

has indicated that it will accept some of the safety data from KJ's treatment.

With these changes, Musunuru predicts that the team will be able to shrink the time needed to produce a therapy from six months to three or four.

Guide to regulators

The scientists are also publishing much of the written correspondence they had with the FDA, to serve as a model for other researchers. The team in Pennsylvania will be "a textbook example of a 'rising tide that lifts all boats'", says Fyodor Urnov, who studies

genome editing at the University of California, Berkeley's Innovative Genomics Institute (IGI), and helped to create KJ's treatment. "We at the IGI will gratefully ride on that tide," he says.

How far that tide can carry everyone is an open question. Musunuru is hopeful that the FDA will consider approving the therapy once another 5–15 children have been treated. But the researchers would need to find a company to sponsor the application.

"Personalized treatments are definitely the direction we need to steer towards," says Maple. "This technology could be more than a game changer. It could be revolutionary."

COVID IS SPREADING AGAIN — HOW SERIOUS IS IT?

Limited COVID-19 surveillance data are hampering vaccination and health strategies, researchers say.

By Katie Kavanagh

SARS-CoV-2 infections have been rising in the past month – global cases increased by more than 19,000 last month compared with the previous month, according to data posted on the World Health Organization (WHO) COVID-19 dashboard (see go.nature.com/4r66nzu).

But the real number of infections is much higher than that, researchers say, because

countries are less focused on collecting data on the infection now than they were during the COVID-19 pandemic.

"Surveillance is happening but it's at a much lower level than it used to be. We don't have a complete picture of virus circulation of the variants that are out there," says Maria Van Kerkhove, interim director of the department of epidemic and pandemic management at the WHO in Geneva, Switzerland. "I think there's a collective amnesia right now about COVID-19."



Data used to track the number of infections are less robust than during the COVID pandemic.

Even if people do test positive after using a home antibody test, there is no way to report a positive result in the community, says Antonia Ho, a clinical epidemiologist at the University of Glasgow, UK. Without high-quality surveillance data, Ho warns that health organizations are not well prepared to recommend corresponding vaccine formulations and time their roll-out. "Surveillance is critical to really understand what's circulating," she says.

How is COVID-19 being tracked?

Although surveillance data that are used to track the absolute number of SARS-CoV-2 infections are less robust than they were during the pandemic, researchers can still track information about the number of people with severe COVID-19 who require hospitalization. "Hospital-based surveillance is what we're mostly doing. But we also have wastewater surveillance, which is quite a useful indicator of what's happening in the community," Ho says.

Genomic analysis of samples containing the SARS-CoV-2 virus shows that the most common variants currently circulating globally are XFG, also known as Stratus or the 'Frankenstein variant', and NB.1.8.1, known as Nimbus. Stratus accounts for 76% of reported cases and is dominant in Europe and the Americas, whereas Nimbus is dominant in the Western Pacific region, accounting for 15% of cases, says Van Kerkhove.

Stratus and Nimbus have similar symptoms to previous variants, including a fever, cough and runny nose, but the Nimbus variant has one distinct symptom: a 'razor blade' sore throat. These two variants have been on the WHO's list of 'currently circulating COVID-19 variants under monitoring' since 4 September.

Van Kerkhove says that the latest information about SARS-CoV-2 strains is far from the complete picture of viral circulation. Even hospitalization data aren't as complete as they were during the pandemic – fewer than 35 countries still report COVID-19 data. "That's why we're trying to make sure that countries are still doing sequencing," says Van Kerkhove.

However, she adds that the currently available surveillance data are sufficient to "provide information to governments related to the effectiveness of vaccines".

Is COVID-19 seasonal?

Vaccination campaigns are focused on people over the age of 65 in the United States, or 75 in the United Kingdom and parts of Europe, and those with a weakened immune system who are older than 6 months. Michael Head, an epidemiologist at the University of Southampton, UK, would prefer a wider vaccine roll-out for younger populations as well. "It's still not a pleasant infection, and vaccines do still have a significant public-health benefit, so they are a vital tool in addressing the threat posed by COVID-19."

In many countries, including Germany and the United Kingdom, COVID-19 vaccine and booster roll-outs are offered as part of the annual influenza vaccination strategy in autumn, in preparation for the winter 'respiratory virus season' (this was also the case in the United States until September, when a key US vaccine advisory committee voted to stop recommending that all adults should get the COVID-19 vaccine.)

However, researchers studying SARS-CoV-2 question whether it is really a seasonal virus.

A study of COVID-19 transmission in 2021 showed that 90% of transmission occurred during temperatures between 3 °C and 17 °C (W. S. Byun *et al. Environ. Res.* **196**, 110972; 2021). And a study assessing COVID-19 in African nations found that the seasonality of asymptomatic transmission also correlated with when and where the weather was coldest

(Y. Montcho *et al. Model. Earth Syst. Environ.* **11**, 114; 2025). But surveillance data also show that rates of hospitalization owing to SARS-CoV-2 rise in summer months. "You could go to the emergency room in the middle of the summer and you'll find cases of people with COVID," says Ziyad Al-Aly, a clinical epidemiologist at Washington University in St. Louis.

Head argues that COVID-19 is not as seasonal as the flu or colds, raising the question of whether COVID-19 vaccine campaigns should be rolled out throughout the year and not just in autumn. "There's still a fairly significant burden in the summer," he says. But "it's hard to say, because there's no real [strict] definition to apply".

The 'holy grail' will be a combined all-in-one flu and COVID-19 vaccine that covers all variations of flu and SARS-CoV-2 viruses. "But we're a little way off that yet," says Head.

object in 2018, they didn't realize it was a superflare. After noticing the object brighten, researchers zeroed in on it with the Palomar Observatory's 5.1-metre Hale Telescope. But a graph of the light emitted by the object proved disappointing. "It didn't seem nearly as interesting as we thought it was," says Matthew Graham, an astronomer at the California Institute of Technology in Pasadena and a co-author of the paper (M. J. Graham *et al. Nature Astron.* <https://doi.org/g986dm>; 2025).

However, in 2023, the team noticed that, even after five years, the black hole remained peculiarly bright. So they took a closer look using the W. M. Keck Observatory in Hawaii, which revealed that the object was roughly 3 million kiloparsecs, or 10 billion light years, away. To appear so bright at such a great distance, the jets of light must have been particularly luminous. Astronomers now say that the flare is 30 times more luminous than any previously detected blaze of light from a black hole.

A trick of the light?

The authors investigated several possible causes of the flare. Perhaps there was a supernova near the black hole, or the flare was merely a trick of the light, appearing much brighter than it was in reality because of gravity's warping effects. But the team found that neither explanation matched well with observations.

Their leading theory, the authors say, is that a massive star met its doom while straying too close to the black hole. As the black hole's gravity shredded the star, the star's jets of light flared about 40 times brighter than they did before. The team also thinks that because the flare has yet to die down completely, the star still hasn't been consumed fully.

As astronomers continue to watch the star's demise unfold, Joseph Michail, an astronomer at the Harvard and Smithsonian Center for Astrophysics in Cambridge, Massachusetts, is interested to see whether the jets will gradually dim, or perhaps flare up again as the light reaches surrounding gas and dust. He also thinks that future sky surveys might soon allow researchers to find many more beacons like this one. "These probably are going to become normal events," Michail says.

Graham thinks that if astronomers are to understand the mysterious flares fully, they'll need to keep their eyes on the sky for some time to come. This black hole is so distant from the Solar System that it takes about seven Earth years to witness just two years of the black hole's activity. Astronomers can effectively watch the black hole devouring the star at only one-quarter speed. To witness more of these events in totality, "it'll be a very long game", Graham says.

BIGGEST BLACK-HOLE OUTBURST RECORDS DEATH THROES OF A STAR

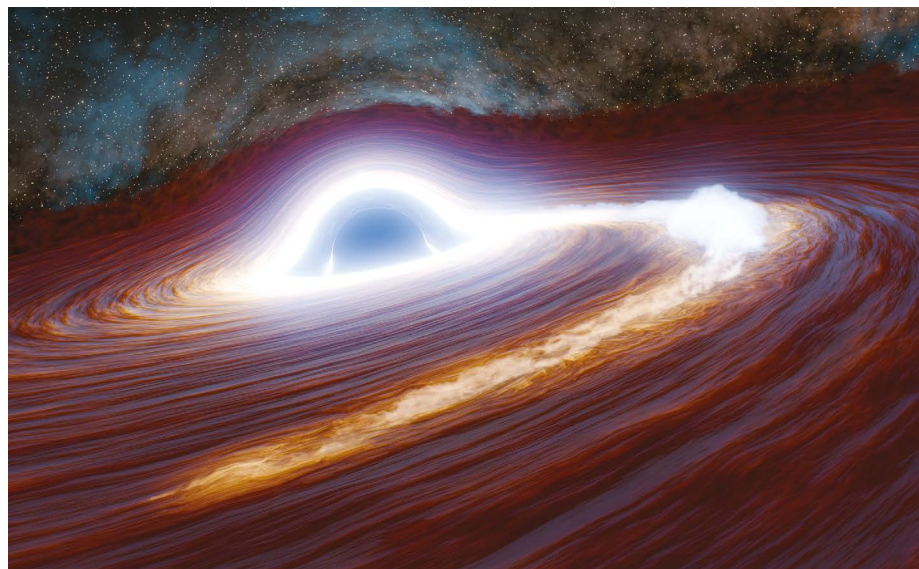
A 'superflare' 10 trillion times brighter than the Sun is confirmed as the record-holder for luminosity.

By Jenna Ahart

Black holes can get energy boosts by 'snacking', although their dish of choice is rather different from our own. Analysis suggests that the most luminous burst of light ever detected

from a black hole – a fireworks show that was, at its peak, more than 10 trillion times brighter than the Sun – flared up as the black hole gobbled up a star that was at least 30 times as massive as the Sun. The findings were published on 4 November.

When astronomers first laid eyes on the



The slow consumption of a star by a black hole (illustration) unleashed a bright blaze of light.