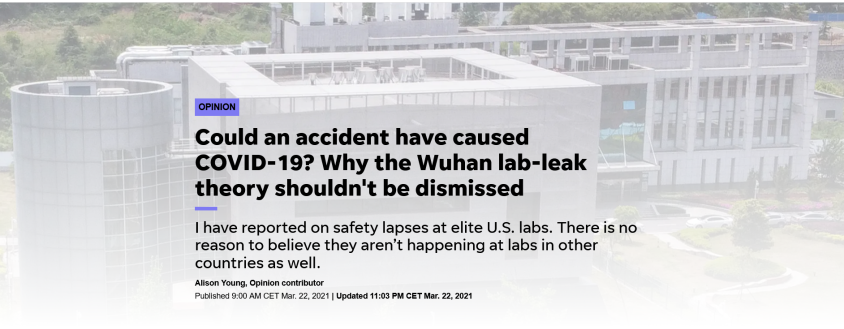

OPINION

Could an accident have caused COVID-19? Why the Wuhan lab-leak theory shouldn't be dismissed

I have reported on safety lapses at elite U.S. labs. There is no reason to believe they aren't happening at labs in other countries as well.

Alison Young, Opinion contributor

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Clink. Clink. Clink.

On a warm summer evening in July 2014, a laboratory worker on the National Institutes of Health's sprawling campus just north of Washington, D.C., exited Building 29A toting a cardboard box. Its contents rattled inside – an assortment of fragile glass vials labeled with faded typewriter script: Q fever, rickettsia and, worst of all, four strains of variola – the dreaded virus that causes smallpox.

Highly contagious, variola is one of the deadliest viruses the world has ever known. It could rip through most of the U.S. population and cause a global health disaster if released. It killed as many as 3 out of every 10 people infected

Clink. Clink.

Nobody has been routinely vaccinated against smallpox in decades, leaving most people in the United States and around the world vulnerable to infection. Yet after forgotten specimen vials dating to the 1940s and 1950s were discovered at the NIH in an unlocked cold storage room, nothing was done to ensure their safe transportation. They were allowed to bump around in a cardboard box with dozens of other old biological specimens as a lone laboratory worker walked them to another building about two blocks away, federal records show.

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One vial had already shattered.

The world got lucky that day, as it often has when safety breaches occur at biological laboratories in the United States and around the world.

A deadly epidemic wasn't unleashed. It was only a tissue specimen that broke and nobody got sick.

"Had any of the six glass vials containing the Variola virus been breached, there would have been nothing to contain the agent and prevent its release to the surrounding environment," according to a joint investigation report by the FBI and federal lab regulators.

As members of a World Health Organization expert team have made international headlines recently dismissing as "extremely unlikely" the possibility that a laboratory accident in Wuhan, China, could have sparked the COVID-19 pandemic, I can't stop thinking of the hundreds of lab accidents that are secretly occurring just in the United States.

As an investigative reporter, I have spent more than a decade revealing shocking safety breaches that officials at laboratories in our own country don't want the public to know about.

require further study," said World Health Organization Director-General Tedros Adhanom Ghebreyesus in February 2021.

CHRISTOPHER BLACK, WORLD HEALTH ORGANIZATION VIA AFP

have revealed how spacesuit-like protective gear and tubes carrying safe oxygen to scientists have torn or broken – repeatedly – and high-tech safety systems have failed dramatically. Vials of viruses and bacteria have gone missing. Researchers bitten by infected lab animals have been allowed to move about in public – rather than being quarantined – while waiting for signs of infection to appear.

These and similar safety lapses are happening with disturbing regularity at elite U.S. labs operated by government agencies, the military, universities and private firms. There is no reason to believe they aren't happening at labs in other countries as well.

The notion that more than 2.7 million deaths worldwide – so far – could be the result of a lab accident has been met with skepticism and derision by many journalists and scientists who often portray it as a crackpot conspiracy theory fueled by former President Donald Trump's China-bashing rhetoric. Without question, the lab-leak theory has been politically and racially weaponized in ugly ways. Nonetheless, that rhetoric needs to be separated from legitimate questions about lab safety that are deserving of investigation.

Science, like journalism, is supposed to be about facts and about getting to the truth. But those who dare seek answers to reasonable questions about any lab accidents in Wuhan are accused of peddling conspiracies.

Let me be clear: Labs in Wuhan might not have played any role in the origin of the pandemic. But a year later, no source has been found, and the world deserves a thorough, unbiased investigation of all plausible theories that is conducted without fear or favor.

> **These and similar safety lapses are happening with disturbing regularity at elite U.S. labs operated by government agencies, the military, universities and private firms.**

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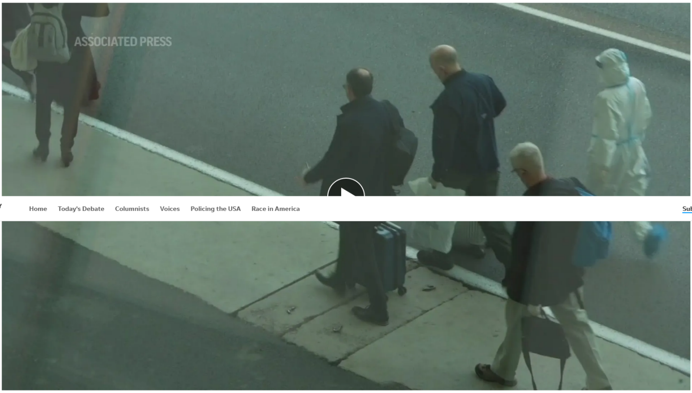
research labs and the risks they can pose – because problems at these facilities are real.

The WHO scientific team, which is looking for the pandemic's origin, is expected to release its final report this week detailing findings from their January trip to Wuhan, the city where the first cases of COVID-19 were identified.

Before leaving China last month, Peter Ben Embarek, the WHO scientist leading the team, said the group's findings suggest it is "extremely unlikely" the pandemic was caused by a laboratory accident at one of Wuhan's high-containment biological research facilities. Those facilities include the Wuhan Institute of Virology, which specializes in coronavirus research, collecting specimens from wild bats in search of new viruses and conducting experiments.

"It was very unlikely that anything could escape from such a place," Ben Embarek said during the Feb. 9 news conference, citing the team's discussions with Wuhan lab officials about their safety protocols and audits. "If you look at the history of lab accidents, these are extremely rare events."

WHO team lands in Wuhan in hunt for virus origins (1:48)



A global team of researchers arrived Thursday in the central Chinese city where the coronavirus pandemic was first detected to conduct a politically sensitive investigation into its origins, amid uncertainty about whether Beijing might try to prevent embarrassing discoveries. (Jan. 14)

AP

Yet lab accidents aren't rare.

What's rare are accidents causing documented outbreaks. But those have happened, including in 2004 when two researchers at a lab in Beijing unknowingly became infected with another type of SARS coronavirus, sparking a small outbreak that killed one person.

The risk that a laboratory-released virus – carried into the community by a worker who didn't know they were infected or through the leak of infectious waste – could cause a deadly outbreak has been a growing concern for many years.

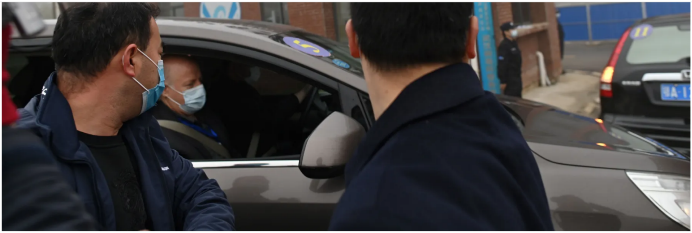
In America, scientists and members of Congress – both Democrats and Republicans – and the nonpartisan Government Accountability Office have expressed concerns for years. In reports and hearings, they've worried that

"The public is concerned about these laboratories because exposing workers and the public to dangerous pathogens, whether deliberate or accidental, can have disastrous consequences," the GAO's Nancy Kingsbury told Congress at a hearing in 2014.

If the COVID-19 pandemic were found to have been caused by a lab accident, it would have far-reaching implications for the fragmented and secretive oversight of biological research in the United States and worldwide that currently relies heavily on the scientific community to police itself.

The prevailing theory among the WHO expert team and scientists worldwide is that the virus probably evolved in bats – because they are common hosts for many types of coronaviruses – then it spread to another type of animal before jumping to humans. This kind of "spillover" from animals to humans is a common source of new diseases. So far, however, no evidence has been found that directly ties the pandemic virus to an animal source.

WUHAN INSTITUTE OF VIROLOGY, CAS



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 in Wuhan in China's central Hubei province on Feb. 3, 2021.

HECTOR RETAMAL, AFP VIA GETTY IMAGES

The WHO team also announced that it supported continued investigation of another possibly related theory, one promoted by China, that the virus might have arrived in Wuhan through imported frozen food. The only theory the team said was so unlikely it didn't merit further investigation was the so-called lab-leak theory.

Within days and with far less fanfare and news coverage, WHO Director-General Tedros Adhanom Ghebreyesus appeared to walk back the team's dismissal of the lab accident theory, saying: "I want to clarify that all hypotheses remain open and require further study."

Like most people, I hadn't ever given much thought to the safety of biological research facilities. I just assumed they were impenetrable sterile fortresses, heavily regulated and guarded, equipped with layers of cutting-edge technology and staffed by workers who zealously adhered to safety protocols.

Then in 2007, I started getting the first of many tips about problems inside the labs at the Centers for Disease Control and Prevention, which has an international reputation for operating the world's premier public health laboratories on its secure headquarters campus in Atlanta. At the time, I was the CDC beat reporter for The Atlanta Journal-Constitution.

With the help of a tipster, I revealed that the CDC's then-new $214 million infectious disease lab building – a crown jewel in the nation's race to defend against the threat of bioterrorism – suffered an hour-long power outage from a lightning strike and the failure of its emergency backup generators. The outage shut down key safety systems in the 368,000-square-foot concrete and glass research tower, known at the agency as Building 18, including specialized air pressure systems that help ensure lethal viruses remain inside individual labs.

CDC's Building 18 houses numerous labs, including a suite of biosafety level 4 labs. Documents released under the Freedom of Information Act reveal a dramatic...

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KIMBERLY SMITH, THE ATLANTA JOURNAL-CONSTITUTION

What's worse, I later obtained internal documents and emails showing the CDC dismissed warnings from the agency's own engineering staff, years before the lab opened, that the backup power system's design "gives us no protection whatsoever from many types of failures."

Following up on another tip, I revealed that scientists in this same troubled building were conducting experiments on

door was sealed with duct tape.

The tape was applied around the edges of the door a year earlier, after it was discovered that a malfunctioning ventilation system was pulling potentially contaminated air out of the lab into a "clean" hallway, where others in the building walk around in street clothes and lack any gear to protect against infection. Nine workers who had been in the fallout zone were tested for potential exposure to the highly infectious bacterium that causes Q fever, which is classified as a potential bioterror agent and can cause mild to severe symptoms, including potentially fatal heart problems. No one was infected.

As I stood in front of the duct-taped door on a summer day in 2008, escorted by five CDC officials, the head of the agency's occupational safety program downplayed the significance of the duct tape. The public was never at any risk, he said, the lab was perfectly safe, and the ventilation system had worked properly in the time since the incident happened a year earlier.

"Then why is the door still sealed with duct tape?" I asked.

"It's an enhancement," replied Patrick Stockton, who at the time was the CDC's safety and occupational health manager. "We could take it off."

Then why weren't they removing it?

Think about that: This was a new $214 million federal building that the CDC had touted back then as the world's most advanced laboratory. And yet the CDC was relying on duct tape to help safeguard against the release of dangerous bioterror bacteria.

In many ways, it was emblematic of what my reporting has found over the years about how labs and regulators approach safety.

In the decade that followed, as a member of USA TODAY's national investigative team, I reported on more incidents at the CDC and scores of other U.S. labs operated by the federal government, universities and private organizations across the country:

- At the Tulane National Primate Research Center near New Orleans, a type of deadly bacteria not found in the United States, called Burkholderia pseudomallei, escaped one of the facility's high-security biosafety level 3 labs in 2014, infecting monkeys that lived in outdoor cages and had not been used in experiments. Federal regulators concluded the bacteria likely was carried out of the lab on workers' contaminated clothing. The bacteria, which can cause serious illness in people and animals, can colonize soil and water in climates like Louisiana, though testing did not find evidence it had spread into the environment.
- At the University of Iowa, records showed that officials in 2014 discovered that a scientist had been conducting experiments with a genetically engineered strain of the MERS virus – which causes a deadly and contagious respiratory disease in humans – without getting approval from the university's biosafety committee.
- Louisiana State University's AgCenter in Baton Rouge was secretly cited by federal regulators in 2008 for serious biosafety lapses while researching Brucella bacteria, which poses a health and economic threat to livestock. Safety failures resulted in a cow in a nearby pasture – that was not involved in the experiments – becoming infected, federal records showed. LSU also was cited for sending infected cattle to a slaughterhouse where the meat was sold for people to eat.

A particularly alarming string of incidents in 2014 included the CDC potentially exposing dozens of its workers to live anthrax and also having dangerous mix-ups with specimens of Ebola virus and a deadly strain of avian influenza.

Meanwhile, in 2015 it was discovered that biological labs operated at the U.S. Army's Dugway Proving Ground near Salt Lake City had been mistakenly shipping live anthrax spores to labs around the world for a decade, the result of faulty assumptions that the research specimens they were sharing had been effectively killed – when they could actually still grow and kill.

United States Army
Dugway Proving Ground
Main Gate
20

A truck approaches the main gate at the US Army's Dugway Proving Ground in the middle of Rush Valley in Utah

In an award-winning 2015 USA TODAY investigation called "Biolabs in Your Backyard," our team revealed that more than 100 U.S. labs working with potential bioterror pathogens had faced secret federal sanctions for safety violations, and that regulators had allowed them to keep conducting experiments while failing inspections, sometimes for years. Among the labs with some of the worst regulatory records, we found, were labs operated by some of the same federal agencies that are charged with regulating laboratory safety.

Laboratory accidents continue to happen across the United States. But the public rarely hears about them because pervasive secrecy obscures failings by labs and also by regulators.

There is no universal, mandatory requirement for reporting lab accidents or lab-associated infections with dangerous pathogens, our USA TODAY investigation found. And even when labs lose their permits to work with dangerous pathogens because of serious safety violations, the government keeps the labs' names secret, citing security concerns and a federal bioterrorism law.

According to documents I obtained recently using the federal Freedom of Information Act, U.S. laboratories reported more than 450 accidents during 2015 through 2019 while experimenting with some of the world's most dangerous pathogens – those subject to federal regulation because they "pose a severe threat" to health and also have the potential to be turned into bioweapons. These pathogens, which the U.S. government calls "select agents," include anthrax, Ebola, plague, deadly strains of avian influenza and types of SARS coronaviruses.

The safety breaches reported to the U.S. Federal Select Agent Program – which is jointly run by the CDC and the U.S. Department of Agriculture – ranged from animal bites and needle sticks to failures of safety equipment and mistakes that resulted in infectious particles becoming airborne inside labs.

In nearly all reported cases, regulators deemed the breaches serious enough to put workers at risk of becoming infected, the program's annual reports to Congress show. As a result, more than 660 U.S. scientists and other lab workers involved in the incidents underwent medical assessment or treatment with preventative medications.

The good news is that almost none of these lab workers got sick, according to the reports, which provide only

home and in public for months. Their exposures were identified only because their lab happened to conduct annual blood tests, checking for antibodies to research pathogens, something that federal regulators don't require. Fortunately, the organisms they were working with were types of bacteria that, while dangerous, don't spread easily from person to person.

But what if a lab worker were unknowingly exposed to something far more contagious, a virus that can infect others before any symptoms appear?

How viruses can escape

There are several ways a pathogen can "escape" a laboratory and cause a public outbreak.

A lab worker can become infected because of a failure in safety equipment or procedures. Sometimes these infections, such as those involving pathogens that spread through contaminated air or through invisible aerosolized droplets, occur without the worker even realizing a safety breach has occurred.

Viruses and bacteria also have the potential to be carried out of labs on contaminated clothing and equipment, or through a mishap in the sterilization of the lab's solid or liquid waste.

While rare, lab accidents causing documented outbreaks that spread to people or animals have happened.

An influenza epidemic in 1977 that spread throughout the world was found to have been caused by a strain of the virus that appeared to be nearly identical to one that hadn't circulated since the 1950s. Many scientists believe that it was not a naturally occurring outbreak, and that it likely was the result of a stored virus specimen that was released through a laboratory accident or possibly a vaccine development project.

In 2007, herds of cattle in Surrey, United Kingdom, began developing painful blisters on their tongues, lips and feet – and were quickly diagnosed with highly infectious foot-and-mouth disease, one of the most dreaded and economically devastating diseases for livestock owners because it weakens animals’ ability to be used for milk and meat production.

laboratory and vaccine manufacturing complex in Pirbright, not far from where the cattle fell ill. British safety regulators concluded that the outbreak was likely caused by leaking wastewater from the Pirbright facility’s drain pipes, which contaminated nearby soil with live virus and then was picked up on vehicle tires and carried to the herds.

Coronaviruses similar to the one causing the COVID-19 pandemic have repeatedly escaped labs.

In 2003 and 2004 – in the months after intense international efforts managed to contain the spread of what was then the first type of deadly SARS coronavirus to infect people around the globe – a series of laboratory accidents threatened to reignite the epidemic that had sickened about 8,000 people in 29 countries, killing nearly 800 of them. This coronavirus virus, which emerged in 2002, causes a disease called severe acute respiratory syndrome, or SARS, that killed at a higher rate than the similarly named SARS-CoV-2 virus that causes COVID-19.

First, a 27-year-old researcher in Singapore working with specimens of West Nile virus became infected with the SARS virus in a shared laboratory that used “inappropriate” lab safety practices. Investigators concluded the infection was caused by accidental contamination of the researcher’s West Nile virus specimens with the SARS virus. Both viruses were discovered in a research specimen the scientist had used before becoming ill. Nobody else was sickened.

Then, three months later at a laboratory in Taiwan, a 44-year-old researcher became infected with SARS, likely by cleaning up spilled liquid waste in December 2003. He flew to attend a meeting in Singapore and didn’t show signs of illness until he returned home, developed a fever and was hospitalized. More than 70 people who had contact with him were quarantined.

“In the post-epidemic period the greatest risk from SARS may be through exposure in laboratories where the virus is used or stored,” the WHO said in an update about the Taiwan lab incident in December 2003.

Despite the WHO’s warnings, in April 2004 an outbreak in China began after two researchers working at a virology lab in Beijing became infected by the SARS virus. Before the outbreak was contained, nine people were infected.

It was unclear how the two researchers were exposed. “Neither of the researchers is known to have directly conducted experiments using live SARS coronavirus. However, investigators have serious concerns about biosafety procedures at the Institute – including how and where procedures using SARS coronavirus were carried out, and how and where SARS coronavirus samples were stored,” the WHO said in a May 2004 update after the outbreak had been contained.

No specific accident was identified at the laboratory, the WHO said, “and it is conceivable that an exact answer may never be determined.”

Wuhan lab scientist worried about leak

Against this backdrop, it’s surprising that questions about any lab accidents in Wuhan continue to be dismissed as promoting a conspiracy theory.

When the pandemic first emerged in Wuhan, a lab accident seemed a very real and horrifying possibility to China’s leading coronavirus researcher.

Shi Zhengli, a renowned scientist at the Wuhan Institute of Virology, has spent years collecting virus samples from bats and experimenting with SARS-like viruses to determine which might pose the greatest risk to humans.

In an interview with Scientific American, Shi described a frantic review of her lab’s records during the early days of the outbreak to see whether there had been any incidents, especially related to the disposal of materials used in experiments. Shi said she was relieved when her lab learned the genetic sequence of the virus sickening people in Wuhan didn’t match any of the viruses her team had collected.

“That really took a load off my mind,” she told the magazine for an article published last year. “I had not slept a wink for days.”

Shi has expressed outrage at public speculation since last spring by then-President Trump and Secretary of State Mike Pompeo that a lab in Wuhan may be responsible for the pandemic.

concerns about safety practices inside the Wuhan Institute of Virology, where China’s first biosafety level 4 laboratory had recently become operational, enabling the facility to do far more dangerous experiments.

“During interactions with scientists at the WIV laboratory, they noted the new lab has a serious shortage of appropriately trained technicians and investigators needed to safely operate this high-containment laboratory,” said one of the cables from January 2018.

In the final days of the Trump administration, Pompeo’s State Department posted on its website a fact sheet titled, “Activity at the Wuhan Institute of Virology.” The document makes clear that the U.S. government doesn’t know where, when or how the COVID-19 virus was initially transmitted to humans.

Even so, it called for greater scrutiny of information it said the U.S. government has learned about the facility, including that the virology institute has been doing classified research with China’s military since at least 2017 and that several researchers at the institute became sick in autumn 2019, before the first identified case of the outbreak. But no details were provided in the fact sheet.

“

We have deep concerns about the way in which the early findings of the COVID-19 investigation were communicated and questions about the process used to reach them.

White House national security adviser Jake Sullivan

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The Wuhan Institute of Virology was among the locations visited recently by the joint China-WHO scientific team looking for the source of the COVID-19 pandemic. Members of the WHO team said they were assured, during conversations with staff at the institute and at other biological labs in Wuhan, that a laboratory accident was extremely unlikely to be the pandemic's source.

COVID-19 cases that were identified during the earliest part of the outbreak.

"We have deep concerns about the way in which the early findings of the COVID-19 investigation were communicated and questions about the process used to reach them," White House national security adviser Jake Sullivan said in a statement last month. "It is imperative that this report be independent, with expert findings free from intervention or alteration by the Chinese government."

An international group of scientists and researchers has issued an open letter calling for an independent investigation, separate from the WHO effort, which they say has lacked the independence, expertise and access needed to adequately investigate the source of the pandemic, including the potential for a lab accident. "Efforts to date do not constitute a thorough, credible, and transparent investigation," the letter, published by The Wall Street Journal, said.

We might never know whether the COVID-19 pandemic started in one of Wuhan's laboratories. But what is known is that as the number of these kinds of high-security labs grows worldwide and more researchers are storing and experimenting with dangerous pathogens, so too does the risk of laboratory accidents causing outbreaks.

That's why all of us have a stake in knowing what is happening in these labs here in the United States and around the world.

Alison Young is an investigative reporter in Washington, D.C. During 2009-19, she was a reporter and member of USA TODAY's national investigative team. Follow her on Twitter: @alisonannyoung

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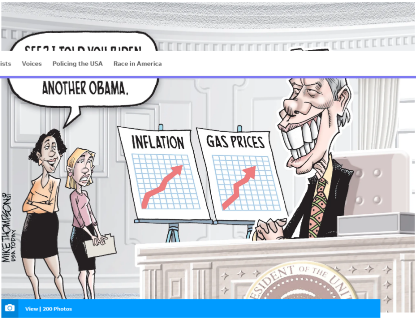

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