



SPER NEWSLETTER

ISSUED FOR JULY 2021

GET INSIGHTS ABOUT

- ZIKA VIRUS
- THIRD-WAVE, LOCKDOWN, AND MENTAL HEALTH
- LONGER GAPS BETWEEN VACCINATIONS
- AI IN PHARMA INDUSTRY
- MONKEYPOX VIRUS





ZIKA VIRUS INFECTION

Zika virus is a mosquito-borne single-stranded RNA virus flavivirus that was first identified in Uganda in 1947 in monkeys.

Zika virus-specific Reverse transcriptase PCR (RT-PCR) is highly sensitive and specific for ZIKV diagnosis.

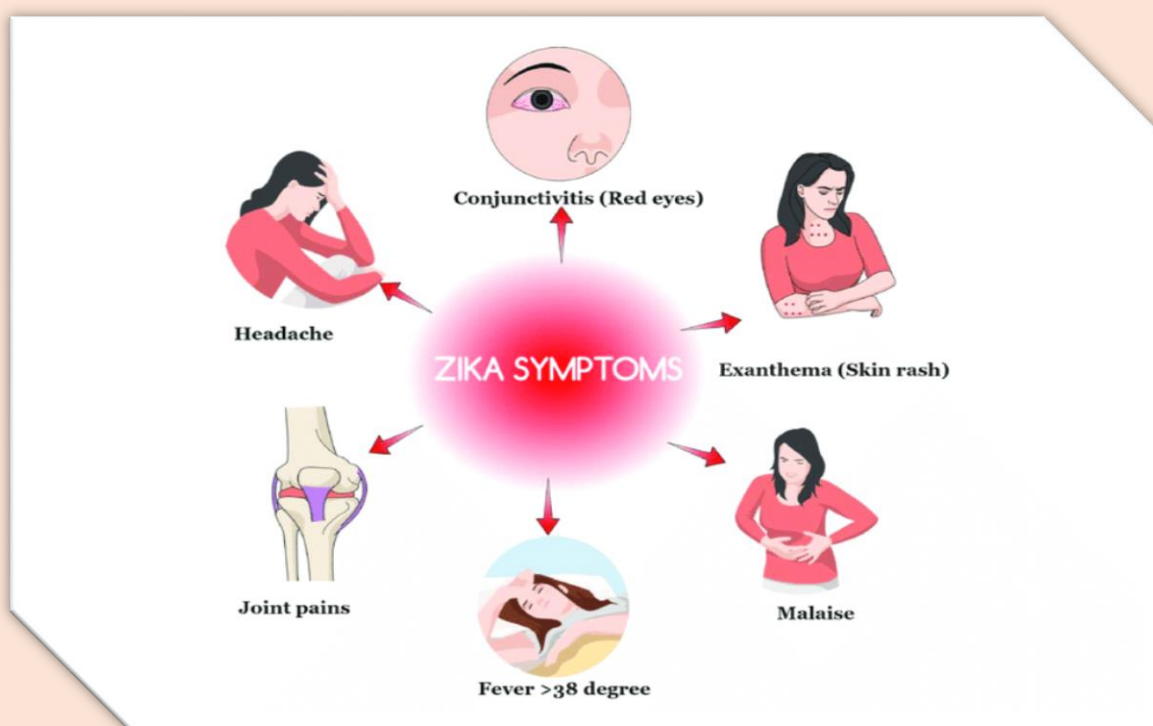
Transmission and vector

Zika virus is primarily transmitted by the bite of an infected mosquito from the *Aedes* genus, mainly *Aedes aegypti*, in tropical and subtropical regions. *Aedes* mosquitoes usually bite during the day, peaking during early morning and late afternoon/evening. This is the same mosquito that transmits dengue, chikungunya, and yellow fever.

Zika virus is also transmitted from mother to fetus during pregnancy, through sexual contact, transfusion of blood and blood products, and organ transplantation.

Symptoms

Mild and include fever, rash, conjunctivitis, muscle, and joint pain, malaise, or headache typically last for 2–7 days. Most people with Zika virus infection do not develop symptoms.



What are the treatments?

There is no specific treatment for infection with the Zika virus. To help relieve symptoms, plenty of rest and drink plenty of fluids to prevent dehydration are recommended. The over-the-counter (OTC) medication



like acetaminophen (Tylenol, others) may help relieve joint pain and fever. Ibuprofen (Advil, Motrin IB), naproxen sodium (Aleve), or aspirin aren't advised unless in dengue fever.

How to Prevent

1. Protection against mosquito bites during the day and early evening is a key measure to prevent Zika virus infection. Special attention should be given to the prevention of mosquito bites among pregnant women, women of reproductive age, and young children.
2. Eliminate these mosquito breeding sites (small collections of water), covering water storage containers, removing standing water in flower pots, and cleaning up trash and used tires.

Linkage with covid 19?

NO there has been no evidence that links them both.

Zika virus is not spread by contact or aerosols. It is spread by mosquitos; different epidemiology.



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COVID THIRD WAVE IN INDIA

- According to WHO the third wave of COVID 19 pandemic may hit India between August and October so, the next upcoming months will be crucial.
- The World Health Organization this week has set the alarm bells ringing as it said that the world is at the very advanced stages of the third wave of the Covid-19 pandemic.
- This wave is mostly being driven by the Delta variant of SARS-CoV-2, first reported in India. WHO's warning is a red flag for India.
- The third wave is the effect of the virus on the social determinants of health, and its effects on the next generation.

The Third Wave

The disease sweeping over the country is considered the first and second waves of COVID. But there's a "third wave" of COVID affecting all Indian's mental health. Factors such as economic hardship, social isolation, and an unknown future have led to increased stress for many



individuals. For those who already had mental health challenges, this time can be even harder.

Lockdown during the third wave

- Lockdown is meant to prevent the spread of infection from one person to another, to protect ourselves and others. This means, not stepping out of the house except for buying necessities, reducing the number of trips outside, and ideally only a single, healthy family member making the trips when necessary.
- For the third wave, Lockdown will be imposed in a state based on the positivity rate, new cases, and availability of oxygen beds.

Mental health and covid 19

Currently, all of us are experiencing emotions, thoughts, and situations we have never experienced before. It is not that there were no pandemics earlier. Pandemics, particularly plague outbreaks have been known since times immemorial. The Cholera pandemic followed by the flu pandemic were highlights of the nineteenth century. Another cholera epidemic ravaged the world in the early part of the twentieth century. Subsequently, while there have been outbreaks of Asian flu, SARS, MERS, Ebola, *etc.* the pandemic of COVID-19 is on a completely different scale. It has

shaken the entire world and created global panic. As COVID-19 initially creeps in and subsequently spreads at a galloping pace, it has been ravaging country after country. The pandemic has significant and variable psychological impacts in each country, depending on the stage of the pandemic.

With COVID continuing to wash over society, it's common for many adults to be experiencing elevated stress levels or depression associated with the pandemic.





The Effects of Coronavirus on Mental Health

Between job uncertainty, pandemic-related anxiety, and a lot more time in the home, we've seen a strong correlation between the COVID-19 pandemic, growing depression levels, and difficulty maintaining mental health.

Signs & Symptoms

- Consistent fear and worry
- Changes in sleep or eating patterns
- Difficulty sleeping or concentrating
- Worsening of chronic health problems
- Irritability
- Difficulty concentrating
- Persistent sad, empty and anxious mood
- A feeling of guilt and helplessness
- Lack of interest in activities
- Decreased energy
- Sudden weight changes





What can be done?

A psychological intervention medical team can be formed as a standalone team or be part of the General medical team attending to patients affected by the pandemic.

The staff should consist of Psychiatrists, with clinical psychologists and psychiatric nurses participating and the teams should formulate interventions plans separately for different groups eg:

- i) Suspected cases and close contacts of confirmed cases
 - ii) Patients with mild symptoms who are in-home quarantine
 - iii) Health care personnel working with COVID 19 patients
 - iv) General public
-
- Understand the mental health status of various groups of the society affected by the pandemic. Timely identification of high-risk groups especially those with prior mental health issues, are Essential to prevent extreme events such as suicide and other impulsive behaviors



- Interventions should be based on a comprehensive assessment of risk factors leading to Psychological issues, including poor mental health before a crisis, bereavement, injury to self or family members, life-threatening circumstances, panic, separation from family, and low Household income.

Mental health issues in older adults with pre-existing mental illness

- The common mental illnesses in older adults are depression, delirium, and dementia. Older adults with a prior history of depression are at risk of relapse or worsening of depressive symptoms. This could be due to psychological stress, poor coping as well as difficulty in ensuring adherence to the routine treatment.
- Older adults are also at a higher risk of delirium or recurrence of delirium due to restrictions in mobility and decompensation of medical and psychological disorders.
- In older adults with pre-existing cognitive impairment, there are few unique challenges. Usually, older adults with cognitive impairment have behavioral problems. They have challenges in understanding the COVID-19 pandemic-related preventive measures and related information. It is difficult for caregivers to restrict mobility in older adults with dementia.



LONGER GAP PERIOD BETWEEN

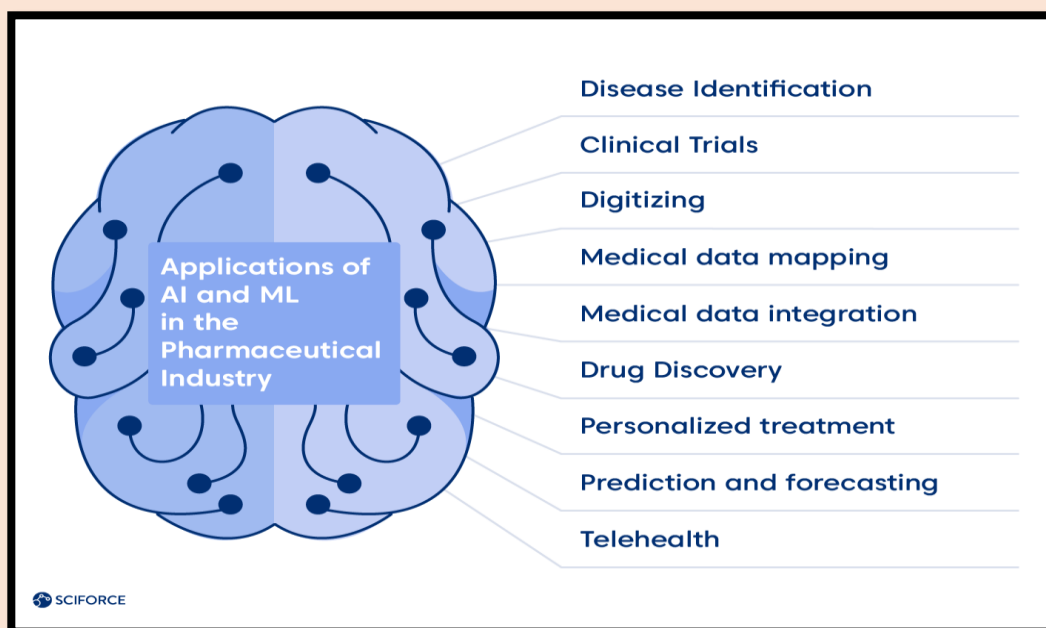
VACCINATION DOSES

The new data from the UK, the country of origin of the Oxford AstraZeneca vaccine, now suggests that the dosage interval of 12 weeks is preferable for Covishield. The researchers found vaccine efficacy reached 82.4 percent after the second dose in those with a dosing interval of 12 weeks or more. If the two doses were given less than six weeks apart, the efficacy was only 54.9 percent. A single dose of vaccine provided 76 percent protection overall against symptomatic Covid-19, but how long this protection might last with a single dose is not understood

This additional data has come from trials involving 17,177 participants in Brazil, South Africa, and the UK. The analyses suggest that it is the dosing interval and not the dosing level that has the greatest impact on the efficacy of the vaccine. This is in line with previous research supporting greater efficacy with longer intervals with vaccines such as for influenza and Ebola. If we take all this evidence together, the 12-week gap between the first and second dose seems to be a better strategy as more people can be protected quickly and the ultimate protective effect is greater.

AI AND ML IN THE PHARMA INDUSTRY

Developing a drug with the usage of artificial intelligence and machine learning can change the way we think about developing a drug. Before we turn to AI applications in the pharma industry, let's check the forecasts for the future. As we can read in the Bekryl Intelligence report “Artificial intelligence has the potential to offer over US\$ 70 billion saving for the drug discovery process by 2028. Additionally, the potential to boost a company's ROI along with its time-saving process has led big pharmaceutical and biotech companies to invest heavily in technologies.





How AI Is Used In Drug Discovery?

AI and machine learning can be beneficial at all stages in the drug discovery process. For example, Healthcare AI startups raised more than \$2 billion in 2020 using AI to streamline the drug manufacturing process, receiving some of the enormous sums compared to startups deploying the technology in other healthcare segments. The stages where AI is employed in drug discovery are:

Phase I - AI in Drug Discovery

The drug discovery process includes everything from reading and analyzing existing literature to testing how potential drugs interact with targets.

Phase II - AI in Preclinical Development

During the preclinical development stage of drug discovery, potential drug targets are tested on animal models. Using AI during this phase could help trials run more smoothly and allow researchers to predict how a drug will interact with the animal model more quickly and successfully.

Phase III - AI in Clinical Trials

After passing the preclinical development phase and receiving FDA approval, researchers begin testing the drug on human subjects. Overall,



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this is a four-stage process usually regarded as the most time-consuming and expensive stage of the drug-making process.

AI can help with monitoring during clinical trials by generating a more extensive set of data faster, and it can also help with retention by personalizing the trial experience.

As a result, AI can quickly identify many compounds in a relatively short period and at a quarter of the cost of traditional methods.

The Advantages of Using AI in the Drug Discovery Market

- For drug discovery, AI does not rely on predetermined targets. As a result, subjective bias and prior knowledge play no role in the drug development process.
- AI makes use of the most recent advances in biology and computing to create cutting-edge drug discovery algorithms. As a result, AI can level the playing field in drug development due to the rapid increase in processing power and reduced processing costs.
- AI has a higher predictive power when it comes to defining meaningful interactions in a drug screen. As a result, the possibility





of false positives can be reduced by carefully designing the parameters of the assay in question.

- AI can move drug screening from the bench to a virtual lab, where you can obtain results faster and can shortlist promising targets without the need for extensive experimental input and staffing hours.

Rise of AI in Drug Discovery Market

The role of Artificial intelligence in drug discovery is expected to grow in the market from 2020 to 2027 due to an increase in the number of cross-industry collaborations, increase in venture capital investments, increase in R&D activities for the use of AI technology, and a rise in the importance of drug discovery.

According to Data Bridge Market Research, the market will be worth USD 3,932.87 million by 2027, growing at a CAGR of 40.5 percent during the forecast period. The growing awareness of the benefits of artificial intelligence among physicians and patients has directly impacted the market's growth



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Factors that will drive the growth of AI in the drug discovery market:

- Increase need to reduce cost and time.
- Adoption of cloud-based services and applications.
- Expansion of pharmaceutical industries
- Delay in patent expiry

AI leading startups in the pharmaceutical industry

Standigm – Novel Drug Design

South Korean startup Standigm offers novel drug design solutions. Standigm BEST explores an AI-generated latent chemical space to generate novel compounds with desired properties. Once the candidates have been identified, Standigm Insights provides biological interpretations to discover pathways and therapeutics patterns and prioritize potential targets. The startup's solutions eliminate the uncertainty in the drug discovery process to save time and costs during development.



CytoReason – Data-Driven Target Discovery

Israel-based startup CytoReason analyzes multi-omic, human clinical data to offer data-driven target discovery. The startup's platform uses vast amounts of proprietary and public data to understand the complex systems of interactions inside cells. The solution uses machine learning algorithms and continual statistical learning to uncover disease-related cell/gene maps. The platform supports research and development (R&D) efforts across the drug development cycle.

Genome Biologics – Preclinical Drug Discovery.

Genome Biologics is a German startup that develops solutions for preclinical drug discovery. GENIMPAS® uses pattern recognition and machine learning to match compound databases and drug discovery and repositioning pipelines with profiles of disease-relevant genes. This allows the startup to identify novel compounds and repurpose known compounds to treat cardiometabolic and cardiovascular diseases and cancers. GENISYST® is a patented technology for multiplexed diseased modeling that uses single-cell transgenics for preclinical testing.

BullFrog AI – Late-Stage Drug Candidates

The US-based startup BullFrog AI develops a proprietary AI platform to enable precision medicine. BfLEAPT™ analyzes clinical trial data sets to



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identify relationships and correlations between therapies and patients to discover novel insights for late-stage drug candidates. The platform parses through complex data to discover novel drug targets, find niche patient populations that may benefit greatly from a drug, and identify synergistic combinations of drugs.

DeepCure – Small Molecule Therapeutics

DeepCure is a US-based startup that uses deep learning to discover small molecule therapeutics. The startup combine AI algorithms, cloud computing, and MolDBTM, their proprietary database with over a trillion unique molecules. The solution identifies the most promising small molecules to reduce time and cost in later development stages. It accounts for the dynamic nature of the target and optimizes for absorption, distribution, metabolism, excretion, and toxicity (ADMET) properties.

MONKEYPOX VIRUS

Monkeypox virus (MPV) is a double-stranded DNA, zoonotic virus, and a species of the genus Orthopoxvirus in the family Poxviridae. It is one of the human orthopoxviruses that includes variola (VARV), cowpox (CPX), and vaccinia (VACV) viruses. But it is not a direct ancestor to, nor a direct descendant of, the variola virus which



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causes smallpox. Monkeypox virus causes a disease that is similar to smallpox but with a milder rash and lower death rate.



Transmission

The virus can spread both from animal to human and from human to human. Infection from animal to human can occur via an animal bite or by direct contact with an infected animal's bodily fluids. The virus can spread from human to human by both droplet respiration and contact with fomites from an infected person's bodily fluids. The incubation period is 10–14 days. Prodromal symptoms include swelling of lymph nodes, muscle pain, headache, fever, before the emergence of the rash.



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First Outbreak

The first reported outbreak in the United States occurred in 2003 in the Midwestern states of Illinois, Indiana, and Wisconsin, with one occurrence in New Jersey. No deaths occurred.

Present scenario

More than 200 people in 27 US states are being tracked for possible rare monkeypox infections.

They fear people may have come in contact with a Texas man who brought the disease in from Nigeria earlier this month.

The Centers for Disease Control and Prevention (CDC) says it is concerned passengers who were on board two flights man-made may have been exposed to the disease.

He flew into Atlanta, Georgia from Lagos, Nigeria on 9 July 2021, before taking a flight to Dallas, where he was hospitalized.

Symptoms

The symptoms include:

- Initially fever, headaches, swellings, back pain, aching muscles, and general listlessness.



- Once the fever breaks, a rash can develop, often beginning on the face then spreading to other parts of the body, most commonly the palms of the hands and soles of the feet.
- The rash, which can be extremely itchy, changes and goes through different stages before finally forming a scab, which later falls off. The lesions can cause scarring.

Vaccine

One vaccine, JYNNEOS™ (also known as Immune or Imvanex), has been licensed in the United States to prevent monkeypox and smallpox. Because the monkeypox virus is closely related to the virus that causes smallpox, the smallpox vaccine can also protect people from getting monkeypox.

Prevention

Animals that are sick or that have been found dead in areas where monkeypox occurs). Avoid contact with any materials, such as bedding, that has been in contact with a sick animal. Isolate infected patients from others who could be at risk Avoid contact with animals that could harbor the virus (including infection.




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SPER HIGHLIGHTS



DELTA VARIANT (B.1.617.2)

- The WHO has labelled B.1.617.2 strain as the Delta variant of SARS-CoV-2 and categorized it as a variant of concern.
- The variant contains multiple mutations, of which at least 4 are of concern: L452R, P681R, D614G, and T478K.
- According to the WHO, the Delta variant is widespread and has been detected in over 80 countries so far.
- The new Delta Plus variant has been formed due to a mutation in the Delta or B.1.617.2 variant.
- The Union Health Ministry has classified the Delta Plus variant as a variant of concern.

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