News from here and there

Prequalified Ebola vaccine for use in high-risk countries

On 12 November 2019, the WHO prequalified Merck's Ebola vaccine, rVSV-ZEBOV-GP (Ervebo), for use in countries at high-risk of Ebola outbreaks. This prequalification came just after the European Commission, based on the recommendation of European Medicines Agency (EMA), granted a conditional marketing authorization for this vaccine.

A prequalification status means that this vaccine has met WHO's standards for quality, safety and efficacy. Based on this recommendation, various United Nations agencies and the international vaccine alliance, GAVI, can access this vaccine and roll it out in nations which are at risk of Ebola.

In clinical trials, Ervebo has been shown to be effective in preventing the Ebola Zaire virus. The WHO stated that this vaccine prequalification process was the fastest conducted by them till date. This became necessary due to the urgent need for an Ebola vaccine. The WHO also noted that this decision was one step closer towards increased accessibility of the vaccine in the future. Licensed doses are set to be available from mid-2020.

The WHO has worked in close association with the EMA and African regulators to facilitate licensing of the vaccine in at-risk countries.

Since August 2018, the Ervebo vaccine has been deployed in the ongoing Ebola outbreak in the Democratic Republic of the Congo. More than 250 000 individuals have been vaccinated so far. It is estimated that the efficacy is more than 97%.

Ervebo is a live, attenuated vaccine genetically engineered to contain a protein from Ebola Zaire virus. It is administered to individuals who are 18 years or older. Ervebo, labelled as V920 during its investigational phase, was engineered at the Public Health Agency of Canada's National Microbiology Laboratory with funding from the US Government's Biomedical Advanced Research and Development Authority (BARDA). The technology was subsequently transferred to a subsidiary of NewLink Genetics Corporation. Towards the end of 2014, Merck acquired the rights. In 2015, the company started manufacturing emergency-use supplies to support Ebola outbreak response efforts.

The family *Filoviridae* to which Ebola belongs, has three genera: *Cuevavirus*, *Marburgvirus* and *Ebolavirus*. There are six species in the genus *Ebola*: *Zaire, Bundibugyo, Sudan, Taï Forest, Reston* and *Bombali*. The current outbreak in the Democratic Republic of the Congo and the 2014–2016 West African outbreaks were caused by Ebola Zaire species.

Fruit bats of the *Pteropodidae* family are natural Ebola virus hosts. Introduction to humans results from close contact with blood, other bodily secretions, or organs of infected animals such as fruit bats, monkeys, chimpanzees, gorillas, porcupines, etc. that are found ill or dead in the rainforests. The virus then spreads from human to human through direct contact via broken skin or mucous membranes. The disease is acute and serious, and frequently fatal without treatment. Fatality rates have ranged from 25% to 90% in past outbreaks.

Ebola virus disease (EVD) was previously called Ebola haemorrhagic fever. It first appeared in two simultaneous outbreaks in 1976. One outbreak was in present day Nzara, South Sudan, and the other outbreak was in a village near the Ebola River. The largest outbreak was in 2014–2016 in West Africa. It began in Guinea and then expanded to Sierra Leone and Liberia.

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Worldwide resurgence of measles

Measles (rubeola) has made a resurgence in all continents. This highly infectious and contagious acute viral illness of childhood had been effectively prevented by vaccination globally from 2000 to 2018. A measles vaccine available in two doses provides excellent protection against the disease. The resurgence of measles dates back to 2006 and it is estimated that 20 million cases of measles occur annually and are a leading cause of death among the young. Measles has resurfaced in areas where it was eliminated or was rare. Further, many cases are under-reported because many patients do not visit health centres, this results in falsely low data.

While the burden of resurgence of measles is borne by low- and middle-income countries, high-income countries have also reported a resurgence of measles outbreaks. India accounted for 50% of measles cases and 30% of measles deaths in 2016. Nigeria leads the list of countries with unvaccinated children with 2.4 million unvaccinated children, with India being next (2.3 million), as per the *Morbidity and Mortality Weekly Report*, 2018. Other countries in the list are Pakistan (1.4 million), Ethiopia (1.3 million), Indonesia (1.2 million) and the Philippines (0.7 million).

The reappearance of infection has been attributed to reasons such as inadequate vaccine coverage, vaccine hesitancy, safety concerns (an unproven belief that measles vaccine is associated with autism), and infection spread by travellers returning from endemic areas.

When vaccination rates fall below a particular threshold, the community is devoid of protective cover and is exposed to the risk. This so-called threshold theorem follows the concept of herd immunity. Herd immunity is the threshold level of immunity in the population above which a disease no longer spreads. For measles, the level of immunity needed to interrupt transmission is higher than the threshold for almost all other vaccine-preventable diseases. Effective prevention of sustained spread of the measles virus requires 92% to 94% of the community protected.

In 2010, the World Health Assembly set milestones for measles control to be achieved by 2015 and to reduce global measles mortality by 95% from the 2000 estimate. These targets were missed. Analysis by the WHO and the US Centers for Disease Control and Prevention (CDC) has shown that despite improvements since 2000, even this progress has reversed in the past 2 years.

With appropriate vaccination, it is possible not only to eliminate but also to completely eradicate the disease. This needs an immunization programme as a priority with urgent need to address the problems of low vaccination as well as early recognition of measles cases in order to contain the infection,

political and administrative commitment, adequate financial resources, and of course, dedicated parents and healthcare practitioners.

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Malnourishment common among adolescents in India

Adolescents fall into the age group of 10–19 years. This phase is the age of rapid growth and developing of new habits. An adolescent generally carries the same habits into adulthood—be it related to positive characters such as exercise, healthy eating or disciplined life or negative habits such as addictions and risk-taking behaviours. Thus, it is an important age group for intervention and making adulthood healthier and happier.

According to UNICEF, adolescents account for 1.2 billion or 16% of the world's population—of which more than half live in Asia. In India, they account for roughly 243 million or 21% of the country's population. The presence of such a huge population with lack of specific healthcare facilities could lead to development of risk factors for non-communicable diseases and morbidity such as addiction, teen-age pregnancies, self-harm, sexually transmitted diseases, interpersonal violence, malnutrition, etc.

Malnutrition is one such disease. According to a new report released by UNICEF in association with the NITI Aayog, over 50% of adolescents in India are malnourished, i.e. short, thin or overweight and obese. More worrisome is the fact there is what is termed 'hidden hunger'—a form of undernutrition loosely defined as deficiency of one or more micronutrients such as iron, folate, zinc, vitamin A, vitamin B12 and vitamin D, which are prevalent in more than 80% of adolescents. The report, titled 'Children, food and nutrition: growing well in a changing world', based on the recently released Comprehensive National Nutrition Survey (CNNS) is a nationally representative and comprehensive nutritional survey profiling children and adolescents in India. It was also noted that adolescent girls, especially, suffer multiple nutritional deprivations. Further, daily consumption of fruit and eggs is noted in less than 10% of the population, while absence of green leafy vegetables was reported in almost 25% of the population surveyed. This figure is alarming as these are basic sources of nutrition. Consumption of milk products was found in only 50% of the population. Anaemia is also prevalent and many adolescents are developing risk factors for diseases such as diabetes mellitus and cardio-vascular diseases as faulty diets lead to improper nutritional uptake in the upper socioeconomic strata, where junk food consumption is widespread. Also all were found to be physically inactive and failed to meet minimum recommended daily outdoor sports activity for 60 minutes.

Though many government nutritional programmes have been operating for more than 50 years now, right from the first nutritional programme for women and children in 1960, they have failed to achieve all of their objectives. Poshan Abhiyaan, a flagship programme, launched in 2018, is aimed to improve nutritional outcomes, and help reorient policies and programmes aimed at curbing malnutrition in adolescents, is expected to be more specific and oriented towards achieving targets with visible impact by 2022. Incorporating the feedback from previous studies/reports and modifying and monitoring the programme progress periodically is one way to ensure that the desired results are achieved.

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IIIT Hyderabad researchers create first-ever template for Indian brain mapping

Researchers at the Center for Visual Information Technology, International Institute of Information Technology (IIIT)-Hyderabad used models originally designed by Montreal Neurological Institute (MNI) and International Consortium for Brain Mapping (ICBM) in 1993, to create the first-ever Indian-specific brain atlas. The images thus mapped can be loaded into magnetic resonance imaging (MRI) machines and be used to analyse differences in grey and white matter of scanned Indian brains. Construction of the Indian-specific human brain atlas was done in collaboration with the Department of Imaging Sciences and Interventional Radiology, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram. The idea to build an India-specific brain atlas was initially proposed by a neuroradiologist at the Sree Chitra Tirunal Institute who discovered that almost all MRI machines utilized 'standard' brain templates that had been created using Caucasian brains as a reference. This difference in ethnicity sometimes hindered diagnosis and decision-making in Indian neuroradiological evaluation.

The Indian Brain Atlas used MRI brain scans of an initial 50 subjects selected across both genders as its database. The images were taken at three different hospitals across three different scanners to standardize variations across scanning machines. After a successful pilot study, the team recruited 100 willing participants in the 21–30 years age group to be scanned for mature brain tissue that would serve as reference points in construction of the Indian Brain Atlas or 'IBA 100'. The constructed indigenous atlas was validated against other atlases available for various populations.

The researchers found the average Indian brain to be smaller in height, width and volume when compared to Caucasian, Chinese and Korean counterparts. The tabulated measurements indicated that the brain size of western-origin population is considerably higher compared to that of Eastern populations (Chinese and Korean). While the Indian brain is closer to the Chinese brain in length, it differs in terms of width and height, whereas the difference in all dimensions is smaller when comparing the Indian brain to its Korean counterpart. The volume of the hippocampus and the structure of the putamen were two of the parameters used by the researchers, who initially plan to focus on improved understanding of the ageing process. India, with its large number of aged persons, is likely to have increased incidences of Alzheimer disease and dementia, both conditions see brain atrophy as a result of advancing age. The researchers hope to expand their database to different age groups to further evaluate the effect of age-related factors on brain anatomy.

The research was published in *Neurology India* in 2019 (Sivaswamy J, Thottupatu AJ, Mehta R, Sheelakumari R, Kesavadas C. Construction of Indian human brain atlas. *Neurol India* 2019;**67:**229–34).

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