Amid concerns about the emergence of 3 variants of sudden acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the challenges they pose to US efforts to fight the pandemic, a team of infectious disease experts at the Johns Hopkins Center for Health Security released a new report on February 16 that recommends strategies to improve the country's ability to respond to this threat.

The 3 variants include B.1.1.7, a variant first detected in the United Kingdom that is more transmissible than previous SARS-CoV-2 variants and also appears to be more lethal. A second variant, B.1.351, first detected in South Africa, appears to more readily reinfect people who had recovered from SARS-CoV-2 infection, as does the third variant, P.1, initially detected in Brazil.

Other concerns about these SARS-CoV-2 variants include whether they might render therapeutics and vaccines for coronavirus disease 2019 (COVID-19) less effective. Those concerns apply as well to future variants that are expected to emerge and spread as the pandemic continues.

As of February 18, at least 42 states had reported cases of the UK variant, 10 had reported cases of the South African variant, and 4 had reported cases of the Brazilian variant, according to the Centers for Disease Control and Prevention (CDC).

“Although viral mutation is inevitable, it is possible to anticipate, manage and mitigate the threat to our collective public health,” note the authors of the new report, Staying Ahead of the Variants: Policy Recommendations to Identify and Manage Current and Future Variants of Concern. “The key to staying ahead of a rapidly evolving virus is to maintain a continuous, systematic genomic surveillance and functional characterization capability that is able to rapidly detect and evaluate new variants of concern.”

Because of the importance of minimizing the frequency with which new variants emerge and their potential to enhance viral spread and to undermine the effectiveness of vaccines and therapeutics, the report’s authors advise maintaining mitigation policies that slow coronavirus transmission and prioritizing contact tracing and investigating cases.

“Mask mandates, capacity limitations in commercial establishments, and limitations on indoor gatherings are vital to sustain until transmission can be controlled through alternate means,” the report says.

Contact tracing becomes more feasible and can have a more substantial effect on breaking chains of transmission when the incidence of COVID-19 cases is below 10 cases per 100,000 population per day, the authors note. Improved contact tracing would allow public health officials to investigate cases and see how a new variant behaves compared with versions already circulating in the population.

In addition to these measures, a “priority recommendation” of the report calls for the US Department of Health and Human Services to draw on resources and expertise from across the US government to develop a national strategy for genomic surveillance, which involves sampling and sequencing SARS-CoV-2 isolates from infected individuals and comparing the sequences to identify mutations.

“Although the United States currently has substantial sequencing capacity, it is primarily used for academic investigation rather than public health surveillance,” the report’s authors note. To bolster the nation’s capabilities in this area, significant leadership and investment are “urgently needed;” they said.
The United Kingdom and Denmark have already benefitted from robust investment in genomic surveillance that allows them to sequence a far greater proportion of their COVID-19 cases than achieved in the United States, according to the report.

After new variants are identified, characterization studies are needed to assess whether the mutations are harmless or pose a meaningful risk—for example, greater transmissibility or a greater likelihood to cause severe disease or death than previous SARS-CoV-2 strains, or a decreased likelihood to be prevented by available vaccines. Such studies require not only computational resources but also bioinformatics specialists to manage and analyze immense quantities of sequence data.

Currently, a "loose network" of US laboratories are involved in characterizing variants, but there is little coordination of such studies, the report says. Because many US public health agencies lack the analytical capabilities needed to interpret genome sequencing, the authors recommend establishment of an "academic center of excellence" to serve as a resource with ongoing capabilities, not only for infectious disease pandemics but also for outbreaks of foodborne disease and infections caused by antibiotic-resistant bacteria.

The report stresses that in addition to increased funding, "clear leadership and coordination" will be needed to create a successful genomic surveillance and characterization network to inform public health policies with respect to concerning variants.

The day after the Center for Health Security released its report, the Department of Health and Human Services and the White House issued statements announcing plans for the CDC to foster a rapid increase in coronavirus genomic sequencing. The CDC will spend nearly $200 million to expand its capabilities (including bioinformatics, reporting, and modeling), which will support increasing sequencing more than 3-fold, from about 7000 samples per week to approximately 25,000 per week.

ARTICLE INFORMATION
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