More than 540 studies, 80 clinical trials and 200 viral genomes: The scientific system is working at full capacity in the Covid-19 epidemic.

Right now, on open scientific servers for preprints such as biorxiv, more than 283 articles on SARS-CoV-2 virus and Covid-19 epidemic have been published. The figure surpasses the number of articles that are officially published in scientific journals, currently about 261. T

On January 22, Dave O'Connor and Tom Friedrich invited several dozen colleagues across the US to participate in an online meeting on Slack. Two scientists working at the Wisconsin National Primate Research Center have been closely following the news of the Covid-19 epidemic in China.

They know that the time will come, researchers will need their chimpanzees to answer some important biological questions about the new strain of SARS-CoV-2 virus.

" *We called a group of researchers and told them, kind of," Hey, let's sit down and talk* , "O'Connor said. During that meeting, Friedrich presented an idea that scientists should coordinate their research to ensure that results are shared and collated.

They named the conversation on Slack the Wu-han Clan, after the Wu-tang Clan, a popular hip-hop group from the '90s in the United States.

Pathologist Professor Dave O'Connor at Wisconsin National Primate Research Center.

More than 540 studies on Covid-19 have been published

The Wu-han Clan is just one of the examples of the increasing efficiency of scientific groups around the world, especially in the face of crises like Covid-19.

Right now, on open scientific servers for preprints such as biorxiv, more than 283 articles on SARS-CoV-2 virus and Covid-19 epidemic have been published.

The figure surpasses the number of articles that are officially published in scientific journals, currently about 261. The total number of studies conducted and published so far has reached more than 540 works.

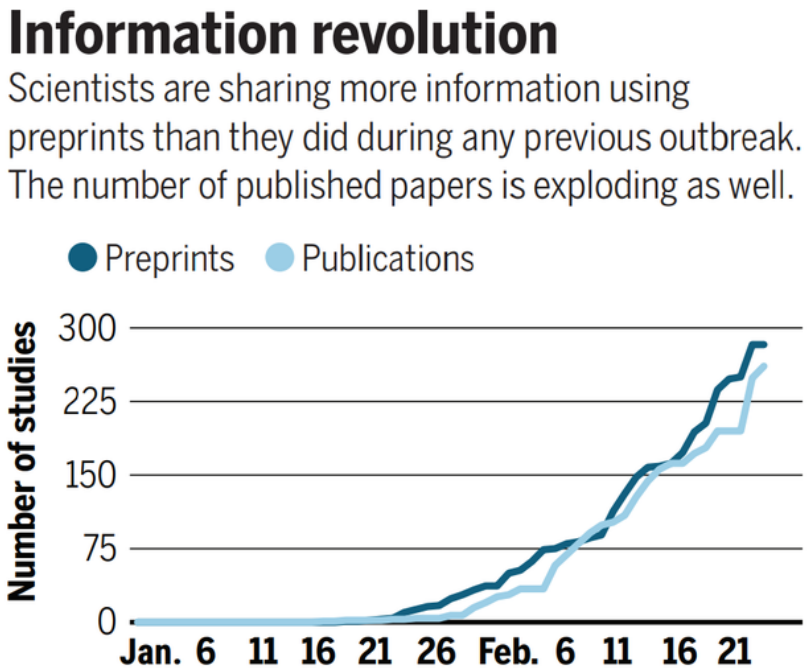
John Inglis, head of the Cold Spring Harbor Laboratory, and runs both of the world's largest biomedical publishing servers, bioRxiv and medRxiv, said he receives about 10 articles a day about New corona virus theme.

This flood is " *a challenge for our small team, who are working overtime both at night and on weekends* ," Inglis said.

Open scientific publishing platforms are becoming an important data warehouse in Covid-19. That's where research works are posted and shared the fastest, where scientists around the world have free access and download the data they need.

These new data related to the Covid-19 translation will be dissected on platforms such as Slack, Twitter and other social networks, before they are officially reviewed and published in a prestigious magazine. Ten years ago it was an impossible thing.

" *This is a very different experience from any disease I have ever experienced,* " said epidemiologist Professor Marc Lipsitch, director of the Center for Infectious Dynamics at TH Chan School of Public Health. *ever participated. "*



283 articles on SARS-CoV-2 virus and Covid-19 epidemic were published in preprints, compared to 261 in mainstream scientific journals (Publications).

The growth of scientific communication has become a powerful catalyst for researchers around the world to collaborate and share the knowledge they gain, faster than any disease outbreak ever occurred. in the past.

"An unprecedented amount of knowledge has been created within 6 weeks," said Jeremy Farrar, head of the Wellcome Trust, a non-government organization in the UK.

In previous epidemics, scientific information was often published very slowly. Although the researchers completed their work, they kept important data until the end, before their paper was accepted by a highly respected and peer-reviewed journal.

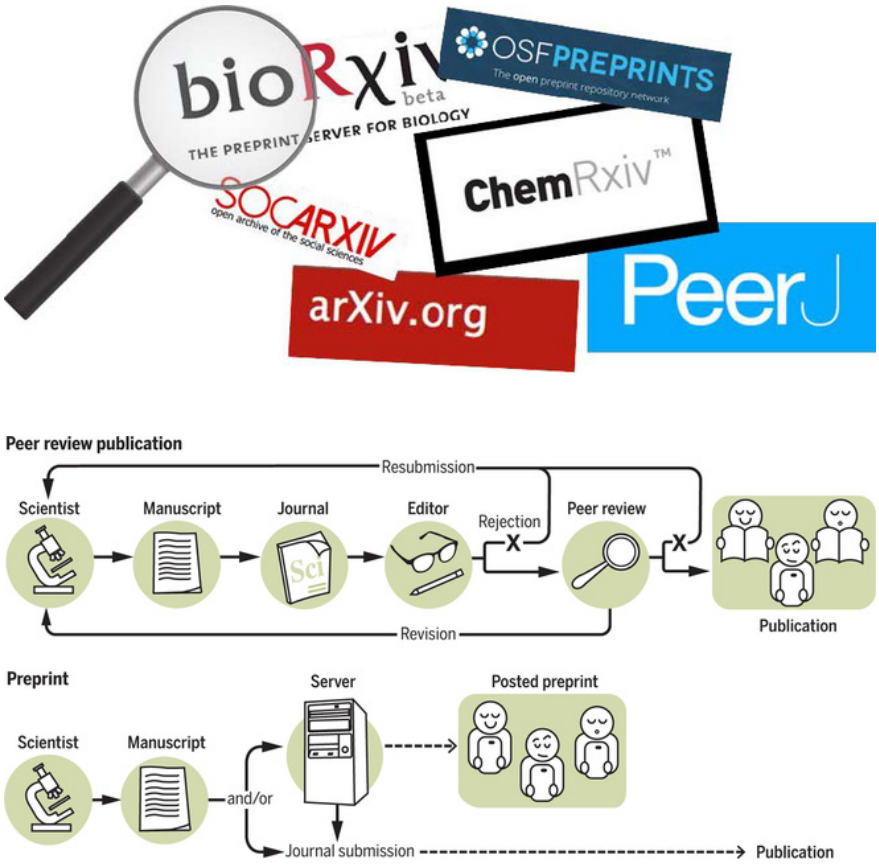
The reason may be because they are worried that competitors may refer to their data and ideas to carry out other studies. And even if researchers were willing to share their findings earlier, about 10 years ago there was no platform to allow them to do so.

It was not until the last few years that Professor Lipsitch realized that servers that publish scientific papers before publication and peer review could change that harsh reality. On these platforms, researchers can publish their data quickly and still receive a certain reputation, regardless of which article they later publish in a scientific journal.

In a 2018 paper, he and his colleagues analyzed to draw conclusions, that pre-published scientific papers promoted the spread of data during the 2015-2016 Zika epidemic and Ebola epidemic in West Africa 2014-2016.

Most pre-published articles were published more than 100 days faster than they were published by a scientific journal.

** Subscribe, update information and the latest research on the Covid-19 epidemic here.*



Open scientific servers for pre-published scientific papers (Preprints) minimize many steps compared to traditional scientific publications, helping scientific information and data to be shared and accessed more quickly.

More than 80 clinical trials are underway in China

In parallel with scientific papers, clinical trial studies are also being promoted very quickly. Nature reports that as of mid-February, 80 Chinese clinical trials of the drug Covid-19 have been conducted or are pending approval.

These tests range from anti-viral drugs of modern medicine to traditional medicine methods that have been thousands of years old in China.

On January 31, when the World Health Organization (WHO) declared the Covid-19 epidemic to an international emergency (PHEIC), Chinese scientists said they had evidence that Song Huang Lien, a traditional Chinese

liquid medicine, has the ability to inhibit the SARS-CoV-2 virus.

They immediately set up a clinical trial of the drug on 400 patients at Shanghai Public Clinical Public Health Center and Tongji Medical Institute in Wuhan City, Hubei Province.

Remdesivir, a drug inhibitor of biotechnology company Gilead, was once designed to fight Ebola.

Remdesivir has been distributed to a group of 760 patients infected with Covid-19 in China, which will soon be deployed into two clinical trials on 1,000 more patients.

Soumya Swaminathan, chief scientist of the World Health Organization, says that WHO teams have joined with China, to ensure that standards for every clinical trial taking place here are also included. as worldwide.

Chinese trials can scale up to more than 600 participants, if not designed with rigorous standards for research parameters, such as the control group, to ensure randomness and accuracy of the method as well as clinical results, such efforts will be futile.

Therefore, WHO will have to set a set of clinical trials standards in China, but at the same time ensure it is designed to be flexible and allow researchers around the world to aggregate their results. by the time.

In China, biomedical researchers can look up drug test information on the Chinese Clinical Trial Registry, a system for listing and comparing clinical trials that are currently underway. In addition to remdesivir and Song Hoang Lien, China is currently conducting trials of many other drugs to treat Covid-19.

These include chloroquine, a drug used to treat malaria. Researchers are also looking into whether steroids can reduce inflammation in people with severe symptoms of Covid-19.

Another pilot study on 300 patients was looking at the effect of giving blood transfusions from cured Covid-19 infected patients to those who were still fighting it.

The antibodies in serum are thought to help patients fight the corona virus, thereby recovering faster. Meanwhile, two stem cell therapies are also being tested by Chinese scientists to see if it works with corona viruses.

In addition to remdesivir and Song Hoang Lien, China is currently conducting trials of many other drugs to treat Covid-19.

More than 200 SARS-CoV-2 virus genomes have been decoded

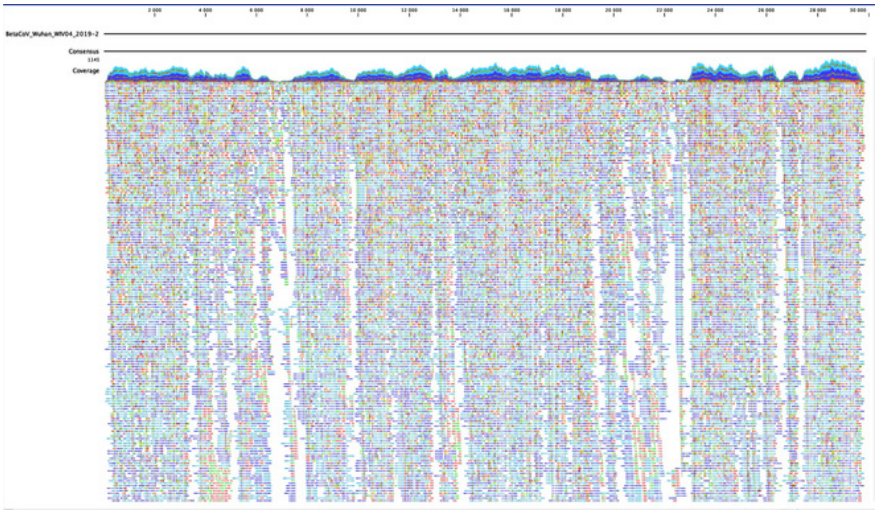
The Covid-19 epidemic saw the fastest speed, in which a pathogen genome was completely decoded. In less than a month after the Chinese epidemic was announced, the scientists successfully deciphered the entire 30,000 characters of the SARS-CoV-2 virus.

Decoding the genome is very important, because it will be essential data to trace the origin of the virus, find out its transmission characteristics, set up testing methods, and control therapies. potential value for it.

Immediately after the gene sequencing, Chinese scientists shared their data with WHO and the rest of the world. Continued after that, scientists in more than 20 other countries have also mapped the SARS-CoV-2 virus gene map for comparison.

On GIASID, a data sharing platform for global influenza viruses, scientists can now find more than 200 genome decoding of SARS-CoV-2, collected on infected patients in different locations, in different time periods.

This will allow them to monitor and detect the changes that the virus can have, a risk that could make the virus more adaptable and increase the complexity of the disease.



A decoding of the SARS-CoV-2 virus genome on GIASID

Genetic sequences have also begun to allow many biotech companies worldwide to produce vaccines for Covid-19. Inovio Pharmaceuticals, a biotechnology company based in San Diego, USA, said that within 3 hours of the corona virus genome was announced, they were able to design a vaccine for it. .

To do this, scientists at Inovio have sought to convert viral RNA into DNA. They then selected a number of genetic sequences in that DNA, using computer simulations to suggest where would the sequence boost the immune system to produce antibodies.

Selected DNA fragments are then injected inside the bacteria, taking advantage of the bacterial biology to create large amounts of protein. It is these proteins that will be used to make the vaccine, and they will help the immune system recognize the SARS-CoV-2 virus once it enters the body.

Another biotechnology company in the US, Moderna Therapeutics, also used the viral genome published by Chinese scientists to create a version of its Covid-19 vaccine. It is expected that they will test the vaccine on humans in early April.

Decoding the SARS-CoV-2 virus genome allows scientists to immediately enter the vaccine research process, without the need for isolated viruses.

It can be seen that the worldwide scientific system is operating at full capacity to deal with the Covid-19 epidemic. Scientists now have a lot more powerful tools, more handy than previous outbreaks, such as genetic decoding databases, early published scientific platforms and open access.

Now, scientific information has been shared faster, more and more widely. Non-traditional channels such as bioRxiv, Slack, Twitter and even social networks are participating in this transition.

O'Connor said a lot of important information was not even shared on mainstream scientific channels, so meetings on Slack with a team of his experts proved very handy.

Many scientists around the world are welcoming these collaborative changes.*"It's like things are moving slowly, we have a whole new culture of scientific research* ," said virologist Isabella Eckerle from the Geneva Center for Emerging Viral Diseases.

* What are the habits you should have during the Covid-19 season? Let's do the following test to check:

Reference *Science, Nature*