**Oral Covid-19 drugs: access inequity between US states dampen impact**

**Dek:** An analysis of the demand for Covid-19 therapeutics and their supply has identified states with a disproportionate shortage

The rapid development and authorization of Covid-19 therapeutics was meant to stem the impact of the tide of cases. But a restricted supply has created acute shortages in some states with a significant Covid-19 case burden. An analysis of publicly available data indicates recent allocations have been below average for certain states failing to meet the demand, while other states have developed a surplus.

Antivirals, namely molnupiravir, developed by Merck and Ridgeback Biotherapeutics, and Pfizer’s Paxlovid, have generated particular interest given that they can be taken orally, conjuring ideas of convenience and accessibility. GlaxoSmithKline’s sotrovimab, the only authorized monoclonal antibody that works against the Omicron SARS-CoV-2 variant, rounds up the list of effective authorized therapeutics, but is administered intravenously.

(Suggestion to replace two paragraphs below)

However, in many states the supply of oral therapeutics remains inadequate in comparison to the demand, according to analysis of data published by the US Department of Health and Human Services (HHS). The data, which lists providers reporting availability of molnupiravir and Paxlovid, shows that Colorado, Tennessee and Florida are among those facing acute shortages of the oral antivirals.

Our analysis, which has combined HHS data with population data from the US census and Covid-19 case data from the Centers for Disease Control and Prevention, revealed that providers in some states are reporting going through their allocations quickly, while other states have received more than their current requirements. In fact, during the most recent phase of distribution for Paxlovid states with high availability of the antiviral received, on average, more new doses than states experiencing shortages.

However, the supply of oral therapeutics remains inadequate in comparison to the demand, according to data analysed from a Therapeutic locator dashboard run by the US Department of Health and Human Services (HHS). US states like Delaware, North Dakota, and Florida, in particular, face an acute shortage compared to others.

Moreover, it appears that some are going through the allocation much quicker while other states where cases have begun to reduce continue to receive more than their current requirements. This is based on an analysis of that takes into account Covid-19 infection rates from the Centers for Disease Control and Prevention, HHS’ distribution data and US Census data.

[**https://app.datawrapper.de/chart/t8AYI/publish**](https://app.datawrapper.de/chart/t8AYI/publish)

For example, while the national average of Paxlovid courses available to each state is 22 per 100,000 individuals, as per HHS data, Florida has no providers reporting Paxlovid availability while only three courses for every 100,000 people are reported for Tennessee. Molnupiravir, marketed as Lagevrio in the UK, also seems to be hardly available in Tennessee, while South Carolina and Colorado have only 13 and 18 courses available respectively, per 100,000 individuals in each state.

Several news agencies have reported the difficulty patients and providers have faced in getting access to these therapeutics. “Even though resources like the Therapeutic locator can point you to where a site has at least received a shipment, it doesn't mean they have it in stock,” says Michael Ganio, the director of pharmacy practice at American Society of Health Systems Pharmacists.

(I’ve removed reference to the Therapeutic locator now, so might need a line before the quote above explaining what it is.)

For example, a prescription can be made for Paxlovid at around noon, but the center could have run out of medication earlier in the day and not updated its stock on the dashboard till much later. “It is challenging for pharmacists who are receiving phone calls asking if they have the therapies, and on patients in search of these therapies,” says Ganio.

“Every step in that process takes time, and the longer that goes, the farther they're getting away from the five-day window in which these oral therapies and monoclonal antibodies are proven to be the most effective,” says infectious diseases clinical pharmacist Justin Moore at Northwestern Memorial Hospital.

Paxlovid, which consists of nirmatrelvir tablets co-packaged with ritonavir, is to be taken as soon as possible after a Covid-19 diagnosis and within 5 days of symptom onset, as per its label. Both Paxlovid and molnupiravir are taken as per five-day regimens.

HHS is said to update the locator is daily. The agency did not respond to a request for comment.

https://app.datawrapper.de/chart/L597f/publish

**Supply chain disrupted**

The majority of Covid-19 cases are mild and in vaccinated, and particularly boosted people, but there are still hospitalisations and intensive care admissions, which has overwhelmed the hospital system at times, says epidemiology professor Dr Luis Ostrosky. “It has been challenging to meet the demand,” says Ostrosky who practices at the University of Texas Health Sciences Center at Houston.

As per AmerisourceBergen, the company contracted to distribute Covid-19 therapeutics, the HHS determines weekly distribution amounts based on new Covid-19 cases and hospitalisations in each state or territory, and inventory and usage data.

However, the rapidly evolving Covid-19 burden means that some states are running through the supply faster than others. Florida has only 80 available courses of either molnupiravir or Paxlovid for every 100,000 people, according to HHS data. In comparison, Louisiana and Wisconsin – states with similar Covid-19 case levels to Florida – both have in excess of 200 available courses per 100,000 people.

https://app.datawrapper.de/chart/TGrwF/publish

At the other end of the spectrum, Illinois and Maryland’s shares of all available **oral antiviral** courses (5.1% and 2.2%) far exceed their shares of new Covid-19 cases in the country (2.7% and 0.5%).

To understand which states have providers reporting high availability of courses relative to their Covid-19 burden, we compared the number of new cases in the past seven days to the stock of available molnupiravir and Paxlovid. Maryland, where case levels started to decline earlier than in most other states, currently appears to be one of the states with the most plentiful stocks, with just 1.4 new Covid-19 cases for each oral antiviral. In contrast, South Carolina, which currently has one of the highest case rates in the country, has 131 Covid-19 cases for each available oral antiviral.

Maine stands out as one of the few states not to experience a dramatic increase in case rates during the recent Omicron surge, and yet it too has high stocks of available courses – currently 3 for every new case. Both Tennessee and North Dakota have over 20 new Covid-19 cases for each available antiviral course.

“My understanding of this system is that they do take into account the size of the population and the caseload that they experience,” says Ostrosky. While the supply has been limited, he said medications have been accessible in Texas. But he adds, colleagues in other parts of the country with a high case burden, have had a different experience in prescription and availability of drugs.

(

Do we want to add here (between sentence one and two) something like:

“While our analysis shows that the most recent state allocations of molnupiravir and Paxlovid have been very closely correlated with population size, they have been negatively correlated with current case levels.”

?)

Florida, which has some of the counties reporting the highest Covid-19 infection burden nationally, presents a notable case study. It currently accounts for over 5% of all new Covid-19 cases in the US in the past seven days but its providers report only holding 3.6% of all available therapeutic courses, including just 1.1% of available courses of Paxlovid, which has emerged as the favored oral antiviral based on its safety and efficacy. The timing of the Omicron surge has been variable in different parts of the country, and Tennessee and Colorado report 3.1% and 1.4% of all cases on the national level respectively but have only 0.8% and 0.5% of all therapeutic courses.

<https://app.datawrapper.de/chart/VqGsg/publish>

Since the HHS began publishing data on available courses of antivirals at the end of December, we have seen many states have a surplus, particularly for molnupiravir. On January 11, Pennsylvania had just under 50 available courses of molnupiravir per 100,000 people. This more than doubled to over 115 by January 24 and increased to 163 per 100,000 people on February 2, even as case numbers continue to drop.

Meanwhile, stocks have been decreasing in other states. Colorado has 18 courses of molnupiravir per 100,000 compared to 26 in early January. Tennessee has also seen its available courses fall during the month – from 58 to 48 per 100,000 people. **TK Average molnupiravir courses/state**

**Omicron impact**

The Delta surge from earlier in 2021 affected the distribution system by leaving a lasting impact. “The Delta variant meant severe Covid-19 disease but had lower transmissibility, so the demand for monoclonal antibodies was much lower than what we've seen recently,” says Moore. Omicron changed the supply dynamics significantly, because of its infectivity rate. Once it rendered other authorized mAbs by Eli Lilly and Regeneron ineffective, that reduced the number of effective treatments. “When there was a reliable supply of the mAbs by Eli Lilly or Regeneron, there were no issues in getting it for patients, but now supply [of effective antivirals] is the rate-limiting factor,” says Ostrosky.

In early 2021, individual pharmacies could order the treatments through open access, says Ganio. But, in order to maintain an equitable distribution, not just in terms of location and patient populations but also to ensure that there are enough supplies over time, the government took over the system again and this has continued over the most recent surge as well, he explains. These are then distributed on a state and county level to local centers. It was the right move to place the oral antivirals in retail pharmacies because they are very widely distributed in both urban and suburban areas, says Ostrosky.

Details on [sotrovimab](https://www.pharmaceutical-technology.com/news/gsk-vir-sotrovimab-eua/), the only mAb treatment that is [effective against Omicron](https://www.pharmaceutical-technology.com/special-focus/covid-19/covid-19-gsk-sotrovimab-activity-omicron-variant/), currently the most dominant variant in most parts of the world, are not included in the Therapeutic locator. A separate database maintained by the HHS that is updated weekly does include information on sotrovimab. A GSK spokesperson said the company did not have any information to provide on sotrovimab’s supply since the HHS was controlling the allocation and distribution.

Several weeks ago, Moore says his hospital saw the highest number of patients its ever seen, even compared to the time before the availability of vaccines, but there has been a downward trend since. “But the point of these drugs is to keep people out of the hospital, so the high demand will not be going to go away anytime soon, especially with the Omicron variant’s transmissibility,” he adds. “We have such a high demand that we're not able to supply them… and it’s frustrating for patients. It's frustrating for a clinician”.

“It is important to ramp up production and increase distribution, because while Omicron is peaking in some places, it is barely starting in others,” Ostrosky says. “Even if a place hits the peak in infections, it will take four to six weeks to go down to pre-Omicron levels, so we're going to be in the situation of a high caseload in the US for at least the next 2-3 months”.