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A year-long stint of India with COVID-19: challenges and achievements

When India reported its first coronavirus case in January 2020, we had negligible laboratory capabilities to test the presence of SARS-CoV-2 infection. We were faced with a highly contagious virus that mandated physical distancing as prevention and as such speculators predicted doomsday for India. One year down the line, COVID-19 related fatality and number of cases has drastically declined from its peak and India has launched the world's largest vaccination drive using two COVID-19 vaccines, which were approved for emergency use.

Indian Council of Medical Research devised the strategy of 5Ts- Test, Track, Trace, Treat and Technology to contain the pandemic. ICMR exponentially increased COVID-19 testing capability by leveraging technology and facilitating innovation in affordable diagnostics platforms. Along with RT-PCR testing laboratories, testing outreach was expanded through indigenous point of care test-device namely TrueNAT. Mobile RT-PCR diagnostic laboratory was also developed, which helped in facilitating testing at the source. What started with one COVID-19 specific diagnostic lab at ICMR-NIV in Pune in January 2020 has now expanded into a network of almost 2500 diagnostic labs.

ICMR conducted three national serological surveys to detect the prevalence of SARS-CoV-2 for improved tracking and tracing. Based on the results researchers highlighted the need to continue to implement the context-specific containment measures. These findings helped to plan and revise testing strategies and recommend the same to states, so that they can focus on limiting COVID-19 cases in specific areas of their respective states.

For devising effective treatment protocol, ICMR established a National Clinical Registry for COVID-19 allowing collection of real time systematic data. Critical data was compiled on clinical signs & symptoms, laboratory investigations, management practices followed, clinical course of COVID-19 disease, disease spectrum and outcomes of patients.

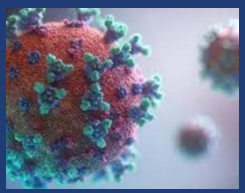
When plasma therapy was being regarded as a treatment for COVID-19 despite lack of conclusive clinical evidence, ICMR carried out a multi-centre randomized controlled trial and based on its results, it was concluded that convalescent plasma played no significant role in preventing deaths or progression to severe COVID-19 disease.

ICMR has been constantly monitoring the development in other countries and when a case of UK variant was reported, India was the first country to isolate and culture the UK variant of SARS-CoV-2 from the clinical specimens collected from UK-returnees. It was also found that ICMR backed Bharat Biotech Limited's indigenous vaccine 'COVAXIN' is effective against UK strain.

While we have made monumental strides, there is still some distance to go before we can rest. As we embark on the last leg of this journey, we must remain COVID-19 conscious, optimistic and forward looking.

Our Achievements

Indigenous COVID-19 vaccine 'COVAXIN' gets approval for restricted use in 'clinical trial mode'.



ICMR-NIV, Pune successfully isolated and cultured the UK variant of SARS-CoV-2 coronavirus.

Achievement

COVID-19 vaccines 'COVAXIN' and 'COVISHIELD' get approval for emergency usage

- Indigenous vaccine 'COVAXIN' has been developed by ICMR and Bharat Biotech International Ltd.
- AstraZeneca/Oxford University's vaccine 'COVISHIELD' is manufactured by SII in India.
- India rolled out world's largest COVID-19 vaccination drive.

Indian Council of Medical Research backed Bharat Biotech International Limited's indigenous vaccine 'COVAXIN' and Serum Institute of India (SII) and AstraZeneca/ Oxford University's vaccine "COVISHIELD" has got approval for restricted use in India. The Drugs Controller General of India (DCGI) after recommendation of subject expert committee of Central Drugs Standard Control Organization (CDSCO) gave approval for restricted emergency use on 3rd January, 2021.

'COVAXIN' is an inactivated vaccine derived from a strain of SARS-CoV-2 virus, isolated at the ICMR-National Institute of Virology (NIV), Pune. Vaccine has generated safety and immunogenicity data in various animal species such as mice, rats, rabbits, Syrian hamster, and also conducted challenge studies on non-human primates (Rhesus macaques) and hamsters. Further, phase I/II clinical trials have demonstrated that the vaccine is safe and provides a robust immune response. The Phase-III efficacy trial is continuing with almost 25,800 participants enrolled.

The other vaccine 'COVISHIELD' has been developed by the Serum Institute of India with a master seed from Oxford University/AstraZeneca. SII has submitted safety, immunogenicity and efficacy data generated on 23,745 participants aged 18 years or older from overseas clinical studies. SII will continue with the Phase-II/III clinical trial on 1600 participants within the country. ICMR has funded the clinical trial site fees while SII has funded other expenses for these clinical trials.

On this momentous occasion Prof (Dr.) Balram Bhargava, Director General, ICMR said, "It is a red letter day for Indian science community. We are dealing with a world war, so at this point we have to look at what is going to be beneficial for society at large. Not only in India but globally all vaccines which have got approved are in emergency use mode."

Indigenous COVID-19 vaccine 'COVAXIN' is an inactivated vaccine derived from a strain of SARS-CoV-2 virus, isolated at the ICMR-National Institute of Virology, Pune.

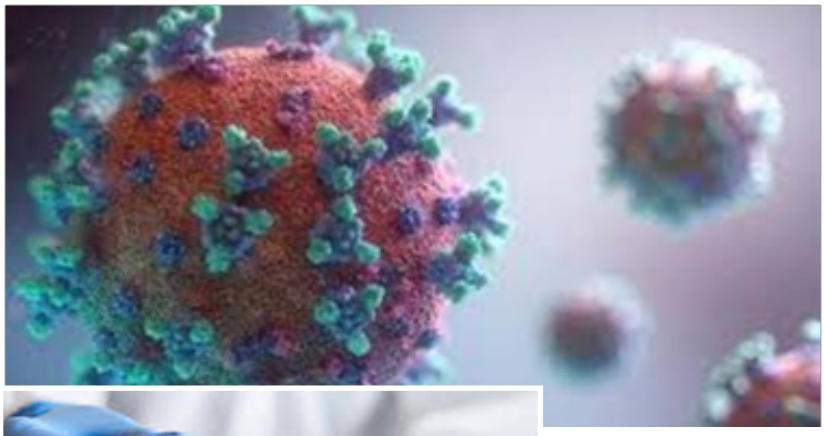
After approval to two vaccines, India embarked on world's largest COVID-19 vaccination drive on 16th January 2021. In the first phase government plans to inoculate nearly 3 crore healthcare and frontline workers.

Achievement

ICMR successfully cultured the UK-variant of SARS-CoV-2

- India is the only country after the UK to successfully culture the SARS-CoV-2 strain.
- Study found that the UK variant of SARS-CoV2 was replicated with all signature changes.
- Genomic surveillance for detection and containment of the UK variant strains will continue.

Indian Council of Medical Research-National Institute of Virology (NIV), Pune added yet another feather in its cap by making India the only country after the United Kingdom to successfully culture the UK strain of SARS-CoV-2. The UK strain, commonly known as VUI–202012/01 first emerged in the UK in mid December 2020. National Institute of Virology, Pune successfully cultured the strain from the clinical specimens collected from UK-returnees by using vero cell lines within a few weeks. At that time, no other country had isolated and cultured the UK variant of SARS-CoV-2.



ICMR-NIV has confirmed that the UK variant of SARS-CoV2 was replicated with all signature changes. The strain had been implicated to have a higher transmissibility as compared to the non-mutated SARS-CoV-2 strain. The claim was confirmed through investigation on the cultured strain which found that variant is defined by a set of 17 changes or mutations.

Dr Samiran Panda, Head (Epidemiology and Communicable Diseases Division), Indian Council of Medical Research said that high transmissibility of SARS-CoV-2 does not necessarily go hand-in-hand with high virulence. A symbiotic relationship evolves over a period of time in which a virus goes from an epidemic existence to an endemic one and with less virulence potential. However, we need to be vigilant.

Timely action was made possible due to diligent monitoring and tracking of the virus through a countrywide network of ICMR laboratories. India has formed a genomic surveillance consortium, INSACOG, for laboratory and epidemiological surveillance of circulating strains of SARS-CoV-2 in the Country. This will continue to do genomic surveillance for early detection and containment of the UK variant SARS-CoV-2 strains. However, it is important to understand that like all other RNA viruses, SARS-CoV-2 will continue to mutate. The mutated virus can also be contained by measures like social distancing, hand hygiene, wearing masks and also by an effective vaccine.

The new variant of the SARS-CoV-2 coronavirus is spreading rapidly in Britain and has prompted high level of concern among global researchers.

Research

Indigenous COVID-19 vaccine 'COVAXIN' effective against UK variant: ICMR

- 'COVAXIN' effective in producing neutralizing antibodies against UK variant.
- Study conducted on 38 individuals who had received the 'COVAXIN' vaccine.
- Study published in BioRxiv, a preprint server for biology.

Indian Council of Medical Research-National Institute of Virology, Pune (NIV) in its study has found that indigenous vaccine 'COVAXIN' is effective against the UK strain of coronavirus. The findings of the study are significant as India has seen a rising number of cases of infection with the UK variant and there were apprehension about effectiveness of indigenous vaccine against UK strain. ICMR in collaboration with Bharat Biotech International Limited has developed inactivated COVID-19 vaccine.

The study was conducted on 38 individuals who had received the 'COVAXIN' vaccine. In "plaque reduction neutralization" test the serum was collected from these selected individuals and then tested against the UK variant of the virus as well as a heterologous strain of the virus that 'COVAXIN' was previously tested against. Study evidently highlighted comparable neutralization activity of vaccinated individuals' sera against variant as well as heterologous SARS-CoV-2 strains. Importantly, sera from the vaccine recipients could neutralize the UK-variant strains. The study titled 'Neutralization of UK-variant VUI-202012/01 with COVAXIN vaccinated human serum' was published in BioRxiv, a preprint server for biology. It can be accessed at *https://www.biorxiv.org/content/10.1101/2021.01.26.426986v2*

Prof (Dr.) Balram Bhargava, Director General, ICMR said "It was reassuring from the data generated in the laboratory that 'COVAXIN' could be expected to work against the new UK variant. It is unlikely that the mutation will be able to dampen the potential benefits of this vaccine."

The UK variant of the coronavirus is spreading rapidly in UK and now accounts for more than 60% of the cases in the country. Throughout this pandemic, SARS-CoV-2 virus has been mutating and it's not unusual for any virus. However, studies have found that this new variant has acquired mutations much quicker than scientists had expected. The variant has 17 different mutations in its genetic code. And eight of those mutations occur in a critical part of the virus, called the spike protein, which reaches out and binds to human cells during the initial stages of infection.

The findings are significant as India has seen a rising number of cases of infection with the UK variant and there were apprehension about effectiveness of indigenous vaccine against UK strain.

Research

ICMR published findings on seroprevalence of chikungunya virus infection in India

- 18% of the study population had presence of chikungunya antibodies.
- Findings will be critical in fighting the virus and future vaccine trials for the disease.
- The study covered 1,17,675 individuals from 15 states in India.

ICMR has published the findings of seroprevalence of chikungunya virus infection in India. This survey was aimed to estimate the age-specific seroprevalence, force of infection (FOI), and proportion of the population susceptible to the infection in surveyed areas. The survey was conducted from June 19, 2017 to April 12, 2018 on individuals residing in 60 selected districts of 15 Indian states in all five geographic areas. The findings was published in international publication *'The Lancet Microbes'* and can be accessed at *https://www.thelancet.com/journals/lanmic/article/PIIS2666-5247(20)30175-0/fulltext*

The finding of the research highlighted that 18% of the study population had presence of chikungunya antibodies. The overall seroprevalence was 9.2% among individuals aged 5–8 years, 14% among individuals aged 9–17 years, and 21.6% among individuals aged 18–45 years. Further, it states that seroprevalence of chikungunya was lowest in the north eastern and highest in the southern region of India. Significant difference was observed between rural (11-5%) and urban (40.2%) population.

The study was conducted between June 19, 2017 to April 12, 2018 and covered 1,17,675 randomly selected individuals in three age groups (5–8 years, 9–17 years, and 18–45 years), covering 240 clusters from 60 selected districts of 15 Indian states spread across all five geographical regions of India.

THE LANCET

Age was the only inclusion criterion and they were tested of serum samples for IgG antibodies against chikungunya virus.

Overall seroprevalence was 9.2% among individuals aged 5–8 years, 14% among individuals aged 9–17 years, and 21.6% among individuals aged 18–45 years. It states that seroprevalence was lowest in the north eastern and highest in the southern region of India.

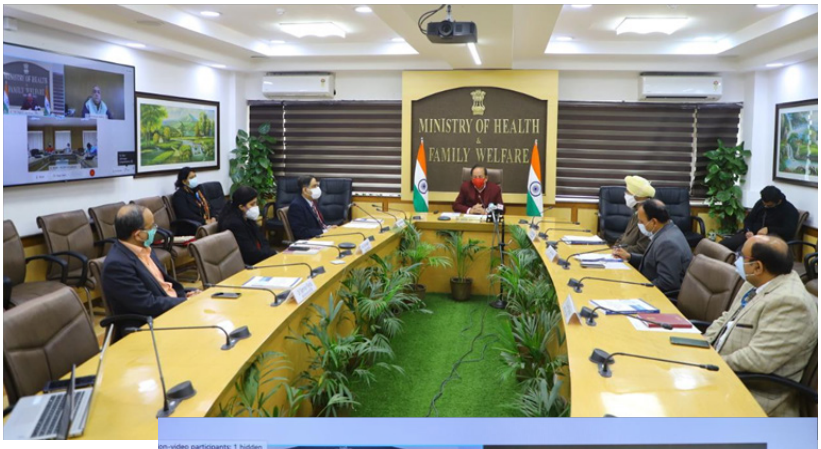
In India, the first wave of chikungunya virus outbreak was reported from 1963 to 1973. It reappeared in 2005, with explosive outbreaks in the southern Indian states of Andhra Pradesh, Karnataka, Tamil Nadu, and Kerala, which affected nearly 1.4 million people, before spreading to western and northern states. Latest survey findings will be useful in identifying appropriate target age groups and sites for setting up surveillance and for future vaccine trials.

Achievement

ICMR-National Centre for Disease Informatics and Research celebrated its foundation day

- Dr. Harsh Vardhan presided over the foundation day celebrations and launched decadal year of ICMR-NCDIR.
- Released findings of the National Non-communicable Disease Monitoring Survey.
- Framework for telemedicine use in management of cancer, diabetes, heart disease & stroke was also released

Indian Council of Medical Research – National Centre for Disease Informatics and Research (ICMR-NCDIR), Bengaluru celebrated its foundation day on 25th January 2021. Union Health Minister of Family Welfare Dr. Harsh Vardhan presided over the foundation day celebrations function through a video conference. During the event, the Union Health Minister released the findings of largest comprehensive national survey on risk factors and health systems preparedness of non-communicable diseases (NCD) along with the framework on use of telemedicine for cancer, diabetes, heart diseases and stroke.



Prof. (Dr.) Balram Bhargava, Secretary, Department of Health Research and Director General, ICMR was guest of honour at virtually organised foundation day event. Other eminent person who attended was Mrs. Anu Nagar, Joint Secretary, Dept of Health Research, Dr Samiran Panda, Head (ECD) ICMR, Dr Rajni Kant, Director, ICMR-RMPPC, and Dr R.S. Dhaliwal, Director, Division of NCD (ICMR). Dr. Prashant Mathur, Director, ICMR-NCDIR officiated the event.

On this occasion Dr. Harsh Vardhan said that ICMR – NCDIR has put in exhaustive efforts to provide valuable insights to tackle various non-communicable diseases. On its foundation day, he exhorted the Institute to help deliver benefits of their research to the common people. He urged to hold qualitative discussions to chart out an actionable roadmap for the next decade to revolutionise health movement in the country. He appreciated the institute's extensive research work on cancer, diabetes, cardiovascular ailments & stroke.

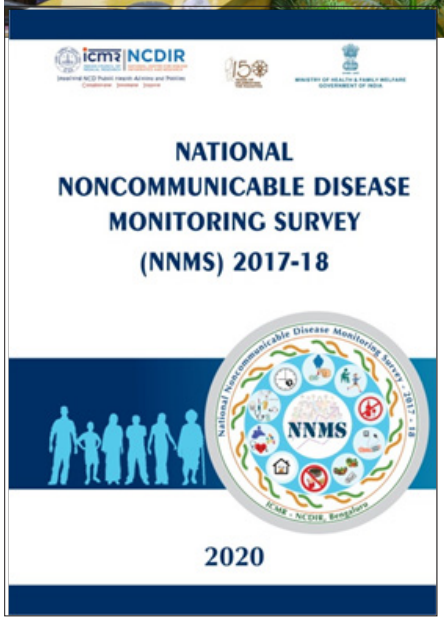
The ICMR-National Centre for Disease Informatics & Research aims to provide baseline information and support the designing, monitoring and evaluating disease control programmes and activities. Institute focuses on specific non-communicable diseases like cancer, diabetes, cardiovascular diseases and stroke. NCDIR also designs, undertakes and implements multi-registry/centric collaborative aetiologic research studies in keeping with recent advances in epidemiological research and facilitates programmes on patterns of patient care and survival in cancer.

Research

ICMR-NCDIR releases findings of National Non-Communicable Disease Monitoring Survey

- NNMS 2017-18 survey provides baseline information on NCDs risk factors.
- 40% adults have multiple risk factors for non-communicable diseases.
- Comprehensive multi-sectoral approach required for prevention and management of NCDs.

Indian Council of Medical Research-National Centre for Disease Informatics and Research (NCDIR) has revealed the findings of the National Non-Communicable Disease Monitoring Survey (NNMS 2017-18). This was the first of its kind of comprehensive survey on non-communicable disease (NCDs) undertaken in collaboration with the Union Health Ministry during 2017-18. The estimated sample size for the survey was 12,000 adults (18-69 years) and 1,700 adolescents (15-17 year) residing in urban and rural areas.



The findings of survey showed that two in five adults had three or more risk factors for NCDs. One in every three adults and more than one-fourth proportion of men used any form of tobacco and consumed alcohol in past 12 months respectively; more than two in five adults and one in four adolescents were doing insufficient physical activity; more than one in every four adults and 6.2% adolescents were overweight or obese; almost three out of ten adults had raised blood pressure.

While releasing the survey, Dr. Harsh Vardhan, Union Health Minister of Family Welfare said that encouraging adoption of healthy lifestyle choices can vastly reduce the disease burden in India. Campaigns like Fit India, Eat right India, and green good deeds have over the years helped galvanise public participation in the movement towards a healthier nation. Policy actions to tackle various non-communicable diseases will greatly benefit from reliable data inputs & epidemiological research.

Prof (Dr) Balram Bhargava, Director General, ICMR said, "It is high time when people of this country need to realize that non-communicable diseases or lifestyle diseases like cancer, diabetes, strokes, hypertension, etc disrupt the quality of life. We know that prevention is better than cure and a slight modification in our daily lifestyle towards healthier approach can prevent these diseases."

Non-Communicable Disease is a big problem in our country, according to World Health Organisation report of 2018, the total per cent of deaths due to NCDs was 63%. Such survey not only provides baseline information on NCDs risk factors but it also highlights the need to improve comprehensive multi-sectoral approaches focussed on both prevention and management of NCDs.

New BSL - II/III Facility Inaugurated at ICMR-NIN

New BSL-II/III facility was inaugurated at Indian Council of Medical Research-National Institute of Nutrition, Hyderabad virtually by Prof (Dr.) Balram Bhargava, Director General, ICMR. Inauguration took place on 7th January, 2021 in presence of Dr. Hemlatha, Director of ICMR-NIN. This new facility will enhance capabilities in conducting challenge studies, cultures of BSL3 micro-organisms & to test efficacy of nutrients & new compounds.

BSL-II/III laboratories are used to study infectious agents or toxins that may be transmitted through the air and cause potentially lethal infection through exposure. Researchers perform all experiments in biosafety cabinets that use carefully controlled air flow or sealed enclosures to prevent infection.

ICMR-National Institute of Nutrition over a century years of glorious service to the nation, has to its credit an impressive record of achievement in the amelioration of several nutritional disorders. Institute has attained global recognition for its pioneering studies on various aspects of nutrition research, with special reference to protein energy malnutrition (PEM).

Indian Journal of Medical Research (IJMR) emerges as preferred Journal for global scientists

Indian Council of Medical Research's peer-reviewed online open-access medical journal, Indian Journal of Medical Research (IJMR) received a record number of articles in year 2020. A total of 4936 articles were submitted for publishing in the journal. Lately, IJMR has emerged as preferred platforms for global scientists, as one third of articles submitted in the journal are from outside of India.

In 2020 almost 40% of the articles submitted were on the topic of coronavirus and related studies. A rich resource of such articles is available in part-I, II and III of special issue titled "India and Covid-19".

The India Journal of Medical Research (IJMR) started its journey in 1913 and completed 100 years in 2013. IJMR publishes peer reviewed quality biomedical research in the form of original research articles, review articles, short papers, and short notes. Research letters are also published in the corresponding section after peer review. The Journal is one of its kind and allows free access (Open Access) to its contents and permits authors to self-archive the final accepted version of the articles on any OAI-compliant institutional/subject-based repository. The publications can be accessed at *https://ijmr.org.in*

ICMR and Nepal Health Research Council to Enhance Bilateral Cooperation

Indian Council of Medical Research and Nepal Health Research Council (NHRC) signed a memorandum of understanding to improve cooperation and collaboration in the field of medical research.

The MoU is intended to improve collaboration on joint research activities between the two nations on cross-border health issues. It will cover non-communicable diseases, mental health, population based cancer registry and tropical diseases (vector-borne diseases such as Dengue, Chikungunya, Malaria, JE etc). Cooperation will also include work on maintenance of clinical trial registry and development of health research ethics.

A Joint Working Group consisting of representatives from both organizations will be created. This group will consider capacity building through exchange of knowledge, skills, tools and fellows and collaboration for adoption of tools, guidelines, protocols and best practices related to health research.

Currently, ICMR has several bilateral science & technology (S&T) cooperation agreements with other countries to facilitate cooperation in the areas of biomedical research between India and foreign countries. ICMR operates in close cooperation with the Indian Ministry of Health & Family Welfare, Ministry of Science & Technology, Ministry of External Affairs, Indian missions abroad and foreign missions in India for the international collaborations.

ICMR-NICED Designated as WHO Collaborating Centre

ICMR-National Institute of Cholera and Enteric Diseases (NICED) in Kolkata has been designated as World Health Organisation collaborating centre for research and training on diarrhoeal diseases. A WHO collaborating centre is an institution designated by the Director-General of WHO to form part of an international collaborative network set up by WHO in support of its programme at the country, intercountry, regional, interregional and global levels.

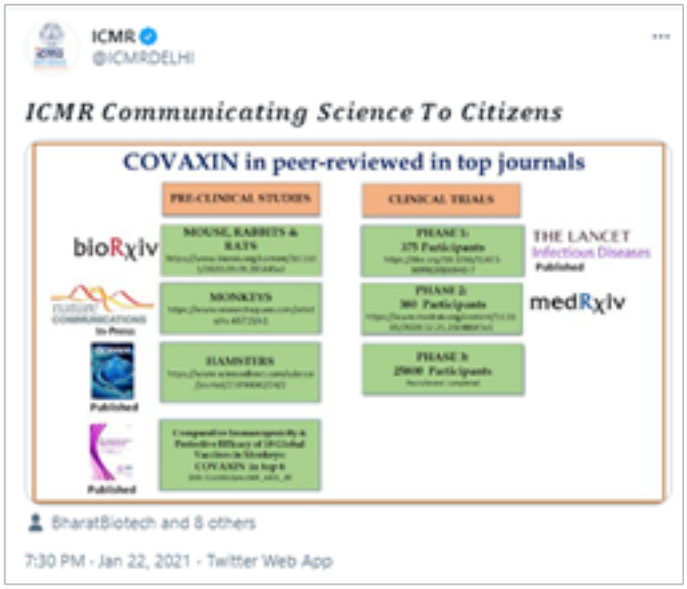
ICMR-NICED will collaborate in collection, collating, analyse data and disseminating information to develop cholera and other diarrhoeal diseases control plan on request from WHO.

Responsibilities include strengthening international capacity building for cholera and other diarrhoeal disease preparedness by organizing workshops in response to WHO requests. It also includes participating in rapid response teams for investigations of outbreaks of cholera and diarrhoeal diseases at the behest of WHO.

ICMR–NICED is engaged in researching and developing strategies for treatment, prevention and control of enteric infections and HIV/AIDS threatening the Nation's health. Institute has extended its support for investigations of any outbreaks of diarrheal diseases, infective hepatitis and unknown fever both in the state of West Bengal as well as in any other part of the country as per requirement.

Social Media

ICMR is available on Facebook, Twitter and Instagram. For latest update about COVID-19 and other medical research breakthrough, you can follow ICMR's Official handles.



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