

OUR BEST SHOT

In a world where developing a vaccine for a dangerous disease used to take years, it turns out getting shots into arms also can be a considerable challenge. By Julia Fraser

St. Patrick once again fell victim to COVID-19.

Last year, the City of Pittsburgh canceled its parade honoring the Irish patron saint—a local celebration dating back to the mid-1800s—and the bars and restaurants that thrive during such events were shuttered. This March, the scene reflected the glass half-full-or-empty state of the pandemic one year later.

The parade, which was originally scheduled for March 13, was “postponed” to a later date to be determined. A few dozen die-hard revelers walked the would-be parade route on their own, but only a handful of onlookers were there to appreciate them. Some restaurants opened, but to only half of their legal indoor occupancy. And a green beer could only be had with the purchase of a meal.

Meanwhile, daily life in the midst of a global health crisis continued to evolve—and not necessarily in encouraging ways. At the beginning of spring, the average number of new COVID-19 cases per week in Allegheny County was more than 10 times greater than the number a year earlier. New

variants of the coronavirus, believed to be more easily transmitted and dangerous, had been detected.

And the race to administer vaccines that offer relief from the pandemic life was fraught with challenges, ranging from building up supply to developing distribution strategies that ensured equal vaccination access to addressing hesitancy among some about getting the shots.

“The vaccine represents such a sign of hope, of a return to normalcy,” said Tami Minnier, chief quality officer at UPMC. “But the biggest challenge [initially] was availability. When the announcement [of the vaccines] started in early December, the world pivoted to: ‘When can I get my vaccine?’”

For federal and local government officials, health care organizations and nonprofits in the U.S., the struggle later morphed from trying to get more vaccine to people to trying to figure out how to get more people to want the vaccine.

The most ambitious mass vaccination effort in our country’s history began late last year after the U.S. Food and Drug Administration gave emergency approval to two COVID vaccines developed by the drug makers Pfizer-BioNTech and Moderna. Both use synthetic messenger ribonucleic acid— mRNA—to instruct the body’s immune system to see “spike” proteins on the COVID virus as an intruder and make antibodies to fight it. Several news stories described how mRNA science is more than four decades old, but only recently has it been used against a fast-moving virus.

Both were among what The New York Times has reported as nearly 100 vaccines developed in laboratories worldwide as scientists around the globe focused on stopping COVID. Both went from the lab to the arms of Americans in months rather than years. And the developments of both were boosted by the federal government agreeing to buy tens of billions of dollars’ worth of vaccine.

A third vaccine developed by Johnson & Johnson earned FDA approval in February. It tells the body to launch an immune response to COVID by engineering a harmless adenovirus—a virus family that includes common colds—to deliver those instructions. Like the Pfizer and Moderna vaccines, the Johnson & Johnson shot was found to be highly effective at preventing serious COVID infections that lead to hospitalizations and deaths.

The first vaccine in the Pittsburgh region went into the arms of five UPMC employees in December. Immediately after that, demand for the shots skyrocketed, outstripping the supply on hand for several months in southwestern Pennsylvania, the state and the nation.

The logistical challenges were daunting. States and counties clamored for more vaccines to meet demand, making it clear that inoculating the public had to be done in phases. The Pfizer and Moderna vaccines require two shots spaced 21 days apart for Pfizer and 28 days apart for Moderna, which complicated scheduling. The two mRNA vaccines had to be shipped and stored in ultra-cold freezers. Supply chains had to be established. Vaccine registration systems had to be created. Armies of workers had to be trained to give the shots. Venues had to be secured.

The U.S. Centers for Disease Control and Prevention issued guidance to the states for prioritizing who gets the shots. Health care workers and residents of long-term care facilities stood at the front of the line. They were followed by

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America's massive vaccination effort began in December after the U.S. Food and Drug Administration gave emergency approval to the Pfizer-BioNTech and Moderna COVID-19 vaccines, followed in February by FDA approval of the Johnson & Johnson vaccine. But this critical first step was just the beginning of what became an arduous journey to get shots in the arms of the majority of people across the country.



Authorization

On Dec. 11, 2020, the U.S. Food and Drug Administration gave emergency approval for the Pfizer-BioNTech COVID-19 vaccine to be used in individuals 16 and older. It was the first vaccine authorized in this country as part of the battle to bring an end to the deadly global pandemic. In May, the FDA expanded the emergency authorization for the Pfizer vaccine to include adolescents ages 12 to 15.



Distribution

The first deliveries of COVID-19 vaccines began Dec. 13, 2020. Specific amounts of COVID-19 vaccine doses were made available to states and jurisdictions, initially with only local leaders determining distribution. Federal officials became more involved in the distribution process this year.



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Vaccination

Charmaine Pykosh, a nurse practitioner, was among the first staff at UPMC Children's Hospital of Pittsburgh to receive the COVID-19 vaccine after it arrived Dec. 14. The Centers for Disease Control and Prevention initially recommended prioritizing health care personnel and residents of long-term care facilities to receive the vaccination first.



Hesitation

As the vaccine supply increased, hesitancy about getting vaccinated also grew among some groups. In the spring, nearly 12 percent of adults in America reported being hesitant about receiving a COVID-19 vaccine, according to a U.S. Census Bureau survey, with reasons ranging from concern about the vaccine's side effects to distrust of the government.

older residents and groups of people whose places in line were based on their exposure to others in their work.

But most of the responsibility of getting vaccines in the arms of their residents fell on state and county governments, particularly during the early months of the rollout.

“The number one challenge was the supply of vaccine, which resulted in the need for priorities and increased the anxiety of community members waiting to be vaccinated,” said Dr. Debra Bogen, director of the Allegheny County Health Department. “There was a great deal of uncertainty for many people, including the Health Department, as we waited to hear what vaccine we were receiving.”

The county Health Department, which typically received about 11 percent of the vaccine delivered to the county, focused its vaccination efforts on the general public, starting with people 65 years or older and those 16 years or older with compromised health conditions in an effort to stem hospitalization or death due to COVID-19. But the priority phases were an imperfect tool to stem health inequities.

The Black Equity Coalition, a Pittsburgh-based group of medical doctors, public health researchers, and business and community leaders, stepped in to make sure the region’s Black community wasn’t left out of the conversation.

“While it is true that most of the hospitalizations and deaths are age 65 and older across race, we know that at younger ages, Blacks are disproportionately affected. They have much higher rates of hospitalizations and deaths,” said Dr. Tiffany Gary-Webb, a member of the coalition and an associate professor in the departments of epidemiology and behavioral and community health sciences at the University of Pittsburgh Graduate School of Public Health.

She and other coalition members insisted that from an equity perspective, the age category needed to go lower, particularly for Black communities.

During the first months of the vaccine distribution, registration for scarce vaccination appointments was almost exclusively done online—a disadvantage for seniors of all races and others who lacked Internet access or the ability to navigate county and hospital websites.

In response, the United Way of Southwestern Pennsylvania partnered with the Health Department to use its 211 hotline system to schedule appointments over the phone for those unable to do so online—an effort that The Heinz Endowments helped fund. Those answering the phones were swamped with 15,000 calls per second the first day.

“It’s amazing that the whole system didn’t crash,” said Bobbi Watt Geer, president and CEO of the United Way of Southwestern Pennsylvania. “We had floods of calls. There was

Disparities

From access to essential services to the job market to testing availability and now to vaccinations, participation rates for people of color have lagged behind those of white individuals. The chart below shows the vaccination rates for different racial groups based on the information collected by the Pennsylvania Department of Health for those who have received at least one vaccine dose. The information reveals not only the vaccination rate disparities but also data gaps in tracking race at the county and state levels. The designation of “other” indicates the percentage of vaccinated people at each level whose race is unknown. (Note: A national comparison is not included because racial statistics are collected and reported differently by federal officials.)



*As of June 16, 2021

only so many we could put in the queue. The sheer volume and the desire to get the vaccine was there and it continued.”

Another challenge was communication along the complicated supply and distribution chain involved in the mass vaccination campaign, said Alison Beam, acting health secretary for the Pennsylvania Department of Health.

“You have the federal government, who does the purchasing and the allocating to states. The state does the allocating to the provider network, which administers the shots, and you have patients who have to go and seek getting vaccinated,” she explained. “Having that many folks play a role in one process is always a potential for confusion.”

The federal government took a more aggressive role in the vaccine rollout following President Joe Biden taking office in January. The government bought an additional 100 million doses each of the Pfizer and Moderna vaccines. President Biden also brokered a deal that recruited drugmaker Merck to help accelerate production of the Johnson & Johnson vaccine. Money for vaccine administration was included in a \$1.9 trillion stimulus package signed into law in March.

The availability of vaccines expanded, widening eligibility. Allegheny County added vaccine clinics as supplies increased. Local hospitals and other health care providers expanded appointments. Large venues, such as PNC Park, were used as mass vaccination sites.

At the beginning of April, President Biden announced all adult Americans would be eligible to get the vaccine by April 19 rather than his original goal of May 1. Pennsylvania Gov. Tom Wolf had set April 19 as the state’s mass eligibility date weeks earlier and later moved it up the calendar to April 13. In May, the FDA authorized the Pfizer vaccine to be given to adolescents ages 12 to 15.

As eligibility opened up, gaps persisted, Dr. Bogen said. The Health Department was determined to address any geographic, racial or age-related gaps in distribution through “ongoing conversations with other providers in the county” so that different agencies could work with each other to address needs.

Identifying gaps in vaccination distribution across race wasn’t easy. While the state mandated that providers report race for those they vaccinated, many were slow to do so. By mid-June, the races of more than 11 percent of the people vaccinated in Allegheny County were still unreported.

Mark Lewis, president and chief executive officer of POISE Foundation, which supports and advocates for Black residents and communities in the Pittsburgh region, and member of the Black Equity Coalition, decried the lack of data.

“If a certain community is experiencing a higher rate of cases, a higher rate of hospitalizations, a higher rate of death, then, when I’m rolling out the vaccine, I’m going

to proportionally put the vaccine in those places,” he said. “Unfortunately, race is not being collected. How do you determine if the vaccine is getting to the most vulnerable places that are experiencing the highest rate if you’re not collecting race?”

Then, as the vaccine supply increased, it became apparent that not everyone was lining up for a shot. The U.S. Census Bureau’s Household Pulse survey found that the reasons for hesitancy ranged from concern about the vaccine’s side effects to distrust of the government.

“The vaccine, if enough of us get it, will allow us to return to normalcy,” Dr. Bogen said. “But to get there we must erase vaccine hesitancy and replace it with vaccine confidence.”

The COVID-19 pandemic has offered several important lessons about the nature of global health crises, experts said.

“In the beginning, there was a complete misunderstanding about what a pandemic is,” said Maureen Lichtveld, dean of Pitt’s Graduate School of Public Health. “It’s not a medical problem. It’s not a clinical problem. It’s a public health problem.”

It’s also a crisis that goes beyond the reach of public health agencies.

The first lesson Dr. Bogen said she’d take away from this past year is that the pandemic affected everyone differently.

“It is challenging, but important, to address the needs of every individual person—and those needs span well beyond what public health agencies alone can tackle,” she said.

The pandemic exposed, for example, how chronic disparities across races and communities is a crucial issue that goes deeper than public health expertise.

Symptoms of disparities have historically received more attention than their root causes, according to Dr. Lichtveld. Investment in addressing those causes and in improving public health preparedness, she said, is “the best way we can be more effective come the next pandemic.” **h**

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