DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

The Role of the National Institute of Allergy and Infectious Diseases in Research to Address the COVID-19 Pandemic

Testimony before the

United States Senate Committee on Health, Education, Labor and Pensions

Hearing Titled:

Examining our COVID-19 Response: An Update from Federal Officials

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Madam Chair, Ranking Member Burr, and Members of the Committee:

remain vigilant. NIAID is rapidly conducting research to better understand these emerging variants of SARS-CoV-2, how they interact with the immune system, and their implications for COVID-19 therapeutic and vaccine formulations.

We also know that African Americans, Hispanic Americans, Native Americans, underserved and minority communities have been disproportionally affected by this pandemic. NIAID is committed to working directly with these communities and partnering with other agencies in the federal government, and with industry, and academia, to ensure that individuals in underserved and vulnerable communities are not left behind as we move forward towards defeating COVID-19. NIAID also recognizes that while many infections with SARS-CoV-2 resolve after a relatively short time, some individuals continue to suffer longer-term effects even after the virus has been eliminated from the body. NIAID is supporting collaborative efforts to study outcomes in patients across all ages, genders, and co-morbid conditions, who have experienced a wide range of severity of original disease, to identify and characterize these post-acute sequelae of SARS-CoV-2 infection (PASC) and develop effective strategies to address them.

Developing Vaccines and Therapies to Prevent COVID-

Early clinical trials demonstrated that mRNA-1273 was generally well tolerated and induced robust neutralizing antibody responses in healthy adults. NIAID and BARDA then began working with Moderna on a Phase 3 clinical trial utilizing the CoVPN that showed that mRNA-1273 was 94.1 percent efficacious in preventing symptomatic COVID-19. On December 18, 2020, after a

Company, also initiated two Phase 3 clinical trials to evaluate whether their investigational monoclonal antibodies, known as REGEN-COV and bamlanivimab respectively, can prevent infection or symptomatic disease in people at high risk of exposure due to their living or working conditions. Each company recently reported promising initial results, and further analysis of the data from the trials is ongoing.

Identifying Therapeutics to Treat COVID-19

Safe and effective therapeutics are urgently needed to treat patients with COVID-19. NIAID launched a multicenter, randomized placebo-controlled clinical trial, the Adaptive COVID-19 Treatment Trial (ACTT), to evaluate the safety and efficacy of multiple investigational therapeutics for COVID-19. ACTT-1 examined the antiviral drug remdesivir for treatment of severe COVID-19 in hospitalized adults. Based on positive data from ACTT-1, the FDA approved the use of remdesivir for treatment in adults and children 12 years of age and older and weighing at least 40 kg hospitalized due to COVID-19. ACTT-2 evaluated the anti-inflammatory drug baricitinib in combination with remdesivir, and based on favorable data from ACTT-2, the FDA issued an EUA for the use of baricitinib in combination with remdesivir for treatment of adults and children older than 2 years hospitalized with COVID-19 and requiring supplemental oxygen, invasive mechanical ventilation, or extracorporeal membrane oxygenation. ACTT-3 is currently evaluating treatment of patients hospitalized with COVID-19 with remdesivir plus interferon beta-1a, which is used to treat individuals with multiple sclerosis. ACTT-4 is currently enrolling adults hospitalized with COVID-19 to assess baricitinib plus remdesivir versus the glucocorticoid dexamethasone plus remdesivir.

NIAID, in collaboration with other NIH 13(A)-7(I(oid)]TJETQ0.00000912 0 612 792 reW*nBT/F1 12 Tf1

19 hospitalized

investigational therapeutics: SNG001, an inhalable beta interferon; AZD7442, an investigational long-acting antibody combination; and camostat mesilate, an orally administered molecule that may block SARS-CoV-2 from entering cells. ACTIV-3 currently is evaluating the AZD7442 monoclonal antibody combination in hospitalized patients. In addition, NIAID launched a Phase 3 trial called, "Inpatient Treatment with Anti-Coronavirus Immunoglobulin," or ITAC, to evaluate hyperimmune intravenous immunoglobulin for treatment of COVID-19 in hospitalized adults. NIAID also began a Phase 3 CoVPN trial of an Eli Lilly combination therapy, bamlanivimab and etesevimab, for treatment of mild to moderate COVID-19.

countermeasures to address them. The SIG was established by HHS to facilitate coordination among NIH, the Centers for Disease Control and Prevention (CDC), FDA, BARDA, the Department of Defense (DOD), and the U.S. Department of Agriculture (USDA) to detect and address SARS-CoV-2 variants as they emerge. NIH, CDC, and DOD are assessing whether vaccine-induced immunity, or natural immunity from prior infection, can be effective in combating the variants. NIH, BARDA, and DOD also are determining the efficacy of certain authorized therapeutics against emerging variants in cells and in animal models. In addition, NIAID is collaborating with vaccine manufacturers on key areas of research to investigate whether vaccines designed for the original strain of SARS-CoV-2 could maintain efficacy against emerging variants. NIAID also plans to test new vaccine formulations designed specifically to protect against certain variants that show early indications of reduced sensitivity to existing countermeasures.

NIAID, the National Human Genome Research Institute, and the National Library of Medicine are participating in the SARS-CoV-2 Sequencing for Public Health Emergency Response, Ep

Monitoring the Long-term Effects of COVID-19

Many people who have had COVID-19 report continued symptoms as they transition from the acute to post-acute phases of the disease, and we continue to learn more about the duration and manifestations of COVID-19 as we hear from these patients. In December 2020, NIAID hosted a Workshop on Post-Acute Sequelae of COVID-19 with clinicians, immunologists, virologists, and members of the patient community to present existing data, identify key knowledge gaps, and explore different perspectives on this heterogeneous condition. Subsequently, NIH announced a trans-NIH effort to address PASC, including targeted funding for research in this critical area. The NIH PASC Initiative will complement ongoing NIAID studies to better understand the various post-acute manifestations of COVID-19 in various populations.

NIAID intramural scientists initiated the Longitudinal Study of COVID-19 Sequelae and Immunity to better understand PASC and determine whether people who have recovered from acute SARS-CoV-2 infection develop an immune response to SARS-CoV-2 that provides protection against reinfection. NIAID-supported investigators also have established the Immunophenotyping Assessment in a COVID-19 Cohort (IMPACC) to determine how immunological markers correspond to, or may even predict, the clinical severity of COVID-19. Since May 1, 2020, IMPACC researchers have collected detailed clinical data along with blood and respiratory samples from 1,800 hospitalized COVID-19 patients of diverse race and ethnicity at approximately 20 hospitals nationwide. The cohort will be followed during hospitalization and up to one year after discharge to assess their functional and immunologic recovery.

Conclusion

NIAID continues to expand efforts to elucidate the biology, pathogenesis and clinical manifestations of SARS-CoV-2 infection, including emerging variants, and to employ this knowledge to develop safe and effective interventions to diagnose, treat, and prevent SARS-CoV-2 infection and COVID-19. NIAID is focused on developing safe and effective SARS-CoV-2 vaccines and therapeutics and sensitive, specific, and rapid point-of-care molecular diagnostic and serological tests. NIAID also is conducting early stage research on candidate vaccines that could protect against multiple strains of coronaviruses. These efforts will improve our response to the current pandemic and bolster our preparedness for the next, inevitable viral disease outbreak.