News from here and there

An innovative test for rapid diagnosis of malaria

Malaria continues to be a major public health problem in India. Microscopic examination of thin and thick peripheral blood smears remains the gold standard for the diagnosis of malaria. While several serological and molecular tests for rapid diagnosis of malaria have been developed, none have emerged as an alternative to the time-tested peripheral blood smear examination. Thus, there is a need for a reliable point-of-care diagnostic test for malaria.

A team of researchers led by Sai Siva Gorthi, an assistant professor at the Department of Instrumentation and Applied Physics, Indian Institute of Science (IISc), Bengaluru, has developed a hand-held screening device that can diagnose malaria using less than a drop of blood (about 200 nanolitres) in under 30 minutes. Combining technologies such as image processing and microfluidics, a prototype of this low-cost portable hand-held diagnostic device has been developed by the IISc scientists and is incubated at the Robert Bosch Centre for Cyber Physical Systems (RBCCPS) at the IISc. The innovation won the 'Best Innovator's Pitch' award given by the Biotechnology Industry Research Assistance Council (BRIC), Government of India, at the Innovation Centre Stage event held in New Delhi in September 2014.

The device, which does not require a skilled technician to operate, has a common optical reader into which the user inserts a replaceable microfluidic cartridge which is pre-loaded with a set of reagents needed to perform automated on-chip processing of the blood sample. Malaria-infected red blood cells display morphological characteristics which are different from normal cells that can be identified automatically by algorithms run on a smartphone-like platform. The qualitative test results are known instantaneously, and quantitative assessment and display of parasitaemia takes about 30 minutes.

Another unique feature of this innovation is its potential for being modified and extended for other diseases diagnosed by microscopy. The device is expected to be available in the market in about 3 years.

ALLADI MOHAN, *Tirupati, Andhra Pradesh*

Ebola virus outbreak, a 'Public Health Emergency of International Concern'

On 23 March 2014, the WHO in a communiqué reported an Ebola virus disease (EVD) outbreak in Guinea (West Africa). The outbreak, which began in Guinea's Guéckédou Prefecture in December 2013, subsequently spread to other parts of Guinea and also neighbouring Liberia and Sierra Leone. The current EVD outbreak is now the largest and most complex epidemic of Ebola. More than 2000 cases with approximately 60% case fatality have occurred in Guinea, Liberia, Sierra Leone, and Lagos, Nigeria. On 8 August 2014, the WHO Director-General named it a 'Public Health Emergency of International Concern'.

The current outbreak is unparalleled and has not yet been brought under control. The spectacular surge in new cases reflects continuing transmission of the virus in the community and in healthcare facilities. This is most probably due to scarce treatment facilities, insufficient human resources and, in some areas, community resistance to bring about preventive measures. Across the globe, the possibility of EVD cases being imported is cause for concern.

Till the onset of the current outbreak, EVD was viewed as endemic in Central Africa, and not West Africa. The disease was first noticed in 1976 when there were two concurrent outbreaks, one in Nzara, Sudan, and the other in Yambuku, Democratic Republic of Congo. The latter outbreak occurred in a village near the Ebola River, hence the name of the disease.

EVD was previously called Ebola haemorrhagic fever. The genus Ebola virus belongs to the *Filoviridae* family. It has five species: *Zaire*, *Bundibugyo*, *Sudan*, *Reston* and *Tai Forest*. The 2014 West African outbreak is due to *Zaire* species, which, based on full-length sequencing and phylogenetic analysis, has been shown to belong to be a separate clade from known Zaire Ebola virus strains. This suggests that the Ebola virus strain from Guinea must have evolved in parallel and has been circulating in the West African region for some time.

Humans get infected through close contact with blood, body fluids and organs of infected animals such as chimpanzees, gorillas, fruit bats, monkeys and others found ill or dead in the rainforests. Fruit bats of the *Pteropodidae* family are believed to be natural Ebola virus hosts. Human-to-human transmission is via direct contact with the blood, body fluids or organs of infected people and with surfaces (such as bedding and clothing) contaminated with these fluids. Certain burial ceremonies wherein mourners have direct contact with the deceased person's body possibly play a role in Ebola transmission. Healthcare workers get infected when strict infection control practices are not followed.

The incubation period of the disease is 2–21 days. An acute onset of prodromal symptoms including fever, malaise, myalgia, diarrhoea, vomiting and abdominal pain is followed by progressive multisystem disease with bleeding being a cardinal feature. Laboratory findings include low white cell and platelet counts and elevated liver enzymes.

Survival of the patient is improved by rehydration and treatment of specific symptoms. No proven treatment is as yet available for EVD. Two potential vaccines are undergoing human safety testing.

P.M. NISCHAL, *Bengaluru, Karnataka*

Japanese encephalitis, rotavirus, rubella and injectable polio vaccine: Four new tools in the immunization programme of India

With a birth cohort of 27 million children, India is currently home to the largest number of unimmunized children in the world. Expansion of the Universal Immunization Programme (UIP) and selection of appropriate vaccines against these preventable diseases is a mammoth task for a government. Previously, introduction of pentavalent vaccine by the government represented an important step in the history of public health in India. The announcement by the Prime Minister on 30 July 2014, about the inclusion of four

new vaccines, takes the total free vaccines available under the UIP to 13. The new vaccines are those against Japanese encephalitis (JE), rotavirus, rubella and polio (injectable).

An adult vaccine (15–65 years) against JE in selected endemic districts in few states where JE has emerged as a public health threat along with two doses in children will play a role in reducing the burden of this vector-borne disease. A rotavirus vaccine developed and licensed under a public–private partnership model by the Ministry of Science and Technology and the Ministry of Health and Family Welfare was introduced to reduce diarrhoeal disease morbidity and mortality. In line with India's journey from hyperendemic to polio-free status and the Global Polio Endgame Strategy, India is set to introduce injectable polio vaccine (IPV), together with 125 countries in a globally synchronized manner. The rubella component is being added to the existing measles vaccine to prevent congenital defects such as blindness, deafness and heart defect among newborns.

GAVI, the Vaccine Alliance welcomed the decision and called upon the government to take this opportunity to also increase immunization coverage. Dr Rajesh Kumar, Professor of Community Medicine and Head, School of Public Health, Postgraduate Institute of Medical Education and Research, Chandigarh welcomed the steps initiated under the UIP. He commented that diarrhoeal disease among children is an important cause of death and hospitalization and rotavirus is one of the major contributing factors. Although sanitation and hygiene will reduce it in the long term, the vaccine is essential to reduce mortality, morbidity and cost of hospitalization from rotavirus diarrhoea. Also apart from preventing mortality, it will have a positive impact on the nutritional status and quality of life of children. He pointed out that immunization was the most effective JE prevention strategy and has been shown to be cost-effective in several Southeast Asian countries. He opined that injectable polio vaccine may be combined as a part of the pentavalent vaccine but its timing and dosage should be based on the epidemiology of virus and eradication strategy. Although studies regarding the burden of mumps are limited, the integrated disease surveillance programme (IDSP) has reported several outbreaks nationally. Considering the morbidity due to its complications along with the availability of a good vaccine, he suggested that introduction of measles, mumps and rubella (MMR) will be more appropriate. He suggested that morbidity and mortality from pneumonia among children is a public health issue and pneumococcal conjugate vaccine (PCV13) if included in the UIP can bring a change in the current scenario. Though available in the market, its non-inclusion in the UIP deprives poorer children of its benefit. At present it is expensive, but if included in the UIP, bulk purchase will reduce the price to an affordable level. The quality of immunization should be ensured and any adverse event following immunization should be addressed immediately. Disease surveillance should be strengthened including laboratory-based surveillance to understand the burden of disease, trends and serotypes.

PRITAM ROY, *Chandigarh*

Prophylactic use of aspirin can reduce the incidence of colonic and other cancers

The role of aspirin in reducing the incidence of cardiovascular events in high- and low-risk individuals has been well documented. However, this effect does not appear to translate into a reduction in cardiovascular mortality. Several new trials address the potential benefit of prophylactic use of aspirin in cancer prevention versus the side-effects, such as an increased risk of bleeding, which appears to be age-dependent. Cuzick *et al*. reviewed the current literature (published on 5 August 2014) in the *Annals of Oncology,* 'Estimates of benefits and harms of prophylactic use of aspirin in the general population'.

The authors had published in 2009 a consensus statement on the role of aspirin in cancer prevention. Since the results of long-term follow-up of studies which were under way at the time of the initial publication have since been made available, the authors sought to re-address the issue with current data.

The review is a multicentre analysis of the most recent systematic reviews and individual studies on site-specific cancers and long-term use of aspirin. It considered the overall effect of the consumption of aspirin (benefits versus harm) on men and women for a duration of 10 years. The age groups were separated with an initiation at 50 years and further stratification at 55, 60 and 65 years. Researchers include doctors from the Centre for Cancer Prevention, Wolfson Institute of Preventive Medicine, London, UK; Department of Epidemiology, IRCCS Institute of Pharmacology Research, Milan, Italy and the Department of Clinical Cancer Prevention, The University of Texas MD Anderson Cancer Center, Houston, USA among others. The study was funded by Cancer Research UK, British Heart Foundation and American Cancer Society and was widely covered by *NHS Choices, BBC News Health*, daily publications *The Telegraph* and *Mirror* and online news channel Mail Online, among others.

The results suggest that convincing data are available for a reduction in colorectal cancer incidence and mortality from regular use of aspirin, with larger benefit on extended duration of use. Less extensive but consistent reduction in oesophageal cancer mortality have been documented in randomized trials and cohort studies, primarily in adenocarcinomas of all sites. The extent of effect of aspirin on stomach cancer appears to be smaller with data currently available being less extensive and more variable. Pancreatic cancer showed non-significant reductions in incidence and mortality on aspirin therapy in the cohort studies and randomized trials. Lung cancer showed a favourable but variable effect in mortality reduction after aspirin consumption on 5-year follow-up. Breast and prostate cancer showed smaller non-significant reductions in incidence and mortality.

The authors suggest that long-term use of aspirin prophylaxis (minimum 5 years, larger benefit at 10 years use) is required to achieve statistically significant cancer prevention. The ideal dose is still unclear. Daily doses of >75 mg show reduction in the incidence of cancer and associated mortality, but there is no evidence to support higher reduction rates with increasing doses. The benefit appears to be maximum if therapy is initiated between 50 and 65 years age, for both men and women. However, the authors caution that the upper age limit at which the harms outweigh benefits of aspirin therapy is still uncertain.

The authors conclude that while the value of aspirin prophylaxis in the general population is uncertain if only prevention of cardiovascular diseases is used as a sole criterion, expanding studies to include the effect of aspirin on reducing cancer-related deaths may be the method through which aspirin acts on overall mortality.

MAHARRA HUSSAIN, *Dubai, United Arab Emirates*