Disease X: A hidden but inevitable creeping danger

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To the Editor—An old adage says, "Prevention is better than cure." Nothing exemplifies this idea better than "Disease X." According to the World Health Organization (WHO), "Disease X represents the knowledge that a serious international epidemic could be caused by a pathogen currently unknown to cause human disease."[1]

Richard Hatchett, chief executive officer (CEO) of the Coalition for Epidemic Preparedness Innovations (CEPI), said about Disease X, "It might sound like science fiction, but Disease X is something we must prepare for."[2] In a list of diseases that the WHO considers high priority in terms of research and development, Disease X occupies a spot among diseases such as Ebola, Zika, and coronavirus disease 2019 (COVID-19).[1] Unexpected outbreaks of infectious disease (Disease X) have repeatedly rocked the medical confidence and have taken the medical world by surprise.[3]

Some experts have even commented that COVID-19, caused by severe acute respiratory coronavirus virus 2 (SARS-CoV-2), met the standards to be considered the first Disease X,[4] while some authors have called Zika a Disease X.[5] However, one unfortunate possibility is that COVID-19 and other recent pandemics might have been milder versions of what will eventually be the most prominent Disease X.

Disease X is supposed to be caused by a "pathogen X." Such a pathogen is expected to be a zoonosis, most likely an RNA virus, emerging from an area where the right mix of risk factors highly promotes the risk for sustained transmission.[6]

The WHO has been criticized for underreacting on pandemics such as the 2014 Ebola pandemic,[7] and as an organization with limited funding and weak political power, the WHO usually fails when it comes to timely and strong acts to reduce the spread of transmissible diseases.[8]

A study that aimed at figuring out where the responsibility lies for the 2014 Ebola outbreak also concluded that while the WHO might have been partly to blame, it's also the lack of cooperation from governments and delayed funding aggravates the situation.[7]

Scientists have also commented that although the COVID-19 pandemic has had a significant impact on the world, as soon as it disappears into the background, healthcare systems will remain the same. Politicians might use the weak recovering economy due to the pandemic as a reason to delay funding for epidemic preparation, as a result failing to produce timely effective measures.[8]

Similarly, while emerging zoonotic pathogens are a threat that needs to be monitored, the possibility of an engineered pandemic pathogen also cannot be ignored.[9] The release of such pathogens, either through laboratory accidents or as an act of bioterrorism, might lead to a disastrous Disease X as well and has been remarked as a global catastrophic risk.[10]

There is a dire need to seriously fund the surveillance of, research into, and treatment of emerging potential pandemic agents that could cause Disease X.[8] Despite the grim situation, steps can be taken to stop Disease X and to reduce the spread and damage of Disease X by properly and preemptively preparing for it. (1) We need to develop international guidelines to control bioterrorism. Bioterrorism attacks could also result in an epidemic, for example, if Ebola or Lassa viruses were used as biological agents. (2) Advice of the academics should be sought in a timely way without any political involvement. (3) Immediate and appropriate travel restrictions and airport screening will need to be implemented to contain the spread of pathogen X across borders. (4) The world's scientists, clinicians, and infectious disease experts must act collaboratively to investigate, control, and eliminate the disease in a timely way. (5) Widespread testing and aggressive contact tracing can effectively contain the outbreak. (6) Timely investments can be made to accelerate the development, availability, and approval of medical countermeasures (like diagnostics, vaccines, and clinical trials) required before and during the pandemic. (7) Active surveillance of virus laboratories is needed to avoid a potential leak of a new virus.

A One Health approach has also been proposed that provides a complete way to address the underlying issues for the spread of Disease X: bridging institutional gaps, defining priority risk areas and pathogens, and emphasizing supposed risk factors for subsequent events involving emerging and re-emerging infectious disease pathogens.[11] The COVID-19 pandemic was not the first to wreak havoc on the world and it will not be the last. Thus, we need to prepare for the next outbreak as soon as possible.

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