or related labs in Wuhan, that SARS2 or a predecessor virus was under development there. For lack of access to such records, another approach is to take certain salient facts about the SARS2 virus and ask how well each is explained by the two rival scenarios of origin, those of natural emergence and lab escape. Here are four tests of the two hypotheses. A couple have some technical detail, but these are among the most persuasive for those who may care to follow the argument.

1) *The place of origin.* Start with geography. The two closest known relatives of the SARS2 virus were collected from bats living in caves in Yunnan, a province of southern China. If the SARS2 virus had first infected people living around the Yunnan caves, that would strongly support the idea that the virus had spilled over to people naturally. But this isn't what happened. The pandemic broke out 1,500 kilometers away, in Wuhan.

Beta-coronaviruses, the family of bat viruses to which SARS2 belongs, infect the horseshoe bat *Rhinolophus affinis*, which ranges across southern China. The bats' range is 50 kilometers, so it's unlikely that any made it to Wuhan. In any case, the first cases of the COVID-19 pandemic probably occurred in September, when [temperatures in Hubei province](#) are already cold enough to send bats into hibernation.

What if the bat viruses infected some intermediate host first? You would need a longstanding population of bats in frequent proximity with an intermediate host, which in turn must often cross paths with people. All these exchanges of virus must take place somewhere outside Wuhan, a busy metropolis which so far as is known is not a natural habitat of *Rhinolophus* bat colonies. The infected person (or animal) carrying this highly transmissible virus must have traveled to Wuhan without infecting anyone else. No one in his or her family got sick. If the person jumped on a train to Wuhan, no fellow passengers fell ill.

It's a stretch, in other words, to get the pandemic to break out naturally outside Wuhan and then, without leaving any trace, to make its first appearance there.

For the lab escape scenario, a Wuhan origin for the virus is a no-brainer. Wuhan is home to China's leading center of coronavirus research where, as noted above, researchers were genetically engineering bat coronaviruses to attack human cells. They were doing so under the minimal safety conditions of a BSL2 lab. If a virus with the unexpected infectiousness of SARS2 had been generated there, its escape would be no surprise.

"When I first saw the furin cleavage site in the viral sequence, with its arginine codons, I said to my wife it was the smoking gun for the origin of the virus," said David Baltimore, an eminent virologist and former president of the California Institute of Technology, often known as CalTech. "These features make a powerful challenge to the idea of a natural origin for SARS2," he said. (1)

2) *Natural history and evolution.* The initial location of the pandemic is a small part of a larger problem, that of its natural history. Viruses don't just make one time jumps from one species



to another. The coronavirus spike protein, adapted to attack bat cells, needs repeated jumps to another species, most of which fail, before it gains a lucky mutation. Mutation—a change in one of its RNA units—causes a different amino acid unit to be incorporated into its spike protein and makes the spike protein better able to attack the cells of some other species.

Through several more such mutation-driven adjustments, the virus adapts to its new host, say some animal with which bats are in frequent contact. The whole process then resumes as the virus moves from this intermediate host to people.

In the case of SARS1, researchers have documented the successive changes in its spike protein as the virus evolved step by step into a dangerous pathogen. After it had gotten from bats into civets, there were six further changes in its spike protein before it became a mild pathogen in people. After a further 14 changes, the virus was much better adapted to humans, and with a further four, the [epidemic took off](#).

But when you look for the fingerprints of a similar transition in SARS2, a strange surprise awaits. The virus has changed hardly at all, at least until recently. From its very first appearance, it was well adapted to human cells. Researchers led by Alina Chan of the Broad Institute compared SARS2 with late stage SARS1, which by then was well adapted to human cells, and found that the two viruses were similarly well adapted. “By the time SARS-CoV-2 was first detected in late 2019, it was already pre-adapted to human transmission to an extent similar to late epidemic SARS-CoV,” they [wrote](#).

Even those who think lab origin unlikely agree that SARS2 genomes are remarkably uniform. Baric writes that “early strains identified in Wuhan, China, showed limited genetic diversity, which suggests that the virus may have been introduced from a single source.” A single source would of course be compatible with lab escape, less so with the massive variation and selection which is evolution’s hallmark way of doing business.

The uniform structure of SARS2 genomes gives no hint of any passage through an intermediate animal host, and no such host has been identified in nature.

Proponents of natural emergence suggest that SARS2 incubated in a yet-to-be found human population before gaining its special properties. Or that it jumped to a host animal outside China.

All these conjectures are possible, but strained. Proponents of a lab leak have a simpler explanation. SARS2 was adapted to human cells from the start because it was grown in humanized mice or in lab cultures of human cells, just as described in Daszak’s grant proposal. Its genome shows little diversity because the hallmark of lab cultures is uniformity.

Proponents of laboratory escape joke that of course the SARS2 virus infected an intermediary host species before spreading to people, and that they have identified it—a humanized mouse from the Wuhan Institute of Virology.

3) *The furin cleavage site.* The furin cleavage site is a minute part of the virus’s anatomy but one that exerts great influence on its infectivity. It sits in the middle of the SARS2 spike protein. It also lies at the heart of the puzzle of where the virus came from.

The spike protein has two sub-units with different roles. The first, called S1, recognizes the virus’s target, a protein called angiotensin converting enzyme-2 (or ACE2) which studs the surface of cells lining the human airways. The second, S2, helps the virus, once anchored to the cell, to fuse with the cell’s membrane. After the virus’s outer membrane has coalesced with that of the stricken cell, the viral genome is injected into the cell, hijacks its protein-making machinery and forces it to generate new viruses.

But this invasion cannot begin until the S1 and S2 subunits have been cut apart. And there, right at the S1/S2 junction, is the furin cleavage site that ensures the spike protein will be cleaved in exactly the right place.

The virus, a model of economic design, does not carry its own cleaver. It relies on the cell to do the cleaving for it. Human cells have a protein cutting tool on their surface known as furin. Furin will cut any protein chain that carries its signature target cutting site. This is the sequence of amino acid units proline-arginine-arginine-alanine, or PRRA in the code that refers to each amino acid by a letter of the alphabet. PRRA is the amino acid sequence at the core of SARS2’s furin cleavage site.

Viruses have all kinds of clever tricks, so why does the furin cleavage site stand out? Because of all known SARS-related beta-coronaviruses, only SARS2 possesses a furin cleavage site. All the other viruses have their S2 unit cleaved at a different site and by a different mechanism.

How then did SARS2 acquire its furin cleavage site? Either the site evolved naturally, or it was inserted by researchers at the S1/S2 junction in a gain-of-function experiment.

Consider natural origin first. Two ways viruses evolve are by mutation and by recombination. Mutation is the process of random change in DNA (or RNA for coronaviruses) that usually results in one amino acid in a protein chain being switched for another. Many of these changes harm the virus but natural selection retains the few that do something useful. Mutation is the process by which the SARS1 spike protein gradually switched its preferred target cells from those of bats to civets, and then to humans.

Mutation seems a less likely way for SARS2’s furin cleavage site to be generated, even though it can’t completely be ruled out. The site’s four amino acid units are all together, and all at just the right place in the S1/S2 junction. Mutation is a random process triggered by



copying errors (when new viral genomes are being generated) or by chemical decay of genomic units. So it typically affects single amino acids at different spots in a protein chain. A string of amino acids like that of the furin cleavage site is much more likely to be acquired all together through a quite different process known as recombination.

Recombination is an inadvertent swapping of genomic material that occurs when two viruses happen to invade the same cell, and their progeny are assembled with bits and pieces of RNA belonging to the other. Beta-coronaviruses will only combine with other beta-coronaviruses but can acquire, by recombination, almost any genetic element present in the collective genomic pool. What they cannot acquire is an element the pool does not possess. And no known SARS-related beta-coronavirus, the class to which SARS2 belongs, possesses a furin cleavage site.

Proponents of natural emergence say SARS2 could have picked up the site from some as yet unknown beta-coronavirus. But bat SARS-related beta-coronaviruses evidently don't need a furin cleavage site to infect bat cells, so there's no great likelihood that any in fact possesses one, and indeed none has been found so far.

The proponents' next argument is that SARS2 acquired its furin cleavage site from people. A predecessor of SARS2 could have been circulating in the human population for months or years until at some point it acquired a furin cleavage site from human cells. It would then have been ready to break out as a pandemic.

If this is what happened, there should be traces in hospital surveillance records of the people infected by the slowly evolving virus. But none has so far come to light. According to the WHO [report on the origins of the virus](#), the sentinel hospitals in Hubei province, home of Wuhan, routinely monitor influenza-like illnesses and “no evidence to suggest substantial SARSCoV-2 transmission in the months preceding the outbreak in December was observed.”

So it's hard to explain how the SARS2 virus picked up its furin cleavage site naturally, whether by mutation or recombination.

That leaves a gain-of-function experiment. For those who think SARS2 may have escaped from a lab, explaining the furin cleavage site is no problem at all. “Since 1992 the virology community has known that the one sure way to make a virus deadlier is to give it a furin cleavage site at the S1/S2 junction in the laboratory,” [writes](#) Steven Quay, a biotech entrepreneur interested in the origins of SARS2. “At least 11 gain-of-function experiments, adding a furin site to make a virus more infective, are published in the open literature, including [by] Dr. Zhengli Shi, head of coronavirus research at the Wuhan Institute of Virology.”

4) *A question of codons.* There's another aspect of the furin cleavage site that narrows the path for a natural emergence origin even further.

As everyone knows (or may at least recall from high school), the genetic code uses three units of DNA to specify each amino acid unit of a protein chain. When read in groups of 3, the 4 different kinds of DNA can specify 4 x 4 x 4 or 64 different triplets, or codons as they are called. Since there are only 20 kinds of amino acid, there are more than enough codons to go around, allowing some amino acids to be specified by more than one codon. The amino acid arginine, for instance, can be designated by any of the six codons CGU, CGC, CGA, CGG, AGA or AGG, where A, U, G and C stand for the four different kinds of unit in RNA.

Here's where it gets interesting. Different organisms have different codon preferences. Human cells like to designate arginine with the codons CGT, CGC or CGG. But CGG is coronavirus's least popular codon for arginine. Keep that in mind when looking at how the amino acids in the furin cleavage site are encoded in the SARS2 genome.

Now the functional reason why SARS2 has a furin cleavage site, and its cousin viruses don't, can be seen by lining up (in a computer) the string of nearly 30,000 nucleotides in its genome with those of its cousin coronaviruses, of which the closest so far known is one called RaTG13. Compared with RaTG13, SARS2 has a 12-nucleotide insert right at the S1/S2 junction. The insert is the sequence T-CCT-CGG-CGG-GC. The CCT codes for proline, the two CGG's for two arginines, and the GC is the beginning of a GCA codon that codes for alanine.

There are several curious features about this insert but the oddest is that of the two side-by-side CGG codons. Only 5 percent of SARS2's arginine codons are CGG, and the double codon CGG-CGG has not been found in any other beta-coronavirus. So how did SARS2 acquire a pair of arginine codons that are favored by human cells but not by coronaviruses?

Proponents of natural emergence have an up-hill task to explain all the features of SARS2's furin cleavage site. They have to postulate a recombination event at a site on the virus's genome where recombinations are rare, and the insertion of a 12-nucleotide sequence with a double arginine codon unknown in the beta-coronavirus repertoire, at the only site in the genome that would significantly expand the virus's infectivity.

“Yes, but your wording makes this sound unlikely—viruses are specialists at unusual events,” is the riposte of David L. Robertson, a virologist at the University of Glasgow who regards lab escape as a conspiracy theory.

“Recombination is naturally very, very frequent in these viruses, there are recombination breakpoints in the spike protein and these codons appear unusual exactly because we've not sampled enough.”



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Robertson is correct that evolution is always producing results that may seem unlikely but in fact are not. Viruses can generate untold numbers of variants but we see only the one-in-a-billion that natural selection picks for survival. But this argument could be pushed too far. For instance, any result of a gain-of-function experiment could be explained as one that evolution would have arrived at in time. And the numbers game can be played the other way. For the furin cleavage site to arise naturally in SARS2, a chain of events has to happen, each of which is quite unlikely for the reasons given above. A long chain with several improbable steps is unlikely to ever be completed.

For the lab escape scenario, the double CGG codon is no surprise. The human-preferred codon is routinely used in labs. So anyone who wanted to insert a furin cleavage site into the virus's genome would synthesize the PRRA-making sequence in the lab and would be likely to use CGG codons to do so.

### A third scenario of origin

There's a variation on the natural emergence scenario that's worth considering. **This is the idea that SARS2 jumped directly from bats to humans, without going through an intermediate host as SARS1 and MERS did.** A leading advocate is the virologist David Robertson who notes that SARS2 can attack several other species besides humans. He believes the virus [evolved a generalist capability while still in bats](#). Because the bats it infects are widely distributed in southern and central China, the virus had ample opportunity to jump to people, even though it seems to have done so on only one known occasion. Robertson's thesis explains why no one has so far found a trace of SARS2 in any intermediate host or in human populations surveilled before December 2019. It would also explain the puzzling fact that SARS2 has not changed since it first appeared in humans—it didn't need to because it could already attack human cells efficiently.

One problem with this idea, though, is that if SARS2 jumped from bats to people in a single leap and hasn't changed much since, it should still be good at infecting bats. And it seems it isn't.

"Tested bat species are poorly infected by SARS-CoV-2 and they are therefore unlikely to be the direct source for human infection," [write a scientific group](#) skeptical of natural emergence.

Still, Robertson may be onto something. The bat coronaviruses of the Yunnan caves can infect people directly. In April 2012 six miners clearing bat guano from the Mojiang mine contracted severe pneumonia with COVID-19-like symptoms and three eventually died. A virus isolated from the Mojiang mine, called RaTG13, is still the closest known relative of SARS2. Much mystery surrounds the origin, reporting and strangely low affinity of RaTG13 for bat cells, as well as the nature of 8 similar viruses that Shi [reports](#) she collected at the same time but has not yet published despite their great relevance to the ancestry of SARS2. But all that is a story for another time. The point here is that bat viruses can infect people directly, though only in special conditions.

So who else, besides miners excavating bat guano, comes into particularly close contact with bat coronaviruses? Well, coronavirus researchers do. Shi says she and her group collected more than 1,300 bat samples during some eight visits to the Mojiang cave between 2012 and 2015, and there were doubtless many expeditions to other Yunnan caves.

Imagine the researchers making frequent trips from Wuhan to Yunnan and back, stirring up bat guano in dark caves and mines, and now you begin to see a possible missing link between the two places. Researchers could have gotten infected during their collecting trips, or while working with the new viruses at the Wuhan Institute of Technology. The virus that escaped from the lab would have been a natural virus, not one cooked up by gain of function.

The direct-from-bats thesis is a chimera between the natural emergence and lab escape scenarios. It's a possibility that can't be dismissed. But against it are the facts that 1) both SARS2 and RaTG13 seem to have only feeble affinity for bat cells, so one can't be fully confident that either ever saw the inside of a bat; and 2) the theory is no better than the natural emergence scenario at explaining how SARS2 gained its furin cleavage site, or why the furin cleavage site is determined by human-preferred arginine codons instead of by the bat-preferred codons.

### Where we are so far

Neither the natural emergence nor the lab escape hypothesis can yet be ruled out. There is still no direct evidence for either. So no definitive conclusion can be reached.

That said, the available evidence leans more strongly in one direction than the other. Readers will form their own opinion. But it seems to me that proponents of lab escape can explain all the available facts about SARS2 considerably more easily than can those who favor natural emergence.

It's documented that researchers at the Wuhan Institute of Virology were doing gain-of-function experiments designed to make coronaviruses infect human cells and humanized mice. This is exactly the kind of experiment from which a SARS2-like virus could have emerged. The researchers were not vaccinated against the viruses under study, and they





were working in the minimal safety conditions of a BSL2 laboratory. So escape of a virus would not be at all surprising. In all of China, the pandemic broke out on the doorstep of the Wuhan institute. The virus was already well adapted to humans, as expected for a virus grown in humanized mice. It possessed an unusual enhancement, a furin cleavage site, which is not possessed by any other known SARS-related beta-coronavirus, and this site included a double arginine codon also unknown among beta-coronaviruses. What more evidence could you want, aside from the presently unobtainable lab records documenting SARS2's creation?

Proponents of natural emergence have a rather harder story to tell. The plausibility of their case rests on a single surmise, the expected parallel between the emergence of SARS2 and that of SARS1 and MERS. But none of the evidence expected in support of such a parallel history has yet emerged. No one has found the bat population that was the source of SARS2, if indeed it ever infected bats. No intermediate host has presented itself, despite an intensive search by Chinese authorities that included the testing of 80,000 animals. There is no evidence of the virus making multiple independent jumps from its intermediate host to people, as both the SARS1 and MERS viruses did. There is no evidence from hospital surveillance records of the epidemic gathering strength in the population as the virus evolved. There is no explanation of why a natural epidemic should break out in Wuhan and nowhere else. There is no good explanation of how the virus acquired its furin cleavage site, which no other SARS-related beta-coronavirus possesses, nor why the site is composed of human-preferred codons. The natural emergence theory battles a bristling array of implausibilities.

The records of the Wuhan Institute of Virology certainly hold much relevant information. But Chinese authorities seem unlikely to release them given the substantial chance that they incriminate the regime in the creation of the pandemic. Absent the efforts of some courageous Chinese whistle-blower, we may already have at hand just about all of the relevant information we are likely to get for a while.

So it's worth trying to assess responsibility for the pandemic, at least in a provisional way, because the paramount goal remains to prevent another one. Even those who aren't persuaded that lab escape is the more likely origin of the SARS2 virus may see reason for concern about the present state of regulation governing gain-of-function research. There are two obvious levels of responsibility: the first, for allowing virologists to perform gain-of-function experiments, offering minimal gain and vast risk; the second, if indeed SARS2 was generated in a lab, for allowing the virus to escape and unleash a world-wide pandemic. Here are the players who seem most likely to deserve blame.

1. Chinese virologists. First and foremost, Chinese virologists are to blame for performing gain-of-function experiments in mostly BSL2-level safety conditions which were far too lax to contain a virus of unexpected infectiousness like SARS2. If the virus did indeed escape from their lab, they deserve the world's censure for a foreseeable accident that has already caused the deaths of three million people. True, Shi was trained by French virologists, worked closely with American virologists and was following international rules for the containment of coronaviruses. But she could and should have made her own assessment of the risks she was running. She and her colleagues bear the responsibility for their actions.

I have been using the Wuhan Institute of Virology as a shorthand for all virological activities in Wuhan. It's possible that SARS2 was generated in some other Wuhan lab, perhaps in an attempt to make a vaccine that worked against all coronaviruses. But until the role of other Chinese virologists is clarified, Shi is the public face of Chinese work on coronaviruses, and provisionally she and her colleagues will stand first in line for opprobrium.

2. Chinese *authorities*. China's central authorities did not generate SARS2, but they sure did their utmost to conceal the nature of the tragedy and China's responsibility for it. They suppressed all records at the Wuhan Institute of Virology and closed down its virus databases. They released a trickle of information, much of which may have been outright false or designed to misdirect and mislead. They did their best to manipulate the WHO's inquiry into the virus's origins, and led the commission's members on a fruitless run-around. So far they have proved far more interested in deflecting blame than in taking the steps necessary to prevent a second pandemic.

3. *The worldwide community of virologists*. Virologists around the world are a loose-knit professional community. They write articles in the same journals. They attend the same conferences. They have common interests in seeking funds from governments and in not being overburdened with safety regulations.

Virologists knew better than anyone the dangers of gain-of-function research. But the power to create new viruses, and the research funding obtainable by doing so, was too tempting. They pushed ahead with gain-of-function experiments. They lobbied against the moratorium imposed on Federal funding for gain-of-function research in 2014, and it was raised in 2017.

The benefits of the research in preventing future epidemics have so far been nil, the risks vast. If research on the SARS1 and MERS viruses could only be done at the BSL3 safety level, it was surely illogical to allow any work with novel coronaviruses at the lesser level of BSL2. Whether or not SARS2 escaped from a lab, virologists around the world have been playing with fire.



Their behavior has long alarmed other biologists. In 2014 scientists calling themselves the Cambridge Working Group urged caution on creating new viruses. In prescient words, they specified the risk of creating a SARS2-like virus. “Accident risks with newly created ‘potential pandemic pathogens’ raise grave new concerns,” they [wrote](#). “Laboratory creation of highly transmissible, novel strains of dangerous viruses, especially but not limited to influenza, poses substantially increased risks. An accidental infection in such a setting could trigger outbreaks that would be difficult or impossible to control.”

When molecular biologists discovered a technique for moving genes from one organism to another, they held a public conference at Asilomar in 1975 to discuss the possible risks. Despite much internal opposition, they drew up a list of stringent safety measures that could be relaxed in future—and duly were—when the possible hazards had been better assessed.

When the CRISPR technique for editing genes was invented, biologists convened a joint report by the US, UK and Chinese national academies of science to urge restraint on making heritable changes to the human genome. Biologists who invented gene drives have also been open about the dangers of their work and have sought to involve the public.

You might think the SARS2 pandemic would spur virologists to re-evaluate the benefits of gain-of-function research, even to engage the public in their deliberations. But no. Many virologists deride lab escape as a conspiracy theory, and others say nothing. They have barricaded themselves behind a Chinese wall of silence which so far is working well to allay, or at least postpone, journalists’ curiosity and the public’s wrath. Professions that cannot regulate themselves deserve to get regulated by others, and this would seem to be the future that virologists are choosing for themselves.

4. *The US role in funding the Wuhan Institute of Virology.* From June 2014 to May 2019, Daszak’s EcoHealth Alliance had a [grant](#) from the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, to do gain-of-function research with coronaviruses at the Wuhan Institute of Virology. Whether or not SARS2 is the product of that research, it seems a questionable policy to farm out high-risk research to unsafe foreign labs using minimal safety precautions. And if the SARS2 virus did indeed escape from the Wuhan institute, then the NIH will find itself in the terrible position of having funded a disastrous experiment that led to death of more than 3 million worldwide, including more than half a million of its own citizens.

The responsibility of the NIAID and NIH is even more acute because for the first three years of the grant to EcoHealth Alliance, there was a moratorium on funding gain-of-function research. Why didn’t the two agencies therefore halt the federal funding, as apparently required to do so by law? Because someone wrote a loophole into the moratorium.

The moratorium specifically barred funding any gain-of-function research that increased the pathogenicity of the flu, MERS, or SARS viruses. But then a [footnote](#) on page 2 of the moratorium document states that “[a]n exception from the research pause may be obtained if the head of the USG funding agency determines that the research is urgently necessary to protect the public health or national security.”

This seems to mean that either the director of the NIAID, Anthony Fauci, or the director of the NIH, Francis Collins, or maybe both, would have invoked the footnote in order to keep the money flowing to Shi’s gain-of-function research.

“Unfortunately, the NIAID director and the NIH director exploited this loophole to issue exemptions to projects subject to the Pause—preposterously asserting the exempted research was ‘urgently necessary to protect public health or national security’—thereby nullifying the Pause,” Ebright said in an [interview](#) with Independent Science News.

When the moratorium was ended in 2017, it didn’t just vanish but was replaced by a reporting system, the Potential Pandemic Pathogens Control and Oversight (P3CO) Framework, which required agencies to report for review any dangerous gain-of-function work they wished to fund.

According to Ebright, both Collins and Fauci “have declined to flag and forward proposals for risk-benefit review, thereby nullifying the P3CO Framework.”

In his view, the two officials, in dealing with the moratorium and the ensuing reporting system, “have systematically thwarted efforts by the White House, the Congress, scientists, and science policy specialists to regulate GoF [gain-of-function] research of concern.” Possibly the two officials had to take into account matters not evident in the public record, such as issues of national security. Perhaps funding the Wuhan Institute of Virology, which is believed to have ties with Chinese military virologists, provided a window into Chinese biowarfare research. But whatever other considerations may have been involved, the bottom line is that the National Institutes of Health was supporting gain-of-function research, of a kind that could have generated the SARS2 virus, in an unsupervised foreign lab that was doing work in BSL2 biosafety conditions. The prudence of this decision can be questioned, whether or not SARS2 and the death of 3 million people were the result of it, which emphasizes the need [for some better system](#) of control.

### In conclusion

If the case that SARS2 originated in a lab is so substantial, why isn’t this more widely known? As may now be obvious, there are many people who have reason not to talk about it. The list is led, of course, by the Chinese authorities. But virologists in the United States and



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Europe have no great interest in igniting a public debate about the gain-of-function experiments that their community has been pursuing for years.

Nor have other scientists stepped forward to raise the issue. Government research funds are distributed on the advice of committees of scientific experts drawn from universities. Anyone who rocks the boat by raising awkward political issues runs the risk that their grant will not be renewed and their research career will be ended. Maybe good behavior is rewarded with the many perks that slosh around the distribution system. And if you thought that Andersen and Daszak might have blotted their reputation for scientific objectivity after their partisan attacks on the lab escape scenario, look at the second and third names on this [list of recipients](#) of an \$82 million grant announced by the National Institute of Allergy and Infectious Diseases in August 2020.

The US government shares a strange common interest with the Chinese authorities: Neither is keen on drawing attention to the fact that Shi's coronavirus work was funded by the US National Institutes of Health. One can imagine the behind-the-scenes conversation in which the Chinese government says, "If this research was so dangerous, why did you fund it, and on our territory too?" To which the US side might reply, "Looks like it was you who let it escape. But do we really need to have this discussion in public?"

Fauci is a longtime public servant who served with integrity under President Trump and has resumed leadership in the Biden Administration in handling the COVID-19 epidemic. Congress, no doubt understandably, may have little appetite for hauling him over the coals for the apparent lapse of judgment in funding gain-of-function research in Wuhan.

To these serried walls of silence must be added that of the mainstream media. To my knowledge, no major newspaper or television network has yet provided readers with an in-depth news story of the lab escape scenario, such as the one you have just read, although some have run brief editorials or opinion pieces. One might think that any plausible origin of a virus that has killed three million people would merit a serious investigation. Or that the wisdom of continuing gain-of-function research, regardless of the virus's origin, would be worth some probing. Or that the funding of gain-of-function research by the NIH and NIAID during a moratorium on such research would bear investigation. What accounts for the media's apparent lack of curiosity?

The virologists' *omertà* is one reason. Science reporters, unlike political reporters, have little innate skepticism of their sources' motives; most see their role largely as purveying the wisdom of scientists to the unwashed masses. So when their sources won't help, these journalists are at a loss.

Another reason, perhaps, is the migration of much of the media toward the left of the political spectrum. Because President Trump said the virus had escaped from a Wuhan lab, editors gave the idea little credence. They joined the virologists in regarding lab escape as a dismissible conspiracy theory. During the Trump administration, they had no trouble in rejecting the position of the intelligence services that lab escape could not be ruled out. But when Avril Haines, President Biden's director of national intelligence, said the same thing, she too was largely ignored. This is not to argue that editors should have endorsed the lab escape scenario, merely that they should have explored the possibility fully and fairly.

People round the world who have been pretty much confined to their homes for the last year might like a better answer than their media are giving them. Perhaps one will emerge in time. After all, the more months pass without the natural emergence theory gaining a shred of supporting evidence, the less plausible it may seem. Perhaps the international community of virologists will come to be seen as a false and self-interested guide. The common sense perception that a pandemic breaking out in Wuhan might have something to do with a Wuhan lab cooking up novel viruses of maximal danger in unsafe conditions could eventually displace the ideological insistence that whatever Trump said can't be true.

And then let the reckoning begin.

### Acknowledgements

The first person to take a serious look at the origins of the SARS2 virus was Yuri Deigin, a biotech entrepreneur in Russia and Canada. In a long and brilliant [essay](#), he dissected the molecular biology of the SARS2 virus and raised, without endorsing, the possibility that it had been manipulated. The essay, published on April 22, 2020, provided a roadmap for anyone seeking to understand the virus's origins. Deigin packed so much information and analysis into his essay that some have doubted it could be the work of a single individual and suggested some intelligence agency must have authored it. But the essay is written with greater lightness and humor than I suspect are ever found in CIA or KGB reports, and I see no reason to doubt that Deigin is its very capable sole author.

In Deigin's wake have followed several other skeptics of the virologists' orthodoxy. Nikolai Petrovsky calculated how tightly the SARS2 virus binds to the ACE2 receptors of various species and found to his surprise that it seemed [optimized for the human receptor](#), leading him to infer the virus might have been generated in a laboratory. Alina Chan published a [paper](#) showing that SARS2 from its first appearance was very well adapted to human cells.



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One of the very few establishment scientists to have questioned the virologists' absolute rejection of lab escape is Richard Ebright, who has long warned against the dangers of gain-of-function research. Another is David A. Relman of Stanford University. "Even though strong opinions abound, none of these scenarios can be confidently ruled in or ruled out with currently available facts," he [wrote](#). Kudos too to Robert Redfield, former director of the Centers for Disease Control and Prevention, who [told CNN](#) on March 26, 2021 that the "most likely" cause of the epidemic was "from a laboratory," because he doubted that a bat virus could become an extreme human pathogen overnight, without taking time to evolve, as seemed to be the case with SARS2.

Steven Quay, a physician-researcher, has applied [statistical and bioinformatic tools](#) to ingenious explorations of the virus's origin, showing for instance how the hospitals receiving the early patients are clustered along the Wuhan [No2 subway line](#) which connects the Institute of Virology at one end with the international airport at the other, the perfect conveyor belt for distributing the virus from lab to globe.

In June 2020 Milton Leitenberg published an [early survey](#) of the evidence favoring lab escape from gain-of-function research at the Wuhan Institute of Virology.

Many others have contributed significant pieces of the puzzle. "Truth is the daughter," said Francis Bacon, "not of authority but time." The efforts of people such as those named above are what makes it so.

*Nicholas Wade is a science writer, editor, and author who has worked on the staff of Nature, Science, and, for many years, the New York Times.*

### Single-Cell, Spatial Analysis Creates COVID-19 Tissue Atlases

Scientists used spatial analysis to describe how cells from multiple organs, infected with SARS-CoV-2, exhibit a range of molecular and genomic changes. The team developed a foundational dataset, consisting of tissue atlases of COVID-19 pathology, to reveal the biological impact of severe SARS-CoV-2 infection across the body. The ability to pinpoint cellular processes, expression pathways, and immune cell profiles offers key insights into systemic COVID-19 disease progression. [+ MORE](#)

### Bees in the Netherlands trained to detect COVID-19 infections

Source: <https://www.reuters.com/lifestyle/oddly-enough/bees-netherlands-trained-detect-covid-19-infections-2021-05-06/>

May 07 – Dutch researchers have trained bees, which have an unusually keen sense of smell, to identify samples infected with COVID-19, a finding they said could cut waiting times for test results to just seconds.

To train the bees, scientists in the bio-veterinary research laboratory at Wageningen University gave them sugary water as a reward after showing them samples infected with COVID-19. They would get no reward after being shown a non-infected sample.

Having got used to the system, the bees were able to spontaneously extend their tongues to receive a reward when presented with an infected sample, said Wim van der Poel, a professor of virology who took part in the project.

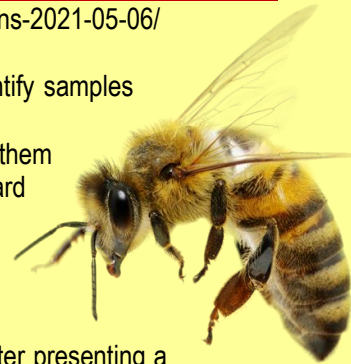
"We collect normal honeybees from a beekeeper and we put the bees in harnesses," he said. "Right after presenting a positive sample we also present them with sugar water. And what the bees do is they extend their proboscis to take the sugar water." The extending of the bees' straw-like tongues to drink is confirmation of a positive coronavirus test result, according to the researchers.

It can take hours or days to get a COVID-19 test result, but the response from the bees is immediate. The method is also cheap, potentially making it useful for countries where tests are scarce, they said.

But Dirk de Graaf, a professor who studies bees, insects and animal immunology at Ghent University in Belgium, said he did not see the technique replacing more conventional forms of COVID-19 testing in the near future.

"It is a good idea, but I would prefer to carry out tests using the classic diagnostic tools rather than using honeybees for this. I am a huge bee lover, but I would use the bees for other purposes than detecting COVID-19," he said.

The technique of "insect sniffing" was effectively tested by the U.S. Dept. of Defence to detect explosives and toxins in the 1990s, De Graaf said.

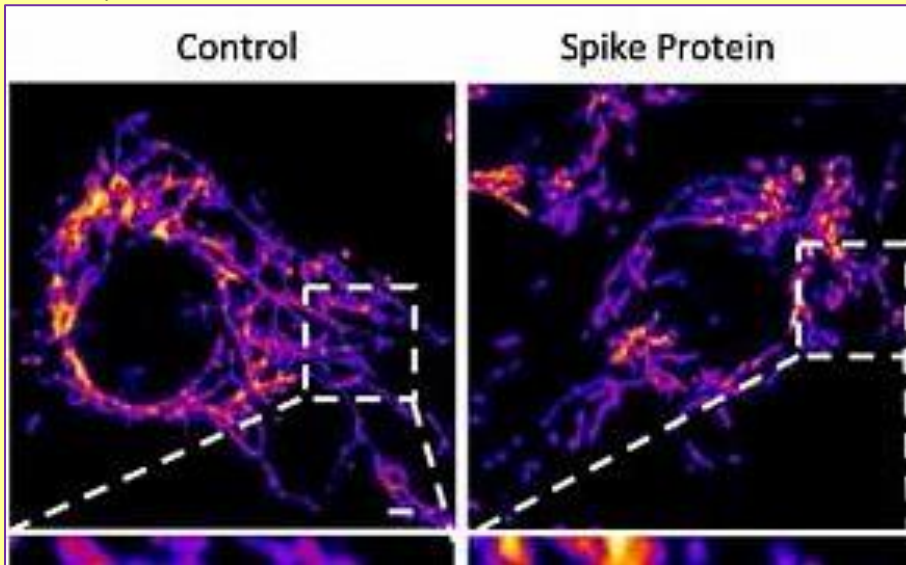


Moths, bees and wasps were used "for safety purposes to detect explosives as well as for medical diagnosis," he said. But too little is known about the Wageningen testing to determine its true effectiveness, he said, although he was open to the idea of bee testing providing an indication of illness when PCR tests were unavailable.

## COVID-19 is a vascular disease not a respiratory one, says study

Source: <https://www.euronews.com/2021/05/06/covid-19-is-a-vascular-disease-not-a-respiratory-one-says-study>

May 06 – A study at the University of San Diego claims to have proof that COVID-19 is not a respiratory illness, but a vascular one. This could explain blood clots in some COVID patients and other issues like "COVID feet", which are not classic symptoms of a respiratory illness.



The study, [published in the journal Circulation Research](#), shows with precision how virus damages the cells of the vascular system.

Healthy endothelial cells (left) and those treated with coronavirus protein S (right) show mitochondrial fragmentation in the vascular system. (Salk Institute)

It was already known that besides the various symptoms of COVID-19 that coincide with respiratory problems, there are other cardiovascular issues that affect other parts of the body.

What's new is the team conducting the study, which included scientists from [the SALK Institute](#), showed the form in which

the virus attacks the vascular or circulatory system.

The S protein of the virus, the spike that forms the crown, attacks the receptor ACE2, damaging the mitochondrias that generate the energy of the cells, thus damaging the endothelium, which lines the blood vessel.

This is something that has already been observed, but what wasn't previously known is the exact mechanism and role of the S protein.

This protein is replicated by all of the currently available vaccines.

The scientists created a pseudovirus for the study, which only had the S protein but not the rest of the virus, to show in the lab that this protein is enough by itself to cause disease.

The effects on the respiratory system are a consequence of the inflammation of the vascular tissue in the lungs.

"A lot of people think of it as a respiratory disease, but it's really a vascular disease," says assistant research professor Uri Manor, who is co-senior author of the study.

"That could explain why some people have strokes, and why some people have issues in other parts of the body. The commonality between them is that they all have vascular underpinnings."

### Only an effect in serious cases?

Professor Rafael Máñez Mendiluce, who has been treating COVID-19 patients for a year as head of intensive care at Bellvitge University Hospital, says this is no surprise, given the clinical pictures presented by those who come to his department.

A year ago, he explained to us that the greatest risk of COVID-19 was the inflammatory symptoms presented by the patients. He also reminded us that blood clots are phenomena that occur in other viruses.

Máñez Mendiluce also wonders whether vascular problems do not occur only in the most severe patients, once the infection has already "conquered" the respiratory tract, spreading through the blood.

"Generally in mild patients, the infection is limited to the upper airways only," he says.



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He also believes the vascular problem could be related to the inflammatory response of the patient's immune system.

For Máñez Mendiluce, who has 30 years of experience in intensive care, this discovery does not drastically change the treatment possibilities for the most severe cases. He recalls that antithrombotic drug treatments have not proven to be particularly effective and that for the time being it is recommended to focus on the inflammation caused by the immune response.

This is a long-standing problem in intensive care. "We still don't have any treatment for thrombosis caused by the inflammatory response generated by the infection," he explains.

The discussion in the scientific community is still open, he adds. These problems are recurrent in intensive care units.

Máñez Mendiluce thinks this study does not call into question existing vaccines, although it should be better understood why the AstraZeneca and Johnson & Johnson vaccines have caused some rare cases of blood clotting.

The discovery has caused a stir. Some wonder whether it is dangerous for vaccines to inoculate precisely replicas of the S protein that appears to be capable of causing the disease.

Professor Uri Manor said on his Twitter account that, contrary to anti-vaccine claims, the study only shows that COVID-19 is a very insidious disease.

He explains that the amount of S protein in the vaccines is too small to be problematic.

He also says that the messenger RNA vaccine is much safer than getting the disease. "Everyone should get it, I did and everyone in my family did! Our paper just shows that this disease really sucks.

The Salk Institute researchers now hope to better understand the mechanism by which ACE2 receptors damaged by the S protein cause deformations and damage to mitochondria, which then cause problems in vascular tissue.

**EDITOR'S COMMENT:** This is not a surprise or new. Colleagues from Northern Italy's hospitals made the initial observation that the main causative factor in Covid-19 was a form of micro-coagulopathy affecting many organs infected.

## WHO approves Sinopharm vaccine in potential boost to COVAX pipeline

Source: <https://www.reuters.com/world/middle-east/who-gives-emergency-approval-sinopharm-first-chinese-covid-19-vaccine-2021-05-07/>

May 08 – The World Health Organization (WHO) approved for emergency use a COVID-19 vaccine from China's state-owned drugmaker Sinopharm on Friday, bolstering Beijing's push for a bigger role in inoculating the world.

The vaccine, one of two main Chinese coronavirus vaccines that have been given to hundreds of millions of people in China and elsewhere, is the first developed by a non-Western country to win WHO backing.

It is also the first time the WHO has given emergency use approval to a Chinese vaccine for any infectious disease. Earlier this week, separate WHO experts had expressed concern about the quality of data the company provided on side effects. [read more](#)

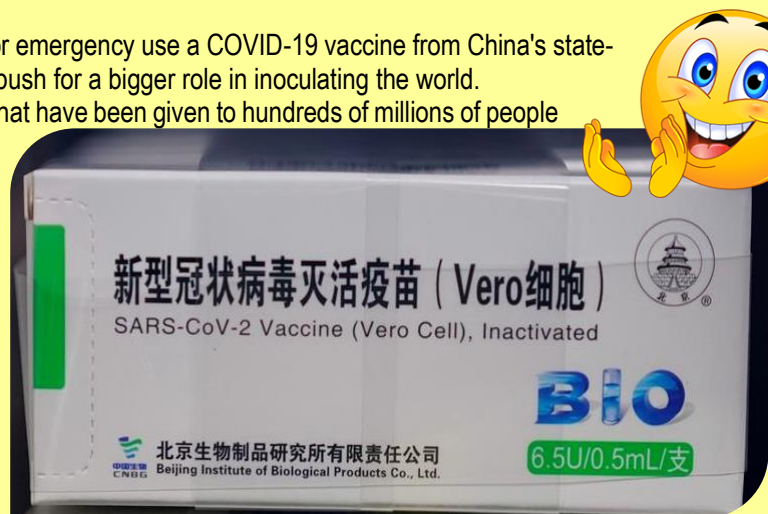
A WHO emergency listing is a signal to national regulators that a product is safe and effective. It also allows it to be included in COVAX, a global programme to provide vaccines mainly for poor countries, which has hit supply problems. [read more](#)

"This expands the list of COVID-19 vaccines that COVAX can buy, and gives countries confidence to expedite their own regulatory approval, and to import and administer a vaccine," WHO Director-General Tedros Adhanom Ghebreyesus told a briefing.

Senior WHO adviser Bruce Aylward said it would be up to Sinopharm to say how many doses of its vaccine it can provide to the programme, but added: "They are looking at trying to provide substantial support, make substantial doses available while at the same time of course trying to serve China's population."

The WHO had already given emergency approval to COVID-19 vaccines developed by Pfizer-BioNTech, AstraZeneca, Johnson & Johnson and, last week, Moderna.

"This ... signifies that the quality, safety, efficacy and accessibility of Sinopharm CNBG's COVID-19 vaccine meet the requirements of WHO standards, which will contribute more Chinese power to the global fight against the COVID-19 pandemic," Sinopharm said in a social media statement published on Saturday.



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### Easy storage

The decision to approve Sinopharm's vaccine was taken by WHO's technical advisory group, which met since April 26 to review the latest clinical data and manufacturing practices.

"Its easy storage requirements make it highly suitable for low-resource settings," a WHO statement said.

Tedros said that, following the approval, its separate Strategic Advisory Group of Experts (SAGE) had recommended that **adults over 18 receive two doses** of the Sinopharm vaccine.

"On the basis of all available evidence, WHO recommends the vaccine for adults 18 years and older, in a two-dose schedule with a spacing of three to four weeks," the WHO said in a statement.

The vaccine, developed by Beijing Biological Products Institute, a unit of Sinopharm subsidiary China National Biotec Group, has an estimated **efficacy of 79% for all age groups**, it said.

Alejandro Craviato, SAGE panel chair, said: "The information we have for people over 60 is still very scarce. There is no reason to think the vaccine would behave differently in this older age group."

But noting gaps in clinical data, he said that Sinopharm or national authorities should monitor people over 60, those with co-morbidities and pregnant women after vaccination.

The WHO has said it could reach a decision on China's other main COVID-19 vaccine, made by Sinovac Biotech ([SVA.O](#)), next week. The technical experts reviewed it on Wednesday. [read more](#)

Arnaud Didierlaurent, chair of WHO's technical advisory group, told the news conference: "We have started to review the report from Sinovac. We actually requested additional information to the manufacturer ... which we hope to receive very soon to make a decision." Sinopharm, which has two COVID-19 vaccines approved in China, has supplied over 200 million doses at home and abroad, and Sinovac has shipped over 300 million doses of its shot worldwide, including at home. Both companies' vaccines have been exported to many countries, particularly in Latin America, Asia and Africa, many of which have had difficulty securing supplies of vaccines developed in the West.

**EDITOR'S COMMENT:** Some might say that this was due to the said close relation of the WHO with China. Others will say that Chinese vaccine/pharmaceutical technology is equal to the western analogue. Now it is time to approve the Sputnik V vaccine in order to prove that the WHO is above politics and misconceptions. Unless the Americans still cannot get over the "name" issue and their space defeat of the past. Sometimes, human brain is blocked by stupid demons.

## How Can Scientists Predict a COVID-19 Outbreak? There Is an App for That

Source: <http://www.homelandsecuritynewswire.com/dr20210507-how-can-scientists-predict-a-covid19-outbreak-there-is-an-app-for-that>

May 07 – A mobile app that uses crowd-sourced data on COVID-19 symptoms can accurately identify where local coronavirus outbreaks will appear, according to [Johns Hopkins Medicine](#) scientists who developed the app.

The Johns Hopkins team launched the **"COVID Control"** app in May 2020 and have been studying how user-reported COVID-19 symptoms can predict potential outbreaks of the virus, enabling public health leaders to enact measures to contain the virus' spread. Results of the researchers' findings were published February 25, in [Nature Scientific Reports](#). "It's a really promising example of how we can use public participation and the ubiquity of technology like cell phones to track disease," says [Robert Stevens, M.D.](#), director of anesthesiology and critical care precision medicine at the Johns Hopkins University School of Medicine. "It's not limited to infectious diseases. This could be used to track the epidemiology of a number of prevalent health conditions, such as heart disease, cancer and diabetes."

Available via [Google Play](#) and Apple's [App Store](#), COVID Control enables users to anonymously report symptoms associated with COVID-19, such as fever, loss of taste/smell, nausea and other symptoms to create a [publicly viewable map](#) showing clusters of people experiencing those symptoms. Since its launch, more than 19,000 users in 1,019 counties in every state across the U.S. have logged more than 174,000 data entries.

The study focused on Baltimore City and Baltimore County and showed that nine clusters of symptoms logged by COVID Control users correlated with locations of increased coronavirus prevalence reported by the Baltimore City Department of Health. New loss of taste or smell



showed the strongest correlation between symptom reporting and confirmed COVID-19 cases, predicting the spike in cases an average of five days before the city's Department of Health confirmed a coronavirus outbreak.

The COVID Control research group comprises engineers, epidemiologists and physicians from Johns Hopkins' Whiting School of Engineering, Bloomberg School of Public Health and the Johns Hopkins University School of Medicine.

## White House acknowledges mysterious health attacks occurred in US, reviewing intel on incidents

Source: <https://www.yahoo.com/gma/white-house-acknowledges-mysterious-health-230439595.html>

May 08 – The mysterious [health](#) incidents that have affected dozens of U.S. personnel around the globe have also occurred within the United States, the White House confirmed for the first time on Friday.

The source of the illnesses, known as "**Havana syndrome**" after [the first cluster of cases](#) at the U.S. Embassy in [Cuba](#), is still unknown. But there is growing pressure from Congress to figure out what has affected so many U.S. diplomats, spies and other officials — and who or what is behind it.

"At this point, at this moment, we don't know the cause of these incidents, which are both limited in nature and the vast majority of which have been reported overseas," said White House press secretary Jen Psaki, acknowledging the newly reported cases in the U.S.

The Biden administration has launched a review of U.S. intelligence to determine if there are other previously unreported cases and if there is a "broader pattern," a National Security Council spokesperson confirmed to ABC News.

Last month, U.S. defense officials briefed lawmakers on the Senate and House Armed Services Committees on several previously unreported incidents of U.S. personnel falling sick after alleged exposures, congressional sources confirmed to ABC News.

Dozens of Americans have been diagnosed with a range of symptoms, including traumatic brain injuries, with several describing bizarre experiences like strange noises and sensations. The U.S. government has acknowledged cases in Cuba, China, Uzbekistan and Russia — but there are media reports of other countries now, too.

The issue has vexed U.S. officials since 2016, when the first cases were reported at the embassy in Havana. While there's still no definitive answer, the National Academies of Science in December [issued a report](#), commissioned by the State Department, that concluded the most likely source is "directed, pulsed radio frequency energy."

Among the possible new cases are also reportedly at least two incidents in the Washington area, according to GQ magazine, CNN and others. ABC News has not independently verified those reports.

"This pattern of attacking our fellow citizens serving our government appears to be increasing," the top Democrat and Republican on the Senate Intelligence Committee, Mark Warner of Virginia and [Marco Rubio](#) of Florida, warned in a statement last week.

While Warner and Rubio praised President Joe Biden's CIA director, Bill Burns, for his "renewed focus on these attacks," other lawmakers have become publicly exasperated with the executive branch's response.

During a Senate hearing last week, Sen. Jeanne Shaheen, D-N.H., criticized the U.S. intelligence community's "clamp down on information that's available to Congress, that's available to the public."

That, in turn, has led to a growing number of reports of alleged incidents without clarity about whether or not they're related to what's happened to U.S. personnel in Cuba, Shaheen said.

"It's not clear whether the information we're getting is correct or incorrect," she told Director of National Intelligence Avril Haines. "The horse is out of the barn on this. The information is already out there, and I think it behooves us all to try to make sure that the information that gets out is accurate and that people understand what's happening."

Beyond Cuba, the State Department has previously acknowledged incidents in China, Uzbekistan and one redacted country in an internal report that was declassified and released in February. That unknown country is likely Russia, where a former CIA official said he was attacked.

That official, Marc Polymeropoulos, told ABC News in March that he's now receiving treatment at Walter Reed Medical Center for a traumatic brain injury as well.

But after reports of possible incidents in Syria, the head of U.S. Central Command said he had no evidence that was true.

"I have found no evidence of those attacks" in CENTCOM's region, which includes Syria, Gen. Frank McKenzie, CENTCOM commander, told a Senate panel in April. During the same hearing, Gen. Stephen Townsend, head of U.S. Africa Command, added he's "not seen that phenomenon in Africa" either.





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One law enforcement source dismissed speculation about one incident in the Washington area, telling ABC News, "There is no credible evidence to support this."

Biden's National Security Council is now conducting "a full review of intelligence reporting to ascertain whether there may be previously unreported incidents that fit a broader pattern," a spokesperson confirmed to ABC News Friday.

While the Trump administration initially said affected personnel had suffered "health attacks," the spokesperson added that whether the incidents are an attack and whether they're the work of a foreign actor are still under "active inquiry."

## 24 Idaho children have experienced rare COVID-19 syndrome. Here's what we know about them

Source: <https://news.yahoo.com/24-idaho-children-experienced-rare-100000811.html>

May 08 – New data from the Idaho Department of Health and Welfare shows that roughly a quarter of Idaho children diagnosed with a rare and sometimes fatal COVID-19 syndrome were Hispanic.

Idaho health officials have only recorded 24 cases of **multisystem inflammatory syndrome in children**, or MIS-C. The rare illness appeared in the U.S. a few months after the COVID-19 pandemic began in March 2020. It appears to be a delayed reaction to the coronavirus and can show up weeks after exposure. **Symptoms can include abdominal pain, vomiting, skin rash, diarrhea and low blood pressure.**

The average age of Idaho children diagnosed with MIS-C is 8.9 years, according to Health and Welfare.

Health officials don't know the ethnicity for 8% of the state's MIS-C cases, about one or two children, according to Health and Welfare data obtained by the Idaho Statesman. **About 25%, or six children, were Hispanic or Latino and at least 16 children, or 67%, were white.**

Latinos are just 13% of Idaho's population and have been disproportionately affected by COVID-19 since the pandemic began. Nationwide, the CDC estimates about 63% of MIS-C cases have occurred in Hispanic or Black children.

The Health and Welfare data also show that Central District Health, which covers Ada, Valley, Elmore and Boise counties, had the most cases, identifying at least eight children with the syndrome. South Central Public Health in the Magic Valley had six cases, Southwest District Health had five cases and Eastern Idaho Public Health and Southeastern Idaho Public Health District had two cases each. North Idaho's two health districts didn't report any MIS-C cases, according to Health and Welfare.

All Idaho children previously diagnosed with MIS-C have recovered and are no longer in the hospital, according to Health and Welfare. About 42% of Idaho children diagnosed with the syndrome had to stay in the ICU.

Although the dangerous and sometimes deadly syndrome caused at least [one Idaho child to be airlifted out of state for a heart transplant](#), Idaho's MIS-C case count is much lower than nearby states like [Washington \(47 cases\)](#) and California (more than 300 cases). [Data from the CDC reports 3,185 MIS-C cases](#) as of March 29, when the data was last updated. At least 36 children diagnosed with MIS-C have died.

## Young Adults Who've Had COVID-19 Show Signs of Lasting Cardiovascular Damage

Source: <https://www.sciencealert.com/young-adults-who-got-covid-19-show-lasting-cardiovascular-damage-in-study>

May 07 – Just because you're young and healthy, doesn't mean the [coronavirus](#) won't affect you.

Young adults who show only minor symptoms of [COVID-19](#) may still suffer lingering changes to their blood vessels, according to a small new study.

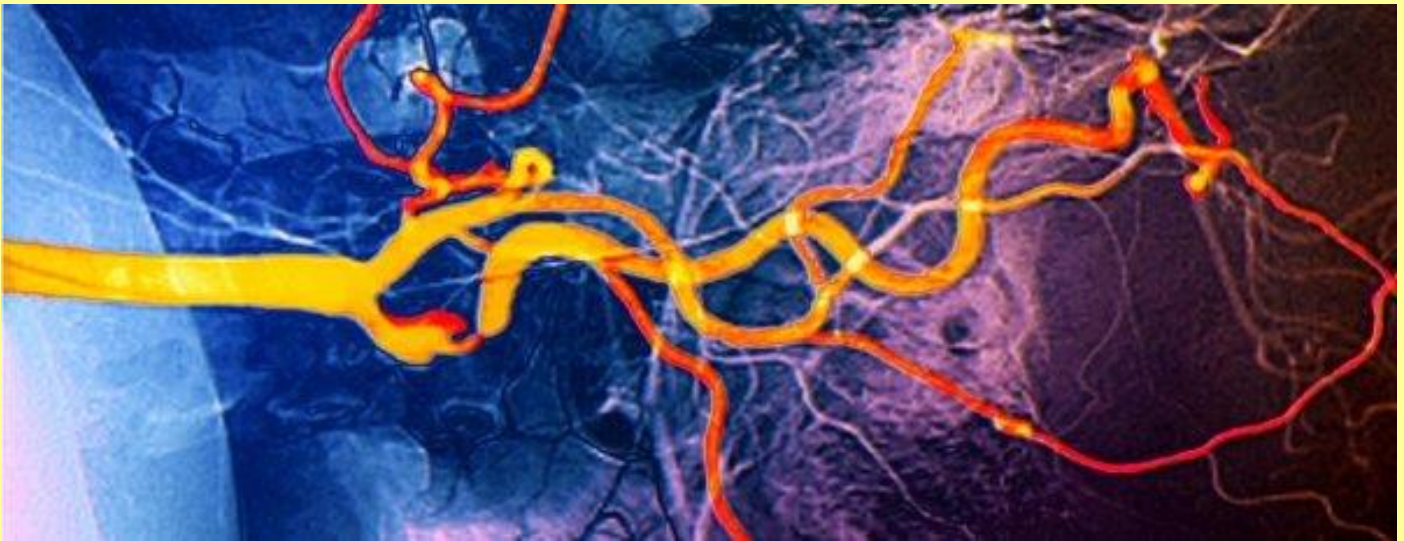
While the [SARS-CoV-2](#) primarily impacts the lungs and is particularly dangerous for older people, growing [research](#) suggests it also leaves a lasting mark on the cardiovascular system, even among young people and [those who experience only mild symptoms](#).

In the most recent study, scientists compared the vascular health of 30 young adults, half of whom had tested positive for COVID-19 about a month before and half of whom were in good health.

Analyzing ultrasound recordings of their pumping arteries, the team found a significant difference between both groups.

Even though no one had been hospitalized, the arteries of those who contracted COVID-19 three to four weeks ago were stiffer and less elastic than the healthy group.





The **carotid artery** (above), which carries blood to the brain, was 27 percent less able to swell and 22 percent less elastic on average. The **aortic artery**, which carries blood away from the heart, was also affected.

It's unclear how these blood vessels looked before the participants contracted COVID-19, which is a limitation, but given that researchers couldn't have predicted the start of a global [pandemic](#), they substituted those comparisons with data from healthy individuals.

The sample size is small, but the initial findings reinforce the idea that COVID-19 is not something to be trifled with. Even if you're young and healthy, and even if you barely got sick from the [virus](#), the impact to your cardiovascular health could last long after your symptoms fade. Changes in the stiffness and structure of arteries increase the risk of cardiovascular conditions, such as myocardial injury, arrhythmias, acute coronary syndrome, or blood clots, and this is particularly concerning for young people who also have other underlying health issues that put their vascular system at risk, like [diabetes](#) or hypertension.

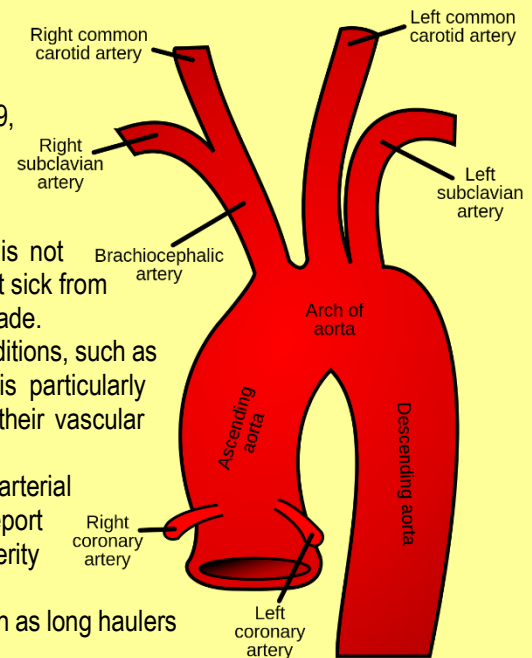
Further research is needed so we can figure out who is most at risk and how long this arterial stiffness sticks around for, but the findings largely match other long-term [studies](#) which report vascular changes that can last for up to three months and are not associated with the severity of COVID-19 symptoms.

In fact, many people currently suffering from long-lasting symptoms of COVID-19 - known as long haulers - [reported only mild cases](#) initially.

Nevertheless, weeks or even months after testing positive, many say their bodies are still struggling to breathe or regulate their blood pressure, suggesting long-term damage to the heart and lungs.

Young and old, symptoms or no, this is a virus we should all do our best to avoid contracting and spreading.

►► The study was published in [Experimental Physiology](#).



## Ebola Outbreak Over in the Democratic Republic of the Congo

Source: <https://www.hstoday.us/subject-matter-areas/pandemic-biohazard/ebola-outbreak-over-in-the-democratic-republic-of-the-congo/>

May 05 – Today the U.S. Centers for Disease Control and Prevention (CDC) and the global health community mark the end of the Ebola outbreak in North Kivu Province, Democratic Republic of the Congo (DRC). The DRC Ministry of Health (MOH) and the World Health Organization made the declaration after reaching 42 days with no new cases following the last survivor



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testing negative and being discharged from an Ebola treatment unit. This Ebola outbreak, DRC's 12th, was announced on February 7, 2021.

"CDC commends the DRC Ministry of Health and partners whose work helped bring this outbreak to an end," said CDC Director Rochelle P. Walensky, MD, MPH. "We are proud to have been part of the effort and remain committed to supporting the DRC's efforts to assist outbreak survivors, prevent future outbreaks, and quickly detect and respond to any new cases of Ebola. Our hearts are with the families who lost loved ones due to this deadly disease."

Recent Ebola outbreaks, including this one, have demonstrated the ability of persistent infections in survivors to start new outbreaks or spark new and ongoing transmission within an existing outbreak. To better understand these linkages between cases and across outbreaks, CDC helped the DRC MOH establish a mobile genetic sequencing lab in Goma and will continue to provide technical assistance as more is learned about sexual transmission of the virus and relapse in survivors.

### A retrospective medical evaluation

"We killed people, albeit in good faith, because we were faced with a new situation, but in intensive care a wrong treatment was applied. They said we should not use anti-inflammatory drugs, which are now the basis of the new treatment. No heparin was used and deep ventilation was performed. I saw the bases of the lungs of Covid patients during the autopsies and they literally burned completely, because the pure oxygen sent at a certain pressure created a real burn. The thromboembolism was caused because the oxygen did not circulate as the lungs became blocked. The doctors followed the government instructions using a completely wrong protocol. It was like treating a diabetic with sugar. [...] »

Researcher Medical Examiner Dr. Pasquale Bacco (*Associazione L'Eretico, Italy*)

### China probed weaponising coronaviruses in 2015: Reports

Source: <https://www.livemint.com/news/india/china-probed-weaponising-coronaviruses-in-2015-reports-11620581659958.html>

May 09 – Chinese military scientists allegedly investigated weaponising coronaviruses five years before the COVID-19 pandemic and may have predicted a World War III fought with biological weapons, according to media reports referring to documents obtained by the US State Department.

According to 'The Sun' newspaper in the UK, quoting reports first released by 'The Australian', the "bombshell" documents obtained by the US State Department reportedly show the Chinese People's Liberation Army (PLA) commanders making the sinister prediction.

US officials allegedly obtained the papers which were written by military scientists and senior Chinese public health officials in 2015 as part of their own investigation into the origins of COVID-19.

Chinese scientists described SARS coronaviruses — of which COVID is one example — as presenting a "new era of genetic weapons".

Coronaviruses are a large family of viruses, several of which cause respiratory diseases in humans – ranging from a common cold to Severe Acute Respiratory Syndrome (SARS).

The PLA papers referenced seem to fantasise that a bioweapon attack could cause the "enemy's medical system to collapse".

It references work by US Air Force colonel Michael J. Ainscough, who predicted World War III may be fought with bioweapons.

The paper also includes musing that SARS —which hit China in 2003 — could have been a man-made bioweapon deliberately unleashed by "terrorists".

They reportedly boasted the viruses could be "artificially manipulated into an emerging human disease virus, then weaponised and unleashed in a way never seen before".

The document lists some of China's top public health figures among the authors and has been revealed in an upcoming book on the origins of COVID, titled 'What Really Happened In Wuhan'.

China reported the first COVID-19 case in the central Chinese city of Wuhan in late 2019 and since then the deadly disease has become a pandemic, affecting more than 157,789,300 people and causing over 3,285,200 deaths worldwide.

Tom Tugendhat MP and Australian politician James Paterson said the document raises major concerns about China's transparency on the origins of COVID-19.

Tugendhat, chairman of the House of Commons Foreign Affairs Select Committee, was quoted in 'The Sun' as saying: "China's evident interest in bioweapons is extremely concerning. Even under the tightest controls these weapons are dangerous.



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"This document raises major concerns about the ambitions of some of those who advise the top party leadership."

Peter Jennings, the executive director of the Australian Strategic Policy Institute (ASPI), told news.com.au that the document is as close to a "smoking gun" as we've got.

"I think this is significant because it clearly shows that Chinese scientists were thinking about military application for different strains of the coronavirus and thinking about how it could be deployed," said Jennings.

"It begins to firm up the possibility that what we have here is the accidental release of a pathogen for military use," added Jennings. He also said that the document may explain why China has been so reluctant for outside investigations into the origins of COVID-19.

"If this was a case of transmission from a wet market it would be in China's interest to co-operate ... we've had the opposite of that." Among the 18 listed authors of the document are People's Liberation Army scientists and weapons experts.

Robert Potter, a cyber security specialist who analyses leaked Chinese government documents was asked by The Australian to verify the paper. He says the document definitely is not fake.

"We reached a high confidence conclusion that it was genuine ... It's not fake but it's up to someone else to interpret how serious it is," Potter told news.com.au.

"It emerged in the last few years ... they (China) will almost certainly try to remove it now it's been covered."

Questions remain over the origins of the deadly virus after a much derided World Health Organisation (WHO) probe earlier this year, with the organisation ordering a further investigation which factors in the possibility of a lab leak.

Most scientists have said there is no evidence that COVID-19 is manmade — but questions remain whether it may have escaped from a secretive biolab in Wuhan — from where the pandemic originated.

China is known to have been carrying out high risk "gain of function" research at the Wuhan Institute of Virology (WIV) — which is near the outbreak's ground zero at the Huanan Seafood Market.

There is no evidence so far to suggest it was intentionally released by China.

Meanwhile, in Beijing, the state-run Global Times newspaper slammed The Australian for publishing the article to smear China.

An academic book that explores bioterrorism and possibilities of viruses being used in warfare was interpreted as a conspiracy theory by The Australian, which deliberately and malignantly intends to invent pretexts to smear China, Chen Hong, a professor and director of the Australian Studies Center at East China Normal University, told the newspaper.

"It is a shame for anti-China forces in Australia to back their own ideology against China at the expense of basic professional journalistic ethics, conspiring to twist the real meaning of the book," Chen said.

## The Sputnik V vaccine helps San Marino to become the first country in Europe to defeat COVID and reduce the infection rate to zero

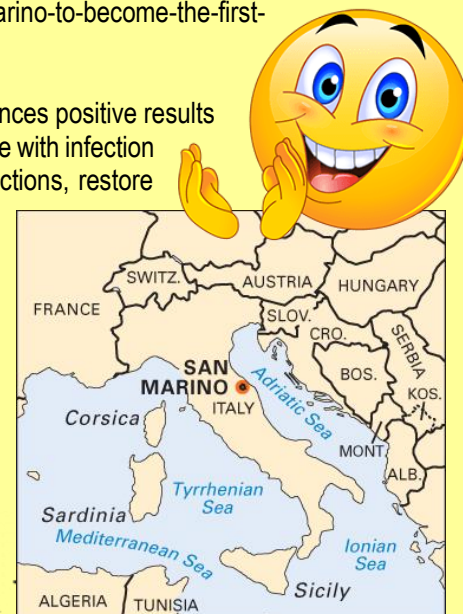
Source: <https://www.prnewswire.co.uk/news-releases/rdif-the-sputnik-v-vaccine-helps-san-marino-to-become-the-first-country-in-europe-to-defeat-covid-and-reduce-the-infection-rate-to-zero-851867104.html>

May 10 – The Russian Direct Investment Fund (RDIF, Russia's sovereign wealth fund) announces positive results achieved by San Marino in the fight against coronavirus thanks to the Russian Sputnik V vaccine with infection rate having fallen to zero level. This has enabled the authorities to start lifting COVID restrictions, restore economic activity and return to normal life.

San Marino was able to roll out the most successful vaccination campaign in Europe thanks to Sputnik V: average 7-day infection rate per 1 mn people (May 3-9) is more than 40 times lower than that in the EU countries. Positive results of the vaccination campaign with Sputnik V were obtained only two months after it started with the median daily COVID cases dropping by 250 times from a highest point in early April to zero level and no cases of infection registered since May 4th.

In San Marino 74% of population of 16+ have been vaccinated with the first dose of a COVID vaccine whereas 90% of those vaccinations were conducted using Sputnik V. Vaccination in San Marino has also helped to eliminate death cases caused by COVID. San Marino closed its hospital ward for treatment of patients infected with coronavirus.

The profound results prove Sputnik V's effectiveness against the British strain that is currently spreading across Europe, including in neighboring Italy.

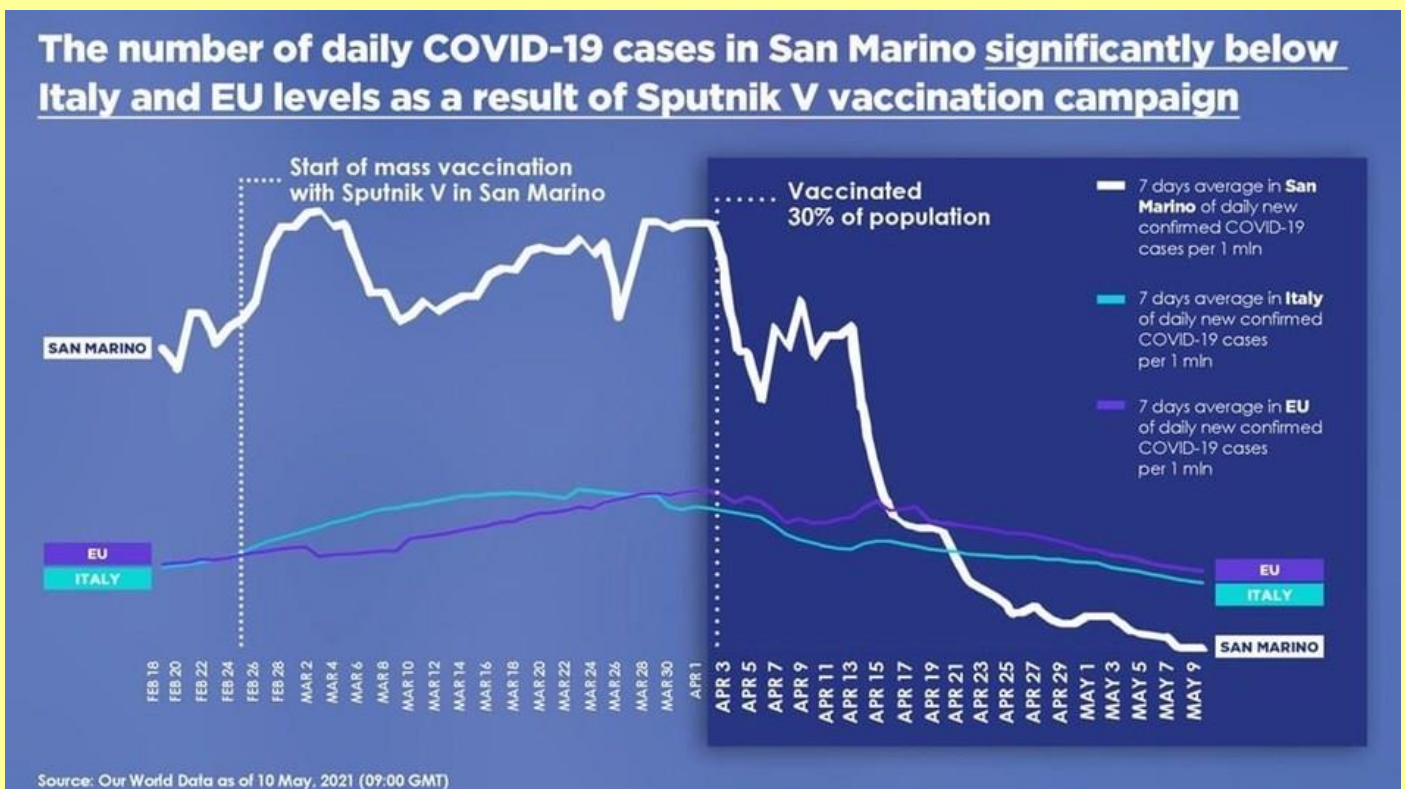


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RDIF is ready to provide additional batches of Sputnik V to San Marino to arrange vaccine tourism based on positive vaccination results in the country which demonstrated a sharp decrease of the infection rate to zero.

Post-vaccination studies in a number of countries, including Argentina, Mexico and Hungary, have demonstrated that Sputnik V is the safest and most effective vaccine against coronavirus. Sputnik V is registered in 64 countries around the world with total population of over 3.2 billion people. Sputnik V ranks second among coronavirus vaccines globally in terms of the number of approvals issued by government regulators.

**Sputnik V has been approved in Russia, Belarus, Argentina, Bolivia, Serbia, Algeria, Palestine, Venezuela, Paraguay, Turkmenistan, Hungary, UAE, Iran, Republic of Guinea, Tunisia, Armenia, Mexico, Nicaragua, Republika Srpska (entity of Bosnia and Herzegovina), Lebanon, Myanmar, Pakistan, Mongolia, Bahrain, Montenegro, Saint Vincent and the Grenadines, Kazakhstan, Uzbekistan, Gabon, San-Marino, Ghana, Syria, Kyrgyzstan, Guyana, Egypt, Honduras, Guatemala, Moldova, Slovakia, Angola, Republic of the Congo, Djibouti, Sri Lanka, Laos, Iraq, North Macedonia, Kenya, Morocco, Jordan, Namibia, Azerbaijan, Philippines, Cameroon, Seychelles, Mauritius, Vietnam, Antigua and Barbuda, Mali, Panama, India, Nepal, Bangladesh, Turkey and Albania.**



The number of daily COVID-19 cases in San-Marino significantly below Italy and EU levels as a result of Sputnik V vaccination campaign (PRNewsfoto/The Russian Direct Investment Fund (RDIF))

**Kirill Dmitriev, CEO of the Russian Direct Investment Fund, said:**

"Daily statistics on the number of cases demonstrate that the successful vaccination campaign with Sputnik V allowed San Marino to reduce the level of coronavirus infection to zero and become one of the first European states to begin lifting coronavirus restrictions. The country is returning to normal life and restoring the economic activity. Based on the successful vaccination campaign RDIF is ready to provide additional supplies of the vaccine to arrange vaccination tourism.

San Marino's success in protecting its population was due to lack of political bias in decision making, including in its choice of the Russian Sputnik V vaccine, approved for use in 64 countries.

*Sputnik V has a number of key advantages:*

- *Efficacy of Sputnik V is 97.6% based on the analysis of data on the coronavirus infection rate among those in Russia vaccinated with both components of Sputnik V from December 5, 2020 to March 31, 2021;*



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- The Sputnik V vaccine is based on a proven and well-studied platform of human adenoviral vectors, which cause the common cold and have been around for thousands of years.
- Sputnik V uses two different vectors for the two shots in a course of vaccination, providing immunity with a longer duration than vaccines using the same delivery mechanism for both shots.
- The safety, efficacy and lack of negative long-term effects of adenoviral vaccines have been proven by more than 250 clinical studies over two decades.
- There are no strong allergies caused by Sputnik V.
- The storage temperature of Sputnik V at +2+8 C means it can be stored in a conventional refrigerator without any need to invest in additional cold-chain infrastructure.
- The price of Sputnik V is less than \$10 per shot, making it affordable around the world.

**Russian Direct Investment Fund (RDIF)** is Russia's sovereign wealth fund established in 2011 to make equity co-investments, primarily in Russia, alongside reputable international financial and strategic investors. RDIF acts as a catalyst for direct investment in the Russian economy. RDIF's management company is based in Moscow. Currently, RDIF has experience of the successful joint implementation of more than 80 projects with foreign partners totaling more than RUB2 tn and covering 95% of the regions of the Russian Federation. RDIF portfolio companies employ more than 800,000 people and generate revenues which equate to more than 6% of Russia's GDP. RDIF has established joint strategic partnerships with leading international co-investors from more than 18 countries that total more than \$40 bn.

## Deadly 'Black Fungus' in India: 10 facts about mucormycosis in Covid patients

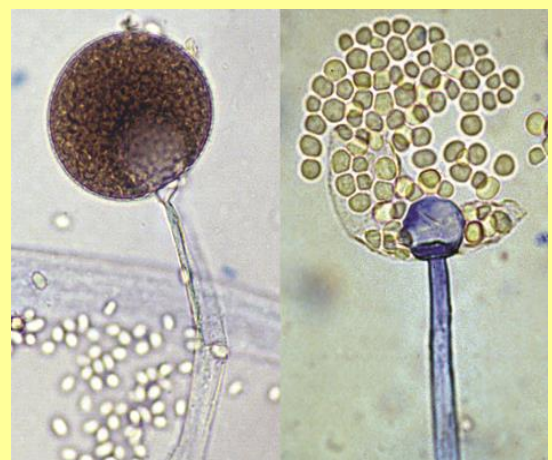
Source: <https://www.livemint.com/science/health/deadly-black-fungus-in-india-10-facts-about-mucormycosis-in-covid-patients-11620705235812.html>

May 11 – Symptoms of mucormycosis or 'black fungus' include headache, fever, pain under the eyes, nasal or sinus congestion and partial loss of vision

Odisha has detected its first case of mucormycosis or 'black fungus' in a 71-year-old Covid-19 patient with a known history of uncontrolled diabetes, officials said, news agency PTI reported. On Friday Niti Aayog Member (Health) V K Paul had said that mucormycosis cases were being found in coronavirus patients. Maharashtra, Gujarat have reported a rise in cases of the rare but potentially fatal infection.

**Let's take a look at the 10 facts about mucormycosis, also known as the 'Black Fungus' infection:**

- 1) 'Black Fungus' is caused by a fungus named mucor (photo bottom right), which is found on wet surfaces.
- 2) Mucormycosis, to a large extent, is happening to people who have diabetes. It is very uncommon in those who are not diabetic.
- 3) Cases of mucormycosis is causing blindness or other serious issues, health officials in Maharashtra and Gujarat said.
- 4) This disease is not new but is on the rise among Covid patients because the use of steroids elevates sugar level and some medicines suppress the patients' immunity, said Dr Tatyrao Lahane, who heads the state government's Directorate of Medical Education and Research.
- 5) The 'Black Fungus' is present in the environment, and those with suppressed immunity or co- morbidities are more vulnerable to infection.
- 6) Symptoms of mucormycosis include headache, fever, pain under the eyes, nasal or sinus congestion and partial loss of vision, Dr Lahane said.
- 7) The treatment involves injections for 21 days. The basic cost of the injections is around ₹9,000 per day.



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8) This fungal infection came to light during the first 'wave' of the pandemic, typically a couple of weeks after the patient was discharged, said Dr Hetal Marfatia, professor and head of the ENT department at the government-run KEM hospital in Mumbai.

9) In an official statement, the Health and Family Welfare Department said that the situation is being monitored and the treatment for mucormycosis is available in the state.

10) Conditions like HIV/AIDS, uncontrolled diabetes, mellitus cancers, organ transplant, long-term corticosteroid and immunosuppressive therapy increase the risk of this disease and the predisposing factor for most of the cases prior to the COVID-19 pandemic, it said.

## Novavax reports promising early study of combined COVID-19, flu vaccine

Source: <https://thehill.com/policy/healthcare/552634-novavax-reports-promising-early-study-of-combined-covid-19-flu-vaccine>

May 10 – Vaccine maker Novavax said Monday that an early study in animals of a combination COVID-19 and flu vaccine [produced a positive immune response](#).

The combination vaccine produced “robust” antibody responses to both coronavirus and the flu in a study in ferrets, the company said. The shot is still early in the development process, and the company said clinical trials in humans “are expected to begin by the end of the year.”

"Despite low rates during the COVID-19 pandemic, influenza remains a significant risk to global public health and the need for versatile, more effective vaccines is as important as ever, including against the flu," said Gregory Glenn, Novavax's president of research and development. "We believe that this novel combination vaccine candidate ... could be an important future tool in the long-term fight against both of these harmful respiratory viruses."

Novavax is also preparing to file for authorization for a vaccine solely aimed at COVID-19, which is much farther along in the process. That vaccine [was almost 90 percent effective](#) in a trial in the United Kingdom, though it dropped to around 50 percent effective against the South African coronavirus variant.

The company is [not expected to file for emergency use authorization](#) for its coronavirus vaccine until at least June, The Washington Post reported.

While supplies of vaccines in the United States are high enough that supply is exceeding demand in many places, the Novavax vaccine could play an important role in providing more doses to other countries that are facing a pressing need.

## New report estimates true COVID-19 death toll is double current figures

Source: <https://newatlas.com/health-wellbeing/covid-19-death-toll-double-current-figures-excess-mortality/>

May 10 – Striking research out of the University of Washington (UW) is estimating the global death toll from COVID-19 could be more than twice as high as official numbers show. Tracking overall 2020 mortality figures from around the world, the data indicates **nearly 7 million people** may have succumbed to the disease up to May, 2021.

One of the more reliable ways to calculate the true mortality rate of a pandemic is to study measures of excess death in a specific population. From year to year, overall mortality rates in a country are reasonably consistent, only rising relative to population growth. In the face of an unusual tragic event, be it a viral epidemic or a natural disaster, the amount of extra deaths that occur above the expected average can offer an insight into the mortality impact of that event.

Several studies published across 2020, focusing on [excess death estimates in the United States](#), have indicated the true toll of the pandemic is probably much higher than the official numbers suggest. A report from the US Centers for Disease Control and Prevention [published last October](#) conceded current COVID-19 mortality figures, “might underestimate the actual number directly attributable to COVID-19, because deaths from other causes might represent misclassified COVID-19–related deaths.”

A new analysis from UW's Institute for Health Metrics and Evaluation is presenting one of the most comprehensive investigations to date into total global COVID-19 mortality figures. The report doesn't simply record all excess deaths as COVID-19 deaths. Instead, the methodology adjusts for a number of factors, including reductions in traffic fatalities due to decreased population mobility and increases in mortality rates due to opioid abuse.

“IHME estimated total COVID-19 deaths by comparing anticipated deaths from all causes based on pre-pandemic trends with the actual number of all-cause deaths during the pandemic,” the institute reported in a recent statement. “This 'excess mortality' figure was then adjusted to remove deaths indirectly attributable to the pandemic (for example, due to people with non-COVID conditions avoiding health care facilities) as well as deaths averted



by the pandemic (for example, declines in traffic deaths due to lower mobility). The resulting adjusted estimates include only deaths directly due to the SARS-CoV-2 virus, which causes COVID-19.”

**The 20 countries with the highest number of total COVID-19 deaths, March 2020–May 2021**

Country	Total COVID-19 deaths	Reported COVID-19 deaths
United States of America	905,289	574,043
India	654,395	221,181
Mexico	617,127	217,694
Brazil	595,903	408,680
Russian Federation	593,610	109,334
United Kingdom	209,661	150,519
Italy	175,832	121,257
Iran	174,177	72,906
Egypt	170,041	13,529
South Africa	160,452	54,390
Poland	149,855	68,237
Peru	147,765	62,739
Ukraine	138,507	46,737
France	132,680	105,506
Spain	123,786	85,365
Germany	120,729	83,256
Indonesia	115,743	45,938
Japan	108,320	10,390
Romania	87,649	28,382





Kazakhstan	81,696	5,620
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IHME's country by country breakdown estimates the United States currently has the highest COVID-19 death toll in the world, with 905,289 (the official current reported deaths at the time of the study were 574,043). However, in terms of under-reporting of deaths, several other countries were shown to have incredibly high levels of pandemic mortality.

Egypt, for example, is cited in the report as only officially counting a little over 13,000 COVID-19 deaths but the IHME analysis estimates the real number to be around 170,000. Russia's real numbers are similarly underestimated, with nearly 600,000 COVID-19 deaths suggested in the new report, compared to official numbers counting little more than 100,000.

Overall, the new report estimates global COVID-19 deaths could be more than double the current official count of around 3.3 million. "As terrible as the COVID-19 pandemic appears, this analysis shows that the actual toll is significantly worse," says Chris Murray, director of IHME. "Understanding the true number of COVID-19 deaths not only helps us appreciate the magnitude of this global crisis, but also provides valuable information to policymakers developing response and recovery plans."

In a [briefing with reporters](#) discussing the new findings, Murray said it is likely by the end of the pandemic COVID-19 mortality figures will rival what the world saw a century ago with the Spanish Flu. A [study last year found](#) COVID-19 to be at least as fatal, if not more so, than the Spanish Flu strain of influenza, which is generally estimated to have killed between [20 and 50 million people](#).

Whether the numbers cited in the new IHME report are accurate or excessive, there is little argument that official mortality figures are lower than the true toll. Anthony Fauci, the White House's chief medical advisor, was recently asked about these mortality estimates on NBC's *Meet The Press*. He noted the numbers were certainly higher than he would have predicted, but agreed current official figures are under-counting the true death toll from COVID-19.

"That's a bit more than I would have thought the under-counting was," [said Fauci](#). "But I think there's no doubt ... that we are and have been under-counting."

## From Pandemic to Pan-shortages

By George Friedman

Source: <https://geopoliticalfutures.com/from-pandemic-to-pan-shortages/>



May 11 – With some notable and grave exceptions, the COVID-19 crisis is winding down for much of the world. But as it does, another problem is popping up, one that could with little effort turn into another crisis. Put simply, there is not as much stuff flowing as there once was.

There is, for example, a well-documented [shortage of microchips](#). The most common explanations for it are friction in the production process due to personnel rules developed to fight COVID-19, along with a significant increase in demand for microchips for a range of products, including automobiles.

There is a shortage of chickens said to be developing in the United States due to increased demand and a lack of workers.

There is a shortage of copper, the price of which is surging, due to increased demand and decreased supply.

There is a shortage of plastics that seems to have originated in the testing and production of the COVID-19 vaccine.

There is a shortage of truck drivers in the U.S., apparently the result of insufficient numbers of instructors. The length of time needed to become a truck driver in the U.S. has increased from two months to six months.

There is, relatedly, a looming shortage of gasoline.

There are reports of supermarkets not receiving shipments from producers. The reason given is the shortage of truck drivers, along with shortages of certain products that cannot be produced without scarce components.

There is a shortage of chlorine, which is used in many things, including swimming pools. This could be as bad for the hospitality industry as it is for the social needs of children in the upcoming summer.

Finally, and far from least, there is a looming shortage in ketchup, the cause of which I have no idea.

This is just a partial list, of course, and though I'm sure the shortages are more complicated than I have so far explained, it's clear that the shortages are real and that they will take some time to harmonize.

They have some things in common. First, the COVID-19 regulations inevitably disrupted the physical production of things, like chicken and copper. The introduction of Zoom allowed management and intellectual production to continue, but the things that are lacking now are material things that required physical presence. Demand was constrained by unemployment and caution in moving about for a time, so there was a delay in when the shortages started



and when we started to really notice. Second, as people get vaccinated or simply go about their daily lives again, demand will outstrip the supply. Last, the pandemic created a displaced workforce. Physical workers could not afford to endure layoffs and reduced hours. They had to get creative in finding other jobs or perhaps starting their own businesses. They might have been paid less, but their old jobs were not available. At some point in the crisis, they had to find work to earn steady incomes and now are disinclined to leave. There are far more specific and complex reasons for the problems in every industry. But there is a core underlying theme. The rules promulgated to fight COVID-19 affected the physical production and delivery of goods – and their workers – more than it affected intellectual and white-collar work.

As the market for labor changed, it became more difficult to refill these roles. The demand may be there, but the supply has to be manufactured. Policymakers seeking to increase demand in this environment may assume the problem can be readily solved – and maybe it can be – or they just don't understand the problem they're facing.

Obviously, one of the reasons for the employment crisis is increased unemployment payments, which are seen as more steady and stable than certain job markets.

And there are issues that have nothing to do with staffing. But the breadth of shortages across industries has some common denominators, including changes in the opportunities for workers and in demand for certain products. The pandemic has structurally changed the economy, as was inevitable, and to some extent, it will not return completely to the prior form. The shortages represent the first wave of disruptions in a longer process.

Some of these problems are limited to a nation. Others are global. Microchip shortages make it difficult to produce cars. The auto industry is central to several nations such as Germany, so the impact on the European Union and Germany's national strategy will likely be significant if solutions are not found quickly. Likewise, for China, the world's largest consumer of copper, increased prices may force business owners to reconsider products that use a lot of it. China may then face a choice between taking losses or closing a product line.

Early in the pandemic, [I expressed my concern](#) about the economic consequences the lockdown measures would eventually have. I knew there would be a recession, and feared a depression [if the supply chain broke down](#). Mercifully it did not, but now that there is light at the end of one tunnel, demand is surging again, and the shape of the workforce is now very different than it once was. In every affected country – indeed, most of the world – governments will have to address a problem they are not used to: a lack of supply.

*George Friedman is an internationally recognized geopolitical forecaster and strategist on international affairs and the founder and chairman of Geopolitical Futures. Dr. Friedman is also a New York Times bestselling author. His most recent book, THE STORM BEFORE THE CALM: America's Discord, the Coming Crisis of the 2020s, and the Triumph Beyond, published February 25, 2020 describes how "the United States periodically reaches a point of crisis in which it appears to be at war with itself, yet after an extended period it reinvents itself, in a form both faithful to its founding and radically different from what it had been." The decade 2020-2030 is such a period which will bring dramatic upheaval and reshaping of American government, foreign policy, economics, and culture. His most popular book, The Next 100 Years, is kept alive by the prescience of its predictions. Other best-selling books include Flashpoints: The Emerging Crisis in Europe, The Next Decade, America's Secret War, The Future of War and The Intelligence Edge. His books have been translated into more than 20 languages.*

## A comprehensive map of the SARS-CoV-2 genome

Source: [https://www.eurekalert.org/pub\\_releases/2021-05/miot-acm050621.php](https://www.eurekalert.org/pub_releases/2021-05/miot-acm050621.php)

May 11 - In early 2020, a few months after the Covid-19 pandemic began, scientists were able to sequence the full genome of the virus that causes the infection, SARS-CoV-2. While many of its genes were already known at that point, the full complement of protein-coding genes was unresolved.

Now, after performing an extensive comparative genomics study, MIT researchers have generated what they describe as the most accurate and complete gene annotation of the SARS-CoV-2 genome. In their study, which appears today in *Nature Communications*, they confirmed several protein-coding genes and found that a few others that had been suggested as genes do not code for any proteins.

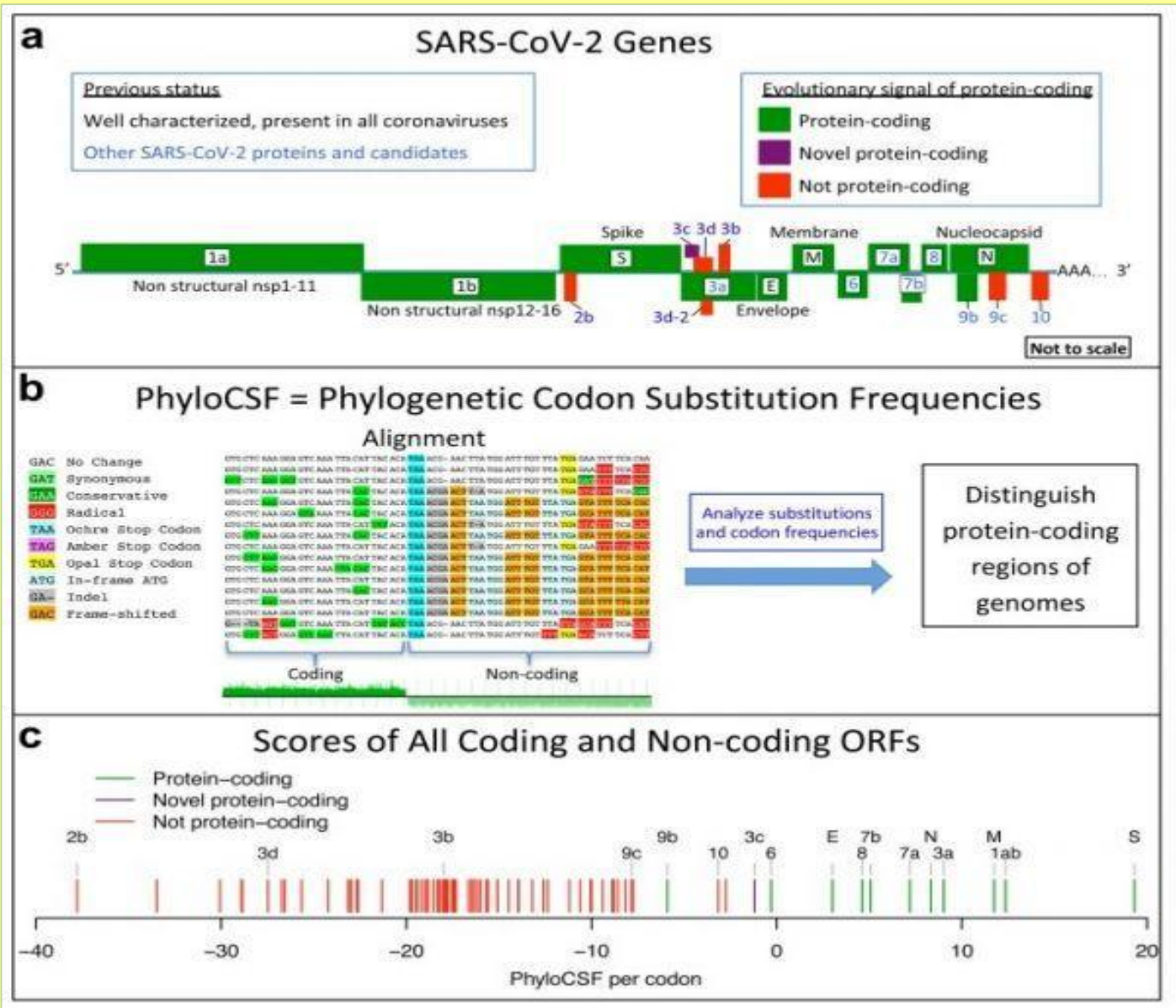
"We were able to use this powerful comparative genomics approach for evolutionary signatures to discover the true functional protein-coding content of this enormously important genome," says Manolis Kellis, who is the senior author of the study and a professor of



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computer science in MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL) as well as a member of the Broad Institute of MIT and Harvard.

The research team also analyzed nearly 2,000 mutations that have arisen in different SARS-CoV-2 isolates since it began infecting humans, allowing them to rate how important those mutations may be in changing the virus' ability to evade the immune system or become more infectious.



### Comparative genomics

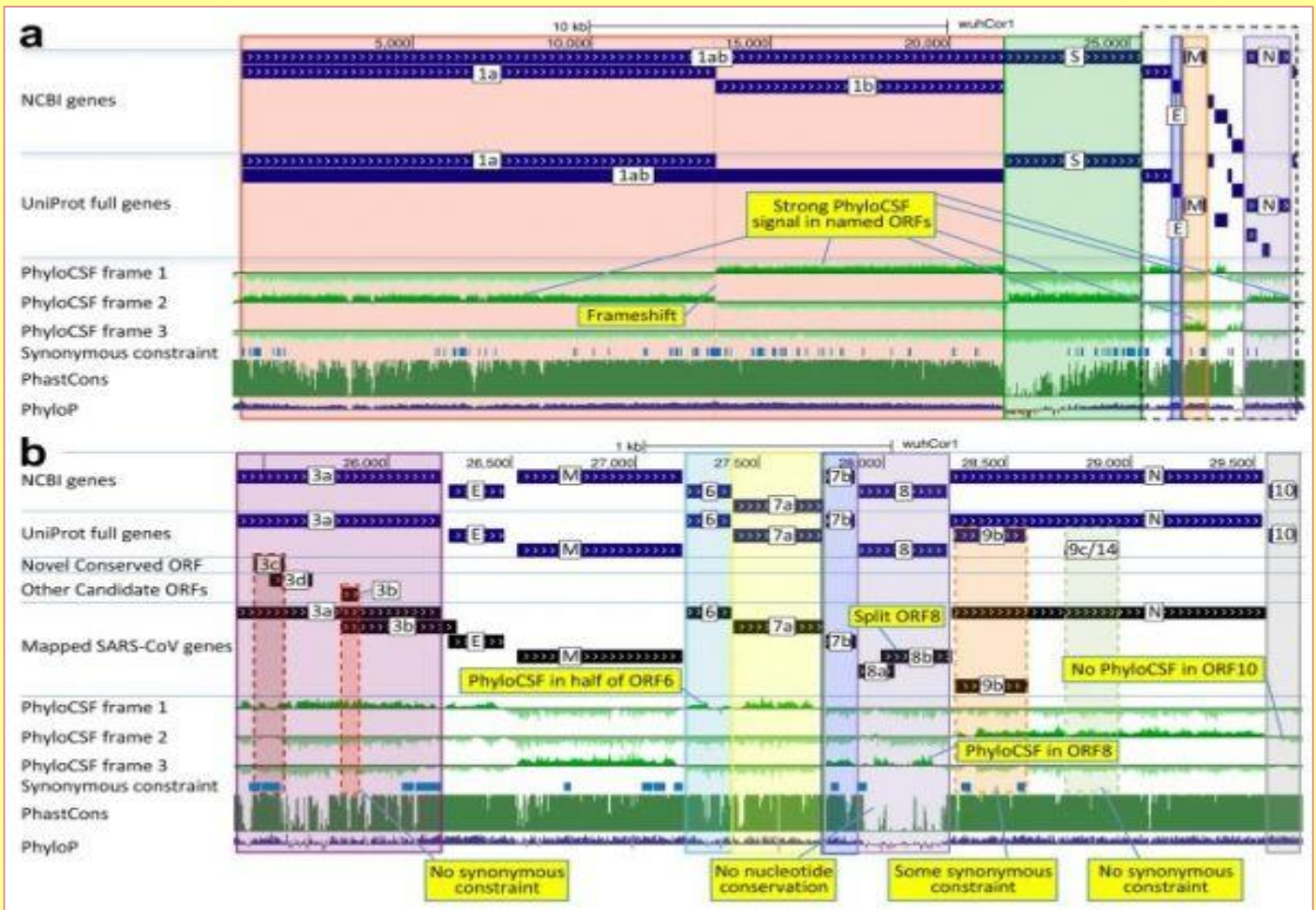
The SARS-CoV-2 genome consists of nearly 30,000 RNA bases. Scientists have identified several regions known to encode protein-coding genes, based on their similarity to protein-coding genes found in related viruses. A few other regions were suspected to encode proteins, but they had not been definitively classified as protein-coding genes.

To nail down which parts of the SARS-CoV-2 genome actually contain genes, the researchers performed a type of study known as comparative genomics, in which they compare the genomes of similar viruses. The SARS-CoV-2 virus belongs to a subgenus of viruses called Sarbecovirus, most of which infect bats. The researchers performed their analysis on SARS-CoV-2, SARS-CoV (which caused the 2003 SARS outbreak), and 42 strains of bat sarbecoviruses.



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Kellis has previously developed computational techniques for doing this type of analysis, which his team has also used to compare the human genome with genomes of other mammals. The techniques are based on analyzing whether certain DNA or RNA bases are conserved between species, and comparing their patterns of evolution over time.



Using these techniques, the researchers confirmed six protein-coding genes in the SARS-CoV-2 genome in addition to the five that are well established in all coronaviruses. They also determined that the region that encodes a gene called ORF3a also encodes an additional gene, which they name ORF3c. The gene has RNA bases that overlap with ORF3a but occur in a different reading frame. This gene-within-a-gene is rare in large genomes, but common in many viruses, whose genomes are under selective pressure to stay compact. The role for this new gene, as well as several other SARS-CoV-2 genes, is not known yet.

The researchers also showed that five other regions that had been proposed as possible genes do not encode functional proteins, and they also ruled out the possibility that there are any more conserved protein-coding genes yet to be discovered.

"We analyzed the entire genome and are very confident that there are no other conserved protein-coding genes," says Irwin Jungreis, lead author of the study and a CSAIL research scientist. "Experimental studies are needed to figure out the functions of the uncharacterized genes, and by determining which ones are real, we allow other researchers to focus their attention on those genes rather than spend their time on something that doesn't even get translated into protein."

The researchers also recognized that many previous papers used not only incorrect gene sets, but sometimes also conflicting gene names. To remedy the situation, they brought together the SARS-CoV-2 community and presented a set of recommendations for naming SARS-CoV-2 genes, in a separate paper published a few weeks ago in *Virology*.

### Fast evolution

In the new study, the researchers also analyzed more than 1,800 mutations that have arisen in SARS-CoV-2 since it was first identified. For each gene, they compared how rapidly that



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particular gene has evolved in the past with how much it has evolved since the current pandemic began.

They found that in most cases, genes that evolved rapidly for long periods of time before the current pandemic have continued to do so, and those that tended to evolve slowly have maintained that trend. However, the researchers also identified exceptions to these patterns, which may shed light on how the virus has evolved as it has adapted to its new human host, Kellis says.

In one example, the researchers identified a region of the nucleocapsid protein, which surrounds the viral genetic material, that had many more mutations than expected from its historical evolution patterns. This protein region is also classified as a target of human B cells. Therefore, mutations in that region may help the virus evade the human immune system, Kellis says.

"The most accelerated region in the entire genome of SARS-CoV-2 is sitting smack in the middle of this nucleocapsid protein," he says. "We speculate that those variants that don't mutate that region get recognized by the human immune system and eliminated, whereas those variants that randomly accumulate mutations in that region are in fact better able to evade the human immune system and remain in circulation."

The researchers also analyzed mutations that have arisen in variants of concern, such as the B.1.1.7 strain from England, the P.1 strain from Brazil, and the B.1.351 strain from South Africa. Many of the mutations that make those variants more dangerous are found in the spike protein, and help the virus spread faster and avoid the immune system. However, each of those variants carries other mutations as well.

"Each of those variants has more than 20 other mutations, and it's important to know which of those are likely to be doing something and which aren't," Jungreis says. "So, we used our comparative genomics evidence to get a first-pass guess at which of these are likely to be important based on which ones were in conserved positions."

This data could help other scientists focus their attention on the mutations that appear most likely to have significant effects on the virus' infectivity, the researchers say. They have made the annotated gene set and their mutation classifications available in the University of California at Santa Cruz Genome Browser for other researchers who wish to use it.

"We can now go and actually study the evolutionary context of these variants and understand how the current pandemic fits in that larger history," Kellis says. "For strains that have many mutations, we can see which of these mutations are likely to be host-specific adaptations, and which mutations are perhaps nothing to write home about."

## CDC says COVID can be transmitted through aerosols. But why now? Experts weigh in.

Source: <https://www.yahoo.com/lifestyle/cdc-covid-19-transmitted-aerosols-experts-weigh-in-183101400.html>

May 10 – The Centers for Disease Control and Prevention raised eyebrows late last week when the organization acknowledged that COVID-19 is also an airborne illness — information that has been suggested by the scientific community for nearly a year.

In a [brief](#) updated on Friday, the CDC says that people are most likely to contract COVID-19 when they are within 6 feet of an infected person.

**However, the organization says, infected people can also release “very fine droplets and aerosol particles” that form when those droplets dry. Those droplets “are small enough that they can remain suspended in the air for minutes to hours,” the CDC says.**

And, the agency affirms, people have gotten infected this way. “These transmission events have involved the presence of an infectious person exhaling virus indoors for an extended time — more than 15 minutes and in some cases hours — leading to virus concentrations in the air space sufficient to transmit infections to people more than six feet away, and in some cases to people who have passed through that space soon after the infectious person left,” the brief reads. However, the CDC also says, “risk of transmission is greatest within three to six feet of an infectious source where the concentration of these very fine droplets and particles is greatest.”

This isn't necessarily new information — research published in the journal [Environment International](#) in November also suggested that SARS-CoV-2, the virus that causes COVID-19, can be aerosolized, with scientists stating that it's “plausible.” And an article published in July in the [Journal of the American Medical Association](#) argued that it's “theoretically” possible.

Also in July, the [World Health Organization](#) acknowledged scientific papers and hypotheses suggesting that SARS-CoV-2 could be transmitted through aerosols. “The proportion of exhaled droplet nuclei or of respiratory droplets that evaporate to generate aerosols, and the



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infectious dose of viable SARS-CoV-2 required to cause infection in another person are not known,” the WHO concluded at the time. So, why is the CDC coming out with this now? It’s hard to say.

“There’s been a lot of controversy over this topic and I don’t think that this is completely settled,” infectious disease expert Dr. Amesh Adalja, senior scholar at the Johns Hopkins Center for Health Security, tells Yahoo Life. “When we talk about airborne pathogens like measles, there is clearly a difference in the epidemiological spread versus COVID-19. Also, many health care workers, including myself, did not universally see patients with full airborne PPE and did not get infected.”

It may be that the CDC has waited to release anything formal because it’s “very difficult to quantify whether people are getting infected from [droplets or aerosols](#) because they’re often exposed to both,” Dr. Thomas Russo, chief of infectious disease at the State University of New York at Buffalo, tells Yahoo Life.

Still, Adalja says, it’s “clear that here are certain circumstances that COVID-19 transmission occurs over long distances,” like in an exercise class or singing group. But, he adds, “we still don’t see the epidemiology resemble measles or chickenpox.”

As for why this is the official word from the CDC now, “it could be that they’re just in the process of setting the record straight,” Russo says. “Pre-Biden, the CDC was disseminating information that seemed to be a little more moderated,” he explains. “Now it seems that there is a much more science-based release of information. They’re probably rectifying something.”

But Russo says that “there’s nothing new here,” adding that “there’s nothing magical” about the recommended 6 feet of social distancing that’s usually recommended to help prevent the spread of COVID-19, noting that SARS-CoV-2 can travel farther than that. The CDC did not respond to Yahoo Life’s request for comment.

Of course, this raises a big question: What does this information mean for your safety? In general, Russo says to be mindful that your risk of getting infected with COVID-19 is higher in small, indoor spaces with poor ventilation. That’s why it’s still important to wear masks in those situations and to try to avoid crowds, both indoors and out, he says.

For now, the CDC still recommends that you wear a mask indoors, whether you’re vaccinated or not.

Adalja agrees. “Overall, I would just say that people need to continue to wear masks in indoor settings and take particular care with situations such as choirs and exercise classes, where aerosolization is more common,” he says.

### Increased Risk for Suicide, Self-harm in ICU Survivors

Source: <https://www.medscape.com/viewarticle/950856>

May 10 – Critically ill adults who survive a stint in the intensive care unit (ICU) have a small, increased risk for future [suicide](#) and self-harm compared to their peers with a non-ICU hospital stay, new research shows.

In addition, the study revealed that younger patients who have a history of mental illness may be particularly susceptible to suicide attempts following a stint in the ICU.

“It’s not lost on us that these high-risk patients from our study have a lot in common with the demographics we have seen in the latest wave of COVID-19 ICU patients – younger, requiring aggressive invasive treatment, and often essential workers with lower socioeconomic status who cannot take time off work and therefore end up putting themselves at risk,” study investigator Shannon Fernando, MD, Ottawa Hospital, Ontario, Canada, told *Medscape Medical News*.

### Post-Intensive Care Syndrome

Using administrative databases, the investigators matched health records for about 423,000 adult ICU survivors with those of three million non-ICU hospital survivors who had similar risk factors for suicide in Ontario, Canada, from 2009 to 2017.

During follow-up, 750 ICU survivors (0.2%) died by suicide, compared with 2427 (0.1%) non-ICU hospital survivors. Self-harm occurred in 5662 (1.3%) ICU survivors, compared with 24,411 (0.8%) non-ICU hospital survivors.

Analysis using weighted models revealed that ICU survivors had a 22% higher risk for suicide compared with non-ICU hospital survivors (adjusted hazard ratio [aHR], 1.22; 95% CI, 1.11 – 1.33) and a 15% higher risk for self-harm (aHR, 1.15; 95% CI, 1.12 – 1.19).

The small increased risk occurred almost immediately after hospital discharge and persisted for years afterward, the investigators report.

“This study is the first to demonstrate this risk, and we can add it to the constellation of outcomes we need to consider with post-intensive care syndrome,” said Fernando.

ICU survivors at highest risk for suicide or self-harm are younger patients (aged 18 to 34 years), those with mental health conditions (depression, anxiety, [posttraumatic stress disorder](#), psychosis), and those who undergo invasive procedures (mechanical ventilation or renal replacement therapy).



### Traumatizing Experience

"Why this association exists is unclear," said Fernando, "but, like most things, there are probably multiple factors.

"ICU care itself is traumatizing," he explained, "and ICU care might exacerbate feelings of trauma that some patients might already be carrying with them. After a lengthy ICU admission, patients might be off their home psychiatric medications for some time or have difficulty connecting with their family physicians or psychiatrists. We don't know exactly why, but those are some plausible explanations."

Fernando thinks clinicians should have a heightened awareness of the risk for suicide or self-harm after an ICU stay.

"The truth is, right now, we're not sure what's actually effective at mitigating risk of suicide in these patients. But what this study does show us is who is at risk, and that's a great starting point," Fernando noted.

"As an ICU physician, I have to admit that I have often glossed over a patient's preexisting psychiatric history. This is not always our focus in ICU. When a patient is on life support, we pay close attention to their preexisting heart function, lung function, kidney function," he said.

"I think screening these high-risk patients is something we can easily do once their condition has improved, and at least ensure that we are considering their mental health.

"It is worth acknowledging to patients that mental suffering after ICU admission is common, and by being aware of it, as clinicians, we can potentially intervene. Sometimes knowing that they are not alone is all a patient needs to confide their symptoms. Mental health is certainly no different," Fernando added.

### "Important Signal"

Reached for comment, Ipsit Vahia, MD, medical director of geriatric psychiatry outpatient programs and medical director at the Institute for Technology and Psychiatry at McLean Hospital, Belmont, Massachusetts, said the study shows "an interesting and important signal" suggesting that ICU survivors may be at higher risk for suicide and self-harm.

"It has been recognized previously that ICU hospitalizations may lead to longer-term psychological symptoms, but this study is among the largest to specifically demonstrate a relationship with increased suicide and self-harm," said Vahia.

"Beyond this primary finding, however, it is important to look at the specific predictors of suicide among ICU survivors. Unsurprisingly, those at highest risk tended to be persons with a previous history of psychiatric illness, residing in lower-income neighborhoods, and those that received [mechanical ventilation](#) or renal replacement, indicating a more serious underlying medical illness," Vahia noted. He said it's also important to recognize that although rates of self-harm or suicide were higher among ICU survivors, the long-term incidence is relatively low.

"The findings of the study are most relevant in demonstrating how certain populations of ICU patients, ie, those with existing psychiatric diagnosis, with more social economic disadvantages, and those with medical conditions severe enough to require invasive treatment, may be especially predisposed to longer-term suicide risk," said Vahia.

He added that the study takes on heightened importance in light of the COVID-19 pandemic.

"An extraordinarily large number of people worldwide have required and continue to require ICU treatment. We already know that the pandemic has had a devastating impact on mental health, especially among younger people.

"As we begin the process of unraveling the immediate, short-, and longer-term mental health impact from COVID-19, studies such as this remind us that the full impact of COVID-19 severe enough to require ICU hospitalization may not actually be recognized for years or even decades from now," Vahia said.

►► The study was [published online](#) May 5 in *The BMJ*.

## Lenzilumab™ significantly improves survival in hospitalised COVID-19 patients

Source: <https://www.europeanpharmaceuticalreview.com/news/149326/lenzilumab-significantly-improves-survival-in-hospitalised-covid-19-patients/>

Mar 31 – In a Phase III trial, adding Lenzilumab™ to steroid and remdesivir regimens improved the likelihood of survival without need for mechanical ventilation by 54 percent.

[Humanigen Inc.](#) has reported that, when combined with other therapies, Lenzilumab™ significantly improved the relative likelihood of survival without the need for invasive mechanical ventilation (IMV) in hospitalised hypoxic COVID-19 patients.



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The randomised, double-blind, placebo-controlled, multi-centre Phase III trial evaluated the safety and efficacy of the company's lead candidate for treating cytokine storms, lenzilumab, in combination with other therapies as a treatment for patients hospitalised with COVID-19. Approximately 88 percent of patients received dexamethasone or other steroids, 62 percent received remdesivir and 57 percent received both, balanced across both the lenzilumab and placebo arms of the study.

The investigators reported that lenzilumab significantly improved patient outcomes and that the trial met its primary endpoint of ventilator-free survival through day 28 following treatment. The company revealed that the Kaplan-Meier estimate for IMV and/or death was 15.6 percent in the lenzilumab arm versus 22.1 percent in the placebo arm, representing a 54 percent improvement in the relative likelihood of survival without the need for IMV.

"The results from our Phase III clinical trial with lenzilumab treatment were associated with better outcomes in hospitalised hypoxic COVID-19 patients who had not yet progressed to the point of requiring IMV," stated Dr Cameron Durrant, Chief Executive Officer of Humanigen. "Additionally, the trial incorporated a diverse population with various comorbidities, most commonly a body mass index above 30, which is representative of a real-world, high-risk population. Our next step is to submit an application for Emergency Use Authorization (EUA) to the US Food and Drug Administration (FDA) as soon as possible. We are also sharing these results with US governmental agencies and other authorities worldwide."

Although the study was not powered to demonstrate a difference in mortality, a favourable trend in mortality was observed: 9.6 percent in the lenzilumab arm compared with 13.9 percent in the placebo arm.

In this study, lenzilumab appeared to be safe and well-tolerated; no new serious adverse events (SAEs) were identified and none were attributed to lenzilumab.

"The data strongly suggest that lenzilumab improved outcomes for hospitalised patients with COVID-19 pneumonia," remarked Dr Zelalem Temesgen, Professor of Medicine at Mayo Clinic and Principal Investigator of the Phase III trial. "The dosing regimen used in this study was specifically designed for hospitalised patients with COVID-19 pneumonia as a potential foundational therapy. Lenzilumab could make the difference between going on a ventilator, which reduces one's chance of survival, and leaving the hospital alive."

### About the lenzilumab trial

The Phase III study enrolled 520 patients in 29 sites in the US and Brazil who were at least 18 years of age; experienced blood oxygen saturation (SpO<sub>2</sub>) of less than or equal to 94 percent; or required low-flow supplemental oxygen, high-flow oxygen support or non-invasive positive pressure ventilation (NIPPV); and were hospitalised but did not require IMV. Following enrollment, subjects were randomised to receive three infusions of either lenzilumab or placebo, each infusion separated by eight hours over a 24-hour period with other treatments.

The primary endpoint was the difference between lenzilumab treatment and placebo treatment in ventilator-free survival through 28 days following treatment. Key secondary endpoints (also measured through 28 days) included ventilator-free days, duration of intensive care unit (ICU) stay, incidence of IMV, extracorporeal membrane oxygenation (ECMO) and/or death, time to death, all-cause mortality and time to recovery. Results of the trial are planned to be submitted for potential publication in a peer-reviewed journal.

## Claims of Microwave Attacks Are Scientifically Implausible

Source: <http://www.homelandsecuritynewswire.com/dr20210511-claims-of-microwave-attacks-are-scientifically-implausible>

May 11 – "It's an act of war," [said](#) Christopher Miller, former President Donald Trump's last acting secretary of defense. He was talking about alleged attacks on diplomatic and intelligence personnel by an unknown microwave directed-energy weapon. Cheryl Rofer writes in [Foreign Policy](#), however, that before the United States declares war on the unknown enemy wielding that weapon, we should know what it is—and whether it exists at all.

Rofer notes that allegations about microwave attacks on U.S. personnel have been reported regularly, some going back [decades](#). The recent wave of reports started in [2016](#), with reports from the American and Canadian diplomatic missions in Havana, hence the name "Havana syndrome." Similar cases have since been reported in other places, including China; Washington, D.C.; and Syria. State Department and intelligence personnel make up most of those affected.





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Here's the problem. Aside from the reported syndromes, there's no evidence that a microwave weapon exists—and all the available science suggests that any such weapon would be wildly impractical. It's possible that the symptoms of all the sufferers of Havana syndrome share a single, as yet unknown, cause; it's also possible that multiple real health problems have been amalgamated into a single syndrome.

Rofer, a former Los Alamos chemist, writes that there's a persistent myth that microwaves heat things from the inside out. Anyone who has heated a frozen dinner knows that this is not true. The outer part of the frozen food thaws first, because it absorbs the microwaves before they can reach the inner part. "In the same way, if a directed microwave beam hit people's brains, we would expect to see visible effects on the skin and flesh. None of that has accompanied Havana syndrome," she notes, adding:

With no clear biological connection of microwaves to Havana syndrome, it's not possible to describe a weapon that would produce that syndrome. We do not know what frequency the supposed microwaves would be or whether they are pulsed or continuous.

....

The evidence for microwave effects of the type categorized as Havana syndrome is exceedingly weak. No proponent of the idea has outlined how the weapon would actually work. No evidence has been offered that such a weapon has been developed by any nation. Extraordinary claims require extraordinary evidence, and no evidence has been offered to support the existence of this mystery weapon.

►► Read also: [http://www.bugsweeps.com/info/electronic\\_harassment.html](http://www.bugsweeps.com/info/electronic_harassment.html)

## How a CIA trap for Bin Laden led to vaccine hesitancy in Pakistan

Source: <https://newatlas.com/health-wellbeing/cia-trap-bin-laden-vaccine-hesitancy-pakistan/>



The CIA used a free vaccination campaign to obtain samples of children's DNA that could be used to confirm Bin Laden's presence

May 11 – A new study from a pair of European researchers has found a covert CIA plot to capture Osama Bin Laden in early 2011 led to significant drops in vaccination rates in Pakistan. The plot, using a fake vaccination campaign to capture children's DNA samples in order to locate Bin Laden, was used in anti-vaccine propaganda in the following years.



In countries such as Pakistan vaccine hesitancy is a major problem. Radical Islamist groups such as the Taliban often use anti-vaccine propaganda as a way of discrediting state-run public health activities and drawing in new supporters. In this kind of heated political climate anything that casts doubt on the veracity of vaccine can be leveraged as propaganda.

As US spies homed in on Osama Bin Laden's location in early 2011, authorities were desperate to clearly confirm his presence before launching a military operation in a foreign country. At the time, the CIA was convinced Bin Laden was living in a compound on the outskirts of Abbottabad in Pakistan.

In March, a doctor named Shakil Afridi started a free hepatitis B vaccine campaign in a poor neighborhood called Nawa Sher. The next month the vaccination team, led by Afridi, unexpectedly moved the campaign across to Bilal Town, a rich neighborhood. Nurses went from household to household offering children free vaccinations.

Later in 2011, months after the US raid that resulted in Bin Laden's death, a [story in The Guardian](#) revealed Afridi had been recruited by the CIA as part of a plot to confirm Bin Laden's location. The plot involved using the vaccination scheme as a cover to collect DNA samples from children living in the compound suspected to be housing Bin Laden. Once collected, the DNA samples could be matched with ones previously collected from Bin Laden's sister to confirm the family connection and validate Bin Laden's presence. It was reported that a nurse working for Afridi did enter the compound to administer the vaccines but it is not known whether this visit successfully obtained DNA samples, or if the covert action even contributed to intelligence that led to the US raid in May 2011.

In the years that followed, a great deal of criticism was leveled at the CIA for using a vaccination program as a ruse to gather intelligence. By the end of 2021 a not-for-profit vaccine charity was booted out of the country by the Pakistan government despite it having no connection to the CIA plot.

Following that, a number of vaccination workers were assassinated, leading the United Nations to suspend polio vaccination efforts in the country. This left Pakistan as [one of only three countries](#) in the world at the time with wild polio transmission.

In 2013 [an open letter](#) from 12 of the most prestigious schools of public health in the United States pressed the government for assurances this kind of covert behavior would not happen again. In response the US government pledged to not use vaccination schemes as cover for intelligence operations in the future.

In an effort to objectively quantify the effect this CIA plot had on subsequent vaccination rates Monica Martinez-Bravo and Andreas Stegmann first tracked the spread of anti-vaccine messaging across the country. The researchers found, following the revelation of the CIA campaign, extremist groups such as the Taliban used the espionage plot to amplify anti-Western sentiment by spreading anti-vaccine misinformation. In districts representing high levels of support of Islamist groups the researchers noted declines in vaccination rates of up to 39 percent.

"Our estimates indicate that the disclosure of the vaccine ruse had substantial negative effects on vaccination rates: districts in the 90th percentile of the distribution of Islamist support experienced a decline in vaccination rates between 23 percent and 39 percent relative to districts in the 10th percentile of Islamist support," the researchers write in the study.

Adding to the hypothesis suggesting the drop in vaccination rates was due to politically-fueled anti-vaccine propaganda, the study notes the data shows a greater drop in vaccination rates for girls. Martinez-Bravo and Stegmann argue this could be related to one type of anti-vaccine messaging being spread by the Taliban claiming vaccines are designed to sterilize young girls.

Ultimately, this new study offers clear and measurable insights into how damaging this CIA plot was to public health. Stegmann points out these findings affirm how governments must be careful to not engage in any behaviors that can be used to discredit important public health measures.

"The empirical evidence highlights that events which cast doubt on the integrity of health workers or vaccines can have severe consequences for the acceptance of health products such as vaccines," says Stegmann. "This seems particularly relevant today as public acceptance of the new vaccines against COVID-19 is crucial to address the pandemic."

►► The new study was published in the [Journal of the European Economic Association](#).

## Strongest Evidence Yet Shows SARS-CoV-2 May Insert Itself Into The Human Genome

Source: <https://www.sciencealert.com/we-have-the-strongest-evidence-yet-that-sars-cov-2-can-insert-itself-into-our-genome>

May 12 – Our genome is a graveyard littered with genetic fragments of [viruses](#) that once plagued our ancestors. If a controversial claim by MIT researchers withstands the criticisms being leveled at it, the virus behind the current [pandemic](#) has a fair chance of joining them.



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Having a few chunks of virus code scattered among our genes doesn't necessarily mean the pandemic is here to stay. It could even go some way towards explaining why a handful of patients continue to test positive for [COVID-19](#) long after recovery.

But [SARS-CoV-2](#) simply isn't equipped with the tools to bury itself in our genetic library, meaning it would need a way to convince our own bodies to manage the job on its behalf.

"SARS-CoV-2 is not a retrovirus, which means it doesn't need reverse transcription for its replication," [says](#) biomedical researcher Liguo Zhang from MIT's Whitehead Institute.

"However, non-retroviral RNA virus sequences have been detected in the genomes of many vertebrate species, including humans." Last year, Zhang and his team [shared the initial results](#) of an investigation suggesting SARS-CoV-2 might have a means of accomplishing such a task after all.

Using published data sets of infected cell cultures and patient samples, the team identified part-human, part-virus transcripts among sequences produced by the cells.



This was followed by experiments that assessed whether the presence of SARS-CoV-2 particles was enough to stimulate cells into producing certain enzymes that specialize in reverse transcribing RNA into DNA.

Their findings supported the rather concerning possibility that sequences of the [coronavirus](#) could be copied and pasted into our genome; importantly, not everybody in the scientific community was convinced by the evidence.

Partially due to the fact [this research](#) was made publicly available as a preprint before entering the peer-review process, it was met with significant skepticism by other researchers, who also noted the virus-human sequences could simply be artifacts of the very method used to find them.

Some expressed concerns it could make it harder to ease fears that vaccines based on the virus's code alter our DNA, an argument that might not disprove the results, but does emphasize the value in being certain of your findings before going public.

The criticisms were fair, as the researchers themselves conceded. So, the team went in search of more robust data to build their case.

Their work has now gone through [peer review](#) and is published in [PNAS](#). In the updated study, the researchers have provided new reasons to think the coronavirus wreaking havoc on our global community might haunt our cells long after the infection is gone.

In addition to looking for chimeras of coronavirus-human genetic fragments and watching for signs of the virus commandeering transcription tools, the team directly searched for evidence of viral sequences actually inside the human genome.

They even used three different DNA sequencing techniques to ensure their results weren't an artifact of any one technology.

In each case, they found fragments of SARS-CoV-2 genetic material slipped into the genetic library of deliberately infected cells, like pages torn from a contraband book.

The fact that half of the 'pages' were randomly inserted upside down adds weight to the argument that they weren't being inserted deliberately by living viruses.

On further inspection, the sequences to either side of these rogue elements weren't random pieces of text, either. The coding carried signatures of something called a [transposon](#) – a so-called jumping gene that evolved a means for falling out of place and inserting itself back into the genome elsewhere.



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Some transposons manage this through the use of enzymes stolen from past viral infections; hijacked hardware that once used by viruses to edit themselves into a host, but now serve no master but the transposable sequence itself.

One such class of sequence, called [LINE1 retrotransposons](#), make up a mind-blowing 17 percent of our entire genome. Though most have lost their talent for packing up and moving, some are active enough to still cause the [occasional bit of mischief](#).

And it could be giving SARS-CoV-2 open access to our DNA.

"There's a very clear footprint for LINE1 integration," [says](#) one of the team, Whitehead Institute biologist Rudolf Jaenisch.

"At the junction of the viral sequence to the cellular DNA, it makes a 20 base pair duplication."

However, the fact this work was done in laboratory-infected cell cultures and not actual human hosts still leaves room for doubt. There's also the question of what it means – while the fragments aren't capable of building new infectious particles, it's far from clear whether they might be biologically active in other ways, for good or bad.

"At this point, we can only speculate," [says](#) Jaenisch.

With so much attention being given to this devastating pandemic, we can be confident that it won't be long before speculations will become solutions that ensure this coronavirus becomes just one more ghost in our bodies' graveyard of plagues.

►► This research was published in [PNAS](#).

## Dengue virus vaccine candidate shows promise in mouse tests

Source: <https://newatlas.com/medical/dengue-virus-vaccine-candidate/>



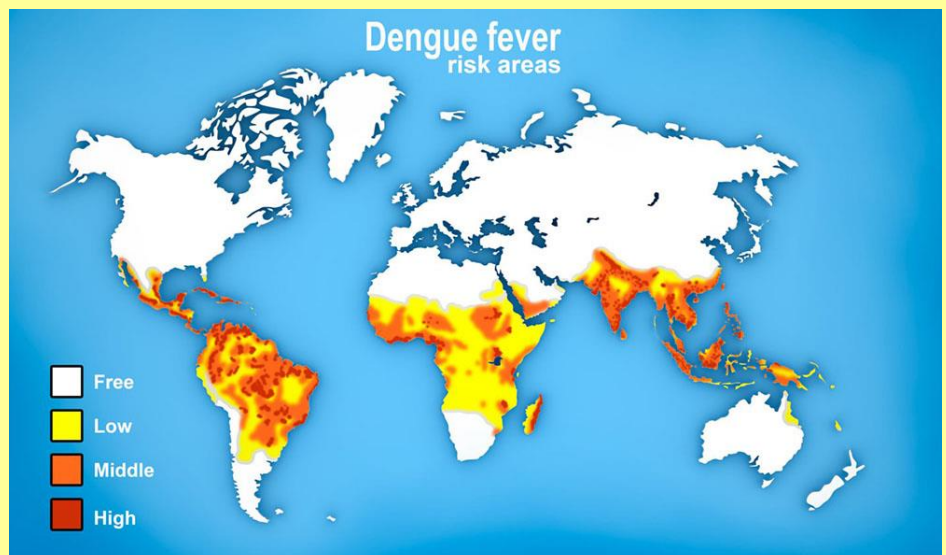
May 12 – Researchers at the University of Queensland (UQ) have developed a new vaccine candidate for dengue virus, a notoriously tricky pathogen to deal with. The new candidate has a number of advantages over existing treatments, with tests on mice using microneedle patches proving promising.

Dengue fever is one of the most prevalent diseases in tropical regions, and efforts to tackle it usually focus on prevention. Much of that involves targeting mosquitoes, the carriers of the virus, with effective [new traps](#), genetic engineering to [reduce their numbers](#) or make the [bugs resistant to the virus](#), or [bacteria that stop](#) the virus from growing.

There is one vaccine against dengue fever currently available, known as Dengvaxia, but it's plagued with issues. The most serious problem is that it's only recommended for people who have previously been infected – if administered to someone who hasn't, it may actually make a [subsequent infection more serious](#). Licensing restrictions also keep Dengvaxia from widespread use.

The UQ team has now developed a new vaccine candidate that may skirt those problems. The researchers created a chimera out of the dengue virus and the recently discovered Binjari virus, which infects insects and is harmless to humans. The Binjari virus forms the base, and it presents dengue virus proteins that a patient's immune system can recognize to launch a response. This comes with a range of advantages, the team says.

"The particles exactly mimic the surface of their dengue counterpart, which induces a strong, authentic and protective immune response," says Jovin Choo, first author of the study. "Also, it allows us to very easily manufacture high yields of the vaccine candidate in mosquito cell culture. And it only grows in insect cells, and not mammalian cells, making it extremely safe."

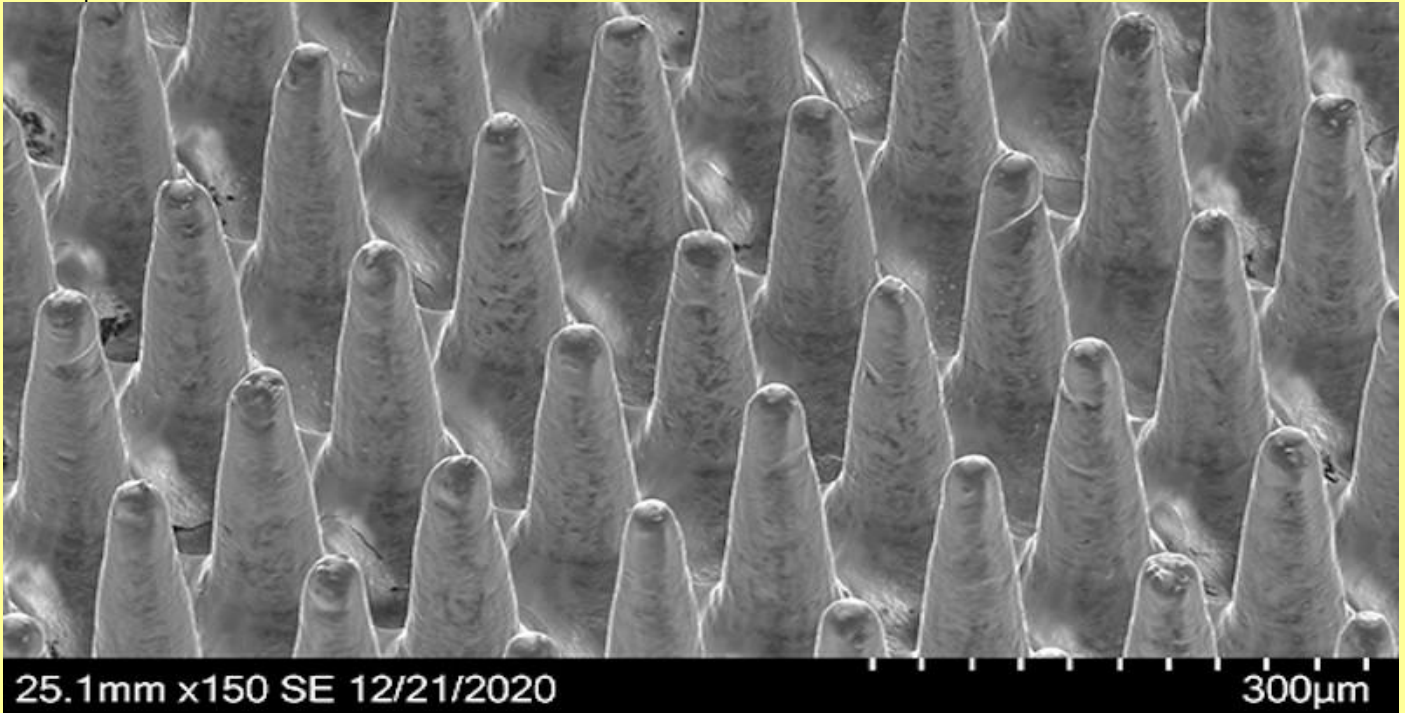


And it only grows in insect cells, and not mammalian cells, making it extremely safe."



## HZS C<sup>2</sup>BRNE DIARY – May 2021

The team tested out the new vaccine candidate in mice. Three doses were administered to each animal 21 days apart, with some containing an adjuvant (a substance that enhances the immune response) and some without, and some delivered subcutaneously (shallow) and others intradermal (a little deeper). Then, 10 days after the third dose they were exposed to the dengue virus. All groups that received the vaccine with the adjuvant were completely protected against the virus. Those without the adjuvant got sick but still had much higher survival rates than the control group – 100 percent for those that received the intradermal injection, and 80 percent for subcutaneous.



A microscope image of a microneedle patch, which can deliver vaccines and other drugs painlessly (University of Queensland)

But perhaps the best feature – especially for those who don't like needles – is that the treatment could be delivered through microneedle arrays. A 1-cm<sup>2</sup> (0.2-in<sup>2</sup>) patch contains 5,000 tiny needles coated in the vaccine, and when applied to the skin they deliver the payload painlessly and, it turns out, more effectively than a traditional hypodermic needle.

In tests on mice using microneedles to deliver the dengue vaccine, the team found that the test mice were completely protected, with 100 percent surviving following exposure compared to no survivors in the control group.

While the results are promising, it's important to remember that mouse studies are a long way from human success. There's plenty more work to do yet – especially because there are four strains of dengue to tackle. The researchers say that the next steps will be to expand their pre-clinical studies to these other strains, and eventually they hope to adapt the tech to other mosquito-borne viruses like the Zika, West Nile and Japanese encephalitis viruses.

►► The research was published in the journal [npj Vaccines](#).

## Your Immune System Could Be Hurting You as a Way of Signalling to Others

By Jonathan Goodman

Source: <https://www.sciencealert.com/our-body-s-immune-responses-could-have-evolved-as-a-way-to-tell-others-we-need-help>

May 13 – A major [debate](#) during the [pandemic](#), and in infectious disease research more broadly, is why infected people die. No virus "wants" to kill anyone, as an epidemiologist once said to me. Like any other form of life, a virus's goal is only to survive and reproduce.

A growing body of evidence instead suggests that the human immune system – which the science writer [Ed Yong says](#) is "where intuition goes to die" – may itself be responsible for many people's deaths.



In an effort to find and kill the invading virus, the body can harm major organs, including the lungs and heart. This has led some doctors to focus on attenuating an infected patient's immune response to help save them.

**This brings up an evolutionary puzzle: what's the point of the immune system if its overzealousness can kill the same people it evolved to defend?**

The answer may lie in humanity's evolutionary history: immunity may be as much about [communication and behavior](#) as it is about cellular biology. And to the degree that researchers can understand these broad origins of the immune system, they may be better positioned to improve responses to it.

The concept of the [behavioral immune system](#) is not new. Almost all humans sometimes feel disgust or revulsion – usually because whatever has made us feel that way poses a threat to our health.

And we aren't alone in these reactions. [Research shows](#) that some animals avoid others that are showing symptoms of illness.

### Eliciting care

However, more recent [theoretical research](#) suggests something more: humans, in particular, are likely to show compassion to those showing symptoms of illness or injury.

There's a reason, this thinking goes, why people tend to exclaim when in pain, rather than just silently pull away from whatever is hurting them, and why [fevers](#) are linked to sluggish behavior.

Some psychologists [argue that](#) this is because immune responses are as much about communication as they are about self-maintenance. People who received care, over humanity's history, probably tended to do better than those who tried to survive on their own.

In the broader evolutionary literature, researchers refer to these kinds of displays as "signals". And like many of the innumerable signals we see across the natural world, immune-related signals can be used – or faked – to exploit the world around us, and each other.

Some birds, for example, [feign injury](#) to distract predators from their nests; rats [suppress disease symptoms](#) so that potential mates won't ignore them.

We also see many illustrations of immune-signal use and misuse in human cultures. In [The Adventure of the Dying Detective](#) (1913), for example, Sherlock Holmes starves himself for three days to elicit a confession from a murder suspect. The suspect confesses only when he is convinced that his attempt to infect Holmes with a rare disease has been successful, misreading Holmes's signs of illness.

This is an extreme example, but people feign signals of pain or illness all the time to avoid obligations, to elicit support from others, or even to avoid submitting an article by an agreed deadline. And this is an essential element of any signalling system.

Once a signal, be it a wince or a jaundiced complexion, elicits a response from whoever sees it, that response will start to drive how and why the signal is used.

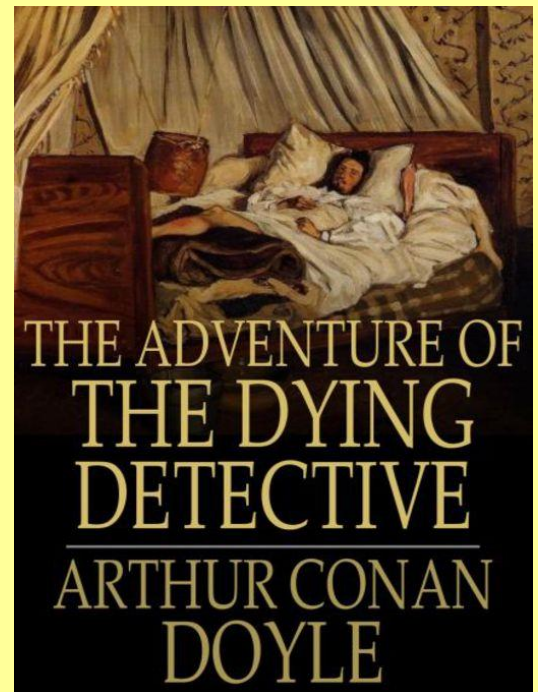
Even germs use – and abuse – immune signals for their own gain. In fact, some [viruses actually hijack](#) our own immune responses, such as coughs and sneezes, to pass themselves on to new hosts, using our own evolved functions to further their interests.

Other germs, like [SARS-CoV-2](#) (the virus that causes [COVID-19](#)) and *Yersinia pestis* (the bacterium that causes plague), [can prevent](#) our signalling to others when we are sick and pass themselves on without anyone realizing.

This perspective of immunity – one that takes into account biology, behavior and the social effects of illness – paints a starkly different picture from the [more traditional](#) view of the immune system as a collection of biological and chemical defenses against sickness.

Germs use different strategies, just as animals do, to exploit immune signals for their own purposes. And perhaps that's what has made asymptotically transmitted COVID-19 so damaging: people can't rely on reading other people's immune signals to protect themselves.

Insofar as doctors can predict how a particular infection – whether SARS-CoV-2, influenza, [malaria](#) or the next pathogen with pandemic potential – will interact with a patient's immune system, they'll be better positioned to tailor treatments for it. Future research will help us sort through the germs that hijack our immune signals – or suppress them – for their own purposes.



Viewing immunity not just as biological, but as a broader signalling system, may help us to understand our complex relationships with pathogens more effectively.

*Jonathan R Goodman, PhD Candidate, Human Evolutionary Studies @ University of Cambridge.*

## **Who Was Better at Predicting the Course of the Pandemic – Experts or the Public?**

**By Gabriel Recchia**

Source: <http://www.homelandsecuritynewswire.com/dr20210513-who-was-better-at-predicting-the-course-of-the-pandemic-experts-or-the-public>

May 13 – Early on in the pandemic, it seemed as if the media was asking anyone with potentially relevant expertise – scientists, doctors, statisticians – to tell us what was coming. These individuals were frequently asked to give off-the-cuff answers to questions about how bad the pandemic might get, even though there was little data to go on.

The use of expert predictions like these are important. They have the potential to shape public opinion and policy and influence how events unfold. Yet these have often been disregarded, particularly on social media, where alternative predictions by non-experts (including [misinformation about experts' forecasts](#)) spread easily.

Despite the potential influence of both expert and non-expert predictions on people's responses to the pandemic, there's been limited research on the accuracy of either – or indeed on the difference in accuracy between them. To this end, in April 2020 my colleagues and I [conducted an experiment](#) to find out whether experts really did have a better idea of what was on the way than the rest of us. Having a sense of this could inform what sort of public role we want experts to play in a future pandemic. Likewise, it could suggest how much weight we should place on expert and non-expert predictions of how future disease outbreaks will unfold.

### **Higher Accuracy, Lower Confidence**

We asked 140 experts (epidemiologists, statisticians, mathematical modelers, virologists and clinicians) and 2,086 laypersons to give their best guesses on several questions about how the pandemic would progress.

We asked them, by the end of 2020, how many people in the U.K. would have been infected with COVID-19, how many deaths there would have been in the U.K., and how many people would have died out of every 1,000 infected with the virus in the U.K. and worldwide. Here's how the two groups fared.

The experts' best guesses were more accurate than laypeople's on every question, but even the experts underestimated the total number of infections and deaths by a substantial margin. For example, the median estimate for the number of U.K. COVID-19 infections by the end of 2020 was 250,000 for non-experts and 4 million for experts. Calculations based on [infection-fatality ratio research](#) suggest the true count was closer to 6.4 million.

For each question, we also asked everyone to pick two numbers that they were 75 percent confident the true outcome would fall between. For example, someone might be 75 percent confident that between 100,000 and 1,000,000 U.K. residents would be infected by the end of the year. Someone who selects a narrower range – say, being 75 percent sure that between 200,000 and 250,000 people will be infected – is more confident about their prediction. Someone who selects a wider range is indicating that they are more uncertain.

If you are 75 percent sure that the true outcome will fall within the range you selected, you might reasonably hope to be correct 75 percent of the time. Unfortunately, our participants weren't. Actual outcomes fell within laypeople's ranges only between 8 percent and 20 percent of the time, depending on the question. For experts, actual outcomes fell within their ranges between 36 percent and 57 percent of the time.

In other words, experts were more accurate and less overconfident than laypeople, but still less accurate and more overconfident than we might hope.

Some notes of caution: our experts were individuals who held one of the occupations described at the beginning of this article and who responded to an announcement on social media. They aren't necessarily representative of experts who spent the most time talking to the media or advising governments.

And our laypeople certainly weren't practiced in forecasting, unlike the experienced predictors on websites such as the [Good Judgment Project](#) and [Metaculus](#), who [may well have outperformed experts](#). Our laypeople were proportional to the U.K. population with respect to age and gender, but may have differed in other ways. However, even when we restricted the



comparison to those laypeople who scored well on a [math test](#), experts were still much more accurate and less overconfident. Perhaps it's not surprising that most people's best guesses about the number of deaths and infections were off: predictions about emerging diseases are hard, and none of us has a crystal ball. We found that even experts weren't particularly good at predicting the pandemic's ultimate course and impact. But our level of confidence about our predictions is within our control – and the evidence suggests that most of us could stand to be a bit more humble.

For experts, this suggests that extra caution is warranted around making confident public predictions, so as to avoid prediction “reversals” that [may undermine public trust in science](#). And for the public, when faced with predictions of how future disease outbreaks will unfold, we should not be surprised if the true situation turns out to be better or worse than predicted – particularly if those predictions come from non-experts.

Unfortunately, the continued threat of pandemics means that this research may continue to be relevant in the future. For example, risks of serious natural pandemics have been estimated at between [1 percent and 5 percent every year](#), and the risks of [engineered pandemics](#) may grow as synthetic biology improves, so [long-term investments](#) in general-purpose disease surveillance and response technologies seem likely to come in handy eventually. In the meantime, we must all learn to live with the fact that we don't know how the future is going to unfold, and that no one can tell us for sure.

*Gabriel Recchia is Research Associate, Winton Centre for Risk and Evidence Communication, University of Cambridge.*

## Expert Panel: Current Global Alert System “Clearly Unfit” to Prevent Another Pandemic

Source: <http://www.homelandsecuritynewswire.com/dr20210513-expert-panel-current-global-alert-system-clearly-unfit-to-prevent-another-pandemic>

May 13 – A panel of leading experts is today (Wednesday, 12 May) is calling on the global community to end the COVID-19 pandemic by immediately implementing a series of recommendations to redistribute, fund, and increase the availability of and manufacturing capacity for vaccines, and to apply proven public health measures urgently and consistently in every country.

The Panel is also recommending that national governments and the international community immediately adopt a package of reforms to transform the global pandemic preparedness and response system and prevent a future pandemic.

The [Independent Panel for Pandemic Preparedness and Response](#) was appointed by the World Health Organization (WHO) Director-General in response to a World Health Assembly resolution calling for an independent, impartial, and comprehensive review of experiences gained and lessons to be learned from the current pandemic. The review was also asked to provide recommendations to improve capacity for global pandemic prevention, preparedness, and response. The Panel released its findings and recommendations on Wednesday, 12 May, in its main report: [COVID-19: Make it the Last Pandemic](#) (and see the report's [background documents](#)).

The Panel, co-chaired by the Helen Clark, former prime minister of New Zealand, and Ellen Johnson Sirleaf, former president of Liberia, has spent the past eight months reviewing the evidence on how a disease outbreak became a pandemic, and on global and national responses.

The report demonstrates that the current system—at both national and international levels—was not adequate to protect people from COVID-19. The time it took from the reporting of a cluster of cases of pneumonia of unknown origin in mid-late December 2019 to a Public Health Emergency of International Concern being declared was too long. February 2020 was also a lost month when many more countries could have taken steps to contain the spread of SARS-CoV-2 and forestall the global health, social, and economic catastrophe that continues its grip. The Panel finds that the system as it stands now is clearly unfit to prevent another novel and highly infectious pathogen, which could emerge at any time, from developing into a pandemic.

As the COVID-19 pandemic continues to devastate communities across the world, the Independent Panel is making a series of immediate recommendations to halt its spread. It recommends that:

- ❖ High income countries with a vaccine pipeline for adequate coverage should, alongside their scale up, commit to provide to the 92 low and middle-income countries in the COVAX Gavi Advance Market Commitment with at least one billion vaccine doses by September 2021.
- ❖ Major vaccine-producing countries and manufacturers should convene, under the joint auspices of the WHO and the World Trade Organization (WTO) to agree to voluntary licensing and technology transfer. If actions on this don't occur within three months, a





waiver of intellectual property rights under the Agreement on Trade-Related Aspects of Intellectual Property Rights should come into force immediately.

- ❖ The G7 should immediately commit to provide 60% of the US\$19 billion required for the Access to COVID-19 Tools Accelerator (ACT-A) in 2021 for vaccines, diagnostics, therapeutics, and strengthening of health systems, and a burden-sharing formula should be adopted to fund such global public goods on an ongoing basis.

Every country should apply proven public health measures at the scale required to curb the pandemic. Leadership from heads of state and government to achieve this is crucial.

**The world must also urgently prepare to prevent a future outbreak from becoming a pandemic.** To this end, the Independent Panel calls for the engagement of heads of state and government to lead on efforts to transform the existing system. The Panel calls for a series of bold and forward-looking reforms, including:

- **Establishing a Global Health Threats Council** that will maintain political commitment to pandemic preparedness and response and hold actors accountable, including through peer recognition and scrutiny. Countries should also adopt a Pandemic Framework Convention within the next six months.
- **Establish a new global system for surveillance based on full transparency.** This system would provide the WHO with the authority to publish information about outbreaks with pandemic potential on an immediate basis without needing to seek approval and to dispatch experts to investigate at the shortest possible notice.
- **Invest in national preparedness now** as it will be too late when the next crisis hits. All governments should review their preparedness plans and allocate the necessary funds and people required to be prepared for another health crisis.
  - **Transform the current ACT-A into a truly global platform** aimed at delivering global public goods including vaccines, diagnostics, therapeutics, and supplies that can be distributed swiftly and equitably worldwide—shifting from a market model to one aimed at delivering global public goods.
  - **Focus and strengthen the authority and financing of the WHO**, including by developing a new funding model to end earmarked funds and to increase Member State fees.
  - **Create an International Pandemic Financing Facility**, which would have the capacity to mobilize long term (10-15 year) contributions of approximately US\$5-10B per year to finance ongoing readiness. It would also be ready to disburse from US\$50-100B at short notice by front-loading future commitments in the event of a pandemic declaration. The Global Health Threats Council would allocate and monitor the funding to institutions which have the capacity to support the development of preparedness and response capacities.
  - **Heads of state and government should at a global summit adopt a political declaration** under the auspices of the UN General Assembly to commit to these transformative reforms.

The Panel's report also shared recommendations for individual countries, including that heads of state and government should appoint national pandemic coordinators who are accountable to them, and who have a mandate to drive whole-of-government coordination for pandemic preparedness and response.

In the presentation of the report and its findings, Sirleaf stressed the need for bold reform: "Our message is simple and clear: the current system failed to protect us from the COVID-19 pandemic. And if we do not act to change it now, it will not protect us from the next pandemic threat, which could happen at any time.

"The shelves of storage rooms in the UN and national capitals are full of reports and reviews of previous health crises. Had their warnings been heeded, we would have avoided the catastrophe we are in today. This time must be different."

Clark, said: "Given the scale of devastation from this pandemic and its continuing impact on people across the globe, the Panel resolved to document fully what happened and why, and to make bold recommendations for change.

"The tools are available to put an end to the severe illnesses, deaths, and socio-economic damage caused by COVID-19. Leaders have no choice but to act and stop this happening again."

The Panel is releasing the report and recommendations together, with a range of background papers which include the authoritative chronology of what happened. This is the culmination of multiple literature reviews, original research, discussions with experts in roundtables and in-depth interviews, and dialogue with those working on the front-line, with women and youth in town hall-style meetings. It also received online contributions to its work.

**The Panel also notes the economic cost of the pandemic: The world lost \$7 trillion in GDP in 2020 – more than the 2019 GDP of the entire African continent (which is \$6.7 trillion). The report says that the pandemic has caused the deepest shock to the global economy since the Second World War.**



## “Paradigm Shift” to Fight Airborne Spread of COVID-19 Indoors

Source: <http://www.homelandsecuritynewswire.com/dr20210514-paradigm-shift-to-fight-airborne-spread-of-covid19-indoors>

May 14 – Humans in the 21st century spend most of their time indoors, but the air we breathe inside buildings is not regulated to the same degree as the food we eat and the water we drink. A group of 39 researchers from 14 countries, including two from [CU Boulder](#), say that needs to change to reduce disease transmission and prevent the next pandemic.

In a [Perspectives piece publishing in Science](#) on May 14, they call for a “paradigm shift” in combating airborne pathogens such as SARS-CoV-2, the virus that causes COVID-19, demanding universal recognition that respiratory infections can be prevented by improving indoor ventilation systems.

“Air can contain viruses just as water and surfaces do,” said co-author [Shelly Miller](#), professor of mechanical and environmental engineering. “We need to understand that it’s a problem and that we need to have, in our toolkit, approaches to mitigating risk and reducing the possible exposures that could happen from build-up of viruses in indoor air.”

The paper comes less than two weeks after the World Health Organization (WHO) changed its website to [acknowledge that SARS-CoV-2 is spread predominantly through the air](#), and 10 months after the WHO [acknowledged the potential for aerosol transmission](#) and 239 scientists (including Miller and Jose-Luis Jimenez) signed an [open letter](#) to medical communities and governing bodies about the potential risk of airborne transmission. The researchers now call on the WHO and other governing bodies in this new article to extend its indoor air quality guidelines to include airborne pathogens and to recognize the need to control hazards of airborne transmission of respiratory infections.

Such a shift in ventilation standards should be similar in scale to the 19th century transformation that took place when cities started organizing clean water supplies and centralized sewage systems. But it would also correct a major scientific misperception that arose around the same time.

When people in London were dying of cholera in the 1850s, scientists assumed the disease was airborne. But British physician John Snow discovered that microorganisms in contaminated water were the reason. Similarly, Hungarian physician Ignaz Semmelweis showed that handwashing before delivering a baby greatly reduced postpartum infections. While these discoveries encountered great resistance in their time, scientists eventually agreed that in these cases, water and hands—not air—were the vector for disease. Then in the early 20th century, American public health expert Charles Chapin erroneously attributed respiratory infections caught in close proximity to other people to large droplets produced by an infected person, which fall quickly to the ground. As a result, he stated that airborne transmission was almost impossible.

Yet in 1945, scientist [William Wells published a paper in the predecessor to Science](#), lamenting that while we were investing in disinfecting water and keeping our food clean, we had done nothing for our indoor air, given the denial of airborne transmission. His research on measles and tuberculosis—caused by airborne pathogens—challenged this notion in the 20th century, but didn’t break it.

Now that the research on SARS-CoV-2 finally has brought to light that many respiratory diseases can be transmitted through the air, researchers argue that we must take action.

“Let’s now not waste time until the next pandemic,” said co-author [Jose-Luis Jimenez](#), fellow in the Cooperative Institute of Research Sciences (CIRES) and professor of chemistry at CU Boulder. “We need a societal effort. When we design a building, we shouldn’t just put in the minimum amount of ventilation that’s possible, but instead we should keep ongoing respiratory diseases, such as the flu, and future pandemics in mind.”

The long-standing misunderstanding of the importance of airborne transmission of pathogens has left a large gap of information in how to best construct and manage building ventilation systems to mitigate the spread of disease—with the exception of some manufacturing, research and medical facilities. Instead, buildings have focused on temperature, odor control, energy use and perceived air quality. So while there are safety guidelines for chemicals such as carbon monoxide, there are currently no guidelines, globally or in the U.S., that regulate or provide standards for mitigating bacteria or viruses in indoor air resulting from human activities.

“Air in buildings is shared air—it’s not a private good, it’s a public good. And we need to start treating it like that,” said Miller.

Lidia Morawska, lead author on the article and director of Queensland University of Technology’s International Laboratory for Air Quality and Health, said there needs to be a shift away from the perception that we cannot afford the cost of control. She notes that the global monthly cost from COVID-19 had been conservatively estimated as \$1 trillion and the cost of influenza in the U.S. alone exceeded \$11.2 billion annually.

While detailed economic analysis has yet to be done, estimates suggest necessary investments in building systems may be less than 1% of the construction cost of a typical building.



Ventilation systems should also be demand-controlled to adjust for different room occupancies, and differing activities and breathing rates, such as exercising in a gym versus sitting in a movie theatre, according to Morawska. For spaces that cannot improve ventilation to an appropriate level for the use of the space, she said air filtration and disinfection will be needed.

Because buildings consume over one-third of energy globally, much from heating or cooling outdoor air as it is brought indoors, it would be useful to design a “pandemic mode,” that would allow for buildings to only use more energy when necessary, said Jimenez. The researchers also call for national comprehensive indoor air quality (IAQ) standards to be developed and enforced by all countries, and for this information to be available to the public.

For this to happen, however, many more than scientists will need to understand its importance.

“I think there is a certain amount of demand that needs to start coming from the consumer and from the person who works in these indoor spaces in order to push change,” said Miller.

## Supply Chains and National Security—the Lessons of the COVID-19 Pandemic

By Bradley Martin

Source: <http://www.homelandsecuritynewswire.com/dr20210514-supply-chains-and-national-security-the-lessons-of-the-covid19-pandemic>

May 14 – National power relies on globally efficient and intertwined supply chains. These highly interconnected supply chains are a fact of life, bringing benefit and vulnerability. Supply chain vulnerability stretches across whole sectors of the U.S. economy and is a national security issue in that sense: a set of interests that if disrupted could directly affect the health and well-being of the United State and its allies.

The response to COVID-19 was an example of a supply chain crisis in medical equipment and support infrastructure that involved no malign actors at all, simply a disease that impacted supply chains across the world in multiple ways. The rapid development of COVID-19 vaccines stands as a remarkable scientific and medical achievement, but the overall response to the pandemic faced supply chain challenges, even in the absence of a competitor bent on creating and exploiting supply chain vulnerability.

What was particularly telling is that in many cases no one understood the origin of commodities within the supply chain and thus the pandemic’s impact. As a result, the nation was faced with such unexpected dilemmas as [shortages of nasal swabs or chemicals for testing kits](#). Not knowing where all the things for a product are made is not a problem for most users. If supplies move freely and production moves toward the places where these parts can be made at least expense, for the most part this is simply accepted as an efficient relationship. However, whether a crisis is man-made or externally imposed, not knowing the origins of materials can become a serious problem when normal flows cease.

Ventilators provide an excellent example of the impact of not knowing the origin of key components. In February 2020, as far as the U.S. medical and public health establishment knew, there was a sufficient supply of ventilators. The outbreak of COVID-19 and the resulting explosion of demand for ventilators to care for critically ill patients was neither anticipated nor planned for. Demand went up 500–700%, and the [shortage of ventilators](#) was dire.

The Trump administration did view this as a national problem and did use the Defense Production Act to allow priority use of industrial facilities. But, the problem did not lie in factory capacity but in the shortage of components to put the ventilators together in the available factories. [Components such as filters and alarms and tubing and power supplies](#) were produced in different countries worldwide, with indeed some produced in the Wuhan District of the People’s Republic of China, which was largely shut down due to COVID-19. With no effort by any malign actor to undermine supply chains, supply chains across the world were being disrupted, with risk imposed on all countries, including the United States.

As the number of critically ill patients increased, it became clear that the nation’s supply of intensive care units, and its supply of people to staff them, was insufficient. Surge facilities were constructed, but then the issue became the [lack of trained personnel](#) to staff the expanded facilities. This is analogous to military examples where a given supply of some commodity or force might be sufficient in steady state but was not so in a time of crisis. The nation’s medical infrastructure is oriented toward meeting the steady state demand, not more stressing cases.

Fortunately, the United States was able to overcome the supply challenges that were presented during the pandemic. But, all these disruptions were the result of an unusual situation, which highlighted several deep vulnerabilities, rather than some actor trying to manipulate chains. Factor in possible actions by a competitor bent on exerting influence and the problems may prove difficult indeed.

The People’s Republic of China (PRC) is deeply embedded in multiple supply chains, becoming the [largest trading nation and “the world’s workshop,”](#) including provision of medical supplies and equipment. Its ability to manipulate supply chains could allow it to use influence against the vulnerabilities that the COVID-19 response demonstrated.



The many shortages that occurred during the COVID-19 pandemic in the United States and elsewhere provide a clear warning. Serious vulnerabilities exist, but the full dimensions of that vulnerability were not known prior to the pandemic in some key sectors, and are not known today in many others. Much more needs to be known about this potential threat to national security.

*Bradley Martin is the director of the RAND National Security Supply Chain Institute, and a senior policy researcher at the nonprofit, nonpartisan RAND Corporation.*

## Did Covid-19 virus leak from a Chinese lab? 18 top global scientists seek fresh answers

Source: <https://www.daijiworld.com/news/newsDisplay?newsID=833489>

May 15 - Suspicion that the Covid-19 virus could have resulted from a laboratory leak in China refuses to die down, following a fresh demand by a group of eminent scientists for further investigations to determine the origin of the deadly disease.

The call for a further probe by 18 leading scientists follows the discovery of a Chinese military paper, which discusses the leading role of bioweapons in case a third world war was to be fought in the future. The publication of the research paper has raised legitimate doubts that China may have been developing bioweapons, which may have accidentally escaped from the Wuhan Institute of Virology --a stone's throw from the wet market where the virus was apparently found in bats.

Covid-19 emerged in China in late 2019, triggering a global pandemic, which has killed 3.34 million people and cost the world trillions of dollars in lost incomes. The social consequences of the outbreak have been horrendous.

"More investigation is still needed to determine the origin of the pandemic," said the scientists, including Ravindra Gupta, a clinical microbiologist at the University of Cambridge, and Jesse Bloom, who studies the evolution of viruses at the Fred Hutchinson Cancer Research Centre, Reuters has reported.

"Theories of accidental release from a lab and zoonotic spillover both remain viable," the scientists including David Relman, professor of microbiology at Stanford, said in a letter to the journal Science.

The authors of the letter question the finding of the World Health Organisation (WHO) into the origins of the virus. They said that the WHO had not made a "balanced consideration" of the theory that it may have come from a laboratory incident.

In its final report, written jointly with Chinese scientists, a WHO-led team that spent four weeks in and around Wuhan in January and February said the virus had probably been transmitted from bats to humans through another animal, and that a lab leak was "extremely unlikely" as a cause.

"We must take hypotheses about both natural and laboratory spill overs seriously until we have sufficient data," the scientists said, adding that an intellectually rigorous and dispassionate investigation needed to take place, according to Reuters.

The demands for a more detailed probe follow an investigative report published on May 7 by the Australian newspaper. The daily brought into global spotlight the existence of a Chinese military paper that discusses the potential of bioweapons based on SARS coronaviruses. Covid-19 is also a mutant of SARS coronavirus called SARS-CoV-2. The findings by the Australian have reopened the debate about the origins of Covid-19, driving holes in the theory that a wet market in Wuhan, was the ground zero from where Covid-19 radiated across the globe.

**The Chinese military paper titled The Unnatural Origin of SARS and New Species of Man-Made Viruses as Genetic Bioweapons**, points out that World War III, if it materialises, will be decided by new age biological weapons. They argue that the future of warfare is biological weapons, signalling that it was therefore necessary for China to develop these weapons of mass destruction. They predict that a "new era of genetic weapons" that can be "artificially manipulated into an emerging human disease virus, then weaponised and unleashed in a way never seen before," is on the horizon.

The authenticity of the 263-page Chinese military paper, authored by 18 top experts, including those drawn from the People's Liberation Army (PLA), has been established by digital forensics specialist Robert Potter. The US Department of Science got hold of the document May 2020, whose details will be published in an upcoming book, to be released in September, titled What Really Happened in Wuhan, authored by Sharri Markson.

The Chinese paper asserts that the new means of delivering bioweapons have been developed. "For example, the new-found ability to freeze-dry micro-organisms has made it possible to store biological agents and aerosolise them during attacks."

The Chinese have been responding furiously to any demands for an independent probe into the origins of Covid-19—a position that has started to seriously impact geopolitics in the



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Indo-Pacific region. Last week, China suspended an economic dialogue with Australia, stepping up a pressure against Canberra, which began after Australia demanded a probe on Covid-19.

Relations between the two countries have plummeted to a new low after China blocked imports of Australian coal, wheat and other goods over the past year. Chinese state media has also threatened Australia with missile strikes if it bonds with Taiwan.

In view of the growing threat from China, the Biden administration has reinforced its support for Australia.

Secretary of State Antony Blinken told his Australian counterpart Marise Payne on Thursday that the U.S. "will not leave Australia alone on the field — or maybe I should say 'alone on the pitch' — in the face of economic coercion by China. That's what allies do."

## Most Anti-Vaccine Conspiracies Online Come From The Same 12 People, Study Shows

Source: <https://www.sciencealert.com/most-anti-vaccine-conspiracies-online-come-from-the-same-12-people-study-shows>

May 17 – Ensuring people are vaccinated against [COVID-19](#) is the most surefire way to save lives in the ongoing global [pandemic](#). Still, [vaccine hesitancy](#) is holding up vital immunization efforts, and it's more important than ever to understand its source.

According to recent research, a large chunk of this very big problem actually has a very small starting point. In a new study, researchers found the majority of [anti-vaccine conspiracies](#) circulating on social media can be traced to a mere handful of individual accounts representing prominent anti-vaccine personalities.

**In all, just 12 of these people and their organizations – the so-called [disinformation dozen](#) – are responsible for initiating up to 65 percent of all false and misleading anti-vaccine propaganda shared on Facebook and Twitter.**

That figure is based on an analysis of over 812,000 posts extracted from Facebook and Twitter between 1 February and 16 March 2021, conducted in an investigation by the not-for-profit [Center for Countering Digital Hate](#) (CCDH) and [Anti-Vax Watch](#), an organization that monitors the anti-vaccine industry.

"Living in full view of the public on the internet are a small group of individuals who do not have relevant medical expertise and have their own pockets to line, who are abusing social media platforms to misrepresent the threat of COVID and spread misinformation about the safety of vaccines," [explains](#) CCDH CEO Imran Ahmed in the report.

"According to our recent report, anti-vaccine activists on Facebook, YouTube, Instagram and Twitter reach more than 59 million followers, making these the largest and most important social media platforms for anti-vaxxers."



**Per the research, the '[disinformation dozen](#)' behind almost two-thirds of anti-vaccine content shared in the study window includes Joseph Mercola, Robert F. Kennedy, Jr., Ty and Charlene Bollinger, Sherri Tenpenny, Rizza Islam, Rashid Buttar, Erin Elizabeth, Sayer Ji, Kelly Brogan, Christiane Northrup, Ben Tapper, and Kevin Jenkins.**

The researchers say these influential accounts have large numbers of followers and produce high volumes of anti-vaccine content. Many people on social media who end up sharing anti-vaccine content wouldn't necessarily follow any of these accounts themselves, but the new analysis suggests the majority of shared anti-vaccine posts on platforms like Facebook and Twitter originally begin with this relatively small group of actors.

The group's influence varies depending on the social platform, featuring in up to 17 percent of anti-vaccine tweets on Twitter, but up to 73 percent of anti-vaccine content on Facebook, the report suggests.

The research, originally released in March, was published to urge the leaders of social media platforms to 'deplatform' these prominent voices, whose airing and sharing of anti-vaccine conspiracies and hoaxes ultimately costs lives.

"Disinformation has become a direct threat to public health," [Ahmed said in March](#).

"Social media is enabling anti-vaxxers to recruit millions of Americans and indoctrinate them with fear and doubt. If Big Tech companies don't act now, the pandemic will be prolonged, and more lives will be lost."

Despite a [wave of political pressure](#) to take action against the identified dozen accounts, a [follow-up study](#) published by CCDH and Anti-Vax Watch in April found 10 of the group were still on Facebook and Twitter as of April 25, with nine remaining on Instagram.

In the weeks since then, [some accounts have been banned](#) or restricted, but [others have been left alone](#), retaining their ability to spread misinformation, exposure to which has been [linked to higher rates of vaccine hesitancy](#).

According to the researchers, it's a dangerous failure by tech companies to properly and responsibly rein in the spread of reckless falsehoods on social platforms – many of which are spearheaded by a canny and highly organized body of profit-seeking entrepreneurs.



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"The key protagonists in the 'anti-vaxx industry' are a coherent group of professional propagandists," Ahmed wrote in an article in [Nature Medicine](#) earlier in the year.

"These are people running multi-million-dollar organizations, incorporated mainly in the USA, with as many as 60 staff each. They produce training manuals for activists, tailor their messages for different audiences, and arrange meetings akin to annual trades conferences, like any other industry."

►► The report is [available on the CCDH website](#), as is the [follow-up analysis](#).

## Researchers develop direct-acting antiviral therapy to treat COVID-19

Source: <https://news.griffith.edu.au/2021/05/17/researchers-develop-direct-acting-antiviral-to-treat-covid-19/>

May 17 – An international team of scientists from [Menzies Health Institute Queensland](#) (MHIQ) at Griffith University and from [City of Hope](#), a research and treatment centre for cancer, diabetes and other life-threatening diseases in the US, has developed an experimental direct-acting antiviral therapy to treat COVID-19.

Traditional antivirals reduce symptoms and help people recover earlier. Examples include Tamiflu®, zanamivir and remdesivir.

**This next-generation antiviral approach used gene-silencing RNA technology called siRNA (small-interfering RNA) to attack the virus' genome directly, which stops the virus from replicating, as well as lipid nanoparticles designed at Griffith University and City of Hope to deliver the siRNA to the lungs, the critical site of infection.**



**"Treatment with virus-specific siRNA reduces viral load by 99.9%.** These stealth nanoparticles can be delivered to a wide range of lung cells and silence viral genes," said co-lead researcher [Professor Nigel McMillan](#) from MHIQ.

"Treatment with the therapy in SARS-Cov-2 infected mice improved survival and loss of disease. Remarkably, in treated survivors, no virus could be detected in the lungs."

[Professor Kevin Morris](#), co-lead researcher from both City of Hope and Griffith University said: "This treatment is designed to work on all betacoronaviruses such as the original SARS virus (SARS-CoV-1) as well as SARS-CoV-2 and any new variants that may arise in the future because it targets ultra-conserved regions in the virus' genome."

"We have also shown that these nanoparticles are stable at 4°C for 12 months and at room temperature for greater than one month, meaning this agent could be used in low-resource settings to treat infected patients," Professor McMillan said.

The results suggest that siRNA-nanoparticle formulations can be developed as a therapy to treat COVID-19 patients, as well as used for future coronavirus infections by targeting the virus' genome directly.

"These nanoparticles are scalable and relatively cost-effective to produce in bulk," Professor Morris said.

"This work was funded as an urgent call by Medical Research Futures Fund and is the type of RNA medicine that can be manufactured locally in Australia," Professor McMillan said.

►► The research has been published in [Molecular Therapy](#).

## Dubai airport trials super long-lasting antiviral spray to kill coronavirus traces

Source: <https://www.thenationalnews.com/uae/transport/dubai-airport-trials-super-long-lasting-antiviral-spray-to-kill-coronavirus-traces-1.1224721>

May 18 – **The coating by Finnish company Nanoksi lasts up to a year** and reduces the need for round-the-clock manual cleaning. An invisible protective shield using nanotechnology to fight Covid-19 has been trialled at Dubai International Airport to encourage safer travel.

Areas operated by Emirates were sprayed with Nanoksi's photocatalytic antimicrobial coating, which offers protection from all viruses for up to a year.

The coating, called **Fotonit**, is applied in a spray and uses energy from visible light to generate reactive oxygen peroxides, which in turn decompose all organic material.

Manual sanitation up to eight times a day is labour-intensive and expensive. Hopefully, the Dubai trial will become the concept for all other airports.

Dr Pasi Keinänen, Nanoksi Finland





Trial results will determine whether the airport becomes the first to adopt the technology.

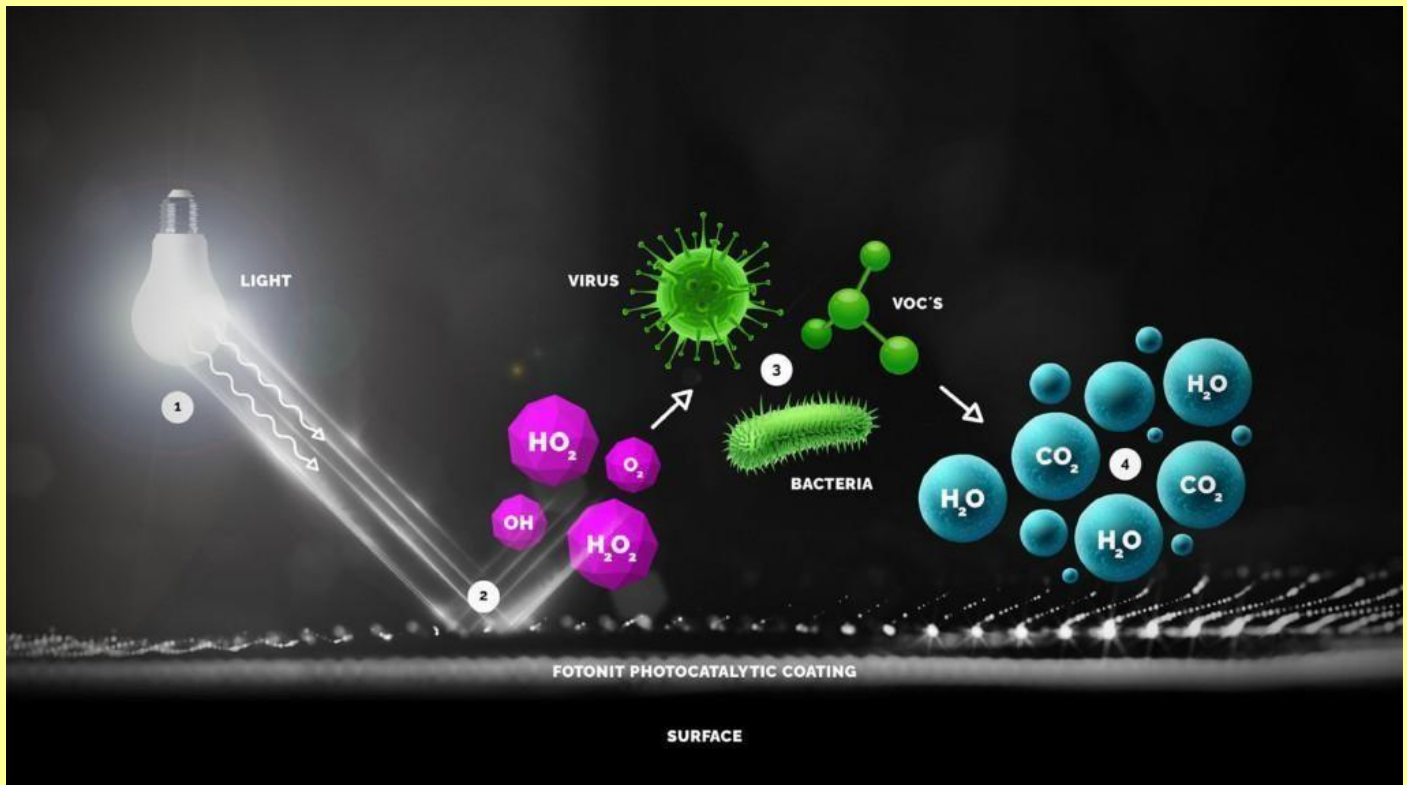
The spray destroys viruses on surfaces and does not need to be reapplied for up to a year. Courtesy: Nanoksi

Nanoksi Finland's chief executive, Dr Pasi Keinaenen, was involved in the research and development of the photocatalytic coating.

He said he hopes the trial will lead to airports around the world adopting the solution.

"Although it is light-activated it does not require ultraviolet light, so can be applied indoors," he said. "You cannot see or feel it; it is non-toxic and can be

reapplied in high-abrasion areas every 12 months.



This is how photocatalysis works: (1) The coating is activated by light and airborne water vapour; (2) The activated coating forms reactive oxygen compounds; (3) Oxygen compounds are very short-lived, as they react with microbes and VOCs on the surface; and (4) The microbes and volatile organic compounds (VOCs) decompose while oxygen compounds are converted to water and carbon dioxide.

"It is purely initiating a natural reaction and does not contain any polymers, so it is highly resistant to high and low temperatures.

"Manual sanitation up to eight times a day is labour-intensive and expensive, so this is a much more efficient alternative.

"Hopefully, the Dubai trial will become the concept for all other airports around the world."

Emirates airline, Airbus, Collins Aerospace, GE Aviation and Thales formed the Aviation X Lab partnership to promote innovation in aviation.

The Nanoksi spray was selected from 107 international entries for the Aviation X Lab Accelerate Traveller Wellbeing Challenge.



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The competition invited companies to submit ready-for-market coronavirus-related products and solutions to bolster health and safety in the travel sector.

Developed in Finland, Nanoksi found that Fotonit reduced cases of norovirus and flesh-eating bacteria such as MRSA in hospitals and care homes.

Norovirus is estimated to cause about 200,000 deaths worldwide each year, while superbugs like MRSA are responsible for about 700,000 deaths annually, according to the US Centres for Disease Control and Prevention.

Analysis of the effectiveness of the solution applied at Dubai International Airport is under way.

The technology was developed in 2017 and has been used in more than 2,000 places in eight countries, mostly in Europe.

Manufacturing and supply chains can increase production to suit global demand, should airport tests prove successful.

During the 10-week trial, Fotonit was used to disinfect Emirates waiting lounges, unaccompanied minor areas, airport buggies, limousines for business class, and the business and first-class lounges.

“Emirates airline chose to explore this project with us to see how we could secure the passenger journey from home and through the airport,” said Katja Boutou, Nanoksi’s director of global operations.

“Testing of the cleanliness of surfaces and the presence of microbes took place in certain areas of the airport managed by Emirates.

“Measurements were taken before the coating and then again a week after it was applied to assess its effectiveness in creating a Covid-free environment.

“This could have a huge impact in this region, particularly in Dubai as it is such a busy transit hub.”

Travel industry leaders said hygiene was the number one consideration for tourists this summer.

Michel Augier, regional director of Wyndham Hotels and Resorts, said cleanliness is important to hotels and guests “like never before”. He was speaking at Dubai’s Arabian Travel Market trade fair.

Dubai International Airport recently received Airport Health Accreditation for its health and safety measures to protect passengers and staff during the pandemic.

The Airports Council International awarded the status due to the measures under way at Dubai International Airport such as fumigation, periodic deep-cleaning, hand sanitiser stations and the use of protective Plexiglass screens at check-in and immigration counters.

“Businesses where this is used in Finland have seen a reduction in sick leave as staff are not picking up other viruses, so it saves money there,” Dr Keinaenen said.

“When Covid hit, it was obvious this was going to be a big area of growth for us.

“There is no way any organic material can be resistant to it, so it will protect against any future pandemics.”

## The 60-Year-Old Scientific Screwup That Helped Covid Kill

By Megan Molteni

Source: <https://www.wired.com/story/the-teeny-tiny-scientific-screwup-that-helped-covid-kill/>

May 13 – Early one morning, Linsey Marr tiptoed to her dining room table, slipped on a headset, and fired up Zoom. On her computer screen, dozens of familiar faces began to appear. She also saw a few people she didn’t know, including Maria Van Kerkhove, the World Health Organization’s technical lead for Covid-19, and other expert advisers to the WHO. It was just past 1 pm Geneva time on April 3, 2020, but in Blacksburg, Virginia, where Marr lives with her husband and two children, dawn was just beginning to break. Marr is an aerosol scientist at Virginia Tech and one of the few in the world who also studies infectious diseases. To her, the new [coronavirus](#) looked as if it could [hang in the air](#), infecting anyone who breathed in enough of it. For people indoors, that posed a considerable risk. But the WHO didn’t seem to have caught on. Just days before, the organization had tweeted “FACT: #COVID19 is NOT airborne.” That’s why Marr was skipping her usual morning workout to join 35 other aerosol scientists. They were trying to warn the WHO it was making a big mistake.

Over Zoom, they laid out the case. They ticked through a growing list of [superspreading events](#) in restaurants, call centers, cruise ships, and a [choir rehearsal](#), instances where people got sick even when they were across the room from a contagious person. The incidents contradicted the WHO’s main safety guidelines of keeping 3 to 6 feet of distance between people and frequent handwashing. If SARS-CoV-2 traveled only in large droplets that immediately fell to the ground, as the WHO was saying, then wouldn’t the distancing and the handwashing have prevented such outbreaks? Infectious air was the more likely culprit, they argued. But the WHO’s experts appeared to be unmoved. If they were going to call Covid-19 airborne, they wanted more





direct evidence—proof, which could take months to gather, that the virus was abundant in the air. Meanwhile, thousands of people were falling ill every day.

On the video call, tensions rose. At one point, Lidia Morawska, a revered atmospheric physicist who had arranged the meeting, tried to explain how far infectious particles of different sizes could potentially travel. One of the WHO experts abruptly cut her off, telling her she was wrong, Marr recalls. His rudeness shocked her. “You just don’t argue with Lidia about physics,” she says.

Morawska had spent more than two decades advising a different branch of the WHO on the impacts of air pollution. When it came to flecks of soot and ash belched out by smokestacks and tailpipes, the organization readily accepted the physics she was describing—that particles of many sizes can hang aloft, travel far, and be inhaled. Now, though, the WHO’s advisers seemed to be saying those same laws didn’t apply to virus-laced respiratory particles. To them, the word *airborne* only applied to particles smaller than 5 microns. Trapped in their group-specific jargon, the two camps on Zoom literally couldn’t understand one another.

When the call ended, Marr sat back heavily, feeling an old frustration coiling tighter in her body. She itched to go for a run, to pound it out footfall by footfall into the pavement. “It felt like they had already made up their minds and they were just entertaining us,” she recalls. Marr was no stranger to being ignored by members of the medical establishment. Often seen as an epistemic trespasser, she was used to persevering through skepticism and outright rejection. This time, however, so much more than her ego was at stake. The beginning of a global pandemic was a terrible time to get into a fight over words. But she had an inkling that the verbal sparring was a symptom of a bigger problem—that outdated science was underpinning public health policy. She had to get through to them. But first, she had to crack the mystery of why their communication was failing so badly.

Marr spent the first many years of her career studying air pollution, just as Morawska had. But her priorities began to change in the late 2000s, when Marr sent her oldest child off to day care. That winter, she noticed how waves of runny noses, chest colds, and flu swept through the classrooms, despite the staff’s rigorous disinfection routines. “Could these common infections actually be in the air?” she wondered. Marr picked up a few introductory medical textbooks to satisfy her curiosity.

According to the medical canon, nearly all respiratory infections transmit through coughs or sneezes: Whenever a sick person hacks, bacteria and viruses spray out like bullets from a gun, quickly falling and sticking to any surface within a blast radius of 3 to 6 feet. If these droplets alight on a nose or mouth (or on a hand that then touches the face), they can cause an infection. Only a few diseases were thought to break this droplet rule. Measles and tuberculosis transmit a different way; they’re described as “airborne.” Those pathogens travel inside aerosols, microscopic particles that can stay suspended for hours and travel longer distances. They can spread when contagious people simply breathe.

The distinction between droplet and airborne transmission has enormous consequences. To combat droplets, a leading precaution is to wash hands frequently with soap and water. To fight infectious aerosols, the air itself is the enemy. In hospitals, that means expensive isolation wards and N95 masks for all medical staff.

The books Marr flipped through drew the line between droplets and aerosols at 5 microns. A micron is a unit of measurement equal to one-millionth of a meter. By this definition, any infectious particle smaller than 5 microns in diameter is an aerosol; anything bigger is a droplet. The more she looked, the more she found that number. The WHO and the US Centers for Disease Control and Prevention also listed 5 microns as the fulcrum on which the droplet-aerosol dichotomy toggled.

There was just one literally tiny problem: “The physics of it is all wrong,” Marr says. That much seemed obvious to her from everything she knew about how things move through air. Reality is far messier, with particles much larger than 5 microns staying afloat and behaving like aerosols, depending on heat, humidity, and airspeed. “I’d see the wrong number over and over again, and I just found that disturbing,” she says. The error meant that the medical community had a distorted picture of how people might get sick.

Epidemiologists have long observed that most respiratory bugs require close contact to spread. Yet in that small space, a lot can happen. A sick person might cough droplets onto your face, emit small aerosols that you inhale, or shake your hand, which you then use to rub your nose. Any one of those mechanisms might transmit the virus. “Technically, it’s very hard to separate them and see which one is causing the infection,” Marr says. For long-distance infections, only the smallest particles could be to blame. Up close, though, particles of all sizes were in play. Yet, for decades, droplets were seen as the main culprit.

Marr decided to collect some data of her own. Installing air samplers in places such as day cares and airplanes, she frequently found the flu virus where the textbooks said it shouldn’t be—hiding in the air, most often in particles small enough to stay aloft for hours. And there was enough of it to make people sick.

In 2011, this should have been major news. Instead, the major medical journals rejected her manuscript. Even as she ran new experiments that added evidence to the idea that influenza was infecting people via aerosols, only one niche publisher, *The Journal of the Royal Society Interface*, was consistently receptive to her work. In the siloed world of academia, aerosols had always been the domain of engineers and physicists, and pathogens purely a medical concern; Marr was one of the rare people who tried to straddle the divide. “I was definitely fringe,” she says.



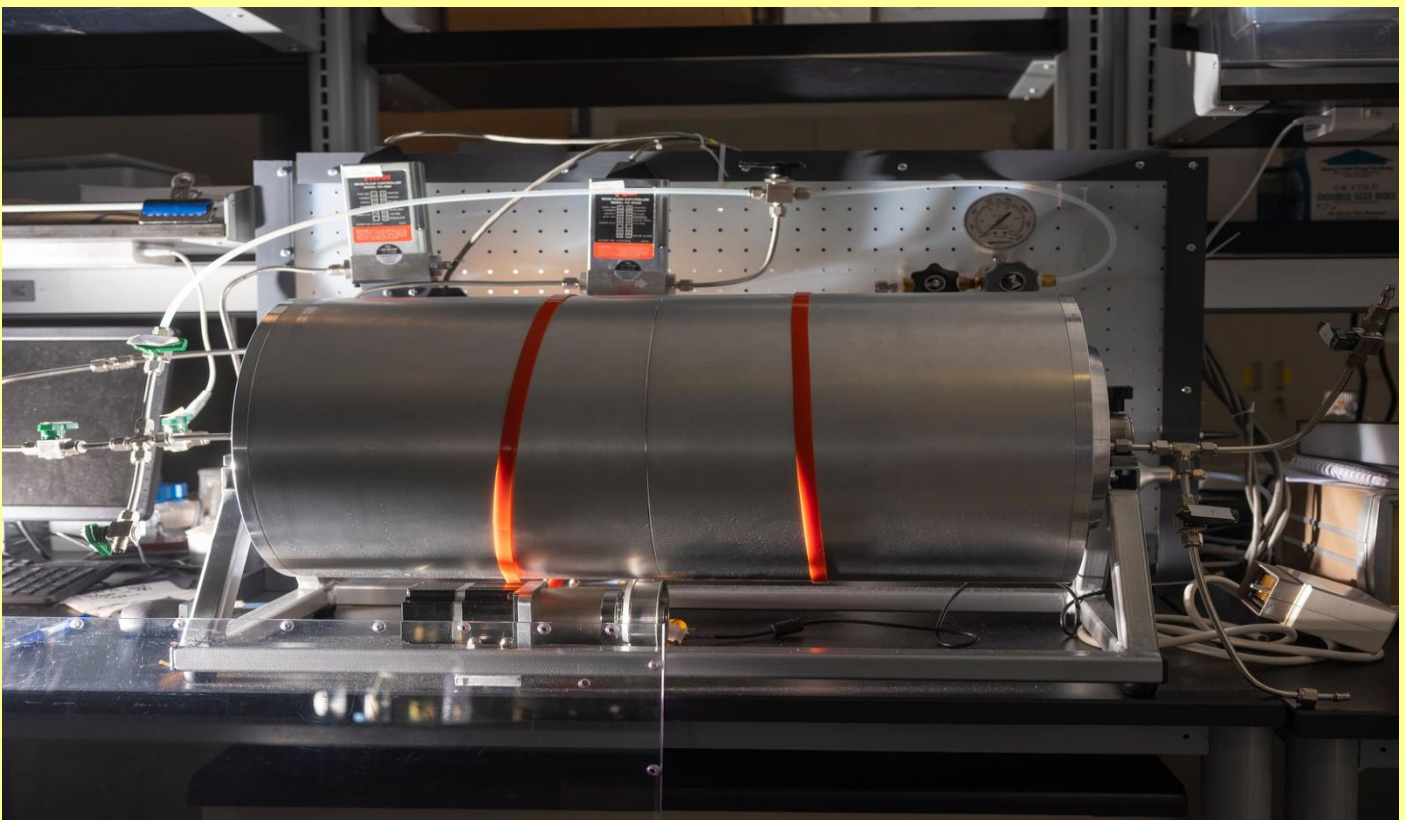
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Thinking it might help her overcome this resistance, she'd try from time to time to figure out where the flawed 5-micron figure had come from. But she always got stuck. The medical textbooks simply stated it as fact, without a citation, as if it were pulled from the air itself. Eventually she got tired of trying, her research and life moved on, and the 5-micron mystery faded into the background. Until, that is, December 2019, when a paper crossed her desk from the lab of Yuguo Li.

An indoor-air researcher at the University of Hong Kong, Li had made a name for himself during the first SARS outbreak, in 2003. His investigation of an outbreak at the Amoy Gardens apartment complex provided the strongest evidence that a coronavirus could be airborne. But in the intervening decades, he'd also struggled to convince the public health community that their risk calculus was off. Eventually, he decided to work out the math. Li's elegant simulations showed that when a person coughed or sneezed, the heavy droplets were too few and the targets—an open mouth, nostrils, eyes—too small to account for much infection. Li's team had concluded, therefore, that the public health establishment had it backward and that most colds, flu, and other respiratory illnesses must spread through aerosols instead.

Their findings, they argued, exposed the fallacy of the 5-micron boundary. And they'd gone a step further, tracing the number back to a decades-old document the CDC had published for hospitals. Marr couldn't help but feel a surge of excitement. A journal had asked her to review Li's paper, and she didn't mask her feelings as she sketched out her reply. On January 22, 2020, she wrote, "This work is hugely important in challenging the existing dogma about how infectious disease is transmitted in droplets and aerosols." Even as she composed her note, the implications of Li's work were far from theoretical. Hours later, Chinese government officials cut off any travel in and out of the city of Wuhan, in a desperate attempt to contain an as-yet-unnamed respiratory disease burning through the 11-million-person megalopolis. As the pandemic shut down country after country, the WHO and the CDC told people to wash their hands, scrub surfaces, and maintain social distance. They didn't say anything about masks or the dangers of being indoors.

A few days after the April Zoom meeting with the WHO, Marr got an email from another aerosol scientist who had been on the call, an atmospheric chemist at the University of Colorado Boulder named Jose-Luis Jimenez. He'd become fixated on the WHO recommendation that people stay 3 to 6 feet apart from one another. As far as he could tell, that social distancing guideline seemed to be based on a few studies from the 1930s and '40s. But the authors of those experiments actually argued for the possibility of airborne transmission, which by definition would involve distances over 6 feet. None of it seemed to add up.



Scientists use a rotating drum to aerosolize viruses and study how well they survive under different conditions. Photograph: Matt Eich



Marr told him about her concerns with the 5-micron boundary and suggested that their two issues might be linked. If the 6-foot guideline was built off of an incorrect definition of droplets, the 5-micron error wasn't just some arcane detail. It seemed to sit at the heart of the WHO's and the CDC's flawed guidance. Finding its origin suddenly became a priority. But to hunt it down, Marr, Jimenez, and their collaborators needed help. They needed a historian.

Luckily, Marr knew one, a Virginia Tech scholar named Tom Ewing who specialized in the history of tuberculosis and influenza. They talked. He suggested they bring on board a graduate student he happened to know who was good at this particular form of forensics. The team agreed. "This will be very interesting," Marr wrote in an email to Jimenez on April 13. "I think we're going to find a house of cards."

The graduate student in question was Katie Randall. Covid had just dealt her dissertation a big blow—she could no longer conduct in-person research, so she'd promised her adviser she would devote the spring to sorting out her dissertation and nothing else. But then an email from Ewing arrived in her inbox describing Marr's quest and the clues her team had so far unearthed, which were "layered like an archaeology site, with shards that might make up a pot," he wrote. That did it. She was in.

Randall had studied citation tracking, a type of scholastic detective work where the clues aren't blood sprays and stray fibers but buried references to long-ago studies, reports, and other records. She started digging where Li and the others had left off—with various WHO and CDC papers. But she didn't find any more clues than they had. Dead end.

She tried another tack. Everyone agreed that tuberculosis was airborne. So she plugged "5 microns" and "tuberculosis" into a search of the CDC's archives. She scrolled and scrolled until she reached the earliest document on tuberculosis prevention that mentioned aerosol size. It cited an out-of-print book written by a Harvard engineer named William Firth Wells. Published in 1955, it was called *Airborne Contagion and Air Hygiene*. A lead!

In the Before Times, she would have acquired the book through interlibrary loan. With the pandemic shutting down universities, that was no longer an option. On the wilds of the open internet, Randall tracked down a first edition from a rare book seller for \$500—a hefty expense for a side project with essentially no funding. But then one of the university's librarians came through and located a digital copy in Michigan. Randall began to dig in.

In the words of Wells' manuscript, she found a man at the end of his career, rushing to contextualize more than 23 years of research. She started reading his early work, including one of the studies Jimenez had mentioned. In 1934, Wells and his wife, Mildred Weeks Wells, a physician, analyzed air samples and plotted a curve showing how the opposing forces of gravity and evaporation acted on respiratory particles. The couple's calculations made it possible to predict the time it would take a particle of a given size to travel from someone's mouth to the ground. According to them, particles bigger than 100 microns sank within seconds. Smaller particles stayed in the air. Randall paused at the curve they'd drawn. To her, it seemed to foreshadow the idea of a droplet-aerosol dichotomy, but one that should have pivoted around 100 microns, not 5.

The book was long, more than 400 pages, and Randall was still on the hook for her dissertation. She was also helping her restless 6-year-old daughter navigate remote kindergarten, now that Covid had closed her school. So it was often not until late at night, after everyone had gone to bed, that she could return to it, taking detailed notes about each day's progress.

One night she read about experiments Wells did in the 1940s in which he installed air-disinfecting ultraviolet lights inside schools. In the classrooms with UV lamps installed, fewer kids came down with the measles. He concluded that the measles virus must have been in the air. Randall was struck by this. She knew that measles didn't get recognized as an airborne disease until decades later. What had happened?

Part of medical rhetoric is understanding why certain ideas take hold and others don't. So as spring turned to summer, Randall started to investigate how Wells' contemporaries perceived him. That's how she found the writings of Alexander Langmuir, the influential chief epidemiologist of the newly established CDC. Like his peers, Langmuir had been brought up in the Gospel of Personal Cleanliness, an obsession that made handwashing the bedrock of US public health policy. He seemed to view Wells' ideas about airborne transmission as retrograde, seeing in them a slide back toward an ancient, irrational terror of bad air—the "miasma theory" that had prevailed for centuries. Langmuir dismissed them as little more than "interesting theoretical points."

But at the same time, Langmuir was growing increasingly preoccupied by the threat of biological warfare. He worried about enemies carpeting US cities in airborne pathogens. In March 1951, just months after the start of the Korean War, Langmuir published a report in which he simultaneously disparaged Wells' belief in airborne infection and credited his work as being foundational to understanding the physics of airborne infection.

How curious, Randall thought. She kept reading.

In the report, Langmuir cited a few studies from the 1940s looking at the health hazards of working in mines and factories, which showed the mucus of the nose and throat to be exceptionally good at filtering out particles bigger than 5 microns. The smaller ones, however, could slip deep into the lungs and cause irreversible damage. If someone wanted



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to turn a rare and nasty pathogen into a potent agent of mass infection, Langmuir wrote, the thing to do would be to formulate it into a liquid that could be aerosolized into particles smaller than 5 microns, small enough to bypass the body's main defenses. Curious indeed. Randall made a note.

When she returned to Wells' book a few days later, she noticed he too had written about those industrial hygiene studies. They had inspired Wells to investigate what role particle size played in the likelihood of natural respiratory infections. He designed a study using tuberculosis-causing bacteria. The bug was hardy and could be aerosolized, and if it landed in the lungs, it grew into a small lesion. He exposed rabbits to similar doses of the bacteria, pumped into their chambers either as a fine (smaller than 5 microns) or coarse (bigger than 5 microns) mist. The animals that got the fine treatment fell ill, and upon autopsy it was clear their lungs bulged with lesions. The bunnies that received the coarse blast appeared no worse for the wear.

For days, Randall worked like this—going back and forth between Wells and Langmuir, moving forward and backward in time. As she got into Langmuir's later writings, she observed a shift in his tone. In articles he wrote up until the 1980s, toward the end of his career, he admitted he had been wrong about airborne infection. It was possible.

A big part of what changed Langmuir's mind was one of Wells' final studies. Working at a VA hospital in Baltimore, Wells and his collaborators had pumped exhaust air from a tuberculosis ward into the cages of about 150 guinea pigs on the building's top floor. Month after month, a few guinea pigs came down with tuberculosis. Still, public health authorities were skeptical. They complained that the experiment lacked controls. So Wells' team added another 150 animals, but this time they included UV lights to kill any germs in the air. Those guinea pigs stayed healthy. That was it, the first incontrovertible evidence that a human disease—tuberculosis—could be airborne, and not even the public health big hats could ignore it.

The groundbreaking results were published in 1962. Wells died in September of the following year. A month later, Langmuir mentioned the late engineer in a speech to public health workers. It was Wells, he said, that they had to thank for illuminating their inadequate response to a growing epidemic of tuberculosis. He emphasized that the problematic particles—the ones they had to worry about—were smaller than 5 microns.

Inside Randall's head, something snapped into place. She shot forward in time, to that first tuberculosis guidance document where she had started her investigation. She had learned from it that tuberculosis is a curious critter; it can only invade a subset of human cells in the deepest reaches of the lungs. Most bugs are more promiscuous. They can embed in particles of any size and infect cells all along the respiratory tract.

What must have happened, she thought, was that after Wells died, scientists inside the CDC conflated his observations. They plucked the size of the particle that transmits tuberculosis out of context, making 5 microns stand in for a general definition of airborne spread. Wells' 100-micron threshold got left behind. "You can see that the idea of what is respirable, what stays airborne, and what is infectious are all being flattened into this 5-micron phenomenon," Randall says. Over time, through blind repetition, the error sank deeper into the medical canon. The CDC did not respond to multiple requests for comment.



In June, she Zoomed into a meeting with the rest of the team to share what she had found. Marr almost couldn't believe someone had cracked it. "It was like, 'Oh my gosh, this is where the 5 microns came from?!'" After all these years, she finally had an answer. But getting to the bottom of the 5-micron myth was only the first step. Dislodging it from decades of public health doctrine would mean convincing two of the world's most powerful health authorities not only that they were wrong but that the error was incredibly—and urgently—consequential.

The mannequins in this chamber were used to test the efficacy of masks. Photograph: Matt Eich

public, signing their names to an open letter addressed to public health authorities, including the WHO. Along with 237 other scientists and physicians, they warned that without stronger recommendations for masking and ventilation, airborne spread of SARS-CoV-2 would undermine even the most vigorous testing, tracing, and social distancing efforts.



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The news made headlines. And it provoked a strong backlash. Prominent public health personalities rushed to defend the WHO. Twitter fights ensued. Saskia Popescu, an infection-prevention epidemiologist who is now a biodefense professor at George Mason University, was willing to buy the idea that people were getting Covid by breathing in aerosols, but only at close range. That's not airborne in the way public health people use the word. "It's a very weighted term that changes how we approach things," she says. "It's not something you can toss around haphazardly."

Days later, the WHO released an updated scientific brief, acknowledging that aerosols couldn't be ruled out, especially in poorly ventilated places. But it stuck to the 3- to 6-foot rule, advising people to wear masks indoors only if they couldn't keep that distance. Jimenez was incensed. "It is misinformation, and it is making it difficult for ppl to protect themselves," he tweeted about the update. "E.g. 50+ reports of schools, offices forbidding portable HEPA units because of @CDCgov and @WHO downplaying aerosols."

While Jimenez and others sparred on social media, Marr worked behind the scenes to raise awareness of the misunderstandings around aerosols. She started talking to Kimberly Prather, an atmospheric chemist at UC San Diego, who had the ear of prominent public health leaders within the CDC and on the White House Covid Task Force. In July, the two women sent slides to Anthony Fauci, director of the National Institutes of Allergy and Infectious Diseases. One of them showed the trajectory of a 5-micron particle released from the height of the average person's mouth. It went farther than 6 feet—hundreds of feet farther. A few weeks later, speaking to an audience at Harvard Medical School, Fauci admitted that the 5-micron distinction was wrong—and had been for years. "Bottom line is, there is much more aerosol than we thought," he said. (Fauci declined to be interviewed for this story.)

Still, the droplet dogma reigned. In early October, Marr and a group of scientists and doctors published a letter in *Science* urging everyone to get on the same page about how infectious particles move, starting with ditching the 5-micron threshold. Only then could they provide clear and effective advice to the public. That same day, the CDC updated its guidance to acknowledge that SARS-CoV-2 can spread through long-lingering aerosols. But it didn't emphasize them.

That winter, the WHO also began to talk more publicly about aerosols. On December 1, the organization finally recommended that everyone always wear a mask indoors wherever Covid-19 is spreading. In an interview, the WHO's Maria Van Kerkhove said that the change reflects the organization's commitment to evolving its guidance when the scientific evidence compels a change. She maintains that the WHO has paid attention to airborne transmission from the beginning—first in hospitals, then at places such as bars and restaurants. "The reason we're promoting ventilation is that this virus can be airborne," Van Kerkhove says. But because that term has a specific meaning in the medical community, she admits to avoiding it—and emphasizing instead the types of settings that pose the biggest risks. Does she think that decision has harmed the public health response, or cost lives? No, she says. "People know what they need to do to protect themselves."

Yet she admits it may be time to rethink the old droplet-airborne dichotomy. According to Van Kerkhove, the WHO plans to formally review its definitions for describing disease transmission in 2021.

For Yuguo Li, whose work had so inspired Marr, these moves have given him a sliver of hope. "Tragedy always teaches us something," he says. The lesson he thinks people are finally starting to learn is that airborne transmission is both more complicated and less scary than once believed. SARS-CoV-2, like many respiratory diseases, is airborne, but not wildly so. It isn't like measles, which is so contagious it infects 90 percent of susceptible people exposed to someone with the virus. And the evidence hasn't shown that the coronavirus often infects people over long distances. Or in well-ventilated spaces. The virus spreads most effectively in the immediate vicinity of a contagious person, which is to say that most of the time it looks an awful lot like a textbook droplet-based pathogen.

For most respiratory diseases, not knowing which route caused an infection has not been catastrophic. But the cost has not been zero. Influenza infects millions each year, killing between 300,000 and 650,000 globally. And epidemiologists are predicting the next few years will bring particularly deadly flu seasons. Li hopes that acknowledging this history—and how it hindered an effective global response to Covid-19—will allow good ventilation to emerge as a central pillar of public health policy, a development that would not just hasten the end of this pandemic but [beat back future ones](#).

To get a glimpse into that future, you need only peek into the classrooms where Li teaches or the Crossfit gym where Marr jumps boxes and slams medicine balls. In the earliest days of the pandemic, Li convinced the administrators at the University of Hong Kong to spend most of its Covid-19 budget on upgrading the ventilation in buildings and buses rather than on things such as mass Covid testing of students. Marr reviewed blueprints and HVAC schematics with the owner of her gym, calculating the ventilation rates and consulting on a redesign that moved workout stations outside and near doors that were kept permanently open. To date, no one has caught Covid at the gym. Li's university, a school of 30,000 students, has recorded a total of 23 Covid-19 cases. Of course Marr's gym is small, and the university benefited from the fact that Asian countries, scarred by the 2003 SARS epidemic, were quick to recognize aerosol transmission. But Marr's and Li's swift actions could well have improved their odds.



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Ultimately, that's what public health guidelines do: They tilt people and places closer to safety.

On Friday, April 30, the WHO quietly updated a page on its website. In a section on how the coronavirus gets transmitted, the text now states that the virus can spread via aerosols as well as larger droplets. As Zeynep Tufekci [noted](#) in *The New York Times*, perhaps the biggest news of the pandemic passed with no news conference, no big declaration. If you weren't paying attention, it was easy to miss.

But Marr was paying attention. She couldn't help but note the timing. She, Li, and two other aerosol scientists had just published [an editorial](#) in *The BMJ*, a top medical journal, entitled "Covid-19 Has Redefined Airborne Transmission." For once, she hadn't had to beg; the journal's editors came to her. And her team had finally [posted their paper](#) on the origins of the 5-micron error to a public preprint server.

**In early May, the CDC made similar changes to its Covid-19 guidance, now placing the inhalation of aerosols at the top of its list of how the disease spreads.** Again though, no news conference, no press release. But Marr, of course, noticed. That evening, she got in her car to pick up her daughter from gymnastics. She was alone with her thoughts for the first time all day. As she waited at a red light, she suddenly burst into tears. Not sobbing, but unable to stop the hot stream of tears pouring down her face. Tears of exhaustion, and relief, but also triumph. *Finally*, she thought, *they're getting it right, because of what we've done.* The light turned. She wiped the tears away. Someday it would all sink in, but not today. Now, there were kids to pick up and dinner to eat. Something approaching normal life awaited.

*Megan Molteni is a science writer at STAT News. Previously, she was a staff writer at WIRED, covering biotechnology, public health, and genetic privacy. She studied biology and ultimate frisbee at Carleton College and has a graduate degree in journalism from the University of California, Berkeley.*

## Brain fog and insomnia 'common in Covid long-haulers'

Source: <https://www.thenationalnews.com/uae/health/brain-fog-and-insomnia-common-in-covid-long-haulers-1.1224537>

May 17 – RAK Hospital study looks at fallout from pandemic and why some patients struggle to shift symptoms

Medic Cornelia Gloor helps a patient at a physiotherapy session at RAK Hospital, which has a specialist unit for patients struggling with long Covid. Reem Mohammed / The National

About a third of Covid-19 survivors continue to be plagued by health problems, said doctors treating "long-haulers" at a specialist UAE clinic.

Insomnia, depression and chronic fatigue were some of the long-term conditions reported by patients receiving care at RAK Hospital in Ras Al Khaimah.

**Despite recovering from Covid, about 30 per cent of patients continued to suffer with symptoms,** which were recorded as part of the hospital's online Covid rehabilitation programme.

People have reported not feeling like themselves, experiencing confusion and short-term memory loss. Chronic fatigue was reported by 47.5 per cent to be the most persistent complaint, with more than a third experiencing sleep problems.

More than a quarter reported "brain fog" or confusion, and 32.5 per cent showed signs of depression.

A loss of taste and smell was another ailment, reported in one in five patients who recovered from the coronavirus.

"Since it's a new disease and our understanding is still limited, we have learnt symptoms can continue for three to nine months and pose challenges for people," said Dr Raza Siddiqui, executive director of RAK Hospital.



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“Even though it is established that certain risk factors including high blood pressure, smoking, diabetes, obesity and heart conditions make people more likely to suffer a serious bout of the infection, there isn’t a clear link between these risk factors and long-term issues faced by people.

“Long Covid may also present in people who may have had mild symptoms during the infectious phase.”

Hospital researchers previously studied 3,200 people in Ras Al Khaimah to understand risk factors associated with severe reactions to Covid-19.

They found overweight people were 62 per cent more likely to develop complications.

Smokers were also found to be 45 per cent more at risk, with those over 50, and anyone with existing heart problems or with a diet high in junk food, also more likely to be admitted to hospital.

As primarily a respiratory ailment, Covid-19 impairs the body’s ability to oxygenate itself. This affects the entire body, causing cardiovascular and neurological problems.

More recent data was collated and shared by Arise, the Private Sector Alliance for Disaster Resilient Societies, a network of organisations led by the UN Office for Disaster Risk Reduction.

Doctors found chronic ailments such as diabetes, high blood pressure, arthritis, obesity and digestive ailments were often exacerbated by Covid-19 and uncontrolled for several months.

Research at RAK Hospital found more than one in five of their patients suffered cardiovascular problems and 35 per cent had neurological problems.

Doctors said affected people showed certain vulnerabilities that were consistent with existing chronic health problems, or a family history of complaints that may have been undiagnosed.

Social isolation on specialist Covid-19 wards or long periods of quarantine during recovery were likely to have contributed to insomnia or mental illness, the experts found.

“The disruption of the sleep cycle is one of the earliest warning signs of mental ill-health,” said Prateeksha Shetty, a clinical psychologist at RAK Hospital.

“In long Covid cases, they can manifest as an isolated symptom or as one of a cluster of symptoms such as mood fluctuations, dysphoria, crying bouts and a loss of interest.

“They may also be accompanied by worries about the future, health of themselves and loved ones.

“These outcomes can be partly attributed to the changes in our brain due to Covid-19 infection.”

RAK Hospital was one of the first in the country to offer bamlanivimab, a lab-made antibody shown to reduce the risk of infected patients falling seriously ill.

US regulators gave the drug emergency use authorisation in November to support those most vulnerable to more severe symptoms of the virus.

Mental illness is a common long-term symptom reported worldwide in recovering Covid-19 patients.

“People have reported not feeling like themselves, experiencing confusion, short-term memory loss or an inability to concentrate,” said Dr Sweta Adatia, a specialist neurologist who is medical director of RAK Hospital.

“The reasons are still unknown and are being investigated, though largely can be attributed to issues of blood supply and cytokines in the brain which cause inflammation.

“In reality, up to 70 per cent of patients with severe Covid-19 may have neurological sequelae [a condition resulting from a disease] of one kind or another.

“The best treatment to avoid brain fog when you contract the infection is to avoid anxiety, have good sleep, eat a balanced diet, avoid alcohol, and take multivitamins and other micronutrients.”

## Pandemic Gaps

By the Editor-in-Chief of C2BRNE Diary

*Presented in a Webinar organized by the Research Institute for European and American Studies (RIEAS) – May 20, 2021*

The ongoing pandemic proved that we were not prepared to deal with such a global disease affecting not only people but also economies and overall survival as well. Several gaps have already been identified and these gaps need to be fixed as soon as possible because we do not know if there will be another wave attributed to virus variants or another pandemic entirely different than this one. We had the chance to solve certain problems in between waves but many countries missed this opportunity until they realized that a pandemic is not just a disease that will last a few weeks and go away. Pandemic might last for years even with our current technological superiority and achievement.



Let us examine some of the most important pandemic gaps:

### 1. Medical intelligence

We failed to evaluate the severity and speed of spread of the first Chinese cluster in late December 2019 – early January 2020. Why? Lack of international collaboration and exchange of information + WHO bureaucracy and politics (?). We all have to change and/or revise our plans and agreements. Public health should always be the premium priority of nations and governments. Is it a “natural” disease or a “man-made” pathogen released? Nobody knows for sure and the world is filled with hypothesizes, rumors, hoaxes, conspiracies, and fake assumptions. In reality, this is not important. It might have been more contagious; more deadly; more difficult to identify but the outcome would be pretty much similar to what we are all experiencing right now. The pandemic equals the “B” in CBRN and this should ring the bell that the other two, at least, letters of this acronym (“C” and “R”) might happen as well. Tomorrow!

### 2. Crisis communication and management

Not in most of the countries but crisis communication and management in Greece has all the prerequisites of “*what not to do*”! Instead of following the basic rule of “one line; one voice” we suddenly discovered that the government, the opposition, private MPs, the mass media (especially private TV channels), the academia, the unions, and other organized social bodies have their own opinion about everything even if they are not qualified for that. The population is bombarded daily by so-called experts of all specialties even irrelevant ones. As a result, people do not know whom to believe and why and in many instances choose to follow their instincts and opinions that are not always the right ones. Those in high places need to go back to school and be taught the basics of crisis communication and management because the ongoing pandemic is not the only crisis they are going to be confronted with shortly.

### 3. Shortage of protective equipment

All countries were not prepared to deal with the tsunami of patients overwhelming hospitals. Essential personal protective equipment (masks; gowns; goggles; etc.) were hard to find and in many instances required cash to buy plus personal connections to overcome priority lists and gentlemen agreements. Large shipments changed destination at the airport and certain countries refused to sell to others fearing that they will not be able to cover their own needs. Available personal protective equipment was not the best available providing comfort for the staff but also for the patients who were not able to see the faces of the nursing staff. The ensemble used in CBRN operations in combination with a *powered air-purifying respirator (PAPR)* will be the perfect solution for both problems – it might be more expensive but can be used many times and be decontaminated.

Training: Pandemic proved that training in personal protective equipment should be included in the overall training of the hospital staff – including that of CBRN training that is entirely neglected worldwide.

The pandemic proved that when a real global emergency happens there is no room for solidarity between nations and organizations. Survival prevails and all the nice talking and politics are set aside. Certain countries are using the pandemic to make politics that will materialize later on when the pandemic will be over or under control. We have proved that even though we are now planning to conquer Mars we remain beasts trying to survive a catastrophe!

### 4. Shortage of ICUs

There are mild cases, medium severity cases, and severe cases requiring ICU. In addition, post-recovery hospitalization required additional resources. All four categories plus the ordinary patient load required beds and specialized equipment not readily available. Only a few countries could deploy field hospitals that could de-escalate the pressure of ordinary hospitals without compromising the quality of healthcare provided. Gradually, major hospitals were transformed to Covid hospitals.

Two additional problems:

(a) shortage of certain specialized equipment required in ICU e.g. respirator connectors and cuffs; 3-D printing proved that can overcome these obstacles and make every hospital self-sufficient in spare parts required for ICU operation.

(b) oxygen supply: even countries that produce and export oxygen are currently having a problem with oxygen supply and that led to an enormous rise in prices and black market interactions. In certain cases, hospital oxygen systems crashed because there were not meant to operate 24/7.

In addition, although we invested a lot in negative pressure rooms or wards the pandemic proved that it is a luxury that will not make the difference with massive Covid casualties but only for sporadic cases of highly contagious individuals infected with more exotic pathogens (e.g., persons with Ebola and alike).





### 5. Healthcare personnel

Physicians and nurses are ordinary people who have needs, families, and own worries that need to be addressed properly by state authorities. These front-line health professionals can also be conquered by fear for the unknown and worry about their families and relatives. Many might have all kinds of pets that need to be taken care of during their long absences and 12 hours shifts. Many rent rooms in hotels avoiding going home on daily basis to protect their beloved ones. All these and many more are problems needing to be properly addressed to ease the stress of those fighting for the lives of those hospitalized. It is not all about money but certain measures worth more than the money offered for extra work.

### 6. Management of the dead

This became a huge problem, especially in Brazil and India. In the latter, they cremate bodies in the open or even dispose of bodies in the Ganges River. There is a shortage of woods and they started to use cow dung cakes while thinking of release flesh-eating turtles in the rivers. The problem is huge in countries with high temperatures and humid weather. Lots of lands are required along with a valid recording system and proper burial protocols. In the West, this problem was addressed in a more civilized way by using refrigerated trucks (yes; the very same trucks used for the transportation of frozen foods) and indoor ice skating installations. We used to make this suggestion for CBRN casualties and everybody in the audience was laughing about but it turned out to be the most proper solution when there are many corpses and not enough proper place to keep them until buried.

### 7. Preventive measures

There is a lot of fuss regarding masks, distancing, and personal hygiene. Again, another area of huge confusion and different opinions ranging from absolute denial to triple masks and alike. Lots of scientific research costing money to prove what logic simply indicates and that is that the virus is airborne meaning that it can use indoor and outdoor wind currents to move towards any direction and any distance possible. And this simple conclusion cancels all directives for 2 meters distance; all protective fiberglass panels places almost everywhere from restaurants and banks to schools and public services. If people knew about this, then they can understand why it is the combination of these measures that work best instead of each of them alone. And this principle applies to education, entertainment, commerce, businesses, etc. A very basic CBRN principle indicating that the core of planning is to take into consideration how people will behave in an emergency instead of how planners and authorities would like them to behave. Therefore, when the gov implements a total lockdown it expects people to stay at home no matter what and by all means. This might work in China but for sure it did not work in the Western world – in Greece to be more specific. Young people have different standards, beliefs, and perceptions and as a result, it is not in their nature to obey rules and follow orders. So they corona-party; they flood beaches or open city spaces; they make jokes with the face masks, and they think that there is no pandemic just an effort to control the populace and restrict privacy and personal freedoms. The young part of the population needs to be educated on disaster management because the unexpected always happens.

### 8. Volunteers

Another proof of under-preparedness is the fact that we did not use the volunteer force properly. Lay people could have helped in many public sectors and retired healthcare professionals and medical students could help ease the burden of front-line health professionals struggling to manage the human tsunami flooding hospitals. This is something that should be re-organized and made right this time. The conscription of medical professionals by authorities is not a clever thing to do and is kind of disrespectful to those fighting for the lives of others. There is always a solution provided you are willing to solve a problem!

### 9. Vaccines and vaccination

The same principles that are necessary for crisis communication and management are applicable regarding vaccines and vaccination procedures. People need to understand why they have to be vaccinated but at the same time they need to be told the truth about possible side effects – death included. If authorities hide important information there is always the Internet that can fill the info gaps not always the proper way. In Greece but also in many EU member states there is the big question of why we do not have access to the Sputnik V vaccine. Is it because it is Russian? Is it because only Western products are good and Russian or Chinese vaccines are not good? Is it about the price of the vaccines? Is profit above public health and the well-being of people? And why I am not able to choose my vaccine even if I have to pay for it? Why do authorities continue to use stupid statistics-based examples of how safe current vaccines are? One in 10,000 say to have a thrombosis related to vaccination. What if this “one” has a name let's say John Nomikos? For him, the possibility becomes 100% and not 1 in 10,000. Isn't it? Or if you go by car from city A to city B about 600 km apart there is a bigger chance to be killed in a car accident than



to die from a coronavirus vaccine. If gov insults the way people think, then they should do not expect vaccination programs to succeed to the level expected to achieve the infamous “herd immunity” or whatever this is. In addition to the above, it is important to make people realize that vaccination is not a panacea! If vaccinated this does not mean that all other preventive measures should be abandoned. On the contrary! Vaccinated people still can host and transmit the virus to others. The only thing is that they will not die from the virus if their system did not manage to restore its defenses following the vaccination. It is a common picture to see people without masks ignore social distancing just because they have done the magic jab! And an additional question of many: why we need two identical doses instead of one? What if the first dose sensitizes the human body to develop hypersensitivity reactions if a second dose is given? Is this the basis of allergies or not? Isn't this why the body responds badly to a food or drug given in the past once or many times? Only Sputnik V explains why two doses are necessary because each dose contains a different adenovirus. And there are a lot of questions about mRNA vaccines and their mode of action and the reactions caused. The infamous PEG allergy was almost totally unknown to allergy specialists for decades; almost all antihistamines contain PEG and now out of know where it is the additive that is responsible for allergic reactions. If experts can not have the right answers how do we expect to persuade the people and ease their worries and concerns? Finally, there is a strange change regarding the use of masks and distancing related to fully vaccinated people. Now we say they have to wear them and stay apart. Now we say (President Biden) that we are free from masks and social distancing! Is it true or just motivation for more vaccinations? Is it public health marketing or reality? How do they know that vaccinated people do not infect others as Dr. Fauci recently stated?

#### 10. Perception “it will not happen to us!”

The last but not least gap has to do with the inherent perception of people – all people – that “it will not happen to us!”. In certain countries, disasters are considered punishments that are driven directly from God! History has proven that diseases to the level of a pandemic are a natural phenomenon to control the population of the planet and restore equilibriums depending on the available resources. The thing is that preparedness is better than treatment and as we say in Greece “doing the same sin twice is not an indication of a wise man!” We were not prepared to deal with a pandemic. We should have been prepared given our history with HIV, SARS, MERS, or H1N1 but we were not. Now that this pandemic is not over, certain people start speaking about the next pandemic; they even call it Pandemic X! This means that we have not the luxury of time or the luxury to give preparedness some time to rest. We have to fill the pandemic gaps and we have to be more insightful regarding possible new problems that we might encounter shortly. If we do not, perhaps we will not be allowed to have another webinar discussing what went wrong and how to fix them.

**Dear colleagues,** a crisis is sometimes synonymous with an opportunity and the current pandemic is our chance to make things better because this is not the last emergency we are facing not even the worst one! Next time we will have not the excuses of the present and the tolerance of the public because now we know how to do things better and more efficiently. If we do not fix pandemic gaps now someone has to pay dearly for this!

**Thank you very much for your attention!**

### **A step towards demystifying rare Covid-19 vaccine-induced blood clots**

Source: <https://www.pharmaceutical-technology.com/comment/covid-vaccine-blood-clots/>

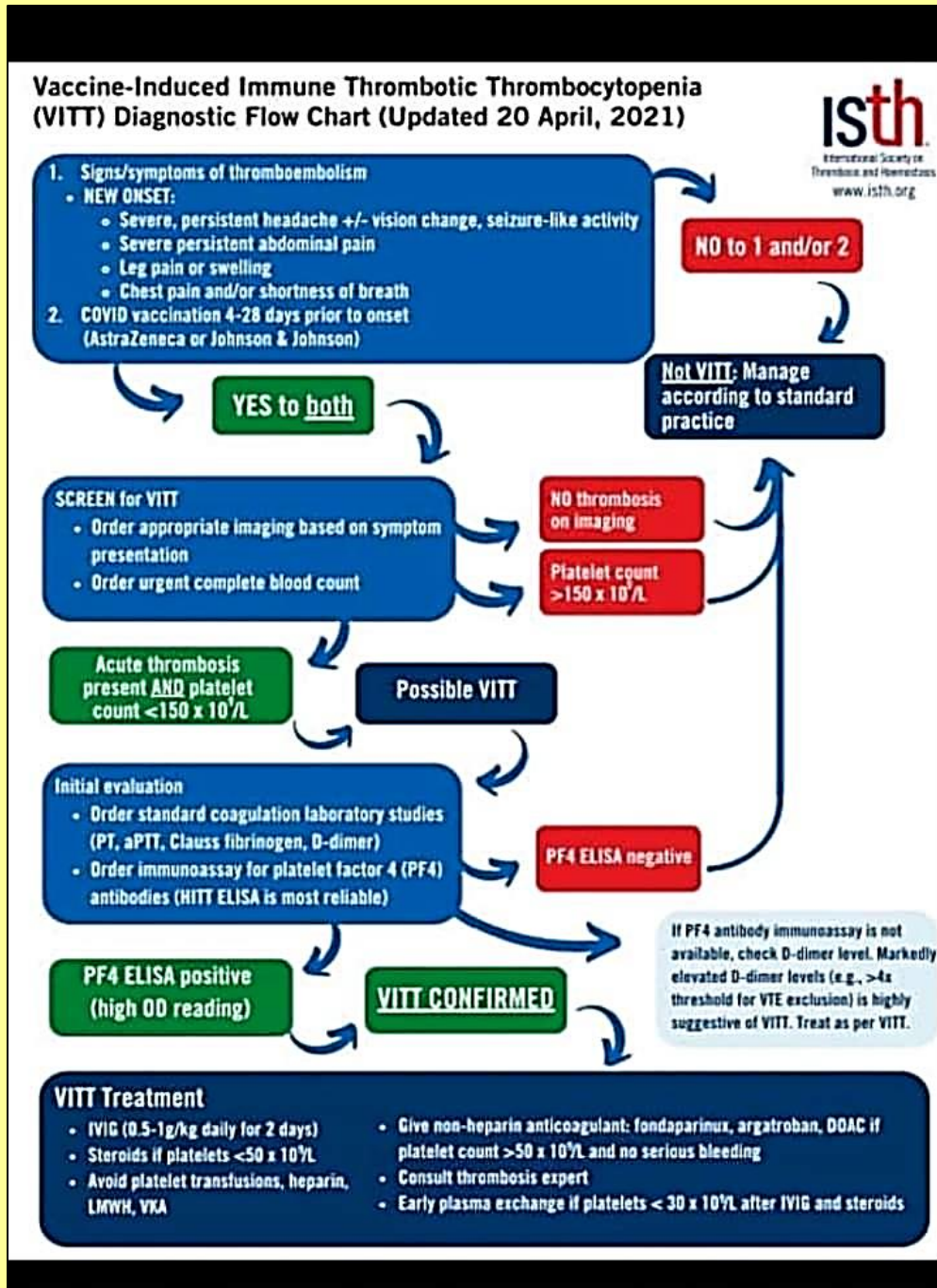
Apr 29 – Concerns surrounding vaccine-induced immune thrombotic thrombocytopenia (VITT) with Johnson & Johnson’s (J&J) single vaccine shot are reminiscent of those that emerged following AstraZeneca’s Covid-19 vaccine rollout. Both vaccines use adenoviral vector technology, where genetically engineered adenoviral vectors introduce a gene from SARS-CoV-2 into the body, prompting cells to make the coronavirus spike protein. Following the pause of J&J’s vaccine administration, the European Medicines Agency (EMA) has reiterated the verdict issued for AstraZeneca’s offering, such that J&J’s vaccine label will carry a warning, with EU member states to determine use in line with needs, clearing rollout to commence across Europe.

In view of a recent agreement with J&J, Dr Andreas Greinacher, a researcher at University Medicine Greifswald in Germany, has indicated plans to study the vaccine components. As well as detailing thorough accounts of patients developing VITT in the New England Journal of Medicine, Greinacher and colleagues have released a report outlining potential mechanisms in which AstraZeneca’s vaccine may trigger these effects. The report is yet to be published in a scientific journal.

The team proposes virus proteins and higher than typically observed concentrations of vaccine constituents such as ethylenediaminetetraacetic acid (EDTA) to be involved in a



sequence of events that mediate VITT. They speculate AstraZeneca’s vaccine activates platelets through mechanisms including platelet interaction with cell culture-derived proteins and EDTA. Activated platelets release platelet factor 4 (PF4). Owing to its positive charge, PF4 binds to vaccine constituents to form multimolecular aggregates that include virus proteins.



A mouse model was used to highlight the increased microvascular leakage facilitated by AstraZeneca’s EDTA-containing vaccine. Increased vascular permeability allows for the dissemination of proteins including cell culture-derived human proteins. Consequently, in some individuals, constituents of the vaccine including PF4 complexes may trigger immune events, leading to anti-PF4 antibody production. In a very small percentage of individuals, high titer anti-PF4 antibodies may result in additional immune reactions, fueling the prothrombotic response observed in VITT. The researchers may be able to determine the occurrence of similar events in the case of Johnson & Johnson. Though EDTA is not listed as an ingredient in J&J’s vaccine, some of the mechanisms proposed by Greinacher may play a role. The proposed mechanisms have been met with support and scepticism by experts. Nonetheless, Greinacher has been commended for leading necessary and intriguing research. Continued investigations into the observed VITT effects could allow for improved treatment of adverse effects as well as vaccine modifications, preventing the

occurrence of unusual clotting.

Though platelet activation effects should not be regarded as a class effect of adenoviral vector vaccines, at present, products in this category should be closely observed. This includes China’s Convidecia vaccine headed by CanSino Biologics and Russia’s Sputnik V developed by the Gamaleya Institute. CanSino Biologics issued a statement advising no blood clot-related serious adverse events were reported in around one million administered vaccinations and reiterated its use of a different adenovirus relative to J&J’s offering. Gamaleya also endeavoured to distinguish Sputnik V from the other adenovirus vaccines, alluding to variations in viruses used, cells lines used in production, sequences of spike DNA carried, purification methods and administration dosages.



## HZS C<sup>2</sup>BRNE DIARY – May 2021

Mounting safety concerns may continue to increase the popularity of mRNA vaccines. Despite trailing behind Pfizer/BioNTech and Moderna's vaccine timelines, German biopharma CureVac may stand to gain from the current obstacles being faced by AstraZeneca and J&J. The company's candidate CVnCoV may also gain a competitive edge on the alternative mRNA vaccines owing to stability at higher temperatures. Strategic agreements with companies including Novartis and Bayer stand to boost production capabilities and potentially aid regulatory approval. Despite uncertainties, researchers and vaccine regulators alike continue to stress that in the vast majority of cases, immunisation benefits continue to outweigh the small risk of VITT.

**EDITOR'S COMMENT:** You need an antigen to trigger the production of antibodies (PF4). So, where is the antigen? Is there something "hidden" in the ingredients of vaccines-induced VITT? Do we know everything about the composition of the vaccines given to the people?

### Logic enough

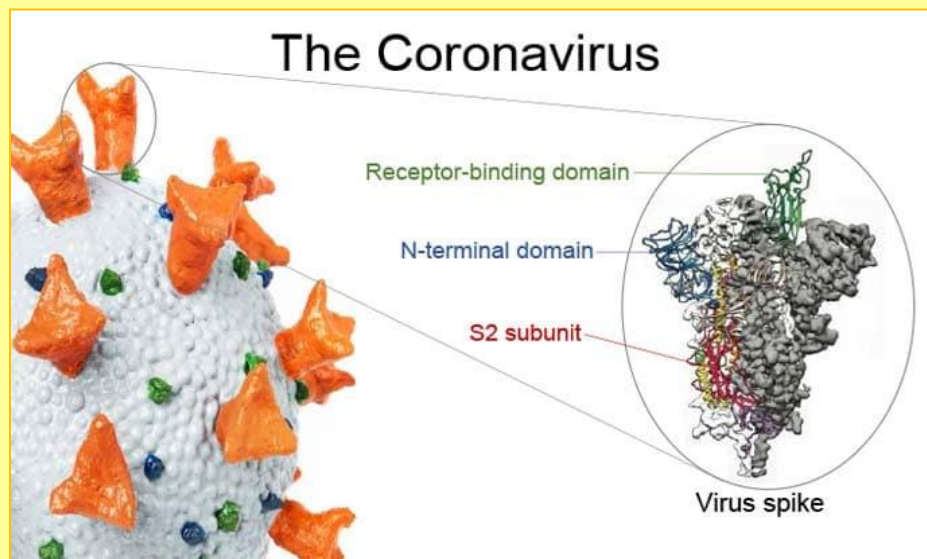
The side effects from the vaccines are caused by activation of the immune system, meaning that the immune system is working and starting to build immunity to COVID-19 -- this is what we want. These **pain relievers** may prevent parts of the immune system from working and slow down the immune response. There is a theory that taking these medications before immunization may reduce their effectiveness. A study from Duke University found that children who took pain relievers before getting their childhood vaccines had fewer antibodies than those who did not take the medications, which could mean less protection. However, there were still protective antibody levels, despite the blunting. Similar results from another 2021 DU study on adults on indomethacin.

### New Clues Show How the Immune System Fights COVID-19

Source: <https://www.medscape.com/viewarticle/950939>

May 11 – When the immune system detects an invading virus like COVID-19, it sends swarms of antibodies to latch on to it, blocking its ability to attach to cells and marking it for destruction by other cells. Now, [new research](#) shows in striking detail how that process works in people who have successfully recovered from COVID-19 and offers new insights to help others.

So far, scientists have focused on one part of the coronavirus spike — the receptor-binding domain — which the virus uses to attach



and gain access to human cells. This part of the coronavirus attaches directly to a person's cells to infect them, and is the part that researchers have made their top priority for vaccine and drug development. The monoclonal antibody therapies approved last year for emergency use by the US Food and Drug Administration use this same target.

*Coronavirus spikes protrude to infect cells (adapted from an illustration by the University of Texas at Austin)*

Now, a team led by immunologists Gregory Ippolito and Jason Lavinder, from the University of Texas at Austin, has taken a closer look at blood samples

from four people who recovered from COVID-19 and found that most of the antibodies their bodies made to fight off illness actually targeted other parts of the coronavirus spike.

In fact, as much as 80% of their antibodies targeted other parts of the spike protein. These antibodies were aiming at another area of the umbrella-shaped protein's canopy, Ippolito explains. And it is this part of the spike protein — called the N-terminal domain — that mutates most frequently. Changes in this region are responsible for many of the variants of



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concern. Such variants might be able to avoid detection by some of the most common antibodies in our defensive arsenal, evading the immune system.

### More Protection

But another large group of antibodies targets the stalk of the spike, called the S2 subunit. That's reassuring, the scientists report, because this is a region that does not mutate often, so if the antibodies that recognize the virus are able to neutralize it, they should offer a layer of protection against any variant.

No S2-binding antibodies have been found to be strongly protective yet, but Lavinder says that if some can be found, they could play a role in the next generation of vaccines and booster shots developed to deal with the variants. It could even point the way toward a vaccine that provides protection against all coronaviruses, not just COVID-19.

"The idea is that because this region is significantly conserved across all coronaviruses, it could make a good pan-coronavirus vaccine," says Ippolito. "It could be important for the strategic design of vaccines in the future."

## Aspirin Use May Decrease Ventilation, ICU admission and Death in COVID-19 Patients

Source: <https://mediarelations.gwu.edu/aspirin-use-may-decrease-ventilation-icu-admission-and-death-covid-19-patients>

Mar 17 — George Washington University researchers found low dose aspirin may reduce the need for mechanical ventilation, ICU admission and in-hospital mortality in hospitalized COVID-19 patients. Final results indicating the lung protective effects of aspirin were published today in *Anesthesia & Analgesia*.

"As we learned about the connection between blood clots and COVID-19, we knew that aspirin – used to prevent stroke and heart attack – could be important for COVID-19 patients," [Jonathan Chow, MD](#), assistant professor of anesthesiology and critical care medicine and director of the Critical Care Anesthesiology Fellowship at the GW School of Medicine and Health Sciences, said. "Our research found an association between low dose aspirin and decreased severity of COVID-19 and death."

Over 400 patients admitted from March to July 2020 to hospitals around the United States, including those at GW Hospital, the University of Maryland Medical Center, Wake Forest Baptist Medical Center and Northeast Georgia Health System, were included in the study. After adjusting for demographics and comorbidities, aspirin use was associated with a decreased risk of mechanical ventilation (44% reduction), ICU admission (43% reduction), and in-hospital mortality (47% reduction). There were no differences in major bleeding or overt thrombosis between aspirin users and non-aspirin users.

Preliminary findings were first published as a preprint in fall 2020. Since then, other studies have confirmed the impact aspirin can have on both preventing infection and reducing risk for severe COVID-19 and death. Chow hopes that this study leads to more research on whether a causal relationship exists between aspirin use and reduced lung injury in COVID-19 patients.

"Aspirin is low cost, easily accessible and millions are already using it to treat their health conditions," said Chow. "Finding this association is a huge win for those looking to reduce risk from some of the most devastating effects of COVID-19."

In addition to Chow, study authors include [David Yamane, MD](#), assistant professor of emergency medicine and anesthesiology and critical care medicine at the GW School of Medicine and Health Sciences; Ivy Benjenk, RN, MPH, lead research coordinator for the Department of Anesthesiology and Critical Care Medicine at GW Hospital; and Shannon Cain, MD, third-year resident in the Department of Emergency Medicine at the GW School of Medicine and Health Sciences; as well as researchers from the University of Maryland Medical Center, Wake Forest Baptist Medical Center and Northeast Georgia Health System.

## The next pandemic: Marburg?

Source: <https://www.gavi.org/vaccineswork/next-pandemic/marburg>

Apr 22 – A deadly cousin of Ebola, Marburg can kill nine out of ten people it infects, and international travel has taken it from Africa to Europe twice in the past 40 years. Will increasing globalisation make this virus more likely to erupt around the world?

In August 1967, a cluster of patients in Marburg and Frankfurt, in Germany, and in Belgrade (then Yugoslavia, now Serbia), began showing symptoms of an infectious disease – a high fever, chills, muscle ache, and vomiting. The patients worsened over the next few days, until they began bleeding from every orifice in their body, including needle puncture wounds. In total 31 people died.



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Three months after this outbreak, virologists in Marburg had discovered the first filovirus, a cousin of the equally-deadly Ebola virus. The virus had been carried by infected African green monkeys from Uganda.

### **Avoiding handling or eating bush meat is also critical to avoid any potential infection that could spread from animals.**

After this first sighting, the virus was then mostly seen in African countries, in bat-infested caves or mines. About 40 years later, however, the virus re-emerged in Europe through a traveler returning to the Netherlands from a trip to Uganda where she had been visiting caves.

The largest known outbreak of Marburg virus, in Angola in 2004, infected over 250 people and had a 90 percent fatality rate. Marburg virus can persist in the eyes and testes of people who have recovered, and in pregnant women it can persist in the placenta and amniotic fluid as well as breast milk. This can be extremely dangerous. In early 2021, there were reports that Ebola, closely related to Marburg, could lay dormant in people only to emerge many months after an epidemic had ended, triggering another outbreak.

### **Disease: Marburg**

**Where is it circulating?** Most outbreaks have been in Africa, with cases reported in Angola, the Democratic Republic of the Congo, Kenya, South Africa, Uganda and Zimbabwe. However, there have been outbreaks in Europe and the USA.

**Pandemic threat:** As Marburg virus can spread from human to human through contact of bodily fluids, much like Ebola. As outbreaks in Europe and the US have already shown, increasing globalisation and international travel mean that the risk for global spread is high, especially when the incubation period could be up to three weeks. This could be disastrous given its high death rate.

**How is it spread?** The Egyptian rousette fruit bats often harbour the virus. African green monkeys have in the past spread the virus

to people in Uganda, but pigs can also become infected and can be a source of infection. Marburg virus is spread through direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and also through any materials such as bedding, that have been contaminated with the infected fluids. As a result, health workers have often become infected by treating patients with Marburg virus. Burial ceremonies in which people have direct contact with the body can also drive the spread of the virus.

**Case fatality rate:** **Marburg is one of the deadliest viruses we know of, killing as many as 88% people it infects.**

**Incubation period:** The incubation varies from as short as two days to up to 21 days, though some studies have suggested the virus can incubate for as long as 26 days.

**Symptoms:** Marburg virus begins with a fever, severe headache and muscle pains. This is often followed by watery diarrhoea, stomach pain, nausea and vomiting, accompanied by extreme exhaustion and lethargy. Many people go on to develop severe viral haemorrhagic fever, and in severe cases have blood in their vomit and faeces, and may bleed from their nose, gums and vagina. The onslaught of the virus is so extreme that most people die 8-9 days after infection, often because of extreme loss of blood.

**Diagnosis:** Marburg can be difficult to distinguish clinically from other diseases, such as malaria, typhoid fever, meningitis and other viral haemorrhagic fevers. Diagnosis can be confirmed using techniques that detect the presence of immune response to the virus, such as antibody-capture enzyme-linked immunosorbent assay (ELISA), or the presence of virus in people presenting with symptoms, via antigen-capture detection tests, reverse transcriptase polymerase chain reaction (RT-PCR) assay, or virus isolation by cell culture. However, often none of these diagnostic tools are available in the countries with highest risk of Marburg outbreaks. In addition to having the diagnostic tests available, countries need to have laboratories that can ensure maximum biological containment conditions due to the fact that the samples are an extreme biohazard risk.

### **Are there vaccines or treatments, or ongoing R&D?**

There are currently no specific therapeutics for Marburg virus. However, supportive care including rehydration with oral or intravenous fluids can improve survival. This can mean maintaining oxygen status and blood pressure, replacing lost blood and clotting factors, and treating any complicating infections. Potential treatments, including blood products, immune therapies and drug therapies, are currently being assessed. Marburg virus vaccine



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candidates are being investigated, and in 2019, for example, IAVI (the International AIDS Vaccine Initiative) began researching a recombinant vesicular stomatitis virus (VSV) vector Marburg virus vaccine candidate, called rVSVΔG-MARV-GP. Another vaccine candidate MVA-BN Filo containing both Marburg and Ebola virus antigens could potentially protect against both haemorrhagic viruses. It is currently in phase 3 trials, and seems to trigger good immunity against the Ebola Zaire strain but it has not yet been tested against Marburg virus.

### How could we lower the risk of it becoming a pandemic?

Since Marburg virus can spread between people, extremely stringent infection control measures are needed to avoid people being in any contact with each other, to ensure any laboratory samples are disposed of carefully, and to ensure safe burial procedures. Avoiding handling or eating bush meat is also critical to avoid any potential infection that could spread from animals. International travel is a major risk factor for the spread of Marburg virus beyond Africa and rapid diagnostics to ensure that cases are picked up before people carry the virus to other countries will be important.

## Airway-on-a-chip Technology Enables COVID-19 Drug Repurposing

Human lung airway cells are grown in one channel of the microfluidic device that is perfused with air, while human blood vessel cells are grown in the other channel, which is perfused with a liquid culture medium to replicate blood flow. Cells grown in this device naturally differentiate into multiple airway-specific cell types in proportions that are similar to those in the human airway and develop traits observed in living lungs such as cilia and the ability to produce and move mucus. [Drug Target Review](#)

## At the Critical Intersection of Public Health and Homeland Security

Source: <http://www.homelandsecuritynewswire.com/dr20210520-at-the-critical-intersection-of-public-health-and-homeland-security>

May 20 – Earlier this spring, physician Pritesh Gandhi, who studied international relations, economics, medicine, and public health at Tufts, was sitting across from his boss, Alejandro Mayorkas, the secretary of the Department of Homeland Security. As the chief medical officer for the department, Gandhi is the principal adviser to DHS leadership on health-related matters.

“Here we were, two children of immigrants, in a position to ensure that every single human being who is on American soil is treated with dignity and respect,” says Gandhi, A04, M11, MG11 (MPH). “And that moment underscored the responsibility we have in fulfilling the charge of our country, of our Constitution, of the expectations of the American people. That moment, and every day I’ve spent on the Southwest border over the last few months, seeing and hearing the stories of those in our care and custody and those who take care of them, have really moved me.”

Gandhi was appointed to the DHS spot by President Joe Biden in January, after serving as associate chief medical officer at People’s Community Clinic in Austin, a federally qualified health center, and as a clinical assistant professor at Dell Medical School at the University of Texas. In 2020, he made an unsuccessful bid in the Democratic primary in Texas’ 10<sup>th</sup> Congressional District, where he made health care a key part of his campaign.

At DHS, he sees a strong health care system as essential to every aspect of the department’s mission, and not only at moments of crisis.

“We have to allow ourselves to think critically about how we view threats to our community, whether those are internal or external threats,” he says. “When we think about homegrown threats to the United States, often these threats come from a position of a lifetime of being marginalized.

“How can we engage, from a public health and medical perspective, in marginalized communities to ensure that we are putting the wellbeing and health of families first? By doing so, we are not only promoting health security, we are fundamentally changing the role that public health has in people’s lives.”

COVID has inevitably altered the priorities and day-to-day operations of DHS, as it has for all aspects of the federal government, Gandhi says. It has also sent a strong message about the importance of public health.

“I think what this pandemic has shown us is that if we think about the need to build systems that promote the health and wellbeing of communities and families, we’re going to be better off as a nation,” he says. “We’re going to be safer. That’s the joy of being in this role.”

In advance of his address to the graduating classes of Tufts University School of Medicine and the Graduate School of Biomedical Sciences on May 23, Gandhi talked with [Tufts Now’s](#) Helene Ragovin about his new role in Washington.



**Helene Ragovin: What's involved in being the chief medical officer for the Department of Homeland Security?**

*Pritesh Gandhi:* I serve as the principal adviser on all matters medical and public health to the secretary of DHS, the assistant secretary for countering weapons of mass destruction, the FEMA administrator, and other senior leaders within DHS. We liaison with other federal agencies and serve as a point of contact for all medical and public health issues tied to homeland security. If you were to take that one step further, what it really means is to ensure that when we think about the work of homeland security, we are taking a “health in all policies” approach, and that applies to all of the components that make up DHS.

It's everything related to COVID, but it's so many other things. It's about food, agricultural, and veterinary defense. It's thinking about new biologic and chemical agents that could be used against American citizens and ensuring we are prepared.

**Ragovin: What has the change been like going from a hands-on role at a community health center, to being part of the administration in Washington?**

*Gandhi:* I miss clinical medicine and I'm working to ensure that I can still see patients. And I think that matters, because it is really easy to lose sight of the work when you're not faced with the stories of the American people day to day.

We live in a world where it is easy to write off the struggles of our neighbors and fellow Americans because of how polarized things are, and when you're in the room and have the privilege of being welcomed into the life of an individual or family, those stories, I think, anchor the work that happens and needs to happen as it relates to policy making.

**Ragovin: What challenges do you face in this new position?**

*Gandhi:* There are two issues that dominate, and I knew ahead of time this would be the case. One is, of course, COVID, and being able to think strategically as it relates to health security for our borders and ports of entry. Second is to ensure that we have built up an evidence-based approach as to how we engage with COVID and the health and wellbeing of children and those in our care and custody along the Southwest border. Those have been the issues that have dominated my first 100 days.

People inform policy—people's stories. I think that is so important. But people also are policy and when you look around, it is why it is also important for Americans to be involved and civically engaged. Your story, your history, your narrative influence your perspective and the perspective you bring to the table with decision makers.

I'm a Tufts Jumbo; I'm trained in the world of active citizenship; I'm a first-generation American, the son of two immigrants. I'm a father to three young daughters who have skin the color of mine. And I'm a physician, a primary care doctor who spent a career working for underserved communities. And so from these perspectives, I can see in real time how these life experiences have influenced the way I think about policy.

**Ragovin: It was not too long ago that COVID wasn't even on our radar. What are the other health-related issues that continue to engage DHS?**

*Gandhi:* There's a host of issues that we focus on—chemical and biological defense; radiological and nuclear defense; food, agriculture, and veterinary medicine; thinking critically about the health effects of WMDs, domestic terrorism, and conventional terrorism; building an electronic health records system for DHS. There is our programming on harm reduction from opioids, and the interface between that at the federal level and law enforcement on the front lines across the country. There is so much richness to the work of medicine in DHS that's not COVID, that are really clear priorities for the department as we hope to move past this pandemic.

**Ragovin: Any advice for your fellow Jumbos?**

*Gandhi:* It is such an important thing for Tufts students to know that you can make a difference in this world. And what you learn in college and the work that you do is relevant. I think the role I'm in now, and the national security space that I work in fits perfectly with my background in international relations and the foundational courses that I took when I was at Tufts.

**How to Use Statistics to Prepare for the Next Pandemic**

By R. Alexander Bentley

Source: <http://www.homelandsecuritynewswire.com/dr20210520-how-to-use-statistics-to-prepare-for-the-next-pandemic>

May 20 – Publicly available statistics about population demographics and culture can help governments prepare for the next pandemic. We have found that by using existing socio-demographic data from early COVID-19 hot spots, where there was a lot of information, officials could have predicted how COVID-19 would spread through society. The next time there is a global health crisis governments can use our techniques to figure out how a disease will likely move beyond hot spots to regions that are not yet affected.

With a [computational social scientist](#) and a [librarian for science, technology and mathematics research](#), we study the socio-cultural drivers of public health crises, such as





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obesity. In two peer-reviewed papers that we published in early 2021, which build on our previous research, we analyzed these drivers [at the scale of U.S. counties](#) and [at scale of nations](#). Both studies connected socio-cultural variables to the impact of COVID-19.

For our U.S. study, we collected data from 3,088 U.S. counties on 31 factors that could affect the spread of COVID-19. These factors included population density and ethnicity, commuting habits for work, voting patterns, social connectivity, underlying health conditions and economic information. We collected this information from the U.S. Census Bureau and a variety of other sources.

Using these factors, we built a predictive model of COVID-19 prevalence. We found that just five risk factors can predict between 47% and 60% of variation in COVID-19 prevalence in U.S. counties: population size, population density, public transport, voting patterns and percent African American population. We validated our model by showing that counties which reported fewer COVID-19 cases in April than expected in our model tended to have more cases in July. The results thus provide a new way of discerning when a U.S. county is under-reporting the actual number of infections present in the community.

In the second paper we sought to explain why certain countries, like the U.S., have death tolls in the hundreds of thousands, while other nations had very few deaths. Using international data from a [large survey](#), measuring cultural values in 88 countries, we found demographic factors like population size and obesity levels were important. But more surprising, we found culture was also important, in that open and tolerant societies, as well as those with low trust in institutions, tended to fare the worst.

This analysis made some surprising predictions about the spread of COVID-19 around the world. For example, while many believed in early 2020 that African countries would be heavily affected by COVID-19, our model predicted that they would not. So far this has been true.

In the U.S., which scored high on many of the socio-cultural risk factors – including low trust in institutions, high tolerance toward minorities and high levels of obesity – COVID-19 has hit very hard. Nearly [583,000 people in the U.S. had died from COVID-19](#) as of May 12, 2021. That is the highest absolute number of deaths in any nation so far, and roughly 17.5% of global deaths from the virus, in a country where only 4% of the world population lives.

### Why It Matters

Governments struggle to predict and plan for the location and extent of disease outbreaks. With so many moving parts, from local mandates like economic shutdowns and face mask recommendations, to international travel bans or restrictions, it seems almost impossible to project the number of cases in different counties or regions. In the average week, how many cases might you expect to have? Should the U.S. expect more cases than Ghana? Why might one city or region be hit harder than another?

We show that additional planning based upon cultural and demographic factors can help predict how outbreaks could progress. It can also reveal which people may be most vulnerable. Properly applied, this data-driven approach might save hundreds of thousands of lives when the next pandemic hits.

### What Still Isn't Known

Our goal is to use the predictive power of cultural and demographic data to anticipate the spread of future pandemics. But neither of our studies specify a relationship between cause and effect.

For example, when looking at the U.S., one of the five predictive factors is the proportion of the population that is African American: Higher proportions predicted higher infection and death rates. Our analysis, however, did not determine whether this one factor might subsume many other truly causal factors. The social science and public health literature posits reasons why African American populations have suffered more from COVID-19, including bigger households, underlying health conditions and a tendency to work in sectors with greater risk of exposure.

*R. Alexander Bentley is Professor of Anthropology, University of Tennessee.*

## EMA issues advice on use of sotrovimab (VIR-7831) for treating COVID-19

Source: <https://www.ema.europa.eu/en/news/ema-issues-advice-use-sotrovimab-vir-7831-treating-covid-19>

May 21 – EMA's human medicines committee ([CHMP](#)) has completed its review on the use of the monoclonal antibody **sotrovimab** (also known as VIR-7831 and GSK4182136) to treat patients with COVID-19. This review was undertaken to provide a harmonised scientific opinion at EU level to support national decision-making on the possible use of the antibody prior to [marketing authorisation](#).



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The Agency concluded that sotrovimab can be used to treat confirmed COVID-19 in adults and adolescents (aged 12 years and above and weighing at least 40 kg) who do not require supplemental oxygen therapy and who are at risk of progressing to severe COVID-19.

The medicine is given by infusion (drip) into a vein and the proposed [conditions of use](#) are available.

EMA made its recommendations following a review of data, including data on quality and from a study into the effects of sotrovimab in adult outpatients with mild COVID-19 symptoms who do not need supplemental oxygen. A planned interim analysis of this study indicated that sotrovimab reduced the risk of hospitalisation for more than 24 hours or death by 85% compared with placebo: hospitalisation for more than 24 hours or death occurred in 1% (3 out of 291) of patients who received sotrovimab and 7% (21 out of 292) of those who received placebo.

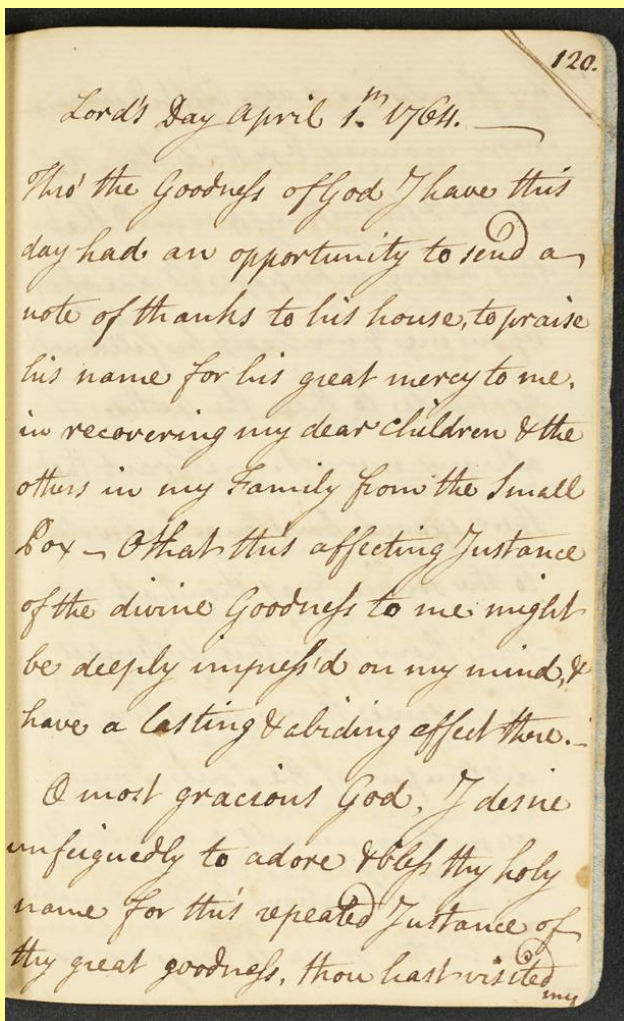
In terms of safety, most side effects reported were mild or moderate. Reactions related to the infusion (including allergic reactions) cannot be excluded and healthcare professionals should monitor patients for these reactions.

EMA's recommendations can now be used to support national advice on the possible use of this monoclonal antibody before a [marketing authorisation](#) is issued.

While the current evaluation has concluded, a [rolling review of sotrovimab](#), which started on 7 May, is ongoing. Once finalised, the rolling review will be the basis for an EU [marketing authorisation application](#) for this medicine.

### More about the medicine

Sotrovimab (also known as VIR-7831 and GSK4182136) is a monoclonal antibody with activity against SARS-CoV-2, the virus that causes COVID-19. A monoclonal antibody is a type of protein that attaches to a specific structure (called an antigen). Sotrovimab is designed to attach to the spike protein of SARS-CoV-2, limiting the ability of the virus to enter the body's cells.



closely with the New England Historic Genealogical Society.

## Old Records Shed New Light on Smallpox Outbreaks in the 1700s

By William Kole (Associated Press)

Source: <https://www.usnews.com/news/us/articles/2021-05-21/old-records-shed-new-light-on-smallpox-outbreaks-in-1700s>

In this image provided by the American Ancestors & New England Historic Genealogical Society, a digitized copy of a page from a handwritten 18th century diary by the Rev. Ebenezer Storer, during a period of smallpox, in Boston, shows an April 1764 entry that includes a prayer Storer wrote weeks after arranging to have his own children inoculated. In the prayer, Storer gives thanks for the recovery of family members from the disease. (American Ancestors & New England Historic Genealogical Society via AP) The Associated Press

May 21 — A highly contagious disease originating far from America's shores triggers deadly outbreaks that spread rapidly, infecting the masses. Shots are available, but a divided public agonizes over getting jabbed.

Sound familiar?

Newly digitized records — including a minister's diary scanned and posted online by Boston's Congregational Library and Archives — are shedding fresh light on devastating outbreaks of smallpox that hit the city in the 1700s.

And three centuries later, the parallels with the coronavirus pandemic are uncanny.

"How little we've changed," said CLA archivist Zachary Bodnar, who led the digitization effort, working



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“The fact that we’re finding these similarities in the records of our past is a very interesting parallel,” Bodnar said in an interview. “Sometimes the more we learn, the more we’re still the same, I guess.”

Smallpox was eradicated, but not before it sickened and killed millions worldwide. The U.S. Centers for Disease Control and Prevention say the last natural outbreak of smallpox in the United States occurred in 1949. In 1980, the World Health Organization's decision-making arm declared it eradicated, and no cases of naturally occurring smallpox have been reported since.

But in April 1721, after an English ship, the HMS Seahorse, brought it to Boston, it was a clear and present danger. By winter of 1722, it would infect more than half of the city's population of 11,000 and kill 850.

Much earlier outbreaks, also imported from Europe, killed Native Americans indiscriminately in the 1600s. Now, digitized church records are helping to round out the picture of how the colonists coped when it was their turn to endure pestilence.

The world's first proper vaccination didn't occur until the end of that century, when an English country doctor named Edward Jenner inoculated an 8-year-old boy against smallpox in 1796.

Before then, doctors used inoculation, or variolation as it was often called, introducing a trace amount of the smallpox virus into the skin. The procedure, or variations of it, had been practiced since ancient times in Asia. Jenner's pioneering of vaccination, using instead a less lethal strain of the virus that infected cows, was a huge scientific advance.

Yet just as with COVID-19 vaccines in 2021, some took a skeptical view of smallpox inoculations in the 18th century, digitized documents show. To be sure, there was ample reason to worry: Early smallpox treatments, while effective in many who were inoculated, sickened or even killed others.

The Rev. Cotton Mather, one of the era's most influential ministers, had actively promoted inoculation. In a sign of how resistant some colonists were to the new technology, someone tossed an explosive device through his window in November 1721.

Fortunately, it didn't explode, but researchers at Harvard say this menacing message was attached: “Cotton Mather, you dog, damn you! I'll inoculate you with this; with a pox to you.”

Among the recently digitized Congregational Church records are handwritten diary entries scrawled by the Rev. Ebenezer Storer, a pastor in Cambridge, Massachusetts. On March 11, 1764, as smallpox once again raged through Boston, Storer penned a prayer in his journal after arranging to have his own children inoculated.

The deeply devout Storer, his diary shows, had faith in science.

“Blessed be thy name for any discoveries that have been made to soften the severity of the distemper. Grant thy blessing on the means used,” he wrote.

Three weeks later, Storer gave thanks to God “for his great mercy to me in recovering my dear children and the others in my family from the smallpox.”

For Bodnar, the archivist, it's a testament to the insights church records can contain.

“They're fascinating,” he said. “They're essentially town records — they not only tell the story of the daily accounting of the church, but also the story of what people were doing at that time and what was going on.”

## What Do We Need to Do to Get Ready for the Next Global Pandemic?

Source: <http://www.homelandsecuritynewswire.com/dr20210521-what-do-we-need-to-do-to-get-ready-for-the-next-global-pandemic>

May 21 – [Michael Mina](#) is assistant professor of epidemiology at the Harvard T.H. Chan School of Public Health, a member of the School's Center for Communicable Disease Dynamics, and associate medical director in clinical microbiology at Brigham and Women's Hospital's Pathology Department. Mina's work revolves around disease testing and the development of new technologies to better understand the population and immunological consequences and patterns underlying infectious diseases.

Mina talked with the [Harvard Gazette](#)'s Alvin Powell.

### ***Alvin Powell: Is it possible to prevent the next pandemic? If not, can we better prepare for it?***

**Michael Mina:** Pandemics are going to happen, but we can absolutely prevent the devastation that occurs from a pandemic. We can act now to put us in a position so that when the next pandemic does happen, we don't have to allow it to get out of control. We can build tools to find it quickly and to act fast. We can build up new public health infrastructure to tackle it once it starts spreading.

There are a lot of ways to do this. One of those steps is building up proper surveillance. We can work together — across countries — in a way that betters societies everywhere. We didn't see it in this pandemic, unfortunately, primarily because our president couldn't even unite people in one country. But in what I would consider more ordinary times, a virus should be something that all people on earth can rally around.



***Powell: What would such a surveillance system look like?***

*Mina:* An immunological observatory, a global immune observatory, would be a massive engineering feat, the likes of which may be compared — at least in my vision — to the weather system. We don't need physicians working on this problem; we really need engineers and epidemiologists and mathematicians. It would be a "collective global good" sort of program to help prevent — or at least rapidly identify — the next pandemic so that we can respond quickly.

It would run all the time in the background and would allow two things. One would be rapid identification of new infectious diseases. It would be a massive, everyday surveillance program using ready-to-access blood samples from blood banks or hospitals that are about to be thrown away — there are tons of ways to get blood samples in the world. This could be supported by federal governments or by industry or the Department of Defense. It would be a daily churn, running lots of different tests to look at people's immune responses.

***Powell: From those immune responses, we'd know what is circulating out there?***

*Mina:* I think of every individual as a recording device. We're all just USB sticks, always recording. The problem is that it's really hard to uncover what we have recorded. But we have the tools to actually go into our blood and say, "What has Michael recorded today in terms of infectious disease exposures? He didn't get sick, but maybe he got exposed to something." We could start doing that for millions of people every single day. That would create a robust surveillance program. The constantly recording devices of our immune system would be interpreted and read out, "Hey, it looks like there's a new coronavirus spreading in Wuhan." Or, in late January [2020], "It looks like there are some people with what looks like a new virus popping up in New York City." And then you would read the news and say, "There's a coronavirus outbreak in Wuhan," put two and two together, and Governor [Andrew] Cuomo would have had the firepower to close down the city in early February instead of March. That would have saved tens of thousands of lives and perhaps prevented that major outbreak in New York.

***Powell: The key would be that we're not waiting for people to get sick or for someone to notice that several people have gotten sick with something that they don't recognize? It would be a routine scan of people's blood collected for other procedures?***

*Mina:* Yes. We have tools that we are developing in my lab, some initially invented by collaborators like Steve Elledge [Gregor Mendel Professor of Genetics and of Medicine] here at Harvard, that use a drop of blood, just a finger prick. The government could spend a few hundred million dollars and buy every American 10 of these that they could use throughout the year — it's like filter paper and a lancet. These things could be mailed to everyone's homes. We actually did this in Massachusetts recently. We mailed thousands of people a little piece of filter paper and a little finger prick thing, just like a diabetes finger prick device, and you put a drop on the filter paper, mail it back into the lab. And with that one drop, we can evaluate somebody's blood for hundreds of thousands of distinct antibodies simultaneously.

What we're doing is asking, for this person: Have they seen any number of hundreds of different pathogens? And we get high resolution for what those individual antibodies look like. For example, if you get a COVID antibody test, you get one number back. With our technology, you get 1,000 numbers back just for COVID. So you can start building up something like fingerprints of what different pathogens look like in terms of the immunological response. Then, if there is a novel virus, something the world has never seen before, you can detect it.

We didn't have this coronavirus in our test a year and a half ago, obviously, because we didn't know it existed. But we would have very quickly picked it up by seeing a picture from a lot of people that looked like a coronavirus antibody response. Our pattern recognition software would have said, "Hey, we just got these 30 new coronavirus cases and these new antibodies detected in people with coronavirus, but they don't target the known coronavirus spike protein. Maybe that's because it's a new spike protein, and it's a new coronavirus." We could use the pattern recognition and the resolution that comes from these new tests to be able to see what are essentially weird patterns. They look a lot like a coronavirus, but don't quite fit the patterns we're used to seeing for coronaviruses. That would give us a hint that maybe a new one is spreading.

***Powell: What is the status of these tests today?***

*Mina:* These technologies exist and are very cheap. We've been trying to build them into a much more robust platform. They could essentially be built into a program that governments or nonprofits could buy and utilize.

It's an extraordinarily powerful way to try to identify new transmission. We're doing a pilot right now in partnership with a company called Octapharma. This company collects blood plasma from regular people, so every week my laboratory gets tens of thousands of samples from places all across the United States. There are 110 different sites.

This is a centralized way to get a huge number of specimens. We are processing them for COVID antibodies. In this case, we're doing passive collection of all these blood samples that were going to be thrown away by the company. So the company said, "We'll just ship them to you."



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So through 2020, we will have processed around half a million specimens, and we'll be able to reconstruct the entrance of this virus into the United States and watch, on a practically daily basis, how the virus' prevalence shifted, grew, and fell, and grew again across the U.S.

Now we're looking back in time, but what I want to do is to get caught up so that we're doing it in real time. Then we'll be able to tell a governor, who might have turned down the state's testing program for viruses, that our surveillance system is starting to see new cases of flu early this year, or coronavirus, or we are detecting a lot of new antibodies against Lyme disease and it looks like this is going to be a really bad year, or Zika, whatever the virus or pathogen might be.

It can also be used not just for pandemic detection, but to provide a whole new data stream that allows people to say, "There's really good evidence that there's rhinovirus moving around in your community." So, if you're a parent and your kid is sick, you probably want to know: Does your kid have the flu? Does your kid have adenovirus? Coronavirus? Rhinovirus? RSV? Each of those require different levels of attention.

So maybe you open up your phone, and an app says your community, your ZIP code, has had a lot of rhinovirus over the past week and almost no flu. So you could probably say, "Look, kid, you're going to be just fine. You very likely have rhinovirus, and if you don't get much worse, we don't really have to take action."

I think of it like the weather system. Right now we look at our phones, and if it says it's going to rain, we bring an umbrella. We don't wait until it starts raining. We preemptively take it with us to work.

**Powell: And so these two functions would be side by side — surveillance for new pathogens and a more routine state of viral — or whatever — transmission occurring in your area?**

*Mina:* That's right. It would be serving dual purposes. Maybe the whole program could be funded by subscribers or something like that. I don't know. I just think that there are ways to make it work. Frankly, it should just be funded by the government. This pandemic is a \$16 trillion hit on our economy. If the government put \$2 billion into an effort like this and it had any chance at all to stop a major expansion of a new pandemic virus in the future, that's well worth the investment. The potential benefits greatly outweigh the financial risk.

**Powell: We talked about a global surveillance system, but you also mentioned building up public health infrastructure as a way to stay ahead of a future pandemic. What does that look like?**

*Mina:* To not have another 2020, we need to put a few things in place. First really is a playbook. Science isn't immutable, but science is much more standard than policymakers. We should not be banking on this or that administration — some might be more scientifically savvy than others. There's no reason we can't be anticipating this and come up with a playbook that every policymaker, whether it's governors, presidents, or prime ministers, should be able to open and say, "OK, this is a virus that seems to be spreading quite readily with aerosolized transmission. It has an R naught of around two; it doesn't seem to be spread too much by fomite transmission; and it's a coronavirus. Now what is the way to deal with this?"

We should have those playbooks written so that when it happens, we can push a button and say, "OK, these are the things we need in place. These are the potential good approaches to take. And these are the tools we're going to need."

*Powell: Is this a process that could run, at least initially, independent of political leaders? Insulated from politics?*

*Mina:* I think so. One lesson that we should learn from this pandemic and from the Trump presidency is that though we assume that scientists with the best interests of humanity would be leading efforts, that did not happen in this presidency. We should have an independent crisis group that doesn't include political appointees. They can say, "This is serious." It could be a constant group of advisers — not the CDC because the CDC has its daily ongoing work — people who maybe rotate every two years, like a National Guard of scientists. It could be a small group, maybe only 20 or 30 who respond when called upon for a threat.

*Powell: What does a strong public health system look like? And how is that different from what we have right now?*

*Mina:* I will answer that question from an infectious disease perspective, because the broader issue of public health is huge and includes nutrition, smoking, and many other things. But it means optimizing the system to help the most people, even at the expense of individuals. Public health tools, whether vaccines, a test, or distancing and masks, need to be evaluated in the context of population and not individual risk.

That requires a whole new way of thinking, and I'd like to start a new field called public health engineering because, ultimately, the response to an outbreak has to be engineered. That's a big difference. Medicine is very much a one-on-one interaction between a patient and a doctor. It's not a cold engineering problem. Public health is. It does include consideration of social structures and belief systems, but those are part of the optimization problem.

**Powell: Is this idea of public health at times conflicting with individual well-being something we've had the luxury of forgetting, since we've tamed so many infectious diseases?**



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*Mina:* Absolutely. We have not had to deal with adversity on our shores in any real population-wide way in decades or even longer. We've lost track of what it means to act collectively. World War II was a great example of when we said, "We have to work collectively. We have to optimize our response." By the end of World War II, we were rolling out B24 bombers every 60 minutes. That is something that would have been unfathomable if we were trying to optimize every individual's safety and well-being and not thinking about the population-level response.

If you go further back and a plague was on board a ship, you'd burn the ship and quarantine every passenger on it. You'd do whatever was needed because the last thing we wanted is for this thing to spread to the population. We've advanced from that, but our problem today is that the virus is the same. It doesn't care. The virus doesn't feel for our emotions. It's not an enemy that we can talk down. We can't bribe a virus with money. It is completely emotionless. There's nothing we can do to control it, except to control it. I think we have lost all sense of that.

We're really good in this country at doing biology, at doing medicine. We were able to go from zero to a vaccine finishing phase three trials in months. But we completely fail — always in this country and in many countries — to actually do the public health part. We did all the expensive biological stuff; we did all the fancy stuff that gives people credit, all the doctor-y things, all the technology things. But then when it came to scaling and distributing the vaccine, the not-sexy, public health intervention part, nobody thought about it. It was complete afterthought, but it's the most important part. So we need a whole new field that is thinking about public health optimization in a whole new way. We need engineers on the ground.

**Powell:** *How do you get at the human behavior part of this? Getting people to do what science and public health tells us will work?*

*Mina:* One thing that governments do badly is we ignore public health. And the way that we communicate public health to the public needs to change. It needs campaigns that are on par with the campaigns of Joe Camel and Marlboro Man, Doritos and Coca-Cola. When it's for profit, we have huge industries focused on how to get people to do something they didn't know they wanted to do. There's a huge amount of psychology that goes into those ad campaigns and those messaging campaigns. Why is that amazing tool left only to adverse things for human populations? To for-profit things that generally don't make people healthier?

*Alvin Powell is a Harvard staff writer.*

## For the First Time, Argonne Researchers Reveal How COVID-19 Has Transformed Communities

Source: <https://www.hstoday.us/subject-matter-areas/emergency-preparedness/for-the-first-time-argonne-researchers-reveal-how-covid-19-has-transformed-communities/>

May 18 – The public now has access to a series of data and analysis resources designed to support and inform long-term COVID-19 recovery efforts across the United States. On May 12, the U.S. Department of Energy's Argonne National Laboratory [released interactive indices, analyses, and maps](#) that provide a detailed understanding of the socio-economic effects of the novel coronavirus outbreak.

Argonne developed these resources to help federal agencies understand where impacts are most acute (down to the county level), and which demographic groups and facets of the economy — employment, housing stability, public sector services — may require recovery support. This data and analysis is helping to guide federal recovery efforts, from informing federal engagement efforts with affected communities to helping target delivery of aid.

With the COVID-19 pandemic touching off widespread health impacts and economic hardship across the U.S., the Federal Emergency Management Agency (FEMA), under its responsibilities implementing the National Disaster Recovery Framework, recognized the need for recovery-focused data and analysis to enhance the capability of federal agencies to reach out and deliver critical services. The Recovery Support Function Leadership Group established the Data and Assessment Working Group (DAWG) to manage recovery data and assessment needs across multiple federal agencies. They designated FEMA and the Economic Development Administration to coordinate DAWG efforts and enlisted Argonne to provide analytic support.

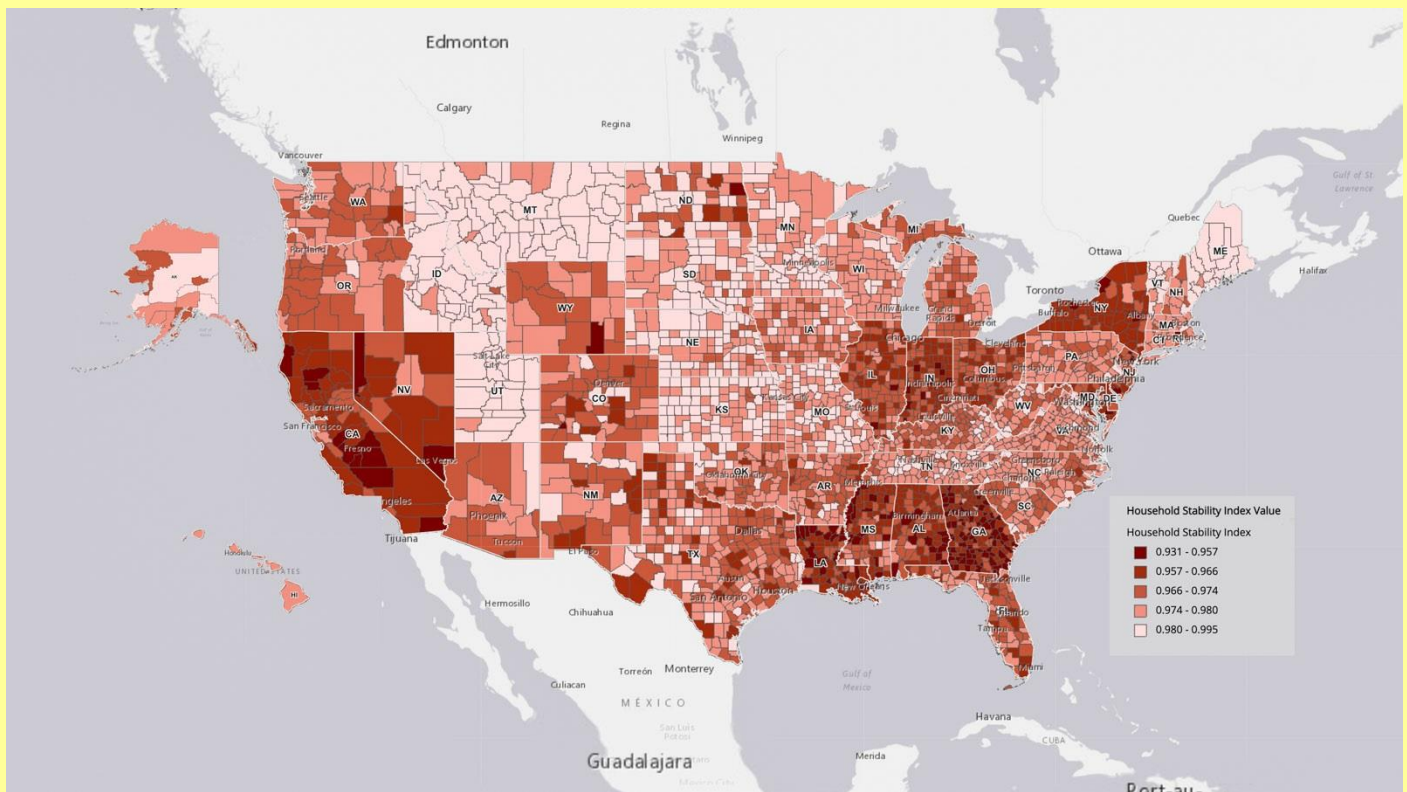
Researchers and experts at Argonne immediately went to work, seeking advice and data from federal agencies that would likely be using these data and analyses—the Department of Commerce, Department of the Treasury, the Department of Interior Office of Insular Affairs, and more than 20 others.

Argonne built a web-based portal, gathered more than 100 data sources, and developed an initial set of analyses in less than a month. "It was an all-hands-on-deck scenario," says portal project leader Carmella Burdi, a senior geographic information systems analyst with



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Argonne's Decision and Infrastructure Sciences (DIS) division. "We tapped economists, infrastructure analysts, all the smartest people we could find to do comparisons between pre- and post-pandemic data sets. That allows us to put a finer point on things than other agencies."



Through input from interagency coordination, Argonne has expanded the scope of data collection and analysis based on agency needs. For example, the Minority Business Development Agency and the National Endowment for the Arts, for instance, separately requested in-depth reports on the pandemic's effects on minority-owned businesses and the arts and culture sector, respectively. More recently, FEMA and Argonne identified the need to share these resources more broadly to support ongoing state, local, tribal, and territorial recovery efforts.

"What is so daunting about the COVID-19 pandemic is the overwhelming scale. That's exactly why an analysis effort like this is so important," says Iain Hyde, deputy director of the DIS division's National Preparedness Analytics Center, who leads the Argonne team.

"Trying to get our heads around what's happening in the entire United States, including all 50 states and all the territories in the Atlantic and Pacific, in all the counties and all the communities is challenging," he says. "That's the major purpose for this effort — trying to make sense of that. The data sources we've been gathering and the products we've developed are providing clarity to that story, not just as a snapshot in time but in terms of how the pandemic is changing over time."

One interactive map lets you zoom in on any of the more than 3,000 U.S. counties to instantly generate a shareable report on how, month by month since January 2020, the pandemic has impacted gross domestic product in that particular area. Another map displays the pandemic's impact on state and local government revenues — important because those bodies often are required to match funds in order to receive federal aid.

Want to know where households are at greater risk of foreclosure or eviction as a result of COVID-19? Click on a Housing Stability Index that reveals the most impacted county in the country: Bronx, New York, where 9% more households are housing insecure than before the pandemic. The County High-Level Economic Recovery and Resilience Index Scorecard calculates which counties within a state are the most (and least) financially vulnerable based on indicators such as government revenue impacts and social vulnerability. The Internet Access Index highlights household accessibility to broadband, providing insight into areas where distance learning or telehealth services may be challenging.



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“Those of us who get into emergency management do so because we want to help save lives and help our communities flourish after something terrible happens,” Burdi says. “Getting our work out there to the most people possible is extremely important.” “The data we’re collecting,” Hyde adds, “is trying to give people perspective on the starting point for the recovery, and give them the information they need to develop a road map moving forward as to how we rebuild the economy, create jobs, help people stay in their housing — and make our communities less susceptible to the next pandemic.”

### GAO: Most Nursing Homes Had Multiple COVID-19 Outbreaks, Weeks of Sustained Transmission

Source: <https://www.hstoday.us/subject-matter-areas/pandemic-biohazard/gao-most-nursing-homes-had-multiple-covid-19-outbreaks-weeks-of-sustained-transmission/>

May 20 – GAO analysis of data from the Centers for Disease Control and Prevention (CDC) shows that, from May 2020 through January 2021, nursing homes commonly experienced multiple COVID-19 outbreaks. According to CDC, an outbreak starts the week a nursing home reports a new resident or staff COVID-19 case and ends when there are 2 weeks with no new cases. GAO found that nursing homes had an average of about three outbreaks during the review period, with most of the nursing homes (94 percent, or 12,555 of the 13,380 nursing homes) experiencing more than one COVID-19 outbreak.

For each nursing home’s longest-lasting COVID-19 outbreak, GAO found that about 85 percent (11,311 nursing homes) had outbreaks lasting 5 or more weeks. Conversely, for about 15 percent of nursing homes (2,005 homes), the longest outbreak was shorter in duration, lasting between 1 and 4 weeks, with 267 of those homes able to control their outbreaks after the initial week.

- The average number of COVID-19 cases per outbreak for nursing homes with a long-duration outbreak was 56, while the average for nursing homes with a short-duration outbreak was 13.
- For both long- and short-duration outbreaks, over half of the nursing homes (66 percent, or 8,720 homes) reported that these outbreaks began with a staff member who tested positive the first week.

To conduct this work, GAO analyzed CDC data on COVID-19 reported by nursing homes each week of the review period from May 2020 through January 2021, the most recent data available at the time GAO conducted its review. Using CDC’s definition of an outbreak, GAO determined the number and duration of outbreaks each nursing home experienced during the review period. GAO included data from the 13,380 Medicare- and Medicaid-certified homes (88 percent of Medicare- and Medicaid-certified homes) that passed CDC and CMS quality checks each week of the review period—the most reliable data for calculating the number and duration of outbreaks. GAO also categorized the nursing homes into two groups based on the duration of their longest outbreak: 1) those nursing homes with outbreaks lasting less than 5 weeks and 2) those nursing homes with outbreaks lasting at least 5 weeks.

▶▶ [Read the GAO report](#)

### We Should Catch Next Virus, Not Fight Last War

By Doug Neckers

Source: <https://www.post-journal.com/opinion/local-commentaries/2021/05/we-should-catch-next-virus-not-fight-last-war/>

May 22 – I’m one of a decreasing few that heard Barry Goldwater bellow “Extremism in the defense of liberty is no vice,” when he accepted the Republican nomination for President in San Francisco’s Cow Palace stadium in July 1964. I was just finishing post-graduate work





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at Harvard and was about to begin my teaching career at Hope College in Michigan, and though I had been a lifelong Republican I was appalled.

Later in that campaign, Goldwater went on to claim that our generals had the right to use what would come to be called “tactical” nuclear weapons to end the war in Vietnam, at a time when we had only a few thousand troops there, troops who were supposedly advisers, not combat soldiers.

I was stunned. But then I moved to western Michigan and the most Republican County in the state, and met many who were all for Goldwater and his message.

They hated the way Franklin D. Roosevelt’s New Deal had changed society, and rightly feared Lyndon Johnson’s Great Society would do more of the same. LBJ won in a historic landslide, carrying Michigan by a million votes, though my Ottawa County neighbors stoutly backed Barry. People were frightened by the thought of war, especially a nuclear one, and once Goldwater was seen as a mad bomber, the election was essentially over.

Ironically, it was Lyndon Johnson who escalated the war in Vietnam, and tore America apart in the process, though he never used nuclear weapons. That was more than a half-century ago, and what was seen as Goldwater’s once-radical extremism has become the mantra of the Republican Party, or so says CNN’s Fareed Zakaria.

But what strikes me most today is that Barry Goldwater’s thinking was not really about how to deal with the modern crisis of his time – Vietnam – but was based on the conflict he had taken part in, World War II.

And I want to concentrate on here is a fatal flaw we seem to have: When tough guys bellow, scientists who helped win victories over the hideous enemies of the past, are hauled out of their labs to fight the old good fight, whether it now makes sense or not.

That’s what has plagued the scientific establishment, for example the directives on which the National Science Foundation was based, for decades. We should be marshalling our national armada of brilliance to catch the next virus before it emerges. Instead, we seem once again to be fighting the last war.

We’ve done it before: The napalm used in Vietnam was based on the flame throwers that Harvard’s Louis Fieser invented in 1944. I saw them demonstrated at the Corry stadium that spring. The chemical weapons we’ve stockpiled are descendants of the Lewisite of Harvard’s James Bryant Conant’s genius in 1918, — they went through Corry on their way to Baltimore in 1918 — and on and on. The thousands of nuclear bombs that still remain are relics of the Cold War. In January 1962, President John F. Kennedy authorized the use in Vietnam of ‘Agent Orange,’ a defoliant discovered at the University of Illinois. Over the next decade, the United States military sprayed nearly 20,000,000 U.S. gallons of it as well as various other chemicals — the “rainbow herbicides” and defoliants — over Vietnam, eastern Laos, and parts of Cambodia.

After Vietnam ended, it was discovered that nearly all of the food the sprays had been destroying in Vietnam was not being produced for guerrillas; it was, in reality, being grown for the local population. So most of what this spraying of Agent Orange accomplished caused massive starvation.

That, and millions of birth defects among generations yet unborn, to say nothing of thousands of American veterans who would carry the aftereffects of being exposed for life.

All this is not to say that Barry Goldwater was an evil man. Goldwater, the last presidential nominee not to have graduated from college, was an Arizona department store owner, with an impressive military record. Everyone I’ve met that knew him thought him a good guy. His trouble was that he was sometimes unsophisticated, and clever speech writers put ill-advised words in his mouth.

I also grew up in New York state, and have long admired the work of two Republicans who were my co-citizens: former Gov. Nelson Rockefeller and U.S. Senator Charles Goodell. Rockefeller, a rich man with a purpose, was singularly responsible for the State University System of New York.

How would the nation be different now, if the clairvoyant, generous Rockefeller had prevailed in 1964 and been the Republican candidate? How different would the country be had Rocky been elected, then or in 1968?

Committed patriots and scientists across the land did give us weapons of mass destruction when we needed them to fight the monsters that attacked us in World War II, the war the 1960’s saw in the rear view mirror. Today’s war is, however, is on a small “bug” — the virus that causes COVID-19.

How many of the best and brightest will we have the sense to engage to fight this bug and all the other viruses that are certain to follow? Our survival may depend on the answer.

*Doug Neckers, distinguished research professor (emeritus) is the founder of the Center for Photochemical Sciences, and chair of the board of directors at the Robert H. Jackson Center.*



## Largest CDC COVID-19 Vaccine Effectiveness Study in Health Workers Shows mRNA Vaccines 94% Effective

Source: <https://www.hstoday.us/subject-matter-areas/emergency-preparedness/largest-cdc-covid-19-vaccine-effectiveness-study-in-health-workers-shows-mrna-vaccines-94-effective/>

May 19 – A new CDC study adds to the growing body of real-world evidence (outside of a clinical trial setting) showing that COVID-19 mRNA vaccines authorized by the Food and Drug Administration (FDA) protect health care personnel (HCP) against COVID-19. mRNA vaccines (Pfizer-BioNTech and Moderna) **reduced the risk of getting sick with COVID-19 by 94% among HCP who were fully vaccinated.** This assessment, conducted in a different study network with a larger sample size from across a broader geographic area than in the clinical trials, independently confirms U.S. vaccine effectiveness findings among health care workers that were [first reported March 29](#).

“This report provided the most compelling information to date that COVID-19 vaccines were performing as expected in the real world,” said CDC Director Rochelle P. Walensky, MD, MPH. “This study, added to the many studies that preceded it, was pivotal to CDC changing its recommendations for those who are fully vaccinated against COVID-19.”

Data for this assessment come from a network covering 500,000 HCP across 33 sites in 25 U.S. states, providing additional robust evidence that mRNA vaccines are effective against symptomatic illness in real-world conditions.

The assessment compared vaccination status of participants who tested positive for SARS-CoV-2, the virus that causes COVID-19 (cases) with vaccination status of those who tested negative (controls). Among the 1,843 participants, there were 623 cases and 1,220 controls. Vaccine effectiveness estimates were calculated by comparing the odds of COVID-19 vaccination in cases and controls. The large sample size in this study allowed for a precise vaccine effectiveness estimate with narrower confidence intervals than earlier CDC [findings published March 29](#).

Understanding vaccine effectiveness among HCP is important because they are at higher risk for exposure to SARS-CoV-2 through patient interactions. Vaccination of HCP protects them and their patients against COVID-19 and ensures continuation of critical health care services.

The assessment found that COVID-19 symptomatic illness was reduced by 94% among HCP who were fully vaccinated, defined in this study as seven or more days after receipt of a second vaccine dose, and by 82% among those who were partially vaccinated, defined in this study as 14 days after receipt of dose one through six days after dose two. These findings support CDC's recommendation that everyone should get both doses of an mRNA COVID-19 vaccine to get the most protection.

This assessment is part of CDC's comprehensive strategy of using complementary methods to understand how COVID-19 vaccines are working in different populations and real-world settings. On May 12, CDC expanded COVID-19 vaccination recommendations to include adolescents 12 years through 15 years of age under the U.S. Food and Drug Administration's Emergency Use Authorization. These adolescents are now authorized to receive the Pfizer-BioNTech COVID-19 vaccine. CDC has several surveillance networks that will continue to assess how well FDA-authorized COVID-19 vaccines are working in real-world conditions in people of different age groups, including children and adolescents.



## Macron to honour French health workers killed by Covid-19

Source: <https://www.rfi.fr/en/france/20210522-macron-to-honour-french-health-workers-killed-by-covid-19>

May 22 – French President Emmanuel Macron has said that France will confer a special honour on health workers who die from Covid while fighting the pandemic.

Macron said a status called "died in the service of the Republic" would be created to honour public employees who lose their life "in exceptional circumstances".



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A similar honour – "died in the service of the nation" – already exists for police and the military, while "[died for France](#)" is reserved for soldiers and civilians killed in battle.

In a video posted on Twitter on Friday, the French president said "I want us to give our gratitude a solid legal foundation."

### Status provides state grants to family

The new status would allow the children of the deceased to become [wards of the state](#) with a right to receive material and moral support from the government, he said.

The current status reserved for military and police entitles the children they leave behind to financial help for education and job training, including free schooling and scholarships.

The new status is aimed at those "who in the [middle of the pandemic](#) look after the lives of others", Macron said, calling the move "an act of justice and fraternity".

Other circumstances that would entitle a public servant to the status include death during rescue operations or military manoeuvres.



**Emmanuel Macron** @EmmanuelMacron  
Officiel du gouvernement - France

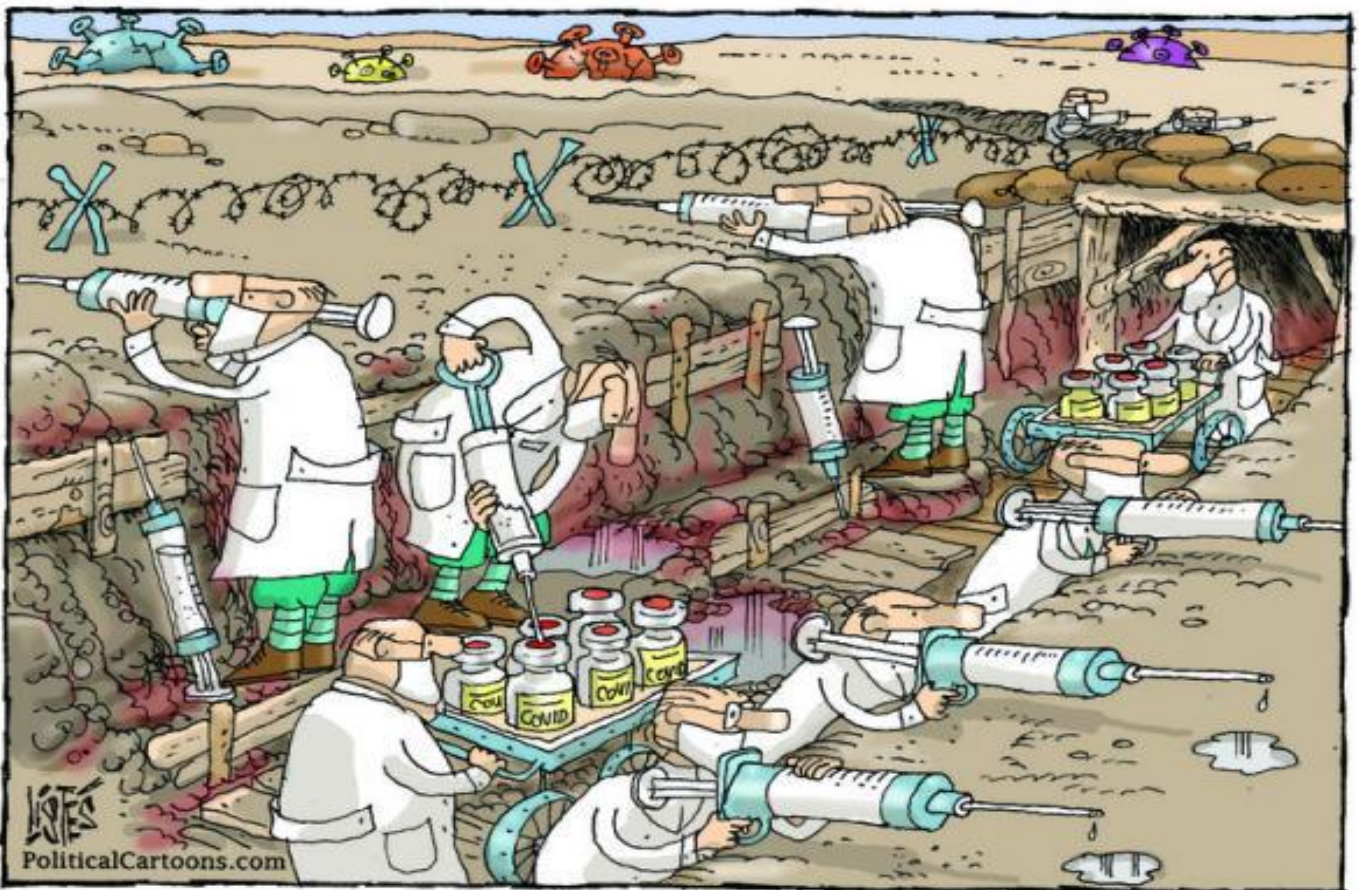


« Morts pour la France. »

« Morts pour le service de la Nation. »

« Morts pour le service de la République. »

Notre République tiendra ses engagements envers celles et ceux qui se sont engagés pour elle. C'est un acte de justice et de fraternité.



## China's first mRNA COVID-19 vaccine to start Phase III trial in May

Source: [http://www.xinhuanet.com/english/2021-04/16/c\\_139884414.htm](http://www.xinhuanet.com/english/2021-04/16/c_139884414.htm)

Apr 16 – China's first messenger RNA (mRNA) COVID-19 vaccine will start its Phase III clinical trial in May, China National Radio (CNR) has reported.



## How long before I can feel normal around other people again?

By Kareem Shaheen

Source: <https://www.thenationalnews.com/opinion/comment/how-long-before-i-can-feel-normal-around-other-people-again-1.1226349>



May 21 – The coronavirus pandemic and its lockdowns have affected us all differently. With everything slowed down, some have found opportunities for renewal and personal growth. Others continued to crave human contact, or burnt themselves out at work. Some struggled to keep up with the demands of their home and work lives, while others found meaning in reconnecting with their children and families trapped under the same roof. Some got divorced, and others' marriages thrived. Some lost their jobs, others made money. Some lost loved ones, others gained an appreciation for the finite time we have together in this world.

I burnt myself out with work, terrified that opportunities as a freelance contractor would, for the most part, dry up, and I would not be able to provide for my family. Those fears have since proved to be unfounded, but they still overwhelm my thoughts. The effects have manifested more recently in the form of melancholy: an inability to find joy and meaning in daily work, to-do lists that once would have taken a couple of hours to complete not getting done in a week, a wariness of contact with people and an addiction to sweatpants.

This all seemed to evaporate for a few hours on Sunday when I put on some decent clothes and pinewood cologne to go to my vaccine appointment at the Olympic park in Montreal.

After some initial stumbles in its vaccine roll-out – caused by the lack of local vaccine production capacity, delays in shipments and some vagaries in government contracts – Canada's inoculation programme finally seems to have hit its stride. At least, that's the situation in my home province of Quebec, where the public health system's virtues are on full display. A smooth and efficient booking and vaccination system is hitting its targets with alacrity, to the point where appointments were opened for the general population earlier than anticipated and the province's plan to give at least one dose to three quarters of residents before June 30 will be reached ahead of schedule. Cases and deaths are down, and a plan is in place to lift all lockdown restrictions.

My own appointment went smoothly enough – I was handed a new mask, my health card was scanned and after a 10-minute walk through the halls and a short conversation with a nurse, I was given a Moderna jab. I experienced some muscle soreness and fatigue, but it was nothing some strategic napping could not fix.

My father-in-law had been vaccinated a month and a half earlier because he is in his 70s, and my wife was vaccinated a week before. My mother, who is in Egypt, where caseloads



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are thought to be underreported, has yet to be vaccinated. I am worried sick about her every day. For a brief moment in the drizzle outside the vaccination centre, though, it felt like tomorrow might be a little bit better.

I am fortunate to live in a country wealthy enough to procure vaccines to cover its entire population several times over. Friends and family all over the world are not so lucky. They still wait with bated breath for deliverance.

Still, and as a journalist I am ashamed to admit this, I remain wary of people, overwhelmed by the possibility of the world opening up again. When your world is shrunk for so long to the confines of your home, to a horizon that stretches to the limits of your neighbourhood supermarket, it is difficult to contemplate the world beyond that. I am both excited and anxious by the prospect of meetings in coffee shops again, by seeing the world from above through the cabin windows of a plane, by reconnecting with friends, by the possibility of going home and my mother seeing her two-year-old grandson for the first time. I am anxious, but cannot wait for meandering dinners at a busy restaurant and the energy of crowds.

It all feels like it belongs to a past life, and I feel like I will have to relearn how to be with people again. A few weeks ago, we had a small birthday gathering for my son with a handful of friends at a nearby park. The Sun was shining and the conversation easy and vibrant, but I felt overstimulated, and had to tear myself away to recharge, quietly observing him going up and down the slides. But I savoured every moment, like someone quenching his thirst after a long march through a parched desert.

Winter is over, and the days of sunshine are more numerous than the overcast days again. My son has started going to day care now that we feel safer. I know that we're not at the end of the tunnel yet, but the light is growing brighter, more defined, its glow warm and welcoming.

I don't know how long it'll be before I can feel normal around others again. But I know that every time I walk to the park and see people enraptured by the melody of a street musician, it brings a joyful tear to my eye. And for now, that is enough.

*Kareem Shaheen is a veteran Middle East correspondent in Canada and a columnist for The National.*

### Do you think that only Covid-19 is bad?

TB is among the top 15 causes of death worldwide, **killing some 1.5 million people** and infecting 9.6 million annually, according to the World Health Organization. An estimated one-third of the global population carries the culprit microbe, *Mycobacterium tuberculosis* (*Mtb*), which is spread through the air. Without proper treatment, about 45 percent of HIV-negative people with active infection—and nearly all HIV-positive people who harbor the TB bacterium—will die. [Read more +](#)

### Here's The Reason Why We Roll Up Our Sleeves And Get Shots In The Arm

By Libby Richards

Source: <https://www.sciencealert.com/here-s-the-reason-why-we-roll-up-our-sleeves-and-get-shots-in-the-arm>

May 22 – Millions have rolled up their sleeves for the [COVID-19](#) vaccine, but why haven't they rolled up their pants legs instead? Why do we get most shots in our arms?

As an [associate professor of nursing](#) with a background in public health, and as a mother of two curious kids, I field this question fairly often. So here's the science behind why we get most vaccines in our arm.

It's worth noting that [most, but not all, vaccines](#) are given in the muscle – this is known as an [intramuscular injection](#).

Some vaccines, like the rotavirus vaccine, are given orally. Others are given just beneath the skin, or subcutaneously – think of the [measles, mumps, and rubella vaccine](#).

However, many others are given in the muscle.

But why is the muscle so important, and does location matter? And why the arm muscle – called the [deltoid](#) – in the top of the shoulder?

#### Muscles have immune cells

Muscles make an excellent vaccine administration site because muscle tissue contains important immune cells. These immune cells recognize the [antigen](#), a tiny piece of a [virus](#) or bacteria introduced by the vaccine that stimulates an immune response.



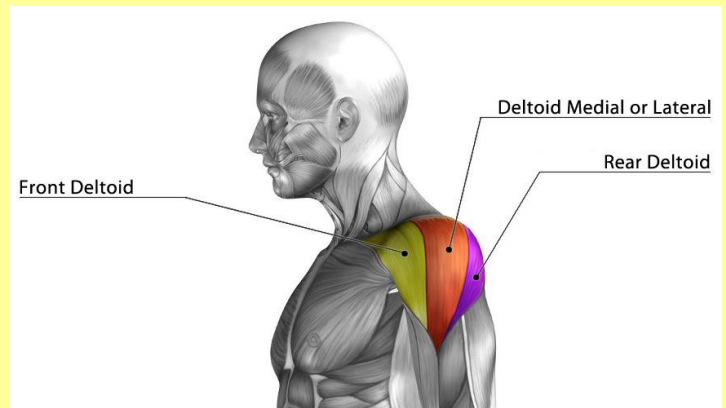
In the case of the [COVID-19 vaccine](#), it is not introducing an antigen but rather administering the blueprint for producing antigens. The immune cells in the muscle tissue pick up these antigens and present them to the [lymph nodes](#).

Injecting the vaccine into muscle tissue keeps the vaccine localized, allowing immune cells to sound the alarm to other immune cells and get to work.

Once a vaccine is recognized by the immune cells in the muscle, these cells carry the antigen to lymph vessels, which transport the antigen-carrying immune cells into the lymph nodes.

Lymph nodes, key components of our immune system, contain more immune cells that recognize the antigens in vaccines and start the [immune process of creating antibodies](#).

Clusters of lymph nodes are located in areas close to vaccine administration sites. For instance, many vaccines are injected in the deltoid because it is close to lymph nodes located just under the armpit. When vaccines are given in the thigh, the lymph vessels don't have far to travel to reach the cluster of lymph nodes in the groin.



### Muscles keep the action localized

Muscle tissue also tends to keep vaccine reactions localized. Injecting a vaccine into the deltoid muscle may result in [local inflammation](#) or soreness at the injection site.

If certain vaccines are injected into fat tissue, [the chance of irritation and inflammation reaction increases](#) because fat tissue has poor blood supply, leading to poor absorption of some vaccine components.

Vaccines that include the use of [adjuvants](#) – or components that enhance the immune response to the antigen – must be given in a muscle to avoid widespread irritation and inflammation. [Adjuvants](#) act in a variety of ways to stimulate a stronger immune response. Yet another deciding factor in [vaccine administration location](#) is the size of the muscle.

Adults and children ages three and older tend to receive vaccines in their upper arm in the deltoid. Younger children receive their vaccines mid-thigh because their arm muscles are smaller and less developed.

Another consideration during vaccine administration is convenience and patient acceptability. Can you imagine taking down your pants at a mass vaccination clinic? Rolling up your sleeve is way easier and more preferred.

Infectious disease outbreaks, as in flu season or amid epidemics like COVID-19, require our public health system to vaccinate as many people as possible in a short time. For these reasons, a shot in the arm is preferred simply because the upper arm is easily accessible.

All things considered, when it comes to the flu shot and the COVID-19 vaccine, for most adults and kids, the arm is the preferred vaccination route.

*Libby Richards is Associate Professor of Nursing @ Purdue University.*



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