David Quammen testimony to the
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Thank you, Secretary General; thank you, Mr. Chairman; and thank you, Honorable Members, for the invitation to talk with you this morning. For the sake of conciseness, I'll put my remarks in the form of a series of questions—questions that have occurred to a lot of people—which I'll answer, as best I can, one by one.

Why do pandemics happen?

They happen, generally, because a dangerous new pathogen—most often nowadays, a virus—causes an unfamiliar disease to break out among humans, in a single location, and that outbreak fails to be contained. If there's bad luck, if the disease proves easily transmissible among humans, if it escapes beyond containment in the outbreak location, it can spread quickly around the world by international airline travel.

Where do dangerous new viruses come from?

New viruses come to humans from wild animals. There is a universe of viruses dwelling in our great, diverse ecosystems; that's just a fact of nature. Every virus exists as a parasite within some other kind of living creature—a species of animal, plant, fungus, or bacteria—and some of those within animals have the capacity to take hold in humans and spread murderously. They help remind us that we *are* animals, we are mammals, closely enough related to other mammals to share some of their viral infections. Recent examples of new viruses that spilled into humans from wild animals: Mapucho (1961), Marburg (1967), Ebola (1976), HIV (recognized 1981), Hendra (1994), Nipah (1998), SARS (2003), MERS (2012).

Which kinds of new virus are most likely to cause a pandemic?

The influenza viruses and the coronaviruses have been at the top of the watch list, among disease scientists, for decades. Why? Because they transmit as respiratory infections, they have the capacity to evolve quickly and adapt to new hosts (such as humans), and because they have a demonstrated record of causing pandemics or dangerous outbreaks in the past.

In the case of influenza viruses, the record is long. In the case of coronaviruses, we had the warning events of the original SARS, in 2002-2003, and MERS, in 2012 and 2015. Some countries, notably Singapore and the Republic of Korea, as well as Hong Kong, were affected enough by those outbreaks, and wise enough, to learn vigilance against the next coronavirus. And some countries, such as my own, were not.

Which animals are most likely to pass their viruses to humans?

Based on past experience: primates, including both apes and monkeys; bats; and rodents. It's also possible for a virus to pass from its natural host into another animal, an intermediate host, and from that animal to humans.

Where and how did this new coronavirus originate?

The molecular evidence, from sequencing viral genomes and comparing them, shows that the ancestral strain of this virus came from bats—horseshoe bats, of a sort that roost in the caves of central and southern China. But that ancestral virus may have spilled over into another animal and evolved in that other animal for as long as 40 or 50 years, before spilling recently into humans. Was the other animal a pangolin? Was it another form of bat? The evidence is so far inconclusive. We need more research on coronaviruses in their animal hosts.

Why is it important to answer the question of where this virus came from?

It's important because that answer may help scientists create vaccines and treatments for this virus—and because it will certainly help us avoid the next coronavirus pandemic.

What circumstances contribute to the spillover of new viruses that may cause human pandemics?

The capture or killing of wild animals for food, and transport of wild animals (alive or dead) for sale privately or in markets—these actions give animal viruses the opportunity to spill into humans. The disruption of wild, diverse ecosystems, again bringing humans into contact with wild animals, is a broader contributing factor.

If a virus makes the leap into humans, and can transmit from one human to another, it has opened a door to great evolutionary success, in the Darwinian sense: proliferating and expanding its existence through geographical space and time.

But if human wisdom and science and preparedness are well mounted against viral adaptiveness and proliferation, then we can succeed next time, not the virus.