

MERA-India brings you...

NEWS & VIEWS

Issue 22, August 2022



INTERVIEW

Dr Sanghamitra Pati
Director, ICMR-RMRC, Bhubaneswar

Editorial, ICMR-NIMR & MERA-India Activities, Interview,
Research in Spotlight, Resource for Malaria Researchers: PROSITE,
A Child's Perception of Malaria, Announcements

Editorial

Dear Readers,

MERA-India team brings you the twenty-second issue of our newsletter.

The month of August brings reasons for celebrations in India with occasions like Independence Day and other festivals. On the other hand, this month also marks the emergence of various vector-borne diseases due to the conducive environment for vector proliferation. The temperature and humidity of the monsoon season help the vector population to thrive and transmit diseases like malaria, dengue, chikungunya, etc. Public gatherings due to festivities also serve as a great opportunity for the vectors like mosquitoes to grab their scrumptious meal and transmit the disease-causing parasites. But celebrating the festivals while also following precautionary measures to avoid mosquito biting and breeding will help society to reduce the havoc of infectious diseases.

This month also marks an important day in the history of malariology. 20th August is an annual commemoration of Sir Ronald Ross's (a surgeon of the British army) discovery of the connection between mosquitoes and malaria. In 1897, while working in India, he found the malaria-causing parasite in the midgut of mosquitoes fed on infected patients and proved that female Anopheles mosquitoes transmit the malaria parasite among humans. Later in 1902, this discovery also got him a Nobel prize for Physiology or Medicine.

Malaria has been a devastating disease for ages, and now as the world is moving towards malaria elimination, MERA-India is providing a platform for all governmental and non-governmental organizations to come together and work to achieve the goal of malaria elimination in India. MERA-India encourages innovative research through funding and capacity building to fulfil this goal. Our newsletter also serves as a medium to update and motivate researchers by bringing new research into the spotlight, sharing interviews of established scientists, highlighting lectures from acclaimed researchers working in the mainstream, and sharing upcoming opportunities for the researchers.

The current edition of the newsletter summarizes the Distinguished Lecture by Dr Ashwani Kumar, Director, ICMR-VCRC, where he enlightens on the importance of vectors in malaria elimination through his lecture on the topic "Vector control is central to malaria elimination." We have also covered the encouraging and inspirational interview of Dr Sanghamitra Pati, Director, ICMR-Regional Medical Research Centre (RMRC), Bhubaneswar. In the section "Research in spotlight", research papers showing the impact of imported cases on malaria transmission, the assessment of the "1-3-7" surveillance strategy in Thailand's path towards malaria elimination, and the contribution of low-density and asymptomatic *Plasmodium vivax* infections for malaria transmission are highlighted.

In continuation of the earlier editions, we also present a beautiful sketch by Miss Priyanshi Mamgai showcasing a child's understanding of malaria in the section “A Child’s Perception of Malaria.”

The calls are open for abstract submission for the 8th Future of Malaria Research Symposium being organized at Johns Hopkins Bloomberg School of Public Health and registration for a short course on Molecular Data for Infectious Diseases being conducted by the Department of Biomedical Sciences of the Institute of Tropical Medicine of Antwerp, Belgium. For more details, please check out our announcement section.

We hope that this issue will be more engaging and fascinating for you. Please write to us for any feedback or suggestions regarding the newsletter’s content at meranewsletter@gmail.com.

With best wishes,
MERA-India team

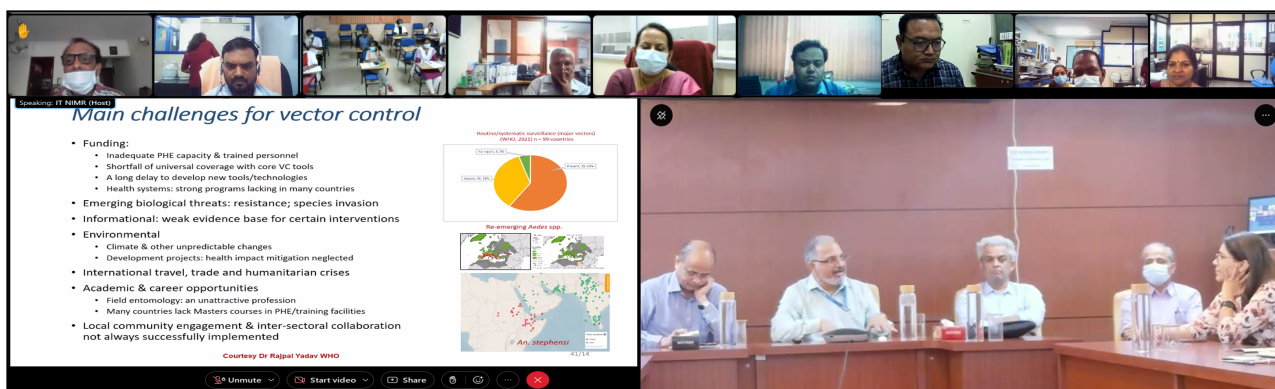
ICMR-NIMR & MERA-India Activities

India's Independence Day Celebrations at ICMR-NIMR



15th August 2022 marked the completion of 75 years since India's independence in 1947. On this occasion, an event was organized at ICMR-NIMR, which was attended by staff, scientists, students, and their families. The Director NIMR & PI MERA-India, Dr Amit Sharma, hoisted India's national flag and addressed the gathering. He highlighted India's achievements, especially in the field of science and technology, over the last 75 years and encouraged the next generation to work harder and sincerely to tackle the current challenges and build innovative solutions to strengthen the foundation of a strong and healthy India. The children, staff, and scientists also recited poems and expressed their thoughts about the day's significance.

Distinguished Lecture by Dr Ashwani Kumar



Dr Ashwani Kumar, Director of ICMR-Vector Control Research Centre (VCRC) Puducherry, visited ICMR-NIMR in July 2022 to deliver a lecture in the ICMR-NIMR & MERA-India “Distinguished Lecture Series”. Dr Kumar had served for over 32 years at NIMR before he moved to VCRC in 2019 as the Director. Dr Amit Sharma, the Director ICMR-NIMR, welcomed Dr Kumar to NIMR, and Dr Sachin Sharma, Chief Consultant, MERA-India, introduced the speaker to the attendees.

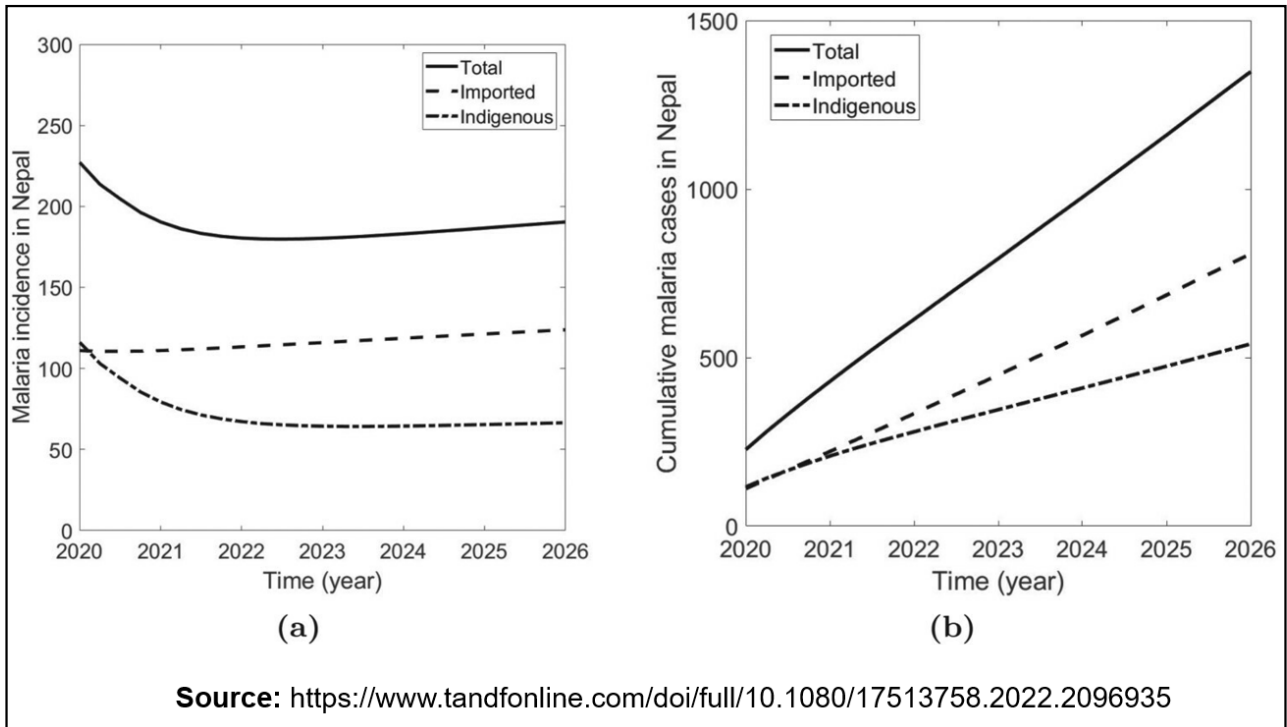
Dr Kumar’s lecture was entitled “Vector control is central to malaria elimination”, in which he emphasized the role of vector control in establishing zero transmission for successfully achieving the malaria elimination target. He talked about the importance of mosquito control considering that mosquitoes are the deadliest animals on earth causing the most number of deaths than any other organism through the transmission of many life-threatening diseases, like malaria. He described the existing worldwide distribution of malaria vectors and the challenges to their control. He highlighted how climate change leading to changes in temperature and rainfall patterns has become a big threat for mosquito-borne disease transmission to newer areas, and emphasized upon the importance of entomology to understand these dynamic changes and the possibilities of the establishment of mosquito species in newer geographical areas. He described the history of vector control methods and the current approaches for mosquito control based on mosquito biology and physiology. He stressed upon the need to enhance vector surveillance capacity, use of integrated vector management, new vector control tools for mitigating the threat of emerging disease/invasive vector species and insecticide resistance, and the capacity building for entomology for malaria entomology.

The lecture was followed by an interaction between Dr Kumar and the NIMR scientists. Dr Kumar also answered questions from the online lecture attendees. The session concluded with Dr Sachin Sharma thanking the speaker and the attendees.

The recording of this lecture is available on the MERA-India website (<https://www.meraindia.org.in/lecture-series>).

Research in Spotlight

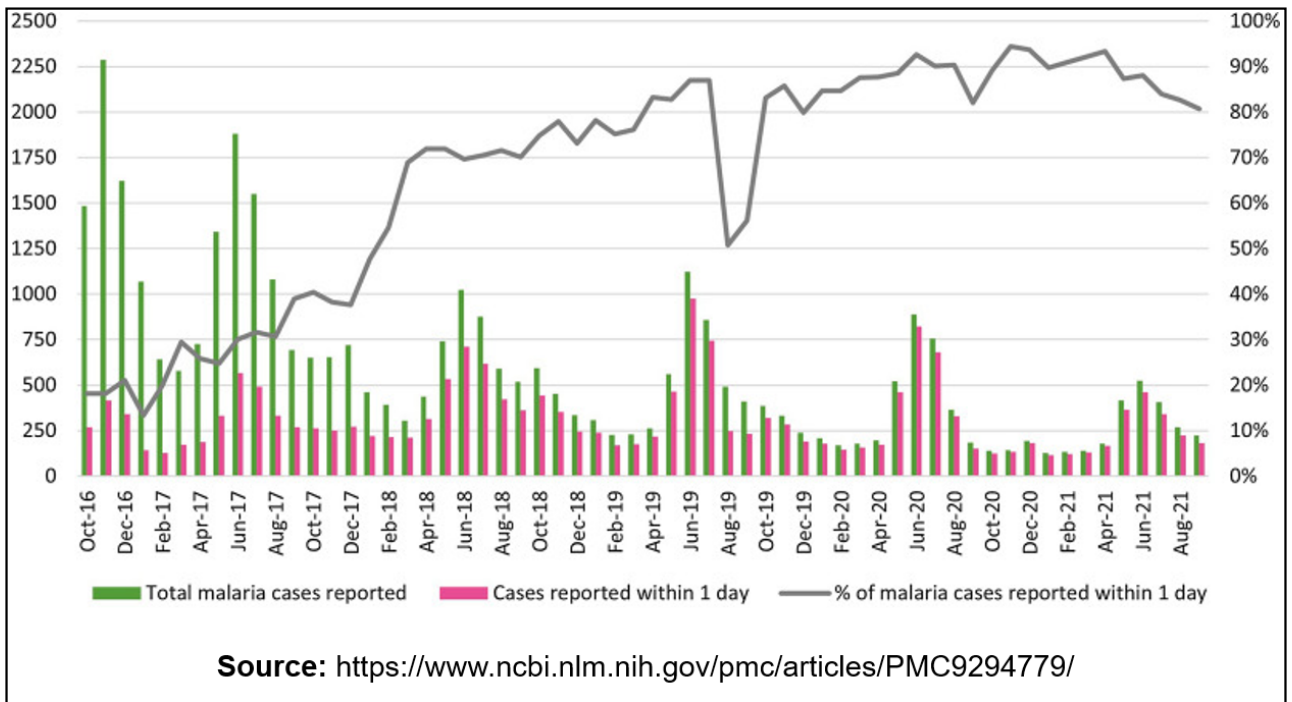
Gautam R. et al., *J Biol. Dyn.*, 2022: Modeling malaria transmission in Nepal: impact of imported cases through cross-border mobility



India's neighboring country Nepal is aiming for malaria elimination by 2026. But because of India-Nepal open border policies, Nepal is facing a rise in cross-border imported malaria cases, which are becoming one of the major roadblocks to their malaria elimination program.

The authors of the present [article](#) developed a mathematical model to predict the impact of malaria cases imported from India on the malaria elimination goal of Nepal. Their model indicated that if the strategies for avoiding cross-border imported cases, like, strict border screening and the absence of cross-border mobility, are implemented properly, then the goal of malaria elimination can be achieved within the set timeframe. They also tested the efficiency of malaria intervention strategies like Indoor Residual Spraying (IRS), insecticide-treated nets (ITN), migration reduction (MR), border screen and isolation (BSI) for maintaining low endemicity in the scenarios of low as well as a high rate of mosquito biting. Their model shows that MR and ITN are the most effective control measures in low and high mosquito biting rate scenarios, respectively. But they have also mentioned that mathematical models use the controlled ideal settings for the simulation, which is not feasible in reality. Thus to resolve the issue of cross-border imported cases, both countries, Nepal and India, should implement combined malaria control strategies.

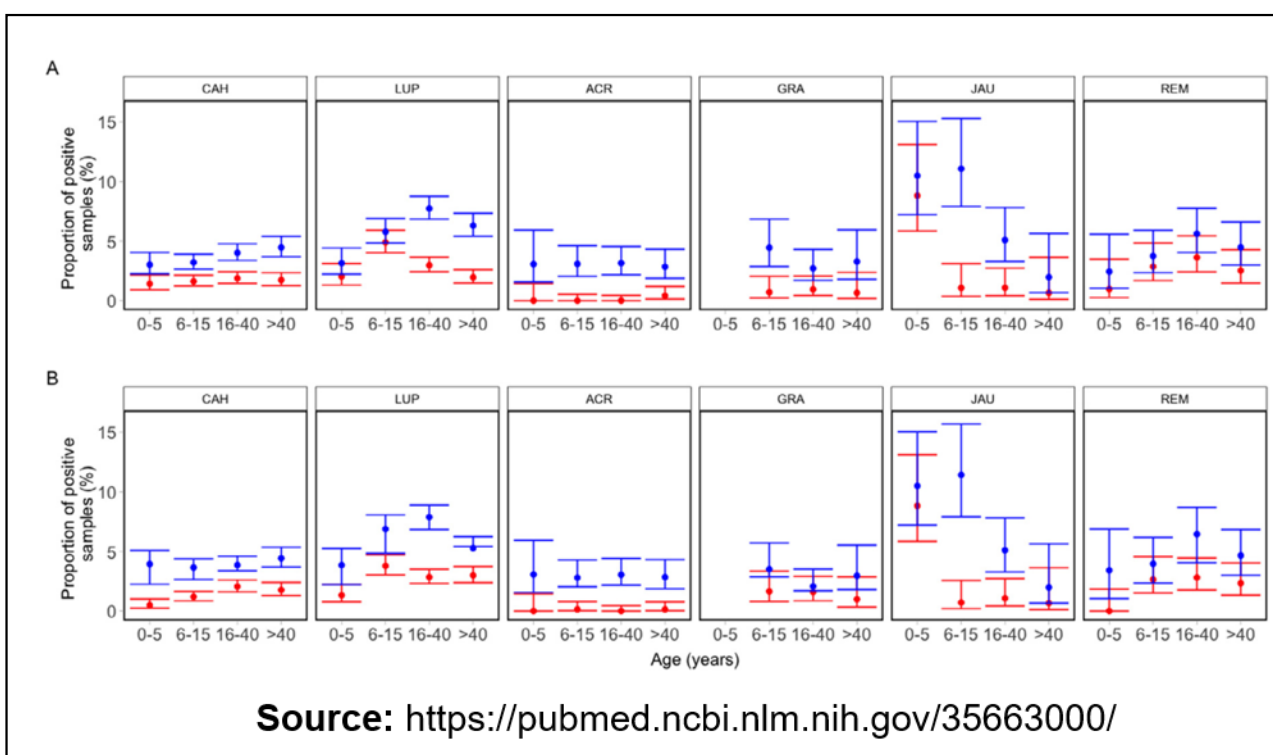
Sudathip P. et al., *Malar J.*, 2022: Assessing Thailand's 1-3-7 surveillance strategy in accelerating malaria elimination



The “1-3-7” strategy was one of the salient features of China’s malaria elimination program. Thailand is targeting malaria elimination by 2026 and implemented the “1-3-7” surveillance strategy across the nation in 2016. This strategy involved case notification within 1 day of diagnosis, case investigation within 3 days to determine if the case was local or imported, and foci investigation and response within 7 days. This strategy thus aims to target the onward malaria transmission from the index case.

In this [article](#), the authors have used the ARIMA model to assess the adherence to the protocol, implementation, and impact of the “1-3-7” strategy on malaria incidence in Thailand during the first five years after the adoption of this strategy. The authors show that while the malaria incidence declined throughout the country after the adoption of the “1-3-7” strategy, there were some geographical variations due to challenges such as migration patterns, civic unrest, and drug efficacy. The timely notifications of the confirmed cases, as well as the foci-based investigations and response, improved markedly since the adoption of the “1-3-7” strategy. This assessment could thus help to strategize the surveillance and response in a more effective way by targeting the high incidence areas and foci to accelerate malaria elimination.

Ferreira M.U. et al., *The Lancet Reg Health – Am.*, 2022: Relative contribution of low-density and asymptomatic infections to *Plasmodium vivax* transmission in the Amazon: pooled analysis of individual participant data from population-based cross-sectional surveys



Source: <https://pubmed.ncbi.nlm.nih.gov/35663000/>

P. vivax has distinct pathophysiology as compared with *P. falciparum*, and it presents a hurdle to existing strategies for malaria elimination. In this [article](#), the authors determined the proportion of sub-patent and asymptomatic *P. vivax* malaria in the Amazon and estimated how parasite density is related to clinical symptoms and malaria transmission in the region. They gathered the information of participants available on databases from 34 population-based cross-sectional surveys from different study sites in Brazil and Peru. They included only participants with microscopy and PCR data and age-specific information from selected study sites. The authors further estimated the relationship between parasite density and infectivity to vectors by experimental mosquito infection data. The authors found that sub-patent infections prevailed more in comparison to patent infections in all age groups selected in this study in the Amazonian population, whereas of all *P. vivax* infections confirmed by PCR, about ~70 % were found to be asymptomatic and dominated over symptomatic infections in all age groups at study sites. The study also showed that sub-patent infections accounted for a small part of the parasite reservoir in the Amazon. Moreover, the authors also presented data for age-specific *P. vivax* infection and its association with disease symptoms in populations exposed to *P. vivax* in the Amazon. They further estimated the contribution of both sub-patent and asymptomatic infections to

P. vivax malaria transmission across all sites. The authors inferred that asymptomatic *P. vivax* carriers serve as a source of mosquito infection and act as a major reservoir of infection in the Amazon, which must be targeted by malaria elimination strategies to alleviate transmission of disease in malaria-endemic regions.

This type of study is important for identifying the human reservoir of *P. vivax* and the development of intensive anti-malarial interventions that target malaria transmission and infection to vectors which might have implications for malaria elimination strategies in an endemic region.

Malaria Scientist to Watch: An interview with Dr Sanghamitra Pati



[Dr Sanghamitra Pati](#)

Director,
ICMR-Regional Medical Research Centre,
Bhubaneswar, Odisha, India

1. Please share with our readers your journey from being a young scientist to your current role as the Director of ICMR-RMRC, Bhubaneswar.

I am a physician turned laboratory scientist and a public health researcher. I completed my MBBS (1992) and MD (1998), both from MKCG Medical College, Berhampur, Odisha, India. In 2000, I received the Joint Japan/World Bank Graduate Scholarship (JJ/WBGS) to pursue a Master of Public Health (MPH) at the University of Maastricht, The Netherlands. Subsequently, I received the AAUW (American Association of University Women) International Fellowship in 2002 for research into maternal mortality. Initially, I served as a medical officer and then worked as a faculty in various medical colleges in Odisha. Subsequently, I joined the Public Health Foundation of India (PHFI) in August 2010. Wellcome Trust funded research, the first in India and any in Low and Middle Income Country (LMIC), assessed the burden and impact of multi-morbidity (coexistence of multiple chronic illnesses in a person) in patients attending health care settings. The MAQ-PC tool developed by me is now being used by many researchers across the LMICs to measure multi-morbidity. Since August 2016, I have been serving as the Director of ICMR's Regional Medical Research Centre, Bhubaneswar (RMRCBB). RMRCBB is committed to advancing research programmes aimed at improvement of public health through addressing different causes of both communicable and non-communicable diseases. The

communicable diseases research programme includes studies on malaria, lymphatic filariasis, diarrhoeal disorder, tuberculosis, and diseases of viral origin. Non-communicable diseases include nutrition-linked diseases, sickle cell disease, hypertension, and diabetes. This also involves developing necessary human resources and establishing a strong linkage with State Health Department in finding solutions to the regional health problem. Besides basic and applied research, translational research is being encouraged.

During the COVID-19 pandemic, RMRC spearheaded the laboratory testing of COVID-19 in Odisha, as well as the adjoining states of Jharkhand and Chhattisgarh, and set up the High Throughput Cobas Lab in a record time. The team RMRC Bhubaneswar conducted multiple rounds of sero-surveys with logistics for COVID-19 testing and informed the Odisha state administration on the status and progression of the pandemic.

Being a native of Odisha, I am aware of the immense burden to the health care caused by malaria in this state and as well as the challenges posed by malaria to the national and global healthcare agencies. Towards addressing the challenges posed by malaria, ICMR-RMRCBB has initiated the highly effective program of DAMAN, aimed at controlling the malaria disease burden through active surveillance and treatment using ACTs. Though DAMAN has resulted in a considerable reduction of the malaria burden, I feel that an efficient vaccine against malaria could be a more practical and economical tool for the effective control and elimination of malaria. It is with this objective in mind that we have put together a team focused on malaria vaccine research at ICMR-RMRC Bhubaneswar, for a multi-institutional malaria vaccine project aimed at establishing proof-of-principle through preclinical studies for chimeric recombinant malaria antigens targeting the pre-erythrocytic development in man as well as reducing community transmission through interfering the development of the parasite within the mosquito vector.

2. While India has set up a target of malaria elimination by 2030 and has been seeing a decline in the number of cases and deaths. What challenges do you see for India in achieving this goal?

As early as the 1960s, India had a very effective malaria control program and was within striking range of achieving malaria elimination. However, due to resistance arising in mosquitoes against insecticides (such as DDT), and the gradual emergence and spread of chloroquine-resistant parasites, the situation of malaria epidemics in India worsened in the subsequent decades. Though we have a clarion call for achieving malaria elimination by 2030, and despite the ongoing effective control measures for reducing both the vector and parasite burdens, I feel the following factors may pose stiff challenges towards achieving this goal:

- i. Difficulties in controlling malaria in tough terrains such as in deep forest dwellings and tribal populations.

- ii. Relatively poorer understanding of *Plasmodium vivax* biology, the major human malaria species, and lack of effective and safe drugs to eliminate hypnozoites, the hidden *P. vivax* reservoir in children, pregnant women, and G6PD deficient individuals. Given the prevalence of roughly 50% *P. vivax* burden in India, malaria elimination may not be achievable without succeeding against the challenge posed by *P. vivax*.
- iii. Additionally, the rising cases of artemisinin resistance in South East Asia and its gradual spread in other parts of the world suggest that it is only a matter of time before this emerges as a challenge in India.
- iv. Further, other factors such as climate change causing an increase in the frequency of heavy rainfalls and flooding, changes in mosquito feeding behaviour etc. are some of the other natural challenges.

I feel that we have to mobilize all resources at our disposal for vector and parasite control as well as supplement these efforts with new tools such as vaccines or new drugs, as and when they would be available to maximize our chances of succeeding in our fight to eliminate malaria.

3. What challenges do you see for women working in STEM?

Women have to overcome biological and various socio-cultural barriers in order to succeed in their professional careers. Despite overcoming these challenges, women continue to face bias against their professional careers in various ways vis-à-vis their male colleagues, even in the most advanced economies around the globe.

In India and particularly in the field of STEM, the participation of women has witnessed an overall rise from just around 8% in the 1970s to currently around an average of about 27%, which definitely needs to improve further. Fortunately, several Government policies in improving primary as well as higher education of girl child as well as support for women in the form of various research fellowship programs is a welcome step in the right direction to ensure rising participation of women in STEM.

It is further required that the Government formulates policies to address the issues of wage disparity and intrinsic biases against the hiring of women candidates and provides facilities (such as baby care centres at workplaces) to help women find better work-life balance.

4. What is one piece of advice that you would like to give to PhD students and early-career researchers?

I think for any progressive society, it is important to invest resources to support research and development activities, and India has a rich heritage of being a knowledge


powerhouse. True to this heritage Government of India has invested heavily in creating a workforce capable of taking on the challenges of the science & technology-led global economy. I feel that PhD students are supported through generous fellowships these days and are provided with a protected environment to help them learn and explore the intricacies of their respective fields of research. While doing so, I would advise them constantly expand their horizon and try to learn from other areas of research, as well. There is equal importance of exploring fundamental research as well as developing translational research applications. No matter which stream of science you pursue, please strive for excellence and do not develop complacency for mediocre achievement. I would strongly urge the students and early-career researchers to find a connection between their research activities and a societal need and let that be the driving passion for their research activities. This, in my opinion is the best way to channelize the scientific potential towards serving the society.

5. What significance do you see for MERA-India in achieving India's malaria elimination target?

MERA-India fills in the long-felt vacuum of a unique platform at the national level, where all stakeholders can interact, discuss and develop strategies through informed discussions for the implantation of policies for effective control and elimination of malaria, as well as other vector-borne diseases. Thus, MERA-India serves as the melting pot for a confluence of thoughts, ideas, and experiences for not only researchers but also for policymakers. In doing so, it also serves to enthuse the younger generation through participatory learning and motivating them in a guided manner to contribute to the overall cause of malaria elimination.

Resource for Malaria Researchers: PROSITE

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Database of protein domains, families and functional sites

New SARS-CoV-2 relevant PROSITE motifs

PROSITE consists of documentation entries describing protein domains, families and functional sites as well as associated patterns and profiles to identify them [[More...](#) / [References](#) / [Commercial users](#)]. PROSITE is complemented by [ProRule](#), a collection of rules based on profiles and patterns, which increases the discriminatory power of profiles and patterns by providing additional information about functionally and/or structurally critical amino acids [[More...](#)].

Release 2022_03 of 03-Aug-2022 contains 1911 documentation entries, 1311 patterns, 1346 profiles and 1359 ProRule.

Search

Browse

- by documentation entry
- by ProRule description
- by taxonomic scope
- by number of positive hits

Quick Scan mode of ScanProsite

Quickly find matches of your protein sequences to PROSITE signatures (max. 10 sequences). [[?](#)] [[Examples](#)]


Enter UniProtKB accessions or identifiers or PDB identifiers or sequences in FASTA format

Exclude motifs with a high probability of occurrence from the scan

For more scanning options go to [ScanProsite](#)

Other tools

- **PRATT** - allows to interactively generate conserved patterns from a series of unaligned proteins.
- **MyDomains - Image Creator** - allows to generate custom domain figures.



Source: <https://prosite.expasy.org/index.html>

[PROSITE](#) is an online database that comprises of a large collection of protein domains, motifs, or functional regions. The database has signatures that identify conserved patterns on the proteins, which are further linked to an annotation document where the information related to the characteristics of a protein family or domain could be found. Though the patterns used in the database serve as useful methods to recognize small conserved regions i.e. enzyme catalytic sites, binding sites of ligands, etc., however, these patterns need to be regularly updated to detect any differences in the regular expression. PROSITE enables the identification of putative functions of uncharacterized proteins and, with computational tools, also identifies the family of proteins to which it belongs. Thus, PROSITE represents a collection of tools for functional characterization and sequence analysis of proteins.

To know more about PROSITE, please visit <https://prosite.expasy.org/prosite.html>.

A Child's Perception of Malaria


In this issue, we showcase the sketch of Miss Priyanshi Mamgai, aged fifteen years. Through the sketch, Miss Priyanshi has depicted the various measures that can be adopted to control mosquito breeding and protect oneself from mosquito bites.



Sketch by: Miss Priyanshi Mamgai (D/o Mr Dayal Chandra, ICMR-NIMR - FU Haridwar);
Age: 15 years; **Class:** X

Announcements

8th Future of Malaria Research Symposium

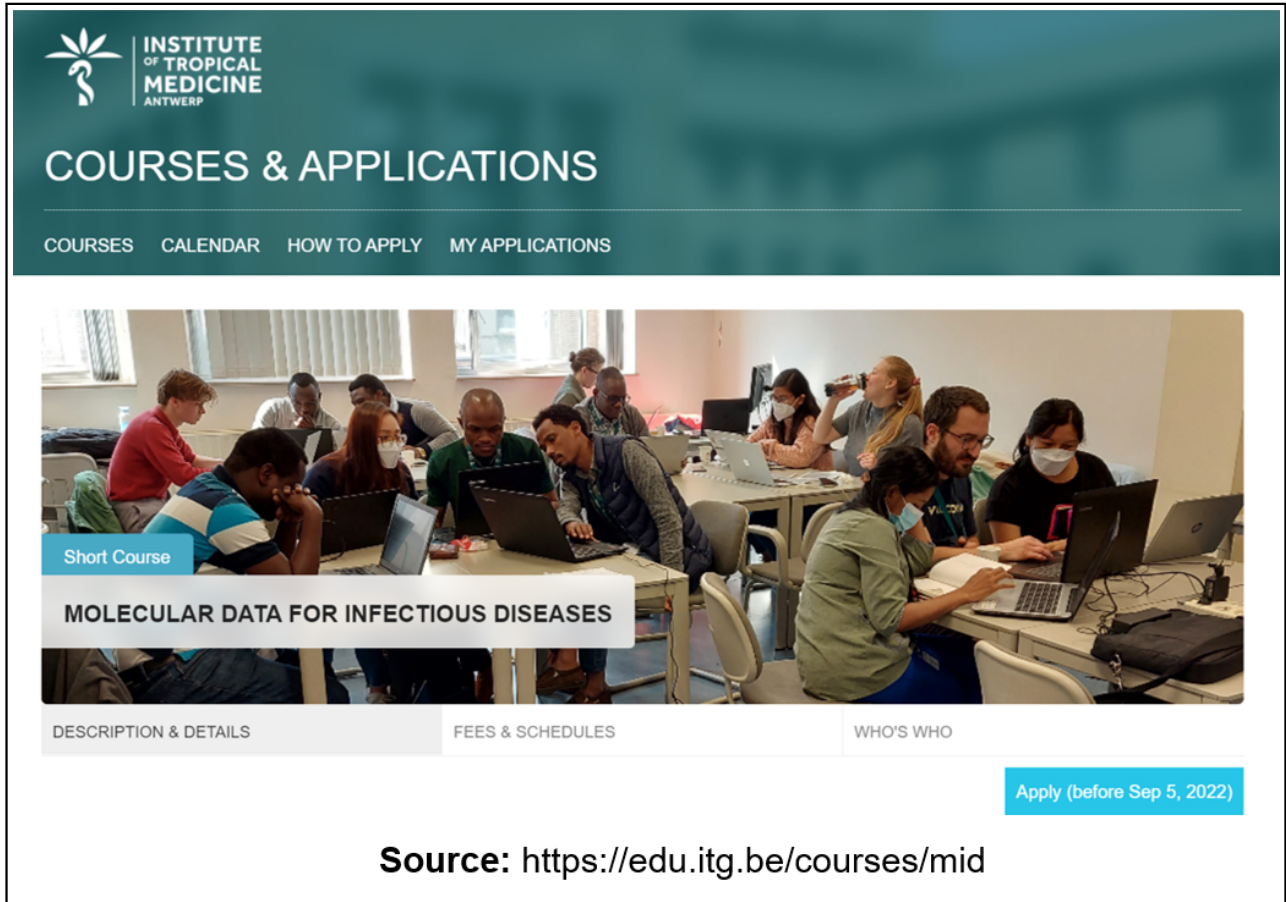


Source: <https://malaria.jhsph.edu/conferences/2022-future-of-malaria-research-symposium/>

Johns Hopkins Bloomberg School of Public Health is organizing the 8th Future of Malaria Research Symposium, in a hybrid mode, on 28th October 2022, focussing on emerging malaria researchers. The abstracts are invited on the themes of parasitology, entomology, epidemiology, and immunology, and the deadline for abstract submission is 20th September 2022. Registrations are open till 07th October for attending in-person and will remain open for virtual attendees.

For more details, visit: <https://malaria.jhsph.edu/conferences/2022-future-of-malaria-research-symposium/index.html>

ITM Antwerp Call for Applications: Short Course on Molecular Data for Infectious Diseases



The screenshot shows the website for the Institute of Tropical Medicine Antwerp. The header includes the logo and the text "INSTITUTE OF TROPICAL MEDICINE ANTWERP". Below the logo, the main heading is "COURSES & APPLICATIONS". A navigation menu contains "COURSES", "CALENDAR", "HOW TO APPLY", and "MY APPLICATIONS". The main content area features a photograph of students working on laptops in a classroom. Overlaid on the photo is a blue box with the text "Short Course" and a white box with the text "MOLECULAR DATA FOR INFECTIOUS DISEASES". Below the photo are three tabs: "DESCRIPTION & DETAILS", "FEES & SCHEDULES", and "WHO'S WHO". A blue button in the bottom right corner says "Apply (before Sep 5, 2022)".

Source: <https://edu.itg.be/courses/mid>

Registration call is open for a short course in Molecular Data for Infectious Diseases being conducted by the Department of Biomedical Sciences of the Institute of Tropical Medicine of Antwerp, Belgium. The course is targeted at experienced molecular biologists, and the main focus is to train about the selection and application of appropriate molecular tools for epidemiological and clinical infectious studies in a resource-limited setting.

The application deadline is 04th September 2022.

For more information, please visit <https://edu.itg.be/courses/mid>



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