Pandemic leads to broader use of monoclonal antibodies

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New cases of COVID-19 in the United States have dropped by about 75% from the latest peak in mid-January, but as of Feb. 14, the two-year-old pandemic had claimed more than 920,000 lives, more than in any

other country. Even now, more than 2,000 deaths are reported every day.

Most at risk: the millions of Americans who are still unvaccinated or not fully vaccinated, and those whose immune systems are compromised or have been suppressed and do not respond to vaccinations. These include patients being treated for cancer or who have received organ transplants.

That is why antiviral drugs and coronavirus-fighting monoclonal antibodies, including those discovered by James Crowe Jr., MD, Robert Carnahan, Ph.D., and colleagues at Vanderbilt University Medical Center, are so important in the continuing fight against COVID-19.

"One positive takeaway from this pandemic is that it has vaulted antiviral monoclonal antibodies into broader usage," said Carnahan, associate director of the Vanderbilt Vaccine Center. "In a worst-case scenario where an efficacious vaccine is not rapidly forthcoming, antibodies can provide the needed protection to prevent or limit a new outbreak.

"Regardless of the status of protective vaccines, we have seen that antibodies will be critical for treating viral infection and protecting those unable to mount a suitable vaccine response," he said. "As we see with the demand for Evusheld, the need for antibody drugs is great."

Evusheld is the name of the long-acting antibody combination discovered at VUMC and optimized and developed by the global biopharmaceutical company AstraZeneca.

According to the U.S. Department of Health and Human Services, nearly 550,000 doses of Evusheld had been distributed to state health departments in the nine weeks since it was granted emergency use authorization by the U.S. Food and Drug Administration on Dec. 8.

Evusheld currently is the only monoclonal antibody product given by intramuscular injection to prevent infection by the COVID-19 virus. It is authorized only for uninfected adults and children 12 years and older who are immunocompromised or have a history of a severe adverse reaction to a COVID-19 vaccine.

Evusheld provides about six months of protection with only minor side effects such as rash, headache and mild fever. It currently is one of three approved monoclonal antibody products shown to protect against the predominant omicron variant.

The others are Xevudy, the GlaxoSmithKline/Vir Biotechnology antibody first approved in May 2021, and Eli Lilly's bebetelivab, approved on Feb. 12, 2022. Both products are given by intravenous infusion to patients who have been infected and who are at high risk of becoming severely ill or dying from COVID-19.

"The next great barrier," said Carnahan, associate professor of Pediatrics at VUMC, "is accelerating the regulatory approval, production and distribution of antibody countermeasures."

Crowe, who directs the Vanderbilt Vaccine Center, is the Ann Scott Carell Professor and professor of Pediatrics and Pathology, Microbiology & Immunology at VUMC. He, Carnahan, and their colleagues have developed ultrafast methods to discover highly potent antiviral human monoclonal antibodies and validate their effectiveness.

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