

Multiple research approaches are key to pandemic preparedness, NIAID officials say

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Preparedness in the face of major disease outbreaks can save thousands of lives: Rapid deployment of effective diagnostics, treatments, and vaccines may even stop the disease from potentially exploding into a pandemic. A new article by Anthony S. Fauci, M.D., director of the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, and colleagues examines the multifaceted nature of effective preparedness and the particular role that biomedical research plays. Specifically, the article examines three approaches to pandemic preparedness: pathogen-specific work, platform-based technologies, and prototype-pathogen efforts. Using vaccine development as an example, the authors conclude that a combination of all three approaches will lead to the best preparedness for future pandemics.

The article appears online today in *The Journal of the American Medical Association*.

Pathogen-specific research prioritizes diseases known to be dangerous, such as Ebola. Countermeasures to prevent and fight the [disease](#) are developed ahead of time and can be rapidly deployed if those diseases emerge. However, this approach relies on the ability to correctly identify future threats and cannot prepare for unexpected outbreaks, such as HIV, SARS, or Zika.

With platform-based approaches, researchers focus on developing customizable techniques, such as those involving nanoparticles or viral

vectors. In the event of a pandemic, genetic material can be incorporated into the platform to protect recipients against a specific disease.

The "prototype pathogen" approach can shorten the time needed to create vaccines using platform-based methods. This [approach](#) involves studying the characteristics of categories or families of pathogens, such as the family of viruses that contains dengue, West Nile and Zika viruses, and developing vaccines for the category ahead of time. When a disease from a specific category causes an [outbreak](#), these vaccines can be customized if necessary to the specific pathogen within that family, and researchers have a greater chance of quickly deploying an effective [vaccine](#), the authors write.

Despite their adaptability, platform-based and prototype-pathogen approaches do not necessarily yield fully-developed vaccines, treatments or diagnostics, which can lead to a slower response than if pathogen-specific countermeasures had been developed. The best way forward is a combination of all three approaches, the authors write. By investing in research to develop specific countermeasures for known threats and utilizing platform-based and prototype-pathogen approaches to allow for adaptation when unexpected outbreaks arise, global public health organizations can best prepare to combat future disease outbreaks.

More information: Hilary D. Marston et al, The Critical Role of Biomedical Research in Pandemic Preparedness, *JAMA* (2017). [DOI: 10.1001/jama.2017.15033](https://doi.org/10.1001/jama.2017.15033)

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