

Manipulating viruses and risking pandemics is too dangerous. It's time to stop.

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For 20 years, taxpayer-funded research programs have sought to identify or create pandemic-causing viruses, all with surprisingly [little transparency](#). The latest evidence of the problem surfaced on Sept. 21 when a group of online snoopers [released](#) purportedly leaked documents [revealing](#) a 2018 grant proposal. The proposal, which went unfunded, sought \$14.2 million for a project to discover, combine and engineer highly infectious SARS-like coronaviruses.

Much of the attention stirred by the revelation focused on the proposal's inclusion of preliminary data from the Wuhan Institute of Virology — a Chinese lab under scrutiny as a possible source of the covid-19 pandemic.

Questions about public oversight, accident risks and pandemic origins are all legitimate. But perhaps the biggest question of all isn't being asked insistently enough: Why is anyone trying to teach the world how to make viruses that could kill millions of people?

Like nuclear physics, with its potential for global catastrophe when put to destructive ends, the proliferation of pandemic biology ought to be considered a matter of international security.

Making a nuclear weapon requires the resources of a nation-state, but many individuals can now single-handedly build and edit viruses. Some fearmongers about biotechnology claim that anyone could do this in a garage. That's mistaken; such bioengineering requires years of training. Still, the number of people who can build a virus from synthetic DNA is not small. In my own laboratory at MIT alone, five people have that capability.

So why search for new pandemic viruses? The enticing idea: If researchers could learn which of the [estimated 500,000](#) animal viruses that could spill over into humans might actually cause the next pandemic, then we may be able to prepare defenses against the most threatening ones. But to credibly identify a single virus as capable of causing a pandemic is to give thousands the power to wield it as a weapon. To discover many dangerous viruses, or learn to enhance weaker ones, is to share the blueprints for an arsenal of plagues.

Good people advocate for such research, and the world needs someone to make the case — it's always possible that the benefits of the knowledge will be worth it. Perhaps the likelihood of virus misuse and accidents is tiny, natural spillovers are more common than history suggests, and studying nature's killers would save even more lives.

But before we discover viruses that might rival nuclear weapons in lethality, we should be aware that the consequences of misuse could be worse than if any of those pathogens spilled over naturally. A malevolent individual could introduce multiple pandemic viruses in different locations around the world — say, at half a dozen major airports — making containment nearly impossible.

Thankfully, we don't yet know of any animal viruses expected to cause a pandemic if deliberately released. That won't last if gain-of-function research projects succeed in engineering or evolving ones that can. Even more alarmingly, multiple health agencies around the world [are actively](#)

[funding](#) efforts to find, study and [rank-order](#) the animal viruses most likely to cause a new pandemic.

These projects are the work of well-meaning scientists doing their best to save us from natural plagues. But they are biomedical researchers and epidemiologists, not defense experts; security and nonproliferation issues aren't part of their training or mandate. Once we consider the possibility of misuse, let alone creative misuse, such research looks like a gamble that civilization can't afford to risk.

Many physicists who contributed to the Manhattan Project lived to see nuclear proliferation threaten the world. For pandemics, the critical experiments have not yet been performed. I implore every scientist, funder and nation working in this field: Please stop. No more trying to discover or make pandemic-capable viruses, enhance their virulence, or assemble them more easily. No more attempting to learn which components allow viruses to efficiently infect or replicate within human cells, or to devise inheritable ways to evade immunity. No more experiments likely to disseminate blueprints for plagues.

There are few commercial or strategic incentives to attempt any of these things, and even if some nation-states continued experimenting in defiance of nonproliferation agreements, at least the work would go far more slowly than if the scientific community led the way.

Instead, health and security agencies should work together, ideally with considerably more than the \$65 billion requested by the White House, to build adequate defenses against future pandemics. We need sequencing-based early-warning networks to detect anything becoming exponentially more common in airport wastewater or clinical samples, millions of diagnostic tests and vaccine doses made available within weeks of a threat identification and comfortable powered respirators for every essential worker.

Natural pandemics may be inevitable. Synthetic ones, constructed with full knowledge of society's vulnerabilities, are not. Let's not learn to make pandemics until we can reliably defend against them.

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