a weekly publication from ICMR-NIRT Library

2022 | Vol.5 | Issue No.18

news bulletin Library

NEWS BULLETIN

02 May 2022 | Vol.5 | #18

A weekly publication from NIRT Library

THE HINDU

World Immunisation Week 2022: Why childhood vaccination is important; expert lists essential vaccines

"It is the only mode which prevents dreadful diseases and is given in early childhood," Dr Meena J, Consultant, Paediatrics and Neonatology, Aakash Healthcare, Dwarka said

By: Lifestyle Desk | New Delhi |
Updated: April 29, 2022 10:25:05 am

Only 65 per cent of children in India receive full immunization during the first year of their life (Source: Getty Images/Thinkstock)

World Immunisation Week is observed in the last week of April, every year, with an aim to highlight the collective action required to promote the use of vaccines to protect people of all ages against diseases. According to the World Health

The Indian EXPRESS

World Immunization Week 2022: Five important things to know about vaccines

Vaccines train the immune system to create antibodies, just as it does when it's exposed to a disease, says a doctor

By: **Lifestyle Desk** | New Delhi |
April 27, 2022 10:00:26 am

Vaccines can cause mild side effects, such as a low-grade fever, pain or redness at the injection site. (Photo: Getty/Thinkstock)

Observed in the last week of April, between April 24 and 30, the World Immunization Week "aims to highlight the collective action needed and to promote the use of **vaccines** to protect people of all ages against disease", states the World Health Organization (WHO)....

Continued in page No.12

Organisation (WHO), which is observing the day with the theme 'Long Life for All' this year, "The ultimate goal of World Immunisation Week is for more people – and their communities – to be protected from vaccine-preventable diseases."

It is widely known that timely vaccination is of utmost importance to prevent many diseases and infections. During the ongoing Covid-19 pandemic, the need for getting vaccinated has only multiplied. Apart from **Covid-19 vaccines**, there has been a stress on getting children immunised to protect them from deadly diseases such as polio, tetanus, hepatitis and diphtheria among others.

"Only 65 per cent of **children in India receive full immunisation** during the first year of their life. Despite clear evidence around the power of vaccines to save lives and control disease, millions of young children around the world are missing out, putting them and their communities at risk of disease and deadly outbreaks," United Nations International Children's Emergency Fund (UNICEF) noted.

Explaining the significance of vaccination during childhood, Dr Meena J, Consultant, Paediatrics and Neonatology, Aakash Healthcare, Dwarka said that it is the only mode which prevents dreadful diseases and is given in early **childhood**. "History has also taught us that vaccination is very important as it helps in eradicating a lot of dangerous diseases like smallpox and polio," she said.

Some important childhood vaccines include the BCG (Bacille Calmette-Guerin) vaccine for tuberculosis, oral polio vaccine and hepatitis B vaccine (File photo)

Dr Meena highlighted that **childhood** vaccines help children fight diseases later on in life too. "The current pandemic has shown us the importance of vaccines and children are being immunised since childhood for long. Due to vaccination, their immunity gets more activated and they can fight against **dreadful diseases**."

Some essential childhood vaccines

Further, the expert listed some of the most essential vaccines for children.

*BCG (Bacille Calmette-Guerin) vaccine for **tuberculosis**, oral polio vaccine, and hepatitis B vaccine.
*Other vaccine-preventable diseases include diphtheria, tetanus, **rotavirus**, pertussis and pneumococcal.
*In infancy, children are given missals, rubella vaccines and typhoid vaccines.
*In some endemic areas, children are vaccinated for Japanese encephalitis and meningitis.
*There are special vaccines for conditions such as **influenza**, meningococcal and rabies.

The Indian EXPRESS

World Malaria Day: 'Data-driven decision making and tailored approaches crucial now in all efforts to eliminate malaria'

Dr Corine Karema, a senior Malaria expert and the former Director of the Rwanda National Malaria Control Program (NMCP), in an interview with The Indian Express group talks about eliminating malaria, the impact of Covid-19 on such programmes and the way forward.

Written by E Kumar Sharma | New Delhi | April 29, 2022 11:46:31 am

A worker fumigates an area to control spread of mosquito-borne diseases. (Express file photo by Nirmal Harindran)

The world has yet to emerge completely out of the long shadow of Covid-19 but the hunt continues to find the most effective ways to eliminate a deadlier disease – Malaria – one that has grappled health experts globally for decades. There is hope on the horizon now with newer technologies and innovative approaches to vector control among other developments. On World Malaria Day, April 25, Dr Soumya Swaminathan, the chief scientist at the World Health Organisation (WHO) shared her insights on this crucial subject and on the way forward **in an interview to the Indian Express Group**. Here, we have **Dr Corine Karema**, a senior Malaria expert and the former Director of the Rwanda National Malaria Control Program (NMCP), who has been involved with the disease closely over the years, sharing her views in an email interview with The Indian Express Group's **E Kumar Sharma**. She covers a range of issues, both for the globe and more specifically for India. Here are the excerpts:

In the context of this year's theme for World Malaria Day – Harness Innovation to Reduce Malaria – how can Commonwealth countries best use innovation in each of these areas to end malaria?

Countries can adopt innovative approaches to partnerships and financing, adopt innovative tools, and take a targeted approach to delivering malaria interventions, improving supply chains, and strengthening surveillance and lab capacity. Importantly, the Covid-19 pandemic has reinforced how investing in real-time data is vital to effectively fight an infectious disease. Countries' increased adoption of data-driven decision-making and tailoring approaches to optimise the use of malaria interventions to local contexts will help drive malaria cases and deaths back down in countries with a high burden of malaria.

There have been several recent scientific advancements made in malaria elimination, including vaccine candidates such as the RTS,S? Which of these do you think will reinforce India's malaria elimination program most dramatically?

The RTS,S vaccine has been recommended as a complement to existing malaria prevention and control tools among children under five in sub-Saharan Africa and in other regions with moderate to high P. falciparum malaria transmission. However, countries will need to determine if and how RTS,S can complement their malaria control strategy by evaluating a range of considerations.

However, there is no 'one size fits all' approach to ending malaria. It is still important that countries continue to scale up a range of existing, complementary tools – such as long-lasting-insecticide treated nets, indoor residual spraying and preventive treatment – to save more lives, strengthen community health and make the best use of limited resources.

India is already making impressive gains against malaria with existing tools. It reported the largest reduction (60%) in confirmed malaria cases in 2019 compared to 2017 and is one of the few high burden countries to demonstrate a significant decline in malaria cases, largely due to commendable commitment in the highly affected state of Odisha.

Your thoughts on how to fine tune an integrated vector control operation when the problem is in select pockets, as is the case with India?

It is vitally important that India continues to increase adoption of data-driven decision making and tailoring approaches to optimise the use of malaria interventions to local contexts. This approach is crucial to maximize resources available to fight malaria and drive down malaria cases and deaths.

However, success against malaria also requires country and community ownership of the fight against malaria. Community voices and action – including among younger generations – must be celebrated and amplified at the local, regional and global level. It is critical that individuals hold leaders accountable to their commitments – whether through speaking to their local leaders, using social media, or calling for increased public and private funding to expand access to life-saving tools.

What are some of your suggestions to have a very effective surveillance system and response mechanism in place?

Frontline workers are increasingly adopting digital tools to report into disease monitoring systems and these digital tools have proved critical during the Covid-19 pandemic. When fully integrated, these surveillance systems are often sustainable and cost-effective.

To scale up these tools, countries must leverage domestic resources to make investments in innovative and effective digital solutions at the point of care. Of course, India already has a wonderful track record for developing digital software in the private sector, and these capabilities could also be applied to create surveillance solutions to fight diseases like malaria.

Your recommendations on manpower training and dealing with challenges when there is shortage of entomologists?

Entomology is important to fight a wide range of diseases, including malaria. India has a strong track record in vector control entomology, particularly for other vector-borne diseases. A wise solution would therefore be to build research institutions' capacity to leverage expertise across a range of vector-borne diseases including malaria, dengue and neglected tropical diseases.

Any thoughts on how to combat drug and insecticide resistant malaria?

In recent years, antimalarial resistance has been observed in the Greater Mekong Region and in some parts of Africa, and insecticide resistance is also a global threat. The malaria parasite and the mosquito that carries it are constantly evolving to evade our efforts to curb the disease, which means there's a risk our existing tools will become less effective over time.

The World Health Organization has developed guidelines to help countries mitigate, monitor and respond to resistance to these tools. In areas where resistance has spread, robust surveillance systems and strategies are critical. For example, genetic disease monitoring systems with improved parasite and mosquito genetic sequencing can track the emergence of resistance to new and existing tools in close to real-time and are being trialled in countries with support from the Global Fund. Rotating the insecticides used for Indoor Residual Spraying campaigns is another key strategy for preventing insecticide resistance.

Scientists are constantly innovating to develop new insecticides and treatments to counter this challenge. For example, initiatives such as the New Nets project, supported by the Global Fund and Innovative Vector Control Consortium, are working to create next-generation nets which

use different combinations of insecticides for use in areas with mosquito net resistance. Last month, for example, a research study found that Interceptor G2 dual-insecticide nets reduced cases of malaria by over a third compared to nets with just one insecticide, and the introduction of Pyrethroid-PBO nets has also proved effective. Tafenoquine, a new treatment for P. Vivax malaria (the most common cause of the disease in India) was also approved for use by the Australian Therapeutic Goods Administration earlier this year in combination with chloroquine. In the longer-term, we must also prioritise developing transformative tools that can be game changers in the fight against malaria.

Individuals and communities must also play a role by using interventions appropriately. To mitigate drug resistance, patients should seek a diagnosis to confirm cases of malaria before taking any medicine and ensure they are fully compliant with the recommended course of treatment. The availability of counterfeits and sub-standard drugs on the market also increases the risk of resistance, so communities should be vigilant (in addition to national monitoring and regulatory control measures).

Disruptions in malaria services delivery during the Covid-19 pandemic meant that the world was unable to deliver on the 2020 goal to ensure 40 per cent global reduction in malaria mortality and cases. Your thoughts on what needs to be reprioritised to ensure we move fast and recover the lost ground?

While the Covid-19 pandemic was disruptive, it is also important to recall that countries mobilized to sustain more than 90 percent of mosquito net and seasonal malaria campaigns, through unwavering commitment and by adopting innovative approaches to ensure campaigns were delivered in time.

We have seen how countries have come together to address the pandemic, to pool resources and take action to reach a common goal. Malaria is no different. We require a combination of high-level political support, more funding, the involvement of the private sector, and community ownership to achieve a malaria-free world.

What are some of the successes from Global Fund and RBM Partnership's response against Covid-19 that malaria programs can take away from?

Throughout the Covid-19 pandemic the RBM Partnership to End Malaria has worked closely with the Global Fund, the US President's Malaria Initiative and national governments and partners to use real-time data to prevent shortages of life-saving medicines and rapid diagnostic tests.

These efforts helped to minimise the impact of the pandemic on malaria prevention and treatment campaigns and I hope they will be maintained long after the pandemic to help countries make informed decisions to have a greater impact against malaria.

Given the overall increase in malaria cases and deaths globally, what should governments, especially in high-burden countries, focus on to 'build back better'?

The pandemic has shone a light on the weaknesses in our health systems and as they build back better after the pandemic, governments should focus on building strong and resilient health systems that are fit for purpose. Investments in building resilient health systems and scaling up community health services will not only help build capacity to detect and respond to future health threats, but these are also fantastic investments that allow us to better fight existing diseases like malaria.

What are some of the measures the RBM Partnership is planning to support high burden countries on the path to elimination?

We know that countries and communities are at the centre of an effective malaria response. Since 2018, the RBM Partnership and the World Health Organization have been working with 11 high-burden countries – including India – to implement the High Burden to High Impact approach. This country-led approach supports countries with a high burden of malaria to better target malaria interventions district-by-district to maximize impact and make the best use of limited resources to address the challenges and epidemiological context specific to each district.

We are also dedicated to supporting countries to take a multisectoral approach, bringing together different stakeholders at the national and subnational levels to align strategies and maximize resources – and ultimately accelerate progress against malaria.

Malaria continues to take its heaviest toll on the world's poorest and most vulnerable people, and through our efforts to end malaria we also hope to achieve a more equitable world. For example, in 2018, in partnership with The Global Fund, we piloted the Malaria Matchbox tool in India and Niger, providing guidance on how to identify risk factors and barriers impeding equitable and integrated people centred malaria programs, included gender-related barriers.

China went from reporting 30 million cases in the 1940s, to zero cases by 2021. Other countries, such as Sri Lanka, Argentina, and El Salvador (2021) have also been granted malaria-free status? What could we learn?

There are several tried-and-tested strategies which have proved successful among countries which have eliminated malaria in recent years. Firstly, to drive down cases of malaria, countries require ongoing commitment and investment to ensure that everyone at risk of malaria is reached with life-saving tools. Tailoring malaria control strategies to local contexts has also proved successful for many countries.

For countries approaching malaria elimination, cross-border collaboration is critical to reduce the risk of malaria-carrying mosquitos crossing borders with neighbouring countries, as well as investing in malaria surveillance and taking a targeted approach to ensure every single remaining case of malaria is reported and treated.

The Covid-19 pandemic has underscored the need to be prepared for future health threats while we eliminate existing ones. Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) supports malaria control in several other countries worldwide (including India). How critical is the replenishment of the GFATM, which called on the world to mobilize US $18 billion to save 20 million lives?

The Global Fund accounts for more than half of global funding for malaria programmes, so its importance cannot be underestimated. By achieving the Replenishment target of at least US$18 billion, the Global Fund estimates these investments can reduce cases of malaria by 66%, cut malaria deaths by 62% and eliminate malaria from at least six countries by 2026, bringing us closer to a malaria-free world.

However, we are now at a precarious juncture and a lot is at risk if countries do not achieve this goal. New data suggests the global malaria burden is higher than previously estimated, the Covid-19 pandemic has disrupted malaria control efforts, and emerging threats such as insecticide and drug resistance and even climate change risk the progress we have made over the past 20 years.

Such investments are not only crucial to accelerate the fight against malaria, TB and

HIV/AIDs; they are also at the heart of countries' efforts to strengthen health systems, be prepared for future pandemics, and even reduce inequalities. Zero Malaria starts with all of us – everyone, everywhere must come together this year to fight for what counts and ensure we achieve a fully replenished Global Fund!

The Indian EXPRESS

'Entry only. No exit:' Beijing sees more Covid closures as anger grows in Shanghai

Chinese health officials did not respond to questions on whether Beijing will go under lockdown or what circumstances might prompt such measures

By: **Reuters** | Beijing, Shanghai |
Updated: April 29, 2022 12:25:17 pm

A worker in a protective suit swabs a man's throat for a Covid-19 test at a testing site in an office complex in Beijing, April 29, 2022. (AP)

China's capital Beijing closed more businesses and residential compounds on Friday, with authorities ramping up contact tracing to contain a Covid-19 outbreak, while resentment at the **month-long lockdown in Shanghai grew**.

In the finance hub, fenced-in people have been protesting against the lockdown and difficulties in obtaining provisions by banging on pots and pans in the evenings, according to a Reuters witness and residents.

A video shared on social media, whose authenticity could not be immediately verified, showed a woman warning people via a loud-hailer not to do so, saying such gestures were being encouraged by "outsiders."

The Shanghai government did not immediately respond to a request for comment.

In Beijing, authorities were in a race against time to detect Covid cases and isolate those who have been around them.

A sign placed outside a residential complex read "Entry only. No exit."

Polish resident Joanna Szklarska, 51, was sent to a quarantine hotel as a close contact, but she refused to share the room, which had only one bed, with her neighbour.

People line up at a makeshift nucleic acid testing site amid the Covid-19 outbreak, in Chaoyang district of Beijing, China April 29, 2022. (Reuters)

She was sent back home, where authorities installed a front door alarm. Then she was called back to the hotel, where she now has her own room.

"Nothing makes sense here," the English-language consultant said by phone.

At a regular press conference on Friday, Chinese health officials did not respond to questions on whether Beijing will go under lockdown or what circumstances might prompt such measures.

The Chaoyang district, the first to undergo mass testing this week, started the last of three rounds of screening on Friday among its 3.5 million residents. Most other districts are due for their third round of tests on Saturday.

More apartment blocks were sealed, preventing residents from leaving, and certain spas, KTV lounges, gyms, cinemas and libraries and at least two shopping malls closed on Friday.

'Hello citizens!'

Chaoyang, which has the biggest share of cases in Beijing, declared more neighbourhoods to be at risk.

People who had recently visited venues in such areas have received text messages telling them to stay put until they get their test results.

"Hello citizens! You have recently visited the beef noodles & braised chicken shop in Guanghui Li community," one such text read. "Please report to your compound or hotel immediately, stay put and wait for the notification of nucleic acid testing."

"If you violate the above requirements and cause the epidemic to spread, you will bear legal responsibility."

Companies such as JD.com, an e-commerce platform, have been striving to keep residents well supplied.

The head of one of its logistics centres on the outskirts of Beijing, 32-year-old Ming Tang, said delivery volumes have increased by 65% since the first cases emerged on April 22, and 80% of the parcels are food-related.

"The effort of delivering parcels on time and long working hours put a lot of pressure on our couriers," he said.

Beijing reported 49 cases on April 28, versus 50 the previous day, a far cry from Shanghai's numbers.

'People's war'

The April 30-May 4 Labour Day break is traditionally one of China's busiest tourist seasons, and hotels are expected to suffer heavy losses this year.

Tourism is on a long list of industries disrupted by Covid curbs around the country, from finance and electronics manufacturing in Shanghai to Jilin in the northern rust-belt.

Many foreigners want to flee mainland China's most cosmopolitan city.

Chinese authorities say being Covid-free is vital to save as many lives as possible.

"We must realize that the virus is what's hurting the economy," said Liang Wannian, head of the Covid response expert panel under the National Health Commission. "Covid control and economic development are in synergy with each other."

"The battle against the Covid epidemic is a war, a war of resistance, a people's war," Liang said.

In Shanghai, after a month in lockdown, authorities said more people have been gradually allowed in principle to leave their homes in recent days. More than 12 million, nearly half the population, are now in that category.

Still, many cannot leave their housing compounds, while those who can have few places to go to as shops and other venues are

closed. Often they are told by police to return home.

Police mobilised 52,000 officers for the lockdown.

Many residents have grumbled at the inflexible enforcement of rules, which sometimes do not take into account individual health emergencies or other special circumstances.

"We understand that ... there are still many shortcomings in our work," Shu Qing, head of the Municipal Public Security Bureau, told reporters.

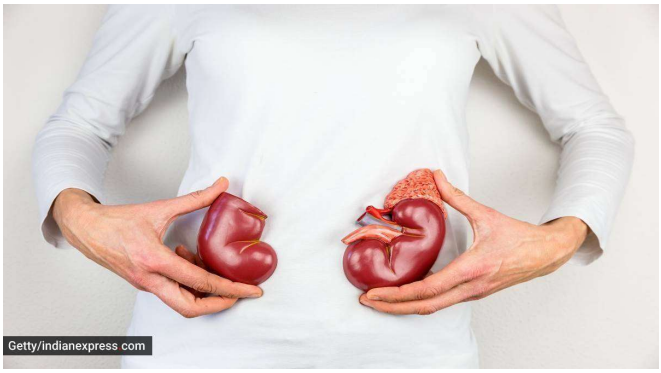
"For example, some individual policemen do not pay attention to styles or methods when enforcing the law, or they are emotional or mechanical."

The Indian EXPRESS

Severe lung infections, kidney injury common in Covid deaths: study

The findings of the autopsies conducted on 33 bodies validate previous clinical discoveries and have been published in Indian Journal of Medical Research on April 8.

Written by **Sohini Ghosh** | Ahmedabad | April 29, 2022 2:35:59 am



The study—the first of its kind in Gujarat and led by Dr Hetal Kyada of the Rajkot-based medical college—noted that lungs bore most of the burden of Covid-19 in among the 33 subjects studied. (File)

Acute kidney injury, secondary respiratory infections and pulmonary macrothrombi (visible blood clots in pulmonary arteries) are common among patients infected with SarS-Cov-2 for more than a week, revealed autopsies of Covid-19 deceased conducted by PDU Government Medical College in Rajkot.

The findings of the autopsies conducted on 33 bodies validate previous clinical discoveries and have been published in Indian Journal of Medical Research on April 8.

The study—the first of its kind in Gujarat and led by Dr Hetal Kyada of the Rajkot-based medical college—noted that lungs bore most of the burden of Covid-19 in among the 33 subjects studied. This is in line with observations from previous autopsy studies of Covid deceased, globally and in India.

Additionally, the Rajkot study made a prominent finding of diffuse alveolar damage (DAD)—a histological feature of acute respiratory distress syndrome used to describe specific changes that occur to the structure of the lungs during injury or disease.

The study included 28 males and five females with a median age of 61 years and an average hospitalisation rate of seven days. The patients had died between September 7, 2020 and December 23, 2020 with the average interval between death and autopsy being three hours.

All 33 patients required oxygen administration at some point during their hospitalisation with 30 of them requiring oxygen administration at the time of admission. Ultimately, 28 of them had to be shifted to invasive modes of ventilation with a median duration for mechanical ventilation being three days as their condition deteriorated gradually.

Similar to previous studies, microscopic and macroscopic evidence of secondary respiratory infections in the form of bronchopneumonia and lung abscesses were observed as a result of hospital-acquired infection. "Such nosocomial infections (contracted while in the hospital for another reason) among Covid-19 patients could be caused by prolonged hospitalisation, prolonged mechanical ventilation, central venous catheter usage, immunosuppressive medications such as steroids and tocilizumab, as well as potential lapses in routine infection-prevention measures due to overburdened hospitals during the pandemic," noted the published study.

The Indian EXPRESS

Covid vaccines for kids below 12 get DCGI nod: All you need to know

The DCGI's decision is significant as it comes at a time when children are returning to school for the first time in over two years.

By: **Express Web Desk** | New Delhi |
April 28, 2022 7:06:22 pm

Kids queue up at a vaccination centre in New Delhi. (Express Photo: Praveen Khanna)

The Drugs Controller General of India (DCGI) has granted emergency use authorisation to two Covid-19 vaccines — Biological E's Corbevax and Bharat Biotech's Covaxin — for children under the age of 12 years. The DCGI also granted EUA to Gujarat-based Zydus Cadila's two-dose Covid vaccine for the 12 years and above population.

The DCGI's decision is significant as it comes at a time when children are returning to school for the first time in over two years. With this, children under the age of 12 may soon be able to receive a dose of the vaccine for the first time.

At a meeting reviewing the Covid situation in India on Wednesday, PM Narendra Modi said the government's priority is to vaccinate all eligible children at the earliest with special campaigns needed in schools.

So does this mean children below the age of 12 can get the vaccine now?

Not yet. For this cohort to begin receiving the vaccine, the regulatory approval and data will have to be placed before three government expert bodies — the National Technical Advisory Group on Immunisation (NTAGI), which provides guidance to the government on vaccination by undertaking technical reviews of scientific evidence; the Covid-19 Working Group and Standing Technical Sub-Committee and the National Expert Group on Vaccine Administration for COVID-19 (NEGVAC), which will make a final recommendation to the health ministry.

The final decision is expected in the next few days.

Who can get the vaccines?

While the national drug regulator has granted emergency use authorisation to Bharat Biotech's Covaxin for the age group 6-12, Biological E's Corbevax, if approved, will be administered on children between the ages of 5 and 12.

"Covaxin exhibits robust immune responses in children with two doses and six months follow-up, indicating durability of immune responses. Data was presented to the CDSCO Subject Expert Committee and will be published in the weeks to come," according to Bharat Biotech.

How many doses will be administered on children?

For the Corbevax vaccine, two doses will be administered with a 28-day gap in between. Meanwhile, for Bharat Biotech's Covaxin, two doses are administered with a 28-40 day gap in between.

Zydus Cadila's two-dose vaccine was granted EUA for the 12 years and above population, while the three-dose version of ZyCoV-D is being used in the national vaccination drive for the adult population. This is the first Covid-19 vaccine built on a DNA platform, and has been approved for commercial use.

What vaccines are being administered on children at the moment?

The Covid-19 vaccination drive for children in the age-group 15-18 years began in January this year with 'Covaxin'. In February, the DCGI granted Corbevax emergency use authorisation for children between 12-14 years.

The Indian EXPRESS

Gap between 2nd dose of Covid jab, precaution dose likely to be reduced to 6 months soon

Studies at ICMR and other international research institutions have suggested that antibody level wanes after about six months from the primary vaccination with both doses and giving a booster increases the immune response.

By: **PTI** | New Delhi |
Updated: April 27, 2022 7:40:34 pm

A healthworker administers a dose of a Covid-19 vaccine in Chennai. (PTI)

The government is likely to soon reduce the gap between the second dose of COVID-19 vaccine and the precaution dose from the current nine months to six months, official sources said on Wednesday. A recommendation on lessening the gap is expected to be made by the National Technical Advisory Group on Immunisation (NTAGI) which is set to hold a meeting on April 29, they told PTI.

Studies at ICMR and other international research institutions have suggested that antibody level wanes after about six months from the primary vaccination with both doses and giving a booster increases the immune response.

All those above the age of 18 who have completed nine months after the administration of the second dose are eligible for the precaution dose.

"Taking into account the scientific evidence and findings of the studies done here and internationally, the gap between the second dose of COVID-19 vaccine and the precaution dose will most likely be reduced from the current nine months to six months soon. A final decision will be taken based on the recommendations by

the NTAGI which is set to meet on Friday," a source in the know of the developments told PTI.

India began administering precaution doses of vaccines to healthcare and frontline workers and those aged 60 and above with comorbidities from January 10.

The government removed the comorbidity clause making all people aged above 60 eligible for the precaution dose in March.

According to health ministry data, 5,17,547 precaution doses have been administered in age group 18-59 years so far.

Besides, 4736567 healthcare workers, 7447184 frontline workers and 14545595 individuals aged 60 and above have taken the precaution shot. India on April 10 began administering precaution doses of COVID-19 vaccines to all aged above 18 years at private vaccination centres.

Continued from page no.1

World Immunization Week 2022: Five important things to know about vaccines

....Dr Fazal Nabi, consultant paediatrician and intensivist, Jaslok Hospital & Research Centre, says **vaccination** is a simple way of protecting a child against harmful diseases, before they come into contact with them. They make the **immune system** stronger.

"Vaccines train the immune system to create **antibodies**, just as it does when it's exposed to a disease. Because vaccines contain only killed or weakened forms of germs, they do not cause the disease or put you at risk of its complications," he explains.

Dr Nabi adds that once we are exposed to one or more doses of a **vaccine**, we remain protected against a disease.

Read on to learn more about the five most important things about vaccine immunity, as listed by the doctor.

* Vaccines are given at different ages, from birth to childhood and to maintain this record a vaccination card is given. It is important to make sure that all these vaccines are up to date.

* Children can safely be given combined vaccinations (e.g. for diphtheria, pertussis and tetanus) — it means fewer injections and reduced discomfort for the child.

* Vaccines can cause mild side effects, such as a low-grade fever, pain or redness at the injection site. Mild reactions go away within a few days on their own.

* Severe or long-lasting side effects are extremely rare.

* Vaccines can safely be given during any mild illnesses. But, children with moderate or severe illness with or without fever may need to wait until they are better to get the dose.

The Indian EXPRESS

Explained: The mysterious Hepatitis outbreak in children around the world

Written by **Sanskriti Falor** , Edited by Explained Desk | New Delhi |
Updated: April 28, 2022 11:14:51 am

Hepatitis B is an infection in the liver which happens because of the Hepatitis B virus or HBV.

The virus usually spreads through blood, semen or other body fluids.

Last week, British officials reported 74 cases of hepatitis, or liver inflammation, found in children since January. (Photo: Getty)

A series of unexplained cases of Hepatitis B in children has taken over the world. Many countries including the US and UK reported mysterious cases of a few children being diagnosed with Hepatitis B.

From January till now, several cases of Hepatitis B positive children have come forward and the doctors are constantly being urged to identify the reason behind this outbreak.

What is Hepatitis B?

Hepatitis B is an infection in the liver which happens because of the Hepatitis B virus or HBV. The virus usually spreads through blood, semen or other body fluids.

It can be prevented or protected against through vaccination. When it is acute, the virus lasts a small time and doesn't always necessarily need treatments although it can get serious and lead to life-threatening diseases like organ scarring, liver failure and even cancer.

The most common symptoms of Hepatitis B are jaundice, fever, fatigue that lasts for weeks or even months, vomiting, loss of appetite, and pain in joints or belly.

There is a fair chance that the symptoms are not visible for one to six months since you catch the virus.

What do we know so far?

The World Health Organization (WHO) said the extent of the outbreak is such that at least 169 cases were recorded of children being diagnosed with Hepatitis B. "Cases have been reported in the United Kingdom of Great Britain and Northern Ireland (114), Spain (13), Israel (12), the United States of America (9), Denmark (6), Ireland (<5), The Netherlands (4), Italy (4), Norway (2), France (2), Romania (1), and Belgium (1)."

Most of these cases were found in children as young as one month and up to 16-year-olds. While 17 children required a liver transplant, at least one child had died of the disease, the WHO report said.

Most of these cases were of acute hepatitis, which causes liver inflammation. The WHO report stated that most of the cases reported symptoms like "abdominal pain, diarrhoea and vomiting preceding presentation with severe acute hepatitis, and increased levels of liver enzymes… and jaundice".

One concern that the doctors face is that the viruses found in affected children were not any of the usual viruses that are linked to Hepatitis A, B, C, D, E. Instead, Adenovirus, which is a family of viruses that usually cause cold among other symptoms, has been found in at least 74 cases worldwide.

The WHO report also stated, "The United Kingdom, where the majority of cases have been reported to date, has recently observed a significant increase in adenovirus infections in the community (particularly detected in faecal samples in children) following low levels of circulation earlier in the COVID-19 pandemic.

The Netherlands also reported concurrent increasing community adenovirus circulation."

Public Health Scotland's director Jim McMenamin told Reuters that 77 per cent of children in Britain had tested positive for the adenovirus.

Amidst rising cases in the US, health officials have been directed to be on the lookout for symptoms of hepatitis in children and conduct tests for adenovirus when they come across such symptoms, especially those linked to a cold virus. The doctors have also been urged to report any suspected cases of Hepatitis B in children to the state as well as the health department.

The United States Centers for Disease Control and Prevention (CDC) has said that it was working with the UK to understand the cause of the disease among children.

What is adenovirus and how is it leading to Hepatitis B in children?

Adenovirus is a group of viruses that commonly cause cold or flu-like symptoms, fever, sore throat, acute bronchitis, pneumonia, conjunctivitis, acute inflammation of the stomach, diarrhoea, vomiting, nausea and stomach pain.

Adenovirus is known to spread from one person to another through close contact, coughing, sneezing and even by touching an object containing adenovirus and then further touching the mouth, nose or eyes.

Type 41 adenovirus is suspected of causing Hepatitis B in children. While there are more than 50 types of adenoviruses, it is type 41 that causes diarrhoea, vomiting and fever along with respiratory problems.

In a statement, WHO said: "Adenoviruses are common pathogens that usually cause self-limited infections. They spread from person-to-person and most commonly cause respiratory illness, but depending on the type, can also cause other illnesses such as gastroenteritis (inflammation of the stomach or intestines), conjunctivitis (pink eye), and cystitis (bladder infection)."

WHO added, "While there have been case reports of hepatitis in immunocompromised children with adenovirus infection, adenovirus type 41 is not known to be a cause of hepatitis in otherwise healthy children."

The Indian EXPRESS

Explained: Why Covid-19 cases are rising in India, but why we needn't panic just yet

The uptick in cases and positivity comes weeks after all Covid-19 related restrictions were removed from across the country.

Written by **Anonna Dutt** , Edited by Explained Desk | New Delhi |
April 25, 2022 4:02:21 pm

A Brihanmumbai Municipal Corporation (BMC) health worker collects swab sample of an outstation passenger for COVID-19 test at CSMT railway station. (PTI)

India has seen a slight increase in the number of Covid-19 cases over the past week, with 2,514 fresh cases reported in the last 24 hours as

compared to 2,183 cases reported the previous Monday (April 18). The number of active cases – or those with are currently infected – was 16,522 on Monday (April 25) as compared to 11,542 on April 18, as per Ministry of Health data.

The weekly positivity rate – that is, the proportion of samples tested that return positive, which is indicative of the spread of the infection in the community – has increased from 0.32% on April 18 to 0.54% this Monday, according to Health Ministry data. This is despite the fact that the number of tests increased from 2.6 lakh on April 18 to 3.02 lakh on April 25, thus widening the denominator.

The uptick in cases and positivity comes weeks after all Covid-19 related restrictions were removed from across the country.

Where are Covid-19 cases increasing in India?

The current increase in the number of cases nationally is driven mainly by Delhi and its neighbouring states like Uttar Pradesh and Haryana. Of the 2,541 cases recorded across the country in the last 24 hours, nearly 1,000 were in Delhi itself.

The number of cases started increasing in Delhi in mid-April, nearly two weeks after the mask mandates were done away with. (It has since been reintroduced in Delhi, and in four districts of Haryana and five districts of Uttar Pradesh surrounding Delhi.)

After remaining low following the January surge in cases, the numbers started going up in mid April in Delhi. It seems to now have stagnated, with nearly 1,000 fresh cases reported for the last five days.

Keeping the low numbers in mind, schools were re-opened and mask mandates were removed in the beginning of April. However, since mid-April, the number of cases in the capital steadily rose from about 100 to over 1,000 in about two weeks.

This increase, however, hasn't been as steep as Delhi Delhi has seen before.

Cases rose from just over 100 to just over 1,000 in 16 days in the capital during the current uptick. In comparison, it took just 10 days for a similar increase in cases during the December-January surge, with cases crossing the 2,000-mark in 12 days and the 5,000-mark in 15 days of the numbers being around 100.

From 5,000, the number of cases had jumped to 10,000 within a day, with the peak of 28,867 cases recorded in another eight days.

Should we be worrying about the increase in cases?

Dr Lalit Kant, former head of the department of epidemiology at the Indian Council of Medical Research said, "An increase in the number of cases was expected once people started taking off masks. There will be periodic ups and downs in the number of cases, what is important are the number of severe disease and deaths."

Hospitals so far have reported very few admissions. Bigger hospitals like Lok Nayak and All India Institute of Medical Sciences have been reporting only a handful of admissions with the infection. The doctors say that most people are getting a high grade fever, cough, cold and sore throat, and recovering within three to five days.

The number of deaths has seen a slight increase, though – 10 deaths were reported due to Covid-19 in the last 14 days since the numbers started increasing, whereas six deaths were reported in the 14 days preceding that. However, doctors say the deaths were only in severely co-morbid and elderly patients, who make up the most vulnerable group.

Bottomline: It isn't yet time to start worrying perhaps, but we should continue to be mindful of the virus, and remain vigilant.

Is there a need for more restrictions?

After the cases started increasing, the Delhi Disaster Management Authority re-introduced a fine of Rs 500 for not wearing masks outdoors. Experts say that instead of mandates, masking should be enforced with health education.

But other than masking, they say there is no need to increase restrictions at this juncture. Epidemiologist Dr Chandrakant Lahariya, said, "How long can we continue the masking mandates and other restrictions? At present, even if people do get the infection, the disease is mild and there is no need for enforcing lockdowns or closing schools."

The Indian EXPRESS

New research: How self-replicating mRNA Covid-19 vaccines work, and what trial results show

An mRNA vaccine, such as those from Pfizer/BioNTech and Moderna, use messenger RNA that encodes the spike protein of the coronavirus.

By: **Express News Service** | New Delhi |
Updated: April 26, 2022 9:27:34 am

A self-amplifying mRNA vaccine — one in which the delivered RNA multiplies inside the body — has shown promising results against Covid-19 in ongoing phase 1/2/3 trials. The vaccine, ARCT-154, has been developed by Arcturus Therapeutics Holdings, based in San Diego, California, and its trials are in progress in Vietnam. It offered 95% protection against severe Covid-19 and death, and 55% against Covid infection, Arcturus said in a press release.

A self-amplifying mRNA vaccine is an improvement on the traditional RNA platform.

WHAT IT MEANS: An mRNA vaccine, such as those from Pfizer/BioNTech and Moderna, use messenger RNA that encodes the spike protein of the coronavirus. In other words, the mRNA directs the cell to produce copies of the spike protein, so that the immune system will recognise the spike if and when actual infection takes place, and mount a response.

A self-amplifying mRNA vaccine is an improvement on the traditional RNA platform. It encodes four extra proteins in addition to the vaccine antigen, and these enable amplification of the original strand of RNA once inside the cell. The basic advantage is that it requires a smaller dose.

THE TRIAL: It enrolled over 19,000 adult subjects in Vietnam, including individuals at higher risk of severe complications of Covid-19 disease. The Phase 3 placebo-controlled vaccine efficacy portion of this study enrolled over 16,000 participants. An analysis between 7 days and 56 days after completion of a two-dose vaccination series demonstrated 55% vaccine efficacy for protection against Covid-19, the release said. These cases were detected during an outbreak in Vietnam when the Delta and Omicron variants were dominant.

The analysis of severe Covid-19 disease (including deaths) included 43 severe cases. Forty-one cases occurred in the placebo group and two in the vaccinated group, demonstrating vaccine efficacy of 95%, the release said. Nine deaths were reported in the placebo group, and one in the vaccinated group, whom the company described as an older age group participant who was also at increased risk of severe Covid-19.

ADVERSE EVENTS: The incidence of unsolicited adverse events in the two groups are comparable, the release said. No cases of myocarditis or pericarditis were reported; however, the company conceded that the study is not large enough to reliably observe these events given their extremely rare frequency of occurrence.

Adverse events collected in diaries of study participants (solicited adverse events) for seven days following each vaccination demonstrate that the majority of these events were mild or moderate in severity, it said. The majority of solicited adverse events resolved within the 7-day window of observation.

IMPLICATIONS: The Pfizer/BioNTech and Moderna vaccines against Covid-19 are the only two mRNA vaccines available so far. "The new vaccine may come with significant advantages: easier storage, along with lower cost because its 'self-amplifying' design allows for smaller doses", Science magazine said.

However, the magazine noted, much of the world has already been vaccinated, and the Arcturus vaccine may be making its debut too late, at least for primary vaccination.

The Indian EXPRESS

Covaxin gets DCGI nod for 6-12 age group, Corbevax for 5-12 year olds

The final decision will be taken by the government's expert body on Covid-19 vaccination, health ministry sources said. Currently, India is only administering Covid-19 vaccines to those above 12 years — Corbevax for 12-14 years and Covaxin for 15-18 years.

Written by **Kaunain Sheriff M** | New Delhi |
Updated: April 27, 2022 5:01:25 am

Children wear mask at an anganwadi on the outskirts of Agartala in 2020. (Express Photo: Abhisek Saha, File)

PAVING THE way for the rollout of the Covid-19 vaccination drive for those aged below 12 years, the Drugs Controller General of India (DCGI) on Tuesday granted emergency use authorisation to Bharat Biotech's Covaxin for 6-12 years and Biological E's Corbevax for 5-12 years.

The final decision will be taken by the government's expert body on Covid-19 vaccination, health ministry sources said. Currently, India is only administering Covid-19 vaccines to those above 12 years — Corbevax for 12-14 years and Covaxin for 15-18 years.

The US Centers for Disease Control and Prevention (CDC) has recommended that all

those above 5 years should be vaccinated. In the US, Pfizer's mRNA Covid-19 vaccine is being used for children in the age group of five years and above.

According to the CDC, children in this age group (5+) are "most frequently" affected by Multisystem Inflammatory Syndrome in Children (MIS-C), a condition associated with Covid-19 where different body parts get inflamed. Noting that vaccination helps prevent MIS-C, the CDC has said that it "is collecting data on how well Covid-19 vaccination works against MIS-C in younger children. As more children under 12 years old get vaccinated, CDC will be able to analyse and share the data."

On Tuesday, Bharat Biotech said according to data on Covaxin for the 2-18 years age group, neutralising antibodies in children was found to be 1.7 times higher than in adults. "Covaxin exhibits robust immune responses in children with two doses and six months follow-up, indicating durability of immune responses. Data was presented to the CDSCO Subject Expert Committee and will be published in the weeks to come," it said.

The DCGI on Tuesday also granted emergency use authorisation to Gujarat-based Zydus Cadila's two-dose Covid-19 vaccine for the 12 years and above population. At present, the three-dose version of ZyCoV-D is being used in the national vaccination drive for the adult population. This is the first Covid-19 vaccine built on a DNA platform, and has been approved for commercial use.

Zydus said the second dose will be administered after 28 days. It said the two-dose regimen was tested on 3,100 volunteers over 12 years of age. In its three-dose regimen, the vaccine is administered with a gap of 28 days between each jab.

"This will increase the compliance for the vaccine and reduce the overall time required for vaccination to improve immunity against the virus. It will also help in administering the vaccine in a larger population in a shorter time, which is always desirable in the midst of a pandemic," said Dr Sharvil Patel, Managing Director, Zydus Lifesciences.

The Indian EXPRESS

Explained: What is Paxlovid, strongly recommended by WHO as the best therapeutic choice for high-risk Covid-19 patients?

Paxlovid consists of nirmatrelvir tablets and ritonavir tablets, co-packaged for oral use. It was given emergency use authorisation (EUA) by the USFDA in December last year

By: **Explained Desk** | New Delhi |
Updated: April 27, 2022 7:52:20 am

Pfizer's oral antiviral drug Paxlovid (Reuters, file)

On April 22, the World Health Organisation (WHO) said Pfizer's oral antiviral drug **Paxlovid was "strongly recommended" for patients with non-severe Covid-19** who are at highest risk of developing severe disease and hospitalisation, such as unvaccinated, older, or immunosuppressed patients.

The recommendation was based on new data from two randomised controlled trials involving 3,078 patients. The data show that the risk of hospitalisation was reduced by 85% following this treatment, the WHO said in a statement. In a high-risk group (over 10% risk of hospitalisation), that meant 84 fewer hospitalisations per 1,000 patients.

The drug

Paxlovid consists of nirmatrelvir tablets and ritonavir tablets, co-packaged for oral use. It was given emergency use authorisation (EUA) by the USFDA in December last year.

Nirmatrelvir inhibits a viral enzyme called protease that is necessary for the virus to replicate itself inside the host cell. Ritonavir slows down the breakdown of nirmatrelvir in order to help it remain in the body for longer at higher concentrations.

A drug like nirmatrelvir is considered to have an advantage over vaccines because it attacks a vulnerability in the virus that does not mutate like spike proteins — which vaccines target — do. As a result, the medication is seen to be effective against all variants. (The Omicron wave showed that in a very large number of cases, vaccines are unable to prevent infection, even though they do prevent serious illness and deaths.)

Even before the WHO's latest endorsement, Paxlovid was seen as a wonder drug that presented a dramatic new advantage in the battle against the coronavirus. A second oral Covid-19 drug, molnupiravir, manufactured by Merck and Ridgeback, too received FDA authorisation in December last year, but showed a somewhat lower efficacy in clinical trials.

Paxlovid is administered as three tablets — two of nirmatrelvir and one of ritonavir — taken together orally twice daily for five days, that is, a total of 30 tablets. The USFDA authorised Paxlovid for use only up to five consecutive days.

The EUA for Paxlovid was based on clinical data that showed a reduced risk of hospitalisation or death by 89 per cent within three days of the onset of symptoms, and 88 per cent within five days of the onset of symptoms, compared to the placebo group.

The European Medicines Agency (EMA) issued advice that Paxlovid can be used to treat adults with Covid-19 who do not require supplemental oxygen and who are at increased risk of progressing to severe disease.

Generic versions

On November 16 last year, Pfizer had announced it had signed a voluntary licence agreement for Paxlovid that would facilitate the production and distribution of the drug by granting sub-licences to qualified generic medicine manufacturers.

Pfizer's licensing agreement with the United Nations-backed public health organisation Medicines Patent Pool (MPP) was intended to enable the supply of the medicines to 95 low- and middle-income countries including India, comprising approximately 53% of the world's population.

It was announced at the time that Pfizer would not receive royalties on sales in low-income countries, and that royalties would be waived on sales in all countries covered by the agreement for as long as Covid-19 remained classified as a Public Health Emergency of International Concern by WHO.

Subsequently, on March 17 this year, the MPP announced that it had signed agreements with 35 companies to manufacture the generic version of nirmatrelvir, which in combination with a low dose of ritonavir can be supplied in 95 low- and middle-income countries. Six companies will produce the drug substance, nine will produce the drug product, and the rest will do both, the MPP said in a release.

The companies are located, besides India, in Bangladesh, Brazil, China, Dominican Republic, Jordan, Israel, Mexico, Pakistan, Serbia, Republic of Korea, and Vietnam.

The MPP, founded by the Geneva-based Unitaid, works to increase access to, and facilitate the development of, life-saving medicines for low- and middle-income countries. MPP partners with civil society, governments, international organisations, industry, patient groups, and other stakeholders to prioritise and license needed medicines and pool intellectual property to encourage generic manufacture and the development of new formulations.

Drug in India

Nineteen of the 35 companies with which the MPP has signed sub-licensing agreements are Indian, and they include drugmakers such as Bengaluru-based Biocon Ltd; Mumbai-based Glenmark Pharmaceuticals, Sun Pharmaceuticals, and Cipla; Ahmedabad headquartered Torrent Pharmaceuticals and Cadila Pharmaceuticals; Hetero Drugs and Laurus Labs of Hyderabad; and Emcure Pharmaceuticals of Pune.

It was reported earlier this week that Hetero's drug could be available at chemists' very soon, but no confirmation was available.

In its April 22 statement, WHO said it was "extremely concerned" that low- and middle-income countries could be pushed to the "end of the queue" while accessing Paxlovid treatment — in the same way these countries had suffered when it came to the supply of Covid-19 vaccines. It said that Pfizer's licensing agreement with the MPP limited the number of countries that can benefit from generic production of the medicine.

Push in the US

The Biden administration is aiming to expand access to oral antiviral treatments like Paxlovid by doubling the number of locations at which they are available, the White House said on Tuesday.

Currently, pharmacies were dependent on states to obtain the pills. The government sends the treatments to select pharmacies, as well as directly to states and community centres. Under the current system, the treatments are available in around 20,000 locations, a Reuters report said.

The administration now expects to increase their direct distribution to over 30,000 locations and reach 40,000 sites over the coming weeks, the report said, quoting an official.

Demand for Paxlovid has been unexpectedly light due to complicated eligibility requirements, reduced testing, and potential for drug interactions. The US has agreed to buy up to 20 million pills at around $530 a course, and Pfizer is on pace to produce 3.5 million courses earmarked for US use by the end of April, the Reuters report said.

The Indian EXPRESS

Explained: What is Corbevax, the vaccine approved for your 5-year-old kid?

By: **Explained Desk** | New Delhi |
Updated: April 27, 2022 7:51:13 am

The national drugs controller has cleared children as young as 5 years old to be vaccinated with Biological E's Corbevax. How

was the vaccine made, and how does it work? How is it different?

Covid-19 vaccination drive for age group 12-14 years at Apeejay school at Nerul, Mumbai. (Express photo by Narendra Vaskar)

As schools around the country return to full in-person classes, and amid reports of some small children testing positive for Covid-19, the national drugs controller on Tuesday (April 26) **cleared children as young as 5 years old to receive vaccination against the coronavirus.**

Once the modalities for the rollout are finalised by the government, kids in the age group of 5-12 can be vaccinated with Biological E's Corbevax.

The United States and United Kingdom have allowed vaccination of children age 5 with Pfizer/BioNTech's mRNA vaccine. Corbevax, which is being used at present to vaccinate pre- and young teens in the 12-14 years age group, is built on a different technological platform.

Also on Tuesday, the Drugs Controller General of India (DCGI) granted emergency use authorisation (EUA) to Bharat Biotech's Covaxin for kids in the age group of 6-12 years, and to Gujarat-based Zydus Cadila's two-dose vaccine for recipients above the age of 12 years.

Zydus Cadila's vaccine is the world's first Covid-19 vaccine built on a DNA platform that has been approved for commercial use. A three-dose version of Zydus Cadila's vaccine is already part of the vaccine basket for the country's adult population.

How does Corbevax work?

Corbevax is a "recombinant protein sub-unit" vaccine, which means it is made up of a specific part of SARS-CoV-2, that is, the spike protein on the virus's surface.

The spike protein allows the virus to enter cells so that it can replicate and cause disease. However, when just the spike protein is injected into the body, it is not as harmful as the virus itself, because the rest of the virus is missing.

The body is expected to develop an immune response against the injected spike protein and, if and when the real virus attempts to infect, the body has an immune response ready, which will make it unlikely that the virus can make the victim seriously ill.

This technology itself is not new. It has been used for decades to make hepatitis B vaccines. However, Corbevax is among the first Covid-19 vaccines to use this platform.

Gaithersburg, Maryland-based Novavax too has developed a protein-based vaccine, which has been manufactured in India under licence by Serum Institute of India. This vaccine, named Covovax in India, received restricted emergency use authorisation for the 12-17 age group from DCGI last month.

How was Corbevax made?

While Biological E, the manufacturer of Corbevax, is a Hyderabad-based biological products company, the beginnings of the vaccine can be traced to the National School of Tropical Medicine at the Baylor College of Medicine (BCM) in Houston, Texas. The school had been working on recombinant protein vaccines for coronaviruses SARS and MERS for a decade.

"We knew all the techniques required to produce a recombinant protein (vaccine) for coronaviruses at high levels of efficiency and integrity," Dr Peter Hotez, Professor and Dean at the National School of Tropical Medicine had told The Indian Express earlier.

When the genetic sequence for SARS-CoV-2 was made available in February 2020, researchers at the school pulled out the sequence for the gene for the spike protein, and worked on cloning and engineering it. The gene was then put into yeast, so that it could manufacture and release copies of the protein.

"It's actually similar to the production of beer. Instead of releasing alcohol, in this case, the yeast is releasing the recombinant protein," Dr Hotez said.

The protein was then purified to remove any remnants of the yeast "to make it pristine". The vaccine was then formulated using an adjuvant to better stimulate the immune response.

Most of these ingredients are cheap and easy to find.

In August 2020, BCM transferred its production cell bank for this vaccine to Biological E, so that the Hyderabad-based company could take the candidate through trials.

How is Corbevax different?

The Covid-19 vaccines manufactured by Pfizer and Moderna are mRNA vaccines; those made by AstraZeneca-Oxford (Covishield in India), Johnson & Johnson and Sputnik V are viral vector vaccines; and Covaxin, Sinovac-CoronaVac, and Sinopharm's SARS-CoV-2 Vaccine-Vero Cell are inactivated vaccines.

Inactivated vaccines, which contain killed particles of the whole SARS-CoV-2 virus, seek to target the entire structure of the virus. On the other hand, Corbevax, like the mRNA and viral vector vaccines, targets only the spike protein, but in a different way.

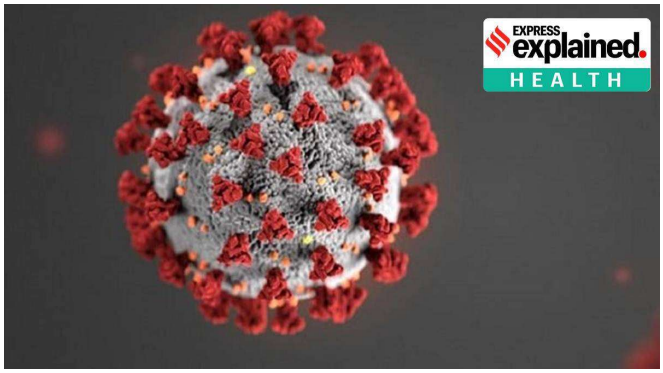
Viral vector and mRNA and vaccines use a code to induce human cells to make the spike proteins against which the body has to build immunity. "In this case (Corbevax), we're actually giving the protein," Dr Hotez said.

The Indian EXPRESS

Asthma drug blocks protein crucial to replication of coronavirus: IISc study

A widely available drug, used for treatment of asthma and allergies, can also block a protein that is key to replication of SARS-CoV-2, a study has found.

Written by **Kabir Firaque** | New Delhi |
Updated: April 27, 2022 7:23:42 am



The researchers first used computational modelling to screen more than 1,600 drugs approved by the US Food and Drug Administration (FDA).

A widely available drug, used for treatment of asthma and allergies, can also block a protein that is key to replication of SARS-CoV-2, the virus that causes Covid-19, a study by Indian Institute of Science (IISc) researchers has found. The study has been published in the journal eLife.

The drug: The drug, montelukast, is an oral treatment given to prevent wheezing, difficulty breathing, chest tightness, and coughing caused by asthma, and also used to prevent breathing difficulties during exercise, according to the US National Library of Medicine. "Montelukast is prescribed in India by physicians. It is readily available as tablets and syrup (for kids) in pharmacy shops under different brand names," IISc Assistant Professor Tanweer Hussain, senior author of the study, told The Indian Express.

In fact, some clinicians were using montelukast to treat Covid-19 patients because of its known role in making breathing easier in asthma patients, Hussain said. "However, it was not known that this drug also has antiviral activity, which we have figured out in this study."

Antiviral activity: When it infects the human cell, the coronavirus releases a protein called Nsp1, which is key to its replication. The viral protein binds to the host cell's protein-making machinery, called the ribosome. "If the ribosome is blocked, then the host cell is unable to synthesise proteins needed to fight the viral infection. This helps in the establishment of viral infection," Hussain said.

Targeting Nsp1, therefore, can reduce the damage inflicted by the virus. And the IISc researchers found that montelukast binds strongly to Nsp1, blocking its access to the ribosome.

Other viral proteins could, of course, still bind elsewhere on the host cell. "However, blocking viral Nsp1 allows the host cells to synthesise immune effector proteins to fight the viral infection," Hussain said.

Also, Nsp1's mutation rate is very low compared to other viral proteins, which means Nsp1 is likely to remain largely unchanged in any virus variants that emerge, Hussain said. Hence drugs targeting this region are expected to work against all such variants.

How the drug was identified: The researchers first used computational modelling to screen more than 1,600 drugs approved by the US Food and Drug Administration (FDA). "A new molecule will have to clear all phase trials before it can be prescribed to patients, which would require months and years to complete. Hence we looked for candidates among USFDA-approved drugs," Hussain said.

The researchers shortlisted a dozen drugs that binds to Nsp1, among which they zeroed in on montelukast and saquinavir, an anti-HIV drug. Lab tests on cultured human cells then showed that only montelukast was able to rescue Nsp1's inhibition of protein synthesis.

Study: 'Drug targeting Nsp1-ribosomal complex shows antiviral activity against SARS-CoV-2', Mohammad Afsar et al, eLife. https://elifesciences.org/articles/74877

The Indian EXPRESS

Vaccinating children up to age 12: what next

India has been rolling out Covid-19 vaccines in a phased manner based on scientific and epidemiological evidence.

Written by **Kaunain Sheriff M** | New Delhi |
Updated: April 27, 2022 10:50:57 am

The national drug regulator has granted emergency use authorisation (EUA) to **Bharat Biotech's Covaxin** for the age group 6-12, and to **Biological E's Corbevax** for the age group 5-12. This paves the way for the rollout of Covid-19 vaccination for children aged 12 and under.

This paves the way for the rollout of Covid-19 vaccination for children aged 12 and under. (File Photo)

Why have the approvals come now?

India has been rolling out Covid-19 vaccines in a phased manner based on scientific and epidemiological evidence. In the first phase, it prioritised groups at the highest risk: healthcare and frontline workers, and the elderly. It expanded the drive, in phases, to cover all adults. As scientific knowledge evolved and more vaccines became available, the government introduced vaccination for the 15-18 age group in January this year, and for the 12-14 age group in March.

The EUAs for children up to age 12, granted by the regulator Drugs Controller General of India, have come on the basis of data from trials submitted by the vaccine manufacturers. With Tuesday's decision, India is a step away from rolling out vaccination for this age group.

So, when will children of this age group get vaccinated?

The regulatory approval and data on the vaccines will be placed before three government expert bodies. These include the National Technical Advisory Group on Immunisation (NTAGI), which provides guidance to the government on vaccination by undertaking technical reviews of scientific evidence, and the COVID-19 Working Group and Standing Technical Sub-Committee. Next, the National Expert Group on Vaccine Administration for COVID-19 (NEGVAC) will make a final recommendation to the Health Ministry. The final decision is expected to come within a few days.

Why is rolling out vaccines for young children an important step?

Covid-19 vaccines protect against severe disease, death, and hospitalisation. Hence, as children have returned to school, vaccination will play a key role in protecting them.

In the United States, the Centers for Disease Control and Prevention (CDC) recommends that everyone aged 5 years and older should get vaccinated against Covid-19. In the US, Pfizer/BioNtech's mRNA vaccine is being used for this age group.

The CDC notes that children aged 5-12 are "most frequently" affected by multisystem inflammatory syndrome in children (MIS-C), a condition associated with Covid-19 and marked by inflammation of various parts of the body. "CDC is collecting data on how well COVID-19 vaccination works against MIS-C in younger children. As more children under 12 years old get vaccinated, CDC will be able to analyze and share those data," the CDC says.

Will there be a choice of vaccines?

The final decision on which vaccine will be available for this age group in India will be recommended by the government. For instance, the government allows only Corbevax to be administered to those in the 12-14 age group, and only Covaxin to those in the 15-18 age group. The Zydus Cadila DNA vaccine, which has been approved for children aged 12 and above, has not been used in the vaccination drive so far.

What is the efficacy and safety profile of these vaccines?

On Tuesday, Bharat Biotech, which is conducting one of the world's first Covid-19 vaccine trials to generate data in the 2-18 year age group, said neutralising antibodies in these children were 1.7 times higher than in adults. "Covaxin exhibits robust immune responses in children with 2 doses and 6 months follow up, indicating durability of immune responses. Data was presented to the CDSCO (Central Drugs Standard Control Organisation) Subject Expert Committee and will be published in the weeks to come," Bharat Biotech said.

Last September, Biological E received approval to conduct phase 2/3 trials with Corbevax in children and adolescents aged 5-18. After getting a no-objection certificate, the company initiated the study in October 2021 (which is ongoing), and has evaluated safety and immunogenicity results. The company said the data indicates that the vaccine is safe and immunogenic.

The Indian EXPRESS

Explained: Do vaccines protect against Long Covid?

The jury is still out, but a growing number of studies suggest that getting a COVID vaccine can reduce — though not eliminate — the risk of longer-term symptoms.

By: **New York Times** |
April 27, 2022 3:16:53 pm

As the pandemic enters its third year, long COVID has emerged as an increasingly important concern. And many people are wondering whether getting a COVID shot can reduce their chances of developing long-term symptoms.

A healthworker fills a syringe with a dose of Covid-19 vaccine before administering it to a beneficiary, in New Delhi, Saturday, April 23, 2022. (PTI Photo/Shahbaz Khan)

What does the research show so far?

The jury is still out, but a growing number of studies suggest that getting a COVID vaccine can reduce — though not eliminate — the risk of longer-term symptoms.

Britain's Health Security Agency conducted an analysis of eight studies that had been published on the topic before mid-January. It reported that six of the studies found that vaccinated people who became infected with the coronavirus were less likely than unvaccinated patients to develop symptoms of long COVID. The remaining two studies found that vaccination did not appear to conclusively reduce the chances of developing long COVID.

How much protection could vaccines offer, according to the studies that found benefit?

Some study results suggest substantial protection, while others find only a slight benefit.

One large study of electronic records of patients in the US Veterans Health Administration found that vaccinated COVID patients had only a 13% lower risk than unvaccinated patients of having symptoms six months later.

Two studies in Britain found a bigger effect. One study of about 1.2 million people, based on patients' reports via a phone app, found a 50% lower risk of lingering symptoms among

vaccinated patients. Another, which has not been peer-reviewed and was based on surveying about 6,000 patients, found a 41% lower risk.

A study of US patients by Arcadia, a health care data firm, and the COVID Patient Recovery Alliance, a collaboration of leaders with health expertise in government and the private sector, found a larger benefit still. The study, which has not been peer-reviewed, analyzed records of about 240,000 patients infected with the coronavirus by May 2021 and found that those who had received even one dose of a COVID vaccine before their infection were one-seventh to one-tenth as likely to report two or more symptoms of long COVID 12 to 20 weeks later. That study also found that people who received their first vaccine dose after contracting the coronavirus were less likely to develop long COVID than those who remained unvaccinated, and the sooner they were vaccinated after infection, the lower the risk of long-term symptoms.

A study in Israel, which has also not been peer-reviewed, found through surveys that people who received two doses of vaccine had between 54% and 82% lower risk than unvaccinated patients to report having seven of the 10 most common long-term symptoms. They were generally no more likely to report symptoms like headache, muscle pain and other issues than people in the general population who had never gotten COVID, the study said. (The authors said they could not confirm whether the patients were vaccinated before or after they had gotten COVID, but said that because of Israeli vaccination policy it was likely most people who received two doses of vaccine were infected with the coronavirus sometime after they had gotten their shots.)

In the veterans' study, also not yet published in a peer-reviewed publication, researchers compared about 48,000 patients who were unvaccinated when they got COVID with about 16,000 patients who were vaccinated. It found that vaccinated patients mostly benefited by being less likely to develop lung problems and blood-clotting difficulties, said one of the authors, Dr. Ziyad Al-Aly, chief of research and development at the VA St. Louis Health Care System and a clinical epidemiologist at Washington University in St. Louis. Other symptoms showed "very little risk reduction" from vaccines, he said.

"The overall message is that vaccines reduce but do not eliminate the risk of long COVID," said Al-Aly, adding that "reliance on vaccination as a sole mitigation strategy is wholly inadequate. It is like going to battle with a shield that only partially works."

What about studies that don't show any benefit?

In an analysis of electronic medical records of patients in the United States, researchers in Britain compared about 10,000 people who had received COVID vaccines with a similar number of people who had not been vaccinated against the coronavirus but had received a flu vaccine — an effort to limit the number of people in the study who might be considered vaccine hesitant or who generally had less healthy behaviors.

The study found that having a coronavirus vaccine before being infected did not reduce the risk of most symptoms of long COVID. There was some suggestion from the data that vaccinated people might be at lower risk of long-term symptoms like abnormal breathing and cognitive issues, the authors wrote, but those results were not statistically conclusive.

The researchers said it was possible that because their data relied on electronic health records, the study might have captured only patients with the most severe symptoms, rather than a wider range of patients who did not seek medical attention for their symptoms.

Why is the research conflicting?

One reason is the differences in the studies themselves. Not all researchers have defined long COVID in the same way, measured the same symptoms or tracked patients for the same length of time. For example, some studies recorded symptoms that have lingered at least 28 days after infection, while others measured symptoms people were experiencing six months later. Studies relying on patient surveys may yield very different results than those based on electronic medical records. And some studies did not have very diverse populations. Patients in the veterans' study, for example, were mostly older, white and male.

Are the results different for different coronavirus variants?

Much of the published data followed patients infected early in the pandemic. Some recently-published data included people infected by the highly contagious delta variant, but it is too early for studies about vaccines and long COVID that include the omicron variant. It is also too early for studies evaluating the effect of boosters on long COVID.

Is there anything scientists can conclude for sure?

Yes. Vaccines are very effective at preventing people from getting seriously ill from infection by all the variants known so far. And many studies have found that COVID patients sick enough to be hospitalized were more likely to have lasting health issues. So, by keeping people out of the hospital, vaccines should reduce the chances of that type of long-term post-COVID case.

Still, many people with long COVID had mild or even asymptomatic initial infections, and while some studies suggest vaccines have potential to ease their long-term symptoms, the evidence is not yet conclusive.

Vaccines do offer some protection against getting infected to begin with — and avoiding infection, of course, is the surest way to prevent long COVID.

Does the brand of vaccine make a difference in potential protection against long COVID?

So far, studies have not found that different vaccines have different effects on long-term symptoms.

What are the possible scientific reasons that vaccines might protect against long COVID?

The cause of long COVID is still unclear, and different symptoms might have different underlying causes in different patients, scientists say. Some believe that the condition may be related to remnants of the virus or its genetic material lingering after the initial infection subsides. Another theory is that the continuing problems are related to inflammation or blood circulation problems spurred by an overactive immune response that is unable to shut down.

Akiko Iwasaki, an immunologist at Yale, has said that vaccines may be able to provide lasting relief in people whose symptoms are caused by vestiges of the virus if the antibodies generated by the vaccines eliminate those remnants.

But in people whose symptoms may be caused by a post-viral response resembling an autoimmune disease, she said, vaccines may help only temporarily, and problems such as fatigue could reemerge.

Can getting vaccinated help if you already have long COVID?

When vaccines were first rolled out, some patients with long COVID were finding that symptoms like brain fog, joint pain, shortness of breath and fatigue improved after they had gotten vaccinated. Still, many people experienced no difference in their symptoms

after vaccination, and a small percentage said they felt worse.

A study by the Office for National Statistics in Britain found that in people ages 18 to 69 who reported their symptoms between February and September 2021, a first dose of a vaccine lowered the odds of reporting long COVID Symptoms by 13%. A second dose further lowered the odds by 9%, the study found.

The recent analysis by the British Health Security Agency evaluated that study and seven others that examined whether vaccinating people with long COVID affected their symptoms. It found that in most of those studies, more people with long COVID reported improvement in their symptoms at some point after they were vaccinated. However, some people also reported worsening of symptoms, and in several studies the majority of people said their symptoms were unchanged.

The agency noted that the definition of long COVID varied widely among the studies and that, because all the studies were observational, changes in symptoms could be due to factors other than vaccination.

The Indian EXPRESS

Explained: 5 takeaways from PM Narendra Modi's meeting with CMs on Covid-19 surge

Coronavirus PM review meet: Here are the five things Narendra Modi told the states during the meeting chaired by him.

Written by **Kaunain Sheriff M** , Edited by Explained Desk
| New Delhi |
Updated: April 28, 2022 8:14:18 am

Prime Minister Narendra Modi speaks during his meeting with Chief Ministers regarding the Covid-19 situation across the nation through a video conference, in New Delhi. (PTI)

Prime Minister Narendra Modi on Wednesday (April 27) **held a review meeting** with chief ministers amid rising cases of the coronavirus infection in the country. Here are the five things the PM told the states during the meeting chaired by him.

'Children are returning to school, need to vaccinate all of them on priority'

During the interaction, Prime Narendra Modi emphasised that priority in the new phase of pandemic should be to vaccinate all the eligible children population — directing the states to run special vaccination campaigns needs to be implemented, especially in the backdrop of children returning to the schools after a long break.

"After a long break, the schools have reopened in our country. Some parents are worried about the increase in cases in some places. There are reports from some schools reporting children being tested positive for Covid-19. However, it is a matter of satisfaction that many children have also received protection through the vaccines. Yesterday, the regulator gave permission to administer Covaxin for 6-12 years. It is our priority to vaccinate all the eligible child population. For this, we have to run special drives in the schools. We have to create awareness among the

parents and the teachers about the importance of vaccination," Modi said.

'Bring case under control, but continue to allow economic activity'

Modi highlighted that the twin strategy of bringing the cases under control and also allowing the economy to continue should remain the priority. "During the third wave, we have witnessed more than three lakh daily cases. Every state handled these cases well. They also allowed economic and social activity to continue. This balance should be part of future strategy. Our scientists and experts are continuously monitoring the global situation. Based on their advice, we have to adopt a preemptive, proactive, and collective approach," Modi said.

'100% RT PCR testing of influenza like illness to track the new variants'

Modi specifically told the states that for early tracking of the variants the local administration should conduct 100% RT PCR testing of all hospitalised patients with influenza like illness and severe acute respiratory illness. "It was our priority to stop the infections right at the beginning. We have to continue to make this our priority now. We have to effectively implement the test, track and treat strategy. It is very important that we do 100% RT PCR testing on hospitalised patients with influenza-like illness and severe acute respiratory illness; all the positive cases should be sent for genome sequencing. By doing this, we will be able to detect the new variants," Modi said.

'Ensure all the PSA oxygen plants, including the hospital beds are made fully functional'

On medical infrastructure, Modi asked the states to ensure all the PSA oxygen plants, including the hospital beds are made fully functional. "We have spoken about the up-gradation of health infrastructure. We have to ensure the up-gradation is completed swiftly. We are in a better position with respect to the availability of beds, ventilators, and the PSA oxygen plants. However, we have to ensure that all of these facilities are fully functional. They have to be monitored and responsibility has to be fixed. If there are any gaps, it my request, that it should be verified at the top level. We also have to scale up our infrastructure and manpower in the medical colleges and district hospitals," Modi said.

'Promote masking , Covid-19 appropriate behaviour, and vaccination'

Modi reiterated that the states promote Covid-19 appropriate behaviour at the social gathering. "At the same time, we should ensure we don't create panic among the public," he said. He also reiterated the vaccination will remain the most potent shield against severe Covid-19. "There are many things that we have learned from our experience of the last surge that we witnessed a few months back. All of us successfully fought the Omicron surge with creating any panic. Within two years, from health infrastructure to oxygen supply, we are strengthening every aspect in our fight against Covid-19. In the third wave, we did not hear from any state about situation going out the control," Modi said

"This should be seen in the context of the mass Covid-19 vaccination drive. Despite many geographical challenges, vaccines have reached the last mile. It is a matter of pride that 96% of the adult population has received the first dose; and 85% of those above 15 years have received their first dose. It is the opinion of the experts that vaccines are the biggest protection shield," Modi said.

The New York Times

The Coronavirus Has Infected More Than Half of Americans, the C.D.C. Reports

But prior infection does not guarantee protection from the virus, officials said, and Americans should still get vaccinated and boosted.

Covid testing at a site in Oakland, Calif. The country has seen about a five-fold drop in P.C.R. testing since the Omicron peak, so tracking new cases has been difficult.Credit...Jim Wilson/The New York Times

By Apoorva Mandavilli
Published April 26, 2022Updated April 27, 2022

Sixty percent of Americans, including 75 percent of children, had been infected with the coronavirus by February, federal health officials reported on Tuesday — another remarkable milestone in a pandemic that continues to confound expectations.

The highly contagious Omicron variant was responsible for much of the toll. In December 2021, as the variant began spreading, only half as many people had antibodies indicating prior infection, according to new research from the Centers for Disease Control and Prevention.

While the numbers came as a shock to many Americans, some scientists said they had expected the figures to be even higher, given the contagious variants that have marched through the nation over the past two years.

There may be good news in the data, some experts said. A gain in population-wide immunity may offer at least a partial bulwark against future waves. And the trend may explain why the surge that is now roaring through China and many countries in Europe has been muted in the United States.

A high percentage of previous infections may also mean that there are now fewer cases of life-threatening illness or death relative to infections. "We will see less and less severe disease, and more and more a shift toward clinically mild disease," said Florian Krammer, an immunologist at the Icahn School of Medicine at Mount Sinai in New York.

"It will be more and more difficult for the virus to do serious damage," he added.

Administration officials, too, believe that the data augur a new phase of the pandemic in which infections may be common at times but cause less harm.

At a news briefing on Tuesday, Dr. Ashish Jha, the White House's new Covid coordinator, said that stopping infections was "not even a policy goal. The goal of our policy should be: obviously, minimize infections whenever possible, but to make sure people don't get seriously ill."

The average number of confirmed new cases a day in the United States — more than 49,000 as of Monday, according to a New York Times database — is comparable to levels last seen in late July, even as cases have risen by over 50 percent over the past two weeks, a trend infectious disease experts have attributed to new Omicron subvariants.

Dr. Jha and other officials warned against complacency, and urged Americans to continue receiving vaccinations and booster shots, saying that antibodies from prior infections did not guarantee protection from the virus.

During the Omicron surge, infections rose most sharply among children and adolescents, according to the new research. Prior infections increased least among adults aged 65 and older, who have the highest rates of vaccination and may be most likely to take precautions.

"Evidence of previous Covid-19 infections substantially increased among every age group," Dr. Kristie Clarke, the agency researcher who led the new study, said at a news briefing on Tuesday.

Widespread infection raises a troubling prospect: a potential increase in cases of long Covid, a poorly understood constellation of lingering symptoms.

Up to 30 percent of people infected with the coronavirus may have persistent symptoms, including worrisome changes to the brain and heart. Vaccination is thought to lower the odds of long Covid, although it is unclear by how much.

"The long-term impacts on health care are not clear but certainly worth taking very seriously, as a fraction of people will be struggling for a long time with the consequences," said Bill Hanage, an epidemiologist at the Harvard T.H. Chan School of Public Health.

Even a very small percentage of infected or vaccinated people who develop long Covid would translate to millions nationwide.

While the focus is often on preventing the health care system from buckling under a surge, "we should also be concerned that our health care system will be overwhelmed by the ongoing health care needs of a population with long Covid," said Zoë McLaren, a health policy expert at the University of Maryland, Baltimore County.

A mass testing site at Dodger Stadium in Los Angeles. Millions of Americans with no immunity to the virus remain vulnerable to both the short- and long-term consequences of infection.Credit...David Mcnew/Getty Images

There are still tens of millions of Americans with no immunity to the virus, and they remain vulnerable to both the short- and long-term consequences of infection, said Dr. Tom Inglesby, director of the Center for Health Security at the Johns Hopkins Bloomberg School of Public Health.

"Betting that you are in the 60 percent is a big gamble," he said. "For anyone who's not been vaccinated and boosted, I would take this new data as a direct message to get that done or expect that the virus is likely to catch up to you if it hasn't already."

Although cases are once again on the upswing, particularly in the Northeast, the rise in hospitalizations has been minimal, and deaths are still dropping. According to the agency's most recent criteria, more than 98 percent of Americans live in communities with a low or medium level of risk.

Even among those who are hospitalized, "we're seeing less oxygen use, less I.C.U. stays and we haven't, fortunately, seen any increase in deaths associated with them," said the C.D.C.'s

director, Dr. Rochelle Walensky. "We are hopeful that positive trends will continue."

The country has recorded about a five-fold drop in P.C.R. testing for the virus since the Omicron peak, and so tracking new cases has become difficult. But the reported count is far less, about 70-fold lower, said Dr. Walensky, reflecting "a true and reliable drop in our overall cases."

New subvariants of Omicron, called BA.2 and BA.2.12.1, have supplanted the previous iteration, BA.1, which began circulating in the country in late November and sent cases soaring to record highs in a matter of weeks.

"Of course, even more have been infected now, because BA.2 will have infected some who avoided it thus far," Dr. Hanage said.

By February, three of four children and adolescents in the country had already been infected with the virus, compared with one-third of older adults, according to the new study.

That so many children are carrying antibodies may offer comfort to parents of those aged 5 and under, who do not qualify for vaccination, since many may have acquired at least some immunity through infection.

But Dr. Clarke urged parents to immunize children who qualify as soon as regulators approve a vaccine for them, regardless of their prior infection. Among children who are hospitalized with the virus, up to 30 percent may need intensive care, she noted.

Although many of those children also have other medical conditions, about 70 percent of cases of multisystem inflammatory disease, a rare consequence of Covid-19 infection, occur in otherwise healthy children.

"As a pediatrician and a parent, I would absolutely endorse the children get vaccinated, even if they have been infected," Dr. Clarke said.

Some experts said they were concerned about long-term consequences, even in children who have mild symptoms.

"Given the very high proportion of infection in kids and adults that happened earlier this year, I worry about the rise in long Covid cases as a result," said Akiko Iwasaki, an immunologist at Yale University who is studying the condition.

To measure the percentage of the population infected with the virus, the study relied on the presence of antibodies produced in response to an infection.

C.D.C. researchers began assessing antibody levels in people at 10 sites early in the pandemic, and have since expanded that effort to all 50 states, the District of Columbia and Puerto Rico. The investigators used a test sensitive enough to identify previously infected people for at least one to two years after exposure.

The researchers analyzed blood samples collected from September 2021 to February 2022 for antibodies to the virus, and then parsed the data by age, sex and geographical location. The investigators looked specifically for a type of antibody produced after infection but not after vaccination.

Between September and December 2021, the prevalence of antibodies in the samples steadily increased by one to two percentage points every four weeks. But it jumped sharply after December, increasing by nearly 25 points by February 2022.

The percentage of samples with antibodies rose from about 45 percent among children aged 11 years and younger, and among adolescents aged 12 to 17 years, to about 75 percent in both age groups.

By February 2022, roughly 64 percent of adults aged 18 to 49 years, about 50 percent of those aged 50 to 64 years and about 33 percent of older adults had been infected, according to the study.

Despite the record high cases during the Omicron surge, the reported statistics may not have captured all infections, because some people have few to no symptoms, may not have opted for testing or may have tested themselves at home.

According to one upcoming C.D.C. study, there may be more than three infections for each reported case, Dr. Clarke said.

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