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So I'm an infectious disease epidemiologist, and it used to be the case that when I would tell people that, they would ask me if it had something to do with the skin.

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(Laughter)

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But thanks to COVID-19, most people have now heard of epidemiologists. So these days, when I tell people what I do, the questions I get asked most frequently are more like: When does this end? When do things go back to how they were? I get it. I am very eager to stop worrying about COVID-19. But these questions seem to be imbued with a hope that when we get to the other side of all this, our prepandemic lives are just going to be waiting for us.

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Now this pandemic will end. But it won't be possible just to go back to how it was in 2019. Now that may sound bleak, but I assure you, it doesn't have to be.

01:09

Let me tell you a story that's been giving me some hope. Feeling better about this. Baltimore 1904. A lit cigarette was left in the basement of the six-story Hurst building. Within a half an hour, the fire grew to an out-of-control conflagration. Local firefighters were quickly overwhelmed, so crews came in from neighboring cities. But when they arrived, they couldn't hook up their hoses because in 1904 there were over 600 variations of hose couplings on hydrants in the United States. The fire destroyed more than 1,500 buildings, 2,500 businesses. And when it was finally extinguished, the burnt district, as it was called, spanned more than 80 blocks. Fortunately, just a few people died, but that was probably a function of luck due to the fact that the fire broke out in a business district that was uninhabited on the weekends.

02:09

The story of the Great Baltimore Fire of 1904 is important for a few reasons. To this day, it is one of the largest urban conflagrations in US history. And in today's money, the toll of this one event is upwards of three billion dollars. But the Great Fire is remarkable not just for its tolls but for what happened afterwards. Witnessing the devastation that was caused by a single unattended

cigarette prompted massive change in how Baltimore and the rest of the country protect itself against urban fires. We saw changes in three major areas. First, we began using data to make buildings safer and to improve the way we respond to fires. Governments passed ordinances that became the basis of the first building codes: standards that inform the design and construction of buildings to make them more resistant to fire and to protect the people that occupy them. We installed fire alarms so that we could detect and pinpoint fires in buildings as soon as they occur and alert people of the need to evacuate. And we created national standards for firefighting equipment so that crews coming out of state could hook up their hoses.

03:18

The second area of change is that we created a culture of fire safety. We regularly test fire alarms and fire hydrants, and we educate people about the risk of fires, how to prevent them and what to do when one occurs. You remember "stop, drop and roll" fire drills in schools? These exercises prime us to act when the alarms go off. Even if there's no noticeable sign of fire, we know we're supposed to get out of the building until someone tells us it's safe to go back.

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The third area of change was that we built up our fire defenses. Communities across the country created and staffed fire departments so that they'd be ready to respond in emergencies. And because we don't know when the next fire is going to occur, we operate our fire defenses 24 hours a day, every day, and we don't get rid of our fire defenses just because we haven't had a fire for a couple of years.

04:11

Data, drills and defense. The collective impact of changes implemented in the US since 1904 has meant that we no longer have the same number of great urban fires that were so frequent in the 19th and early 20th centuries.

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Now I first came to Baltimore 17 years ago, actually when the city was gearing up to commemorate the 100th anniversary of the Great Fire. I came to study infectious disease outbreaks, and even then, well before COVID-19, it was abundantly clear that the risk of our experiencing a dangerous pandemic was high and increasing. By the year 2000, the number of emerging infectious disease outbreaks that was occurring was four times greater than in the 1940s. And in the last 17 years, we have witnessed a string of events that have each exposed vulnerabilities in how we respond to infectious diseases and have challenged us in ways that should have made us really worried how we'd fare when the big one hit.

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I first heard about COVID December 2019. I was on vacation with my family, and in a few weeks we would learn that the virus was spreading easily between people. As an epidemiologist, that's when the alarms went off. At that point, most of my work had been focused on other countries, helping places develop the tools they needed to stop the spread of new diseases. But it was becoming clear the US was not taking the steps it needed to protect us from the unfolding pandemic. On February 5, 2020, I testified before Congress about the US experience of COVID, and I said that just closing travel to China was not going to be sufficient, that we urgently needed to bolster our defenses. We had a lot of reasons to be worried. Due to budget cuts, there were 250,000 fewer public health workers in the US than we needed. Our hospitals weren't ready for a surge of patients, and the outbreak in China was causing disruptions in global supplies of personal protective equipment and medicines. But our leaders didn't heed those alarms. While other countries, like South Korea, snapped into action developing COVID tests and contact tracing programs, the US remained in denial. Instead of telling us how to protect ourselves, our political leaders tried to assure us we had nothing to worry about.

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Over the last year, I've worked with the Johns Hopkins Coronavirus Resource Center, analyzing key COVID data and gathering information from governments around the world. And for much of the pandemic, we have had an inconsistent picture of how much of a crisis COVID has been here in the US and who has been most affected because states collect and report COVID data in inconsistent ways. Still today states report testing data, vaccine data, COVID demographic data differently. Having nonstandard data, unstandardized data, in the midst of a pandemic is like not being able to hook up your hoses to the hydrants when your country is burning down.

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Today, our culture of safety around infectious diseases is in shambles. We finally have vaccines, lifesaving tools to end the pandemic. And too many of us won't take them. If we thought about pandemics the way we thought about fires, what we would do would be to try to learn as much as possible about our vulnerabilities during COVID and work to ensure we are never again left so unprotected. We would commit to action in three areas. Data, drills and defense.

08:03

First, we would develop systems to ensure we have the data we need to know when and where there's danger and how best to protect ourselves. The next time there's a concerning outbreak in the world, we wouldn't just wait until people get sick enough to go to the hospital to test them. We would go out and start looking for infections so that we could detect them as early as possible. And every case we find, we would investigate it, so that we could quickly learn what

specific places and activities are most likely to get people sick instead of just saying, "Stay home, if you can, for two years." And we would develop national data standards, so that data from New Jersey could be meaningfully compared to data from Oklahoma.

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The second area of action would be to start building a culture of safety that empowers us as individuals and businesses and community organizations to protect ourselves and others. We would work to ensure that everyone had access to in-home tests so that we could know if it's safe to go to work or to see family. We would teach people about the threat, how to protect themselves and how not to spread it to others. But this education would be mostly a reminder because we would be practicing these skills well in advance of the next pandemic. We would use every flu season as a drill.

09:24

Long before COVID-19, Taiwan began staging mass vaccination exercises every flu season. They did this to boost vaccination rates in the most vulnerable, but also to practice how they would do it in a pandemic, so that well in advance of a crisis, people would know where and how they would get a vaccine.

09:43

Now, at a time when the country is incredibly divided, I know it may seem impossible that we could build this culture of safety around infectious diseases that we need. But I have spent the last year and a half talking to all sorts of people with a range of views on these issues, from top leaders to QAnon believers. And I assure you, we all want to protect ourselves and our families. But we need to build trust. And we can't do that if we wait until the next crisis to talk to each other.

10:20

The third area where we'd take action is to build our defenses against infectious diseases. Instead of a skeletal public health infrastructure that waxes and wanes with every crisis, we would maintain, for good, a large cadre of highly skilled public health professionals who work day in and day out to make our communities healthier and safer and be ready to respond in an emergency. We'd reduce our structural vulnerabilities to infectious diseases, starting with our buildings, updating our building codes and ventilation systems so that we could be assured that these spaces will not result in super spreading. And we would implement economic defenses: policies that provide financial and social support to people who need to stay home because

they're sick or a loved one is sick or they need to quarantine so they don't have to choose between following public health guidance and earning a paycheck.

11:19

Data, drills and defense. If we acted in these three ways, we'd have a much better shot of keeping the next pandemic threat to a manageable outbreak instead of a blazing inferno that engulfs entire cities and countries.

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When people ask me when the pandemic is going to end, I don't think they're also wondering when the next one is going to occur. They are, understandably, focused on getting past this threat. They want to know for how much longer do we have to hold our breath until the flames of the pandemic die down. But conflagrations don't end just because one was put out. The frequency and severity of fires changes when changes are made. The same is true for pandemics.

12:23

So when people ask me when are things going to go back to how they were, I have to say: hopefully never.

12:38

Thank you.

12:39

(Applause)

12:45

Helen Walters: Thank you. Thank you so much. Thank you. So you talked about trust in that -- and we've seen the vaccine rate, when it's available, it's really shockingly low, and much of that is really related to trust, trust in the systems, trust in society. What are ways that you think that we can do a better job as a society to convince people that vaccines are safe and people should take them?

13:12

Jennifer B. Nuzzo: I think, first of all, don't give up on people. I have seen people change. And you have to come at your conversations with people from a place of empathy. Try to understand why, right? We don't do enough of that, trying to understand why people feel that way, and engage with them, hear them. I have found that just simply giving space to people, to allow them to talk about their anxieties and their concerns and having the conversation takes it from a culture war to just a conversation between human beings. And we've lost that ability, and part of the pandemic has taken that ability from us because we've had few opportunities. But we really do have to talk to each other and have the hard conversations, and just recognize that we're all walking through this world trying to get the same things, trying to do the same thing.

14:06

HW: Well, thank you for everything that you're doing, Jennifer.

14:09

JBN: Thank you. (Applause)