The 10th Southeast Asia and Western Pacific Bi-regional TEPHINET Scientific Conference

November 1–5, 2021

Combating Emerging and Reemerging Public Health Threats through Regional Field Epidemiology Training Networks

Program and Abstracts
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Welcome Message

From TEPHINET

It is indeed a pleasure to welcome you to the 10th Southeast Asia and Western Pacific Bi-regional TEPHINET Scientific Conference organized by our esteemed partners, the South Asia Field Epidemiology and Technology Network (SAFETYNET) and the Taiwan Field Epidemiology Training Program. I am certain that all the attendees and participants will take full advantage at all the opportunities presented at this conference for knowledge exchange and networking.

It is well-recognized that every country needs effective field (or applied) epidemiology capacity to safeguard and promote the health of its citizens. With the COVID-19 pandemic the world has recognised the importance of outbreaks and public health emergencies. Never before has the need for increased field epidemiology capacity been more apparent than now. The field epidemiologists in our network including those that are members of SAFETYNET and ASEAN+3 have been working around the clock to trace contacts, investigate and manage cases, analyze COVID-19 data, educate their communities, and much more. Without them, ministries of health would not have access to reliable data on the spread of COVID-19 in their populations. In many countries FETP residents and graduates are a critical part of the workforce in place to conduct contact tracing and case investigations.

TEPHINET salutes the outstanding work done by FETPs at the forefront of disease surveillance, public health emergency and disease outbreak response in the Southeast Asian and Western Pacific regions and your efforts to build the field epidemiology workforce needed to detect and respond to disease outbreaks before they become pandemics with devastating human and economic consequences.

There will be other pandemics and no single institution has all the capacity required to be adequately prepared to face future threats. We need to harness the resources and capacities of a wide range of partners and stakeholders and we need political leadership, whole-of-government and whole-of-society commitment. It is also critical to develop the human resources and field epidemiology technical capacity required to protect the health of all people.

We urge you to support the work of the Strategic Leadership Group (SLG) to ensure that every country in the world has the applied epidemiology capacities needed to protect and promote the health of its own population, and to collaborate in the implementation of our roadmap for building global field epidemiology capacity and strengthening the FETP Enterprise.

Carl Reddy
Director
Training Programs in Epidemiology and Public Health Interventions Network
From SAFETYNET

Welcome to the first Bi-Regional VIDEO conference!

I would like to thank the Taiwan FETP for instigating and inspiring us to have this activity. It speaks of their concern for programs to be able to continue sharing their experiences so that we may learn from each other notwithstanding the abnormal situation we are in.

Thanks and gratitude to TEPHINET for guiding us and finding ways to keep us connected. Too, for the unqualified support of the US Centers for Disease Control and Prevention.

We are so lucky that in this lifetime, we are able to witness the outbreaks of HIV/AIDS, SARS, Ebola, Avian flu, MERS-CoV, and now this COVID pandemic. We lived them, we breathed them, we tried to understand them so that the next generation will be better able to prevent and control them. Such is our contribution.

It is perfect timing (or fate) that even when we cannot travel or socialize the way we used too, the distancing that is imposed on us happened in this day and age of high technology. We can still communicate well and reach out in a blink of an eye, even if we’re separated by thousands of miles. And therefore we can respond.

Though we would like to think that we can get it right the first time, it is very possible that we will encounter glitches and inconveniences in the next three days of presentations. We beg for your patience and expect everybody’s understanding. Because we want to share, we want to learn, we want to help.

Here’s to a productive conference ahead of us!

Maria Consorcia Lim-Quizon, MD
Executive Director
South Asia Field Epidemiology and Technology Network, Inc.
From Dr. Riris Andono Ahmad

Dear colleagues and friends,

Allow me to warmly thank the organizers of this important conference for giving me the privilege of welcoming and addressing you all. For me, it is an honor and a pleasure.

I would also like to thank the Taiwan FETP for bringing us to the 10th Southeast Asia and Western Pacific Bi-regional TEPHINET Conference. As I am writing this welcome address, COVID-19 pandemic has been with us for almost two years. Unfortunately, last time, our colleagues at the Taiwan FETP had to postpone the conference twice due to the COVID-19 situation. So no one can foresee even the near future, and we all are experiencing a long tunnel of uncertainty in health, economy, and everyday life.

However, as life continues, we now know how COVID-19 impacts disease spread in the population and how we should respond to these health problems. It is, therefore, essential for us to meet and share what we have learned in the field during the pandemic era. How we effectively respond to the COVID-19 pandemic, and how we can effectively respond to other public health problems taking into account many restrictions due to the pandemic.

Although we cannot meet in person this time, I genuinely hope you will join us in this exciting gathering and make a significant contribution to our commitment to advancing the Field Epidemiology Training Program. We are looking forward to greeting you at the virtual conference.

Riris Andono Ahmad
Member, TEPHINET Advisory Board
Director, Center for Tropical Medicine, Faculty of Medicine, Universitas Gadjah Mada
From Dr. Steven Peng-Lim Ooi

It is my honor to deliver this welcome message for all participants of our 10th Southeast Asia and Western Pacific Bi-regional TEPHINET Scientific Conference.

Our conference is important because it brings together so much of the good work being done at the forefront of emerging diseases surveillance, outbreak investigation, community engagement and health protection. Such a conference plays a critical role in improving our global health security, and abilities to detect and respond to disease threats.

In the current pandemic, we care for both lives and livelihoods. Having experienced outbreak alerts as governments attempt to reopen the economy and put an end to crippling lockdowns, we can expect Covid-19 to wax and wane in asynchronous cycles. The hard lessons learned must be shared because virus variants are shifty and pose a major challenge to control.

An epidemic surge is our moment for courage and tenacity in the face of challenge. The key to safeguarding public health is to sustainably combine vaccination strategy, testing and tracing with community hygiene measures and safe distancing into an effective system that works for each country situation.

With TEPHINET and FETPs in place, we are cautiously optimistic at collectively turning the corner. At this conference, let us stand together with renewed confidence in our cause - united in our heritage of the past, and determined in our hopes for the future!

Assoc Prof (Dr) Steven Ooi
Member, TEPHINET Advisory Board
Senior Consultant, National Centre for Infectious Diseases, Singapore
From the Ministry of Health and Welfare, Taiwan

It is with great pleasure that I welcome you to the 10th Southeast Asia and Western Pacific Bi-regional TEPHINET Scientific Conference.

The Taiwan Ministry of Health and Welfare was established more than a decade ago by merging Taiwan’s health and welfare departments. Over the years, Taiwan has gained valuable experience in promoting the well-being of our citizens, in addition to minimizing threats that challenge the health of people in Taiwan.

The public health community has been expecting and preparing for a pandemic for many years. Despite all the preparation, COVID-19 has presented challenges to us like no other public health emergencies in our lifetime. The COVID-19 pandemic has forced us to work quickly to contain the spread of the disease within our own countries and compelled us all to forge new collaborations internationally, to face the pandemic together.

Taiwan has actively participated in sharing our experiences with the global public health community. We seek opportunities to work with our international partners on issues regarding human and animal health, environmental health, and other public health events. I hope that through this conference, we will be able to learn from each other and foster new relationships.

Taiwan is a beautiful island with friendly people. In addition, we have a convenient public transportation system, vibrant culture, and diverse cuisines. Even though you could not be here physically, I hope you will be able to come and visit us soon.

Shih-Chung Chen, DDS
Minister
Ministry of Health and Welfare, Taiwan
From the Ministry of Health and Welfare, Taiwan

On behalf of the Conference Steering Committee, welcome to the 10th Southeast Asia and Western Pacific Bi-regional TEPHINET Scientific Conference in Taipei, Taiwan.

The theme of this year’s conference is “Combating Emerging and Reemerging Public Health Threats through Regional Field Epidemiology Training Networks.” Since the last TEPHINET meeting in Taiwan in 2007, we have experienced several emerging disease outbreaks, including pandemic influenza H1N1 in 2009, MERS in 2012 and 2013, and now, COVID-19. In addition, we have had a number of reemerging diseases, including Ebola infection in West Africa, Zika virus infection in the Americas in 2016, and measles in the Pacific Islands in 2019. In responding to each outbreak, we are reminded of the importance of having an FETP network, through which we can share firsthand information and experience.

I regret that, instead of sitting in a conference room in Taipei, you are joining us via videoconferencing because of the COVID-19 pandemic. Taiwan has so much to offer in terms of history, culture, and nature. I hope you will be able to visit us here in the near future.

Once again, welcome, and I wish you a successful conference.

Jui-Yuan Hsueh, MD, LLM
Deputy Minister
Ministry of Health and Welfare, Taiwan
From the Centers for Disease Control, Taiwan

Welcome to the virtual 10th Southeast Asia and Western Pacific Bi-regional TEPHINET Scientific Conference.

Responding to COVID-19 means that we are testing out many of the control measures that we have planned for years, from quarantine to social distancing, to mass vaccination. Using current technology, we have been able to better implement our control measures and understand the effectiveness of our interventions.

Getting together to share our love of public health, our experiences as trainers and trainees, and our proud traditions from different cultural backgrounds has been an important part of being a member of the FETP family. Even though the pandemic is keeping us physically apart, through technology, we can still meet. It may be a bit more difficult to chat with someone from a different program at the conference, but I hope we can still take the opportunity to get to know each other and learn from each other.

I want to use this occasion to thank SAFETYNET for their unflinching support in putting together this conference. Their guidance has been immeasurably valuable.

Once again, welcome, and enjoy the conference.

Jih-Haw Chou, DDS, MPH
Director-General
Centers for Disease Control, Taiwan
Conference Steering Committee

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Deputy Minister, Ministry of Health and Welfare, Taiwan

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Attending Physician, National Taiwan University Children’s Hospital, Taiwan

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Director, Taiwan Field Epidemiology Training Program, Centers for Disease Control, Taiwan  
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Director, Public Relations Office, Centers for Disease Control, Taiwan

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Former Director, Taipei Regional Center, Centers for Disease Control, Taiwan (served until July 2021)

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Director, Taipei Regional Center, Centers for Disease Control, Taiwan

**Dr. Song-En Huang, Committee Member**  
Medical Officer, Centers for Disease Control, Taiwan
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Hamufare Mugauri
Syed Nadeem ur Rehman
Meenakumari Natarajan
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Sukarma Tanwar
Tsung Pei Tsou
Noorhaida Ujang
Aishat Usman
Ma. Elaine Joy Villareal
Grace Viola
Ngoc Long Vu
Hsin-Yi Wei
Krista Wilkinson
Seymour Williams
Thanachol Wonghirundecha
Rajesh Yadav
Pre-Conference Workshops

**Workshop 1: I am scared of (adverse events following) immunizations — vaccine safety evaluation and communication**

Organizer: Taiwan FETP

Despite having been administered safely for decades, public health and healthcare practitioners may still find the evaluation and communication about vaccine safety daunting tasks. With new vaccines and vaccine platforms being used for COVID-19 prevention and control, any adverse event following immunization (AEFI) may lead to the loss of confidence in COVID-19 vaccines and sow distrust in government disease control efforts. The objectives of this workshop are to help participants in understanding post-introduction AEFI surveillance, AEFI investigation and causality assessment, hypothesis strengthening using background rates, hypothesis testing using controlled studies, and communication response to vaccine-related events (VRE). The workshop will use real-life examples for an interactive case study, to facilitate participants’ understanding of vaccine safety evaluation and communication.

**Workshop 2: Developing FETP Curriculum for Field Epidemiology in Pandemics**

Organizer: FETP, Bangladesh

Many FETP fellows and graduates responded to the COVID pandemic. While their FETP training involved investigation of small and localized disease outbreaks, the COVID response is larger in scope, magnitude and complexity than most FETP field projects. The response also presented additional challenges with lack of knowledge of the new virus and its pathogenicity, insufficient resources to respond, use of unfamiliar control efforts such as quarantine, contact tracing and non-pharmaceutical interventions, and need to respond quickly. Most FETP curriculum do not contain these topics. We convene a workshop to develop a curriculum that will teach FETP graduates, future FETP cohorts and other public health professionals how to respond to a regional epidemic or a global pandemic.

**Workshop 3: EpiCore, Crowdsourcing Verification Activities Locally to Enable Epidemic Intelligence Worldwide**

Organizer: ENDING PANDEMICS

Epidemic intelligence (EI) aims to produce timely and verified intelligence on potential public health events through systematic collection of health information across the one health spectrum from a variety of sources which is validated, analyzed, and assessed.

The purpose of EI is to speed up the detection of new health threats and to define appropriate control measures to be acted upon by health authorities.

The EI landscape has gone through several changes recently, including the introduction of new communication technologies and the increase of collaborative initiatives among health organizations from different levels and sectors. Today, one of the most relevant EI challenges is the management of an increasing
volume of early warning signals, generated by innovative Event-Based Surveillance (EBS) activities, that can affect the health authorities in their daily work.

EpiCore™ (https://epicore.org/) aims to support the public health verification of EI signals through the voluntary contribution of a network of animal, environmental, and human health professionals actively collecting information at the local level in response to unofficial reports. Health professionals can contribute to global health security by enhancing EI activities that complement the verification and risk assessment processes implemented by the health authorities.

Participants will discuss recent EI developments in different contexts and learn about EpiCore project: they will have the opportunity to become members and be actively engaged in the public health events verification and assessment processes, to be supported in addition to their regular health professional roles. Participants will be provided with a certificate and have access to EpiCore platform.

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**Workshop 4: Understanding Infectious Disease Modelling**

Organizer: Strengthening Preparedness in the Asia-Pacific Region through Knowledge (SPARK) Modelling Network

"Public health and biosecurity responses to infectious disease outbreaks can be informed by disease modelling. This introductory workshop will give participants an understanding of infectious disease models and their value for public health. The workshop will cover the use of modelling to examine disease causes and to assess strategies for control in the context of a variety of infectious diseases. No prior detailed knowledge of modelling infectious diseases or epidemiology is required, and only high school level mathematics is needed. The workshop provides an excellent opportunity for students and researchers with an interest in the topic to see a broad range of modelling techniques applied to disease transmission. It aims to demonstrate how these techniques can support decision-making. The workshop is targeted at a broad range of participants including epidemiologists, clinicians and public health professionals.

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**Workshop 5: Evaluating the Impact of Field Epidemiology Training**

Organizer: Field Epidemiology in Action

Despite the success of the FETP model globally, there have been relatively few evaluations published. Those evaluations that have been published have focused on variables that are easy to measure, such as process indicators (e.g. reaction of trainees to the training) or simple output indicators (e.g. number of students graduating). There are very few evaluations focusing on the outcomes and impact of FETPs. As the key driver behind FETPs is to improve the health of populations by improving the ability to detect, investigate and respond to public health threats, the utility of evaluations focusing solely on process and output indicators is extremely limited.

International development agencies are placing increasing emphasis on addressing development effectiveness and impact. Given the high monetary and opportunity costs of FETP programs, there has been a move towards demonstrating value for money and measuring impact. Demands for increased accountability and demonstrated returns on investment have not only come from donors, but also from program beneficiaries. This workshop will introduce participants to different methods for training evaluation, including review of a mixed-method impact evaluation framework currently being used to evaluate FETP programs in Papua New
Guinea and Solomon Islands. No prior evaluation experience is necessary. Evaluation experts and practitioners will share firsthand experiences of evaluation methods to walk participants through evaluation methodologies in a practical step-by-step manner. Participants will engage in small group discussions and activities that guide reflection and critiques of how different impact evaluation approaches relate to their own program contexts.

At the conclusion of this workshop, participants will be able to:

- Recognize the diverse range of training evaluation methods and approaches
- Describe how Theory and Change, Kirkpatrick’s Four Levels of Learning Evaluation, and Success Case methodologies can contribute to FETP impact evaluation
- Assess the relevance and practicality of different evaluation methods in their contexts
- Develop a draft impact evaluation framework for a specific FETP

**Workshop 6: FETP From Face-to-Face to Blended Modality**

Organizer: EMPHNET

The COVID-19 pandemic affected the continuity of many running FETP programs and interrupted their training agenda, most of the planned face to face workshops were cancelled or postponed and this resulted on extending the programs duration. The main reasons were due to the restrictions associated with the pandemic (social distancing and lockdown). In addition, most of the trainers as well as the residents are taking part in the response and control measures. Even before the pandemic, many regions and interested public health workforces have had limited opportunities to join FETP. Among the causes reported are that their workplaces cannot withstand absenteeism, personal, social, or economic reasons, as well as the ongoing emergencies and security concerns.

Within this context, a need arose to evolve existing training modalities to respond to changing public health context and demand. Some developments are the establishment of online training modules, the establishment of more intermediate and basic FETPs in the region, the introduction of courses specific to COVID-19, development of case studies, and more operational research work.

EMPHNET works with CDC and the FETP technical advisors in the countries to review the existing intermediate FETP training materials and to ensure that they are in line with updated training materials. EMPHNET has converted the reviewed training materials including the presentations, case studies and the mentor training package to online content. To meet the countries’ needs, EMPHNET has developed the basic and intermediate FETP in Arabic and French language in addition to the English language. FETPs in the target countries are provided with the access to the online intermediate FETP training package and trained them on its use.

Now those FETP levels are provided as blended training where both online/remote sessions are complemented by interactive workshops. The model keeps the same amount of learning hours (LH) as in the classic program. The difference is in the modality where classes are partially flipped. In this model, theoretical sessions are provided as self-learning materials and interactive workshops are preserved for the exercise, group projects, and cases studies. Despite being a promising modality in delivering the FETP, the experience is faced by some challenges that EMPHNET, together with CDC, are working to solve them.

The overall goal of this preconference workshop is to share EMPHNET experience in converting the FETP from face-to-face to blended modality.

Specific objectives of workshop are
Workshop 7: Scientific Writing

Organizer: SAFETYNET

This workshop will focus on the FETP core competency of scientific communication, highlighting four of the written outputs required by many programs. Starting off with an overview of scientific writing style applicable to all FETP deliverables, the following segments will present information and strategies linked to reporting an outbreak investigation, evaluating a surveillance system, writing up the analysis of primary or secondary data in a quantitative manuscript, and finally wrapping up with abstract development.

If you are planning to write a similar paper or abstract, or are currently writing it, this session will provide tips and tools to make your paper clearer and more concise. Bring your specific questions and challenges to share at this workshop.

Workshop 8: Accreditation/Program Quality for Intermediate-Level FETPs

Organizer: TEPHINET

TEPHINET’s Accreditation of FETPs has, since 2016, served as a quality standard bearer in this field, with 18 accredited programs representing all regions, and dozens of trained reviewers. The accreditation program provides an opportunity for FETPs to align with common standards supporting quality training and increased recognition of the value of FETPs. For the first time, TEPHINET will be rolling out an accreditation process for intermediate-level programs in 2022. This workshop will provide an opportunity to learn about the eligibility requirements, the quality standards, and the documentation required for an intermediate program to be accredited. Participants will also get a peek into the brand-new online application system.

The workshop will be virtual but with interactive methods and lots of time for Q&A.
Virtual Tour

Date & Time: 13:30–14:30, GMT+8, Friday, November 5, 2021

Although the pandemic kept us apart, it is a pleasure to see everyone online and know that everyone is healthy and doing well. The conference organizer has organized a live virtual tour to introduce you to Taiwanese culture. Taipei City may seem innovative, but it is also a city full of history.

The first stop is the North Gate. It is the only gate that retained its original Qing Dynasty appearance. The surrounding buildings tell the history of Taipei City.

On to Bao’an Temple, where Baosheng Emperor is worshiped. Baosheng Emperor was a famous doctor from the Song Dynasty and the initial religion of northern Taiwan.

The third stop is Taipei Confucius Temple. Taipei Confucius Temple not only serves as a historical monument, but also uses modern technology to enhance people's understanding of Confucianism and its history.

The last stop is Dadaocheng, where different architectural styles are mingled. Several original business clusters remain active, such as tea, herbal medicine, and fabrics. Undoubtedly, Dadaocheng has been and will be one of the essential places in Taiwan's history and culture.
List of Awards

The following awards will be presented during the Closing Ceremony on Friday, November 5, 2021.

**Presentation Awards**
Best Oral Presentation, 1st Place
Best Oral Presentation, 2nd Place
Best Oral Presentation, 3rd Place

Best Poster Presentation, 1st Place
Best Poster Presentation, 2nd Place
Best Poster Presentation, 3rd Place
Photo Contest Winners

🌟 1st Place

Ma. Ivy Rozeth Saavedra-Ituralde
Philippines FETP

Field investigation on vaccine-derived poliovirus type 1 with FETP fellows and local public health personnel in a southern Mindanao Island, Philippines, November 2019.

🌟 2nd Place

Werenfridus Leonardo Luan
Indonesia FETP

Fogging focus: This activity is carried out in the context of overcoming dengue hemorrhagic fever, which aims to kill adult *Aedes aegypti* mosquitoes infected with the dengue virus so that there is no person-to-person transmission. This activity was carried out in Tugu Sub-district, Guava Village, Trenggalek District, East Java Province on January 21, 2020. This collection was carried out during field practice 1: analysis of health problems in the health office of Trenggalek District, East Java Province.
Dagmawi Abebe
Ethiopia FELTP

A photo was taken during a surveillance data analysis activity, in Dire Dawa, Ethiopia. Photo captured on April 25, 2021. This is a field epidemiology resident conducting his epidemiologic surveillance activity.

Salwa Yahya Mohammed Al-Eryani
Yemen FETP

As intervention during a measles outbreak, vitamin A supplement for measles contacts were given by Y-FETP resident in Amran, Yemen, March 17, 2021.
<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td><strong>Monday, November 1</strong></td>
<td>08:00 – 17:00</td>
<td>Pre-Conference Workshops</td>
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<tr>
<td><strong>Tuesday, November 2</strong></td>
<td>10:00 – 10:30</td>
<td>Opening</td>
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<td></td>
<td>10:30 – 11:30</td>
<td>Keynote Session: Anthropology and Disease Control</td>
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<td>11:30 – 11:45</td>
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<td>13:30 – 15:00</td>
<td>Oral Presentation Sessions</td>
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<td>(OP 1) Effects of COVID-19</td>
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<td>(OP 2) Non-Communicable Diseases</td>
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<td>(OP 3) Outbreak Investigation and Response</td>
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<td>(OP 4) Surveillance</td>
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<tr>
<td><strong>Wednesday, November 3</strong></td>
<td>10:00 – 11:30</td>
<td>Plenary Session 1: Re-Emerging Vaccine Preventable Diseases</td>
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<td>Plenary Session 2: One Health Approach to Outbreak Response</td>
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<td>(OP 6) Animal Health and Zoonotic Diseases</td>
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<td>(OP 7) Vaccine Preventable Diseases</td>
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<td>(OP 8) More on Surveillance</td>
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<tr>
<td><strong>Thursday, November 4</strong></td>
<td>10:00 – 11:30</td>
<td>Plenary Session 3: Field Epidemiology Training Development Strategies</td>
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<td>11:30 – 11:45</td>
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<td>11:45 – 13:15</td>
<td>Oral Presentation Sessions</td>
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<td>(OP 9) Therapeutics</td>
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<td>(OP 10) Severe Illnesses and Deaths</td>
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<td>(OP 11) Foodborne Diseases</td>
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<td>(OP 12) Vectorborne Diseases</td>
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<td>13:15 – 13:30</td>
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<td>(OP 14) Environmental Health</td>
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<td>(OP 15) Healthcare-Associated Infections</td>
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<td>(OP 16) Malaria</td>
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<td><strong>Friday, November 5</strong></td>
<td>10:00 – 11:30</td>
<td>Plenary Session 4: Communication, Ethics, and Equity in Public Health Emergencies</td>
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<td>11:30 – 11:45</td>
<td>Break</td>
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<td>11:45 – 13:15</td>
<td>Oral Presentation Sessions</td>
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<td>(OP 17) Vaccine Safety</td>
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<td>(OP 18) More on Vaccine Preventable Diseases</td>
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<td>(OP 19) Other Infectious Diseases</td>
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<td>13:15 – 13:30</td>
<td>Break</td>
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<td>13:30 – 14:30</td>
<td>Virtual Tour</td>
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<td>14:30 – 15:00</td>
<td>Closing</td>
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</tbody>
</table>
10:30 – 11:30, Tuesday, November 2

**Keynote Session: Anthropology and Disease Control**

1. Anthropology: A Timely Discipline for Field Epidemiologists  
   Speaker: Prof. Shao-hua Liu

11:45 – 13:15, Tuesday, November 2

**Opening Oral Session: COVID-19 Dominated All Aspects of Our Lives**

1. Retrospective Epidemiological Analysis of SARS-CoV2 Wastewater Surveillance and Case Notifications Data — New South Wales, Australia, 2020  
   Presenter: Hendrik Camphor
2. Characteristics and Risk Factors Associated with Severe Coronavirus Disease 2019 (COVID-19), Taiwan, January–June 2020  
   Presenter: Yang Li
   Presenter: Frans Yosep Sitepu
4. Impact of COVID-19 on Diagnosis and Treatment of Pulmonary Tuberculosis in Tianjin, China, 2020  
   Presenter: Guoqin Zhang

13:30 – 15:00, Tuesday, November 2

**Oral Presentation Session 1: Effects of COVID-19**

1. Assessment of Functional Health Status and Persistence of Symptoms among Recovered COVID-19 Individuals, Tamil Nadu, India 2020  
   Presenter: Suganya Barani
2. Estimation of Out-of-Pocket Expenditure on COVID-19 Treatment among Patients Managed at Home, Iraq, 2020  
   Presenter: Falah A. Saeed
3. Surveillance of Vaccine-Preventable Diseases in Iraq during the COVID-19 Pandemic: How much were They Affected?  
   Presenter: Aqeel Ismaeel
   Presenter: Ha-Linh Quach

**Oral Presentation Session 2: Non-Communicable Diseases**

1. Self-Care Practice and Predicting Factors among Hypertensive Patients in Debre Tabor Referral Hospital, Northwest Ethiopia  
   Presenter: Shegaw Gelaw
2. Surveillance Data Analysis of Severe Acute Malnutrition in East Hararghe Zone, Oromia Region, Ethiopia, 2011–2015  
   Presenter: Biniyam Teshome
3. Assessment of the Availability and Readiness of Hypertension Management Services at Primary Healthcare Facilities — Central Highland region, Vietnam, 2020  
   Presenter: Thang Hoang
4. Estimation of the Relapse Time to Drug Use in Adolescents — San Jose, Costa Rica, 2018  
   Presenter: Jose Diaz

**Oral Presentation Session 3: Outbreak Investigation and Response**

1. Dengue Outbreak in a Coastal Municipality in Catanduanes, Philippines, 2019  
   Presenter: Richelle Abella
2. A Case-Control Study on the Measles Outbreak in Mati City — Davao Oriental, January 2020  
   Presenter: Karla May Manahan
3. The Effectiveness of Class Suspension on Containing Enterovirus Infection Clusters in Preschools — New Taipei City, Taiwan, 2013–2017  
   Presenter: Yu-Neng Chueh
4. Food Poisoning Outbreak at Night before Eid-Al-Fitr at Islamic Boarding School — Gunungkidul Regency, Indonesia, May 2021  
   Presenter: Nadiyah Kamilia

**Oral Presentation Session 4: Surveillance**

1. Data Analysis of the Nutrition Surveillance System, Yemen, 2019  
   Presenter: Sumia Alturki
2. Consistency of Mobile or Email-Based Reporting to Surveillance System by Private Health Facilities, Poonamallee Health District, Tamil Nadu, India: A Parallel Group, Exploratory Randomized Open Trial  
   Presenter: Abishek Stanislaus
   Presenter: Wye Lee Chiew

4. Enhanced Event-Based Surveillance for Infectious Diseases during the Tokyo 2020 Olympic and Paralympic Summer Games in Japan, 2021  
   Presenter: Ayu Kasamatsu

10:00 – 11:30, Wednesday, November 3

Plenary Session 1: Re-Emerging Vaccine Preventable Diseases
1. Global and Regional Update on Polio  
   Speaker: Jaymin Patel
2. Measles — Is the Time to Act Now? A Global and Regional Update  
   Speaker: Meru Sheel
3. COVID-19 Vaccines: How can We Achieve Equitable Distribution and Combat Vaccine Hesitancy to Achieve High Vaccine Uptake  
   Speaker: Margie Danchin

11:45 – 13:15, Wednesday, November 3

Plenary Session 2: One Health Approach to Outbreak Response
1. A Recipe for Good Investigation of Foodborne Disease Outbreaks  
   Speaker: Martyn David Kirk
2. Successes and Challenges of One Health Approach to Animal Disease Control  
   Speaker: Sith Premashthira
3. Integrating the Knowledge of Epidemiology and Wildlife Ecology for Understanding the Ecology of Wildlife Origin Pathogens  
   Speaker: Chen-Chih Chen

13:30 – 15:00, Wednesday, November 3

Oral Presentation Session 5: COVID-19 Transmission
   Presenter: Kanokkarn Sawangrisutikul
2. Timeliness of Contact Tracing among Flight Passengers during the COVID-19 Epidemic in Vietnam  
   Presenter: Ngoc-Anh Hoang
3. COVID-19 Risks in a Restaurant Superspreading Event — Singapore, July 2021  
   Presenter: Gao Qi
   Presenter: Mohammed S. Abdulwahid

Oral Presentation Session 6: Animal Health and Zoonotic Diseases
   Presenter: Mariam Pashalishvili
   Presenter: Suwitcha Panchakhan
   Presenter: Yacoub Ould Sidi Moctar
4. Investigation of Tuberculosis in Captive Asian Elephants, Kanchanaburi province, Thailand, November 2018  
   Presenter: Kirana Noradechanon

Oral Presentation Session 7: Vaccine Preventable Diseases
1. Measles Elimination Program Progress in Madhubani District, Bihar, India, 2015–2018  
   Presenter: Sambit Pradhan
2. Diphtheria Outbreak in Sahar District, Sa’adah Governorate — Yemen, 2020  
   Presenter: Elham Zeehrah
3. Using Epidemiological Data on a Vaccine-Derived Poliovirus Type 1 (VDPV1) Polio Event in a Southern Mindanao Island to Guide Outbreak Response — Philippines, November 2019  
   Presenter: Ivy Rozeth Saavedra-Iturralde
4. Measles Cases in Conflict Areas, Yemen, 2018–2019  
   Presenter: Waleed Hasan Al-Marrani
### Oral Presentation Session 8: More on Surveillance

1. COVID-19 Pandemic: Understanding the Trend, Distribution and Surveillance of COVID Cases in Udupi District, Karnataka, 2020  
   Presenter: Prashant Bhat
2. Assessment of Dengue Disease Surveillance in One of the High Prevalent Districts in Maharashtra, India, 2020  
   Presenter: Rahul Shimpi
   Presenter: Bomto Riram
4. Importance of COVID-19 Surveillance and Health Profiling of Filipino Repatriates from MV Diamond Princess, Capas, Tarlac, Philippines, 2020  
   Presenter: Richelle Abellera

### 10:00 – 11:30, Thursday, November 4

<table>
<thead>
<tr>
<th>Plenary Session 3: Field Epidemiology Training Development Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Global Field Epidemiology Roadmap—From concept to Action</td>
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<tr>
<td>Speaker: Kip Baggett, Carl Reddy</td>
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<tr>
<td>2. Learning in the Global FETP Community: FETP Learning Strategy Implementation Updates and Strategies during the Pandemic</td>
</tr>
<tr>
<td>Speaker: Manickam Ponnaiah</td>
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<tr>
<td>3. Completing the Journey—Field Epidemiology Training Program in Papua New Guinea</td>
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<tr>
<td>Presenter: Tambri Housen, Berry Ropa</td>
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### 11:45 – 13:15, Thursday, November 4

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<tr>
<th>Oral Presentation Session 9: Therapeutics</th>
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<tbody>
<tr>
<td>1. Effects of Hydroxychloroquine with or without Azithromycin on SARS-CoV-2 Clearance in COVID-19 Patients, Taiwan, March–June 2020</td>
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<tr>
<td>Presenter: Yi-Ting Yang</td>
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<td>2. Anti-Retroviral Therapy for People Living with Human Immunodeficiency Virus — Yemen, 2018–2020</td>
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<td>Presenter: Ehab Al-Sakkaf</td>
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<td>3. Survey of Accessibility, Availability, Price and Affordability of Essential Medicines and Diagnostic Technologies for the Clinical Measure and treatment of Hypertension on Primary Health Care Units of West Gojjam Zone, Northwest Ethiopia, 2020</td>
</tr>
<tr>
<td>Presenter: Zelalem Yirga</td>
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<td>4. Evaluation of Community Pharmacists’ Involvement and Barriers to Their Participation in Public Health Activities, Assiut, Egypt, 2019</td>
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<tr>
<td>Presenter: Azza Badry</td>
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</tbody>
</table>

### Oral Presentation Session 10: Severe Illnesses and Deaths

1. Investigation of COVID-19 Deaths among the Staff of a University in Aligarh, Uttar Pradesh, India, May 2021  
   Presenter: Mukesh Kumar Prasad
2. Sex-Based Variations in Clinical Manifestations, Co-Morbidities, and Outcome of COVID-19 Patients in Baghdad, Iraq, 2020  
   Presenter: Nameer A. Ali
3. COVID-19 Mortality, Kerala, India 2020: A Descriptive Study  
   Presenter: Ajan M J
4. Diseases and Mortality Representation among Children of the Uitoto Indigenous People of the Colombian Amazon, 2019–2020  
   Presenter: Marcela Benavides

### Oral Presentation Session 11: Foodborne Diseases

1. Kluang Prison Acute Gastroenteritis Outbreak — February 2020  
   Presenter: Jeyanthini Sathasivam
2. Norovirus Foodborne Outbreak in a Buffet Restaurant — Yilan, Taiwan, August 2020  
   Presenter: Ching-Hui Huang
3. An Outbreak of Food Poisoning after Consumption of Chicken Curry Contaminated with E. coli in an Old-Age Home, Kannur District, Kerala, India, 2019  
   Presenter: Sachin KC
4. *Clostridium Perfringens* Suspected as Causative Pathogen of Foodborne Outbreak in a Wedding Party-Bantul District, Indonesia, March 2021  
   Presenter: Fitriana Puspitarani
## Oral Presentation Session 12: Vectorborne Diseases

1. Nairobi Fly Dermatitis Outbreak — Boditi, Southern Ethiopia, April 2019  
   Presenter: Mesay Gunta Gutulo
2. Evaluation of Scrub Typhus Surveillance System — Alwar District, Rajasthan, India, July–August 2020  
   Presenter: Surendra Mohan Prajapati
3. Case Series: SARS-CoV-2 and Dengue Virus Coinfection in Mexico  
   Presenter: Noé Hernández Valdivia
4. Dengue Outbreak — Ipil, Zamboanga Sibugay Province, Philippines, 2019: A Case-Control Study  
   Presenter: Kasmira Maramag

## Oral Presentation Session 13: More on COVID-19

1. Outbreak Investigation of Early Coronavirus Disease Cases — Maharashtra, India, March 2020  
   Presenter: Bomto Riram
2. Comparison of COVID-19 Outbreak Cases in Two Different Call Centers  
   Presenter: Sangeun Lee
3. Descriptive Epidemiology of COVID-19 in Pathanamthitta District, Kerala, India, March–September 2020  
   Presenter: Amjith Rajeevan
4. Assessment of Baseline Knowledge and Attitude of COVID-19 among Hotel Staff in Kigali, Rwanda, 2020  
   Presenter: Aphrodis Hagabimana

## Oral Presentation Session 14: Environmental Health

1. An Outbreak of Acute Seizure Illness — Eluru, Andhra Pradesh, India, December 2020  
   Presenter: Sahil Sharma
2. Emergence of Schistosomiasis in a Previously Non-Endemic Area, Leyte, Philippines, December 2018  
   Presenter: Francis Guimpatan
3. Sudden Deaths due to Leakage of Lindane, a Hazardous Chemical, Jalalpur Village, Sitapur, Uttar Pradesh, India, 2020: A Field Epidemiological Investigation  
   Presenter: Piyush Jain

## Oral Presentation Session 15: Healthcare-Associated Infections

1. COVID-19 Outbreak in Health Workers, Hospital Nacional Psiquiátrico, Costa Rica, 2020  
   Presenter: Jose Diaz
2. Descriptive Epidemiology of COVID-19 Affected Health Care Personnel (HCP), from a Tertiary Care Cancer Hospital of Delhi, March–May 2020  
   Presenter: Nishant Nirwan
3. Clusters of Hepatitis C Virus Infection among Patients Receiving Chronic Hemodialysis in Three Hemodialysis Facilities — Northern Region, Taiwan, 2019–2020  
   Presenter: Pei-Yuan Wu
   Presenter: Khaled Al-Jamrah

## Oral Presentation Session 16: Malaria

1. Malaria in Cambodia: A Retrospective Analysis of a Changing Epidemiology, 2006–2019  
   Presenter: Srean Chhim
   Presenter: Yamlak Gindola
   Presenter: Brahima Traore
4. Malaria Outbreak in Bali S’t’ad District, Almahwit Governorate, 2020  
   Presenter: Samar Nasher
### Plenary Session 4: Communication, Ethics, and Equity in Public Health Emergencies

1. The Many Aspects of Policy Communication in Health Emergencies  
   Speaker: **Kumnuan Ungchusak**

2. Emergency Response: Communications, Ethics, and FETP's Role  
   Speaker: **Steven Peng-Lim Ooi**

3. It's a Small World After All: Health Equity in Public Health Emergencies  
   Speaker: **Nina T. Castillo-Carandang**

### Oral Presentation Session 17: Vaccine Safety

1. Incidence of Adverse Events Following Yellow Fever Mass Immunization Campaign — Katsina State, Nigeria, 2019  
   Presenter: **Amadu Lawal**

   Presenter: **I-Ping Lin**

3. Analysis of Death Cases and Adverse Events Following Immunization (AEFI) with Influenza Vaccines in the 2020–2021 Season in the Republic of Korea — Focused on Social Panic and the Reported Rate of Adverse Events  
   Presenter: **Hee Kyoung Kim**

   Presenter: **Pui Li Teoh**

### Oral Presentation Session 18: More on Vaccine Preventable Diseases

1. Emergence of Circulating Vaccine-Derived Poliovirus Type 2 — Marogong, Lanao Del Sur, Philippines, September 2019  
   Presenter: **Nolie Rimando**

2. Serosurvey of SARS-CoV-2 Infection in Garment Workers of a Selected District in Bangladesh, 2020  
   Presenter: **Shahta Zarab Salehin**

   Presenter: **Raheem Hussein Zayer**

4. A Case Report of a Child with Immunodeficiency-Related Vaccine-Derived Poliovirus Type 2, Laguna, Philippines, September 2019  
   Presenter: **Alethea De Guzman**

### Oral Presentation Session 19: Other Infectious Diseases

1. Recent Surge of Genital Chlamydia Disease among Young Male and Female in Japan  
   Presenter: **Tomohiko Ukai**

2. Prevalence and Predictors of Renal Dysfunction among People Living with Human Immunodeficiency Virus on Antiretroviral Therapy in the Southern Highland of Tanzania: A Hospital-Based Cross-Sectional Study  
   Presenter: **Mololo Noah**

3. A Case-Control Study on the Melioidosis Outbreak in Isabela Province and Santiago City, Philippines, 2019  
   Presenter: **Karla May Manahan**

   Presenter: **Garba Mustapha Umar**

5. Proximity in Work-Setting Leading to Transmission of COVID-19 in a Medical Research Institute- Chennai, Tamil Nadu, 2020  
   Presenter: **Nuzrath Jahan**
**Poster Session: COVID-19**

1. Characteristics and Risk Factors Associated with COVID-19 Infection Severity among Health Care Workers — Iraq, 2020
   Presenter: Inam Hameed

2. COVID-19 Cluster in a Coastal Fishing Community: A Case Control Study — Poonthura, Kerala, India 2020
   Presenter: Lipsy Paul

3. Description of Cases of a COVID-19 Outbreak in a Care Home for Young People Living with Human Immunodeficiency Virus in Mexico City, 2020
   Presenter: Evelyn Guadalupe Pineda Lopez

   Presenter: Khyati Aroskar

   Presenter: Ouedraogo Jean-Baptiste

   Presenter: Ravirwarman Lakshmanasamy

   Presenter: Mohamad Fawzy

8. The First Month COVID-19 Cases in Indonesia: Epidemiology and Outcome
   Presenter: Defi Amalia

   Presenter: Dan Phan Tan

    Presenter: Charuttaporn Jitpeera

**Poster Session: Non-Communicable Diseases**

1. Evaluation, Challenges and Cost Analysis of the Thailand Global HEARTS Package on Healthy Lifestyle and Blood Pressure Control among Hypertensive Patients, Anghthong Province, 2019–2020
   Presenter: Charuttaporn Jitpeera

2. Identifying the Scope of Task Shifting for Delivering Community-Based Hypertension Control Program in the Bhopal District
   Presenter: Ashish Krishna

3. Magnitude, Trend and Pattern of Hypertension among Adults Aged 15 and above — Dire Dawa, Ethiopia, from 2015 to 2019
   Presenter: Dagmawi Abebe

**Poster Session: Vector-Borne Diseases**

1. Chikungunya in a Village: An Outbreak Investigation — Udupi, Karnataka, India, February 2020
   Presenter: Prashant Bhat

2. Dengue Fever Outbreak Investigation in Al-Hurriya Village, Taiz Governorate, Yemen, 2020
   Presenter: Sumia Alturki

3. Investigation of High lethality Associated with Severe Malaria in Children under 5 years at Dori Regional Hospital Center — Sahel Region, Burkina Faso
   Presenter: Berenger Kabore

4. Malaria Outbreak Investigation in Nono Benja Woreda, Jimma-Zone, Ethiopia, 2020
   Presenter: Berhanu Abebe

5. Situational Analysis of Dengue in Perlis, Malaysia, 2015–2019
   Presenter: Che Muzaini Che Muda

**Poster Session: Potpourri**

1. Clinical Manifestations, Laboratory Characteristics and Treatment of Toxocariasis Patients Treated with Albendazole: A Cross-Sectional Study in Northern Vietnam
   Presenter: Nguyen Thu Huong

2. Evaluation of the Human Immunodeficiency Virus Epidemiological Surveillance System at Outpatient Treatment Center — Mauritania, 2020
   Presenter: Mohamedou Hmeied Maham

3. Resilience Social Factor Index to Earthquake at West Halmahera District, North Maluku Province, Indonesia, 2019
   Presenter: Febriyanti Abd Radjak

4. Seroprevalence of Hepatitis B Virus among Antenatal Clinic Attendees — Gamawa Local Government Area, Bauchi State, Nigeria, 2018
   Presenter: Garba Mustapha Umar
**Keynote Session: Anthropology and Disease Control**

**Prof. Shao-hua Liu**  
Research Fellow, Institute of Ethnology, Academia Sinica, Taiwan  
Professor, Institute of Anthropology, National Tsing Hua University (Joint appointment)

### Education
- May 2007  
  Ph.D. Sociomedical Sciences and Anthropology, Columbia University

### Professional Positions
- 2017/2–2019/2  
  Associate Professor, Institute of Anthropology, National Tsinghua University (Joint Appointment)
- 2011/9–2018/11  
  Associate Research Fellow, Institute of Ethnology, Academia Sinica, Taiwan
- 2010–2013  
  Adjunct Assistant and Associate Professor, Department of Sociology, National Taiwan University
- 2007/8–2011/9  
  Assistant Research Fellow, Institute of Ethnology, Academia Sinica, Taiwan

### Academic Services
#### International
- 2018/8–2020/12  
  Executive Committee, World Council of Anthropological Associations (WCAA)
- 2016/11–2019/10  
  Board Member, Society for East Asian Anthropology (SEAA)
- 2015/10–  
  Board Member, East Asian Anthropological Association (EAAA)
- 2015/7–2019/6  
  Co-editor, *Asian Anthropology*
- 2012/7–2017/6  
  Editorial Board Member, *Medical Anthropology Quarterly*
- 2012/7–2016/6  
  Editorial Member, Public Anthropology Section of *American Anthropologist*
- 2012/7–  
  Editorial Board Member, *Human Organization*

#### Taiwan
- 2021/1–  
  Discipline Coordinator, Anthropology and Ethnic Studies, Ministry of Science and Technology
- 2021/1–2021/12  
  Advisory Committee Member, Research Institute for the Humanities and Social Sciences, Ministry of Science and Technology
- 2020/1–2022/12  
  R.O.C. Committee Member, Pacific Science Association (PSA)
- 2020/11–2022/11  
  Review Committee Member, Dr. Hu Shih Memorial Chair Professorship, Academia Sinica
- 2019/5–  
  President, Taiwan Society for Medical Anthropology
- 2018/8–2020/12  
  Deputy Executive Secretary, Academia Sinica White Paper on Taiwan Rural Development
Anthropology: A Timely Discipline for Field Epidemiologists

In the 21st century, the emerging and pressing public health challenges humans face are mostly arising not in the hospital, but at home (e.g., chronic diseases) and in the field. As such, social and cultural relevance is more crucial than in the past in our understanding of people’s lifestyle, political environment, and relationship with animals and the environment, as well as their responses to health interventions.

The main approach and mindset of infectious disease investigation, especially of new outbreaks, are to understand and control the disease at source. However we define “source,” be it the origin of the outbreak, the network of infection, or prevention of future transmission, to achieve the intervention goal, control at source cannot be taken place only in the lab or office. It must also to be done “in the field.” Under the circumstances, ethnographic, ethnological, or descriptive hypothesis and investigation are critical to confirm the problems under study and intervention at source.

This ideal approach may sound pragmatic, yet it also requires an epistemic or perspective change to warrant its application. Epidemiology and anthropology have appropriated key concepts and techniques from each other and make them relevant to each other’s social investigation. In the current global health era when cultures, peoples, diseases, and politics greatly influence social worlds beyond borders, collaboration between the two disciplines is a timely and more critical endeavor than before. In the talk, I would like to begin with a philosophical thinking related to such joint endeavor. Then, we can turn the more abstract ideas into methodological tools. Hopefully through this mindset tuning process, we can see pragmatic implications out of conversation between the two disciplines.
Plenary Session 1: Re-Emerging Vaccine Preventable Diseases

Dr. Jaymin Patel
Epidemiologist, US Centers for Disease Control and Prevention

Education and Experience:

2008, BS, Biology & BA, Environmental Studies, University of North Carolina at Chapel Hill
2011, MPH, Global Epidemiology, Emory University School of Public Health
2016, PhD, Infectious Disease Epidemiology, University of North Carolina at Chapel Hill


Global and Regional Update on Polio

The Global Polio Eradication Initiative and partners, including ministries of health, continue to address challenges toward progress in the global effort towards polio eradication. Although the WHO African Region was certified as interrupting endemic wild poliovirus transmission in 2020, two countries in the Eastern Mediterranean Region – Afghanistan and Pakistan – continue to have endemic transmission. The need to maintain high population immunity to poliovirus remains essential throughout the world but pockets of under-immunized children persist due to suboptimal vaccination rates of children through essential immunization programs. Outbreaks of circulating vaccine-derived poliovirus (cVDPV) have been detected in over 30 countries across the globe since 2019, including countries in all WHO regions except the Americas. Within the Southeast Asia and Western Pacific regions, cVDPV outbreaks affected the countries of China, Indonesia, Malaysia, Myanmar, Papua New Guinea, and the Republic of the Philippines since 2019.

Disclaimer: The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention / the Agency for Toxic Substances and Disease Registry
Wednesday, November 3

Plenary Session 1: Re-Emerging Vaccine Preventable Diseases

Dr. Meru Sheel
Senior Research Fellow, Research School of Population Health, College of Health and Medicine, Australian National University

Education and Experience
Dr. Meru Sheel is a senior research fellow and infectious diseases epidemiologist at the Australian National University. Dr. Sheel is currently also working with Jhpiego to support global efforts at COVID19 vaccine roll out. Dr. Sheel's expertise is in health emergencies, infectious diseases and immunization; and works at the nexus of these areas.

Dr. Sheel holds a Bachelor of Science in Biotechnology from the Manipal University in India. Dr. Sheel moved to Australia and earned a PhD in life sciences from the Queensland Institute of Medical Research and the Queensland University of Technology working on new vaccines for bacterial pathogens (group A streptococcus).

Dr. Sheel undertook post-doctoral training in parasite immunology with a focus on malaria and visceral leishmaniasis before transitioning into public health. Dr. Sheel completed the MPhil in Applied Epidemiology (Australia’s MAE program) in 2017, following which she worked at the National Centre for Immunisation Research and Surveillance. Dr. Sheel has worked in several dynamic and challenging environments in Australia and in the Asia-Pacific region including India, Cambodia, Samoa, American Samoa. Dr. Sheel has responded to several international emergencies in Fiji, Dominica, Rohingya Crisis in Cox’s Bazar Bangladesh. In January 2020, Dr. Sheel responded to the Pacific measles outbreak in Tonga, when she helped the national health teams pivot to establishing their COVID19 response plan. Later in the year, Dr. Sheel deployed to Papua New Guinea for COVID19.

Dr. Sheel is a strong advocate for gender equity and passionate about seeing diverse leadership particularly from the global south. In 2019, Dr. Sheel won the Science and Medicine award for the 40 Under 40 Most Influential Asian-Australians; and the ANU Vice Chancellor's Awards for Impact and Engagement in 2020.

Measles — Is the Time to Act Now? A Global and Regional Update

Recent years have seen a global resurgence in measles including in the Western Pacific Region. With the COVID-19 pandemic leading to disruption in routine immunization programs globally, there is a greater risk of measles outbreaks globally. This talk will provide a brief update on the global and regional situation of measles, and discuss the 2019-2020 measles outbreak in the Pacific island countries. The talk will also briefly discuss implications on practice and explore ways forward.
Plenary Session 1: Re-Emerging Vaccine Preventable Diseases

Assoc. Prof. Margie Danchin
A/Prof Margie Danchin MBBS PhD FRACP
Group Leader, Vaccine Uptake, Murdoch Children's Research Institute
Paediatrician, Department of General Medicine, The Royal Children's Hospital
Clinician Scientist Fellow and Honorary Principal Fellow, Department of Paediatrics and School of Population and Global Health, The University of Melbourne
Director Clinician Scientist pathways, The University of Melbourne
Chair, Collaboration on Social Science and Immunisation (COSSI)

Education and Experience
Margie is a consultant paediatrician at the Royal Children's Hospital and an Associate Professor and Clinician Scientist, University of Melbourne and Murdoch Children’s Research Institute (MCRI). As leader of the Vaccine Uptake Group, MCRI, her research focuses mainly on vaccine confidence, acceptance and uptake, particularly amongst high risk-groups and in low and middle-income countries. In Australia, she is the chair of the Collaboration on Social Science in Immunisation (COSSI) Group, chair of the Social Science Advisory Board and a member of the Scientific Advisory Committee, National Centre for Immunisation Research and Surveillance (NCIRS) and on the COVID-19 ATAGI working group. She works closely with WHO and Global Vaccine Demand Hub and is part of the Melbourne Children's Global health Leadership team.

COVID-19 Vaccines: How can We Achieve Equitable Distribution and Combat Vaccine Hesitancy to Achieve High Vaccine Uptake

COVID-19 vaccines are the key solution to control the pandemic and resume our previous way of life. Vaccine rollouts have commenced globally with over 890 million doses delivered so far, but supply issues are considerable for many countries and equitable distribution remains a critical issue. Additionally, with serious vaccine adverse events being associated with some COVID-19 vaccines, effective risk communication, community engagement with all sectors of the community, especially vulnerable and at-risk groups, and strong leadership from government are crucial to achieve sustained vaccine confidence and uptake. Overcoming vaccine hesitancy and refusal and strategies to achieve high vaccine uptake will be discussed, building on the current international experience.
Education and Experience
Professor Kirk has PhD and Master's degrees in epidemiology and works as NHMRC Career Development Fellow at The Australian National University. Previously Professor Kirk has run the Australian Field Epidemiology Training Program (FETP) and coordinated foodborne disease surveillance for Australia. Professor Kirk is the Acting Chair of the TEPHINET Advisory Board and a member of the Strategic Leadership Group for the FETP Enterprise. Professor Kirk is a member of the World Health Organization Advisory body—the Foodborne Disease Burden Epidemiology Reference Group.

A Recipe for Good Investigation of Foodborne Disease Outbreaks

Foodborne disease outbreaks are a key indicator of a lapse or failure in systems designed to ensure that food is safe. Some foodborne outbreaks may be due to contamination of foods at the point where it is prepared, while other relate to contamination that has occurred where foods are grown or produced. It is important to rapidly investigate foodborne outbreaks to identify the likely source and cause of contamination to prevent further spread and future outbreaks. Foodborne disease outbreak investigations can range from very simple epidemiologic studies through to complex multi-jurisdictional undertakings that involve extensive traceback of food ingredients and sophisticated laboratory testing. In this presentation, I will outline the key ingredients and steps that make for a good foodborne disease investigation and ultimately improve food safety.
Wednesday, November 3

Plenary Session 2: One Health Approach to Outbreak Response

Dr. Sith Premashthira
Veterinarian, Senior Professional Level and R-FETPV Project Manager, Regional Field Epidemiology Training Program for Veterinarian, Department of Livestock Development, Thailand

Education:

<table>
<thead>
<tr>
<th>Year</th>
<th>Qualification</th>
<th>Institution</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>2012</td>
<td>Doctor of Philosophy (Veterinary Epidemiology)</td>
<td>Department of Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Colorado State University</td>
<td>Fort Collins, CO, USA</td>
</tr>
<tr>
<td>2014</td>
<td>Master of Science (Tropical Medicine)</td>
<td>Mahidol University, Department of Tropical Hygiene, Faculty of Tropical Medicine</td>
<td>Bangkok, Thailand</td>
</tr>
<tr>
<td>2000</td>
<td>Doctor of Veterinary Medicine</td>
<td>Faculty of Veterinary Medicine, Kasetsart University</td>
<td>Bangkok, Thailand</td>
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Experience:

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<tr>
<th>Year</th>
<th>Position and Institution</th>
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<tbody>
<tr>
<td>2020–Present</td>
<td>Project Manager, Regional Field Epidemiology Training Program for Veterinarian</td>
</tr>
<tr>
<td>2001–2020</td>
<td>Graduate Research Assistant at Colorado State University, USA</td>
</tr>
<tr>
<td>2006–2011</td>
<td>Veterinarian at Department of Livestock Development, Thailand</td>
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Successes and Challenges of One Health Approach to Animal Disease Control

The outbreaks of SARS and HPAI sent alarms to the world regarding the pandemic threats that human beings are confronting. Similar cases, but more obviously are repeatedly warned by the covid-19 pandemic. Thailand faced animal and zoonotic diseases that must be controlled in global, regional, and domestic aspects. One Health approach developed in Thailand before the word one health was widely used. An example of joint response, Department of Livestock Development and Department of Communicable Diseases set a small war room to guard the introduction of Nipah virus during its emergence in Malaysia in 1999. Since 2005, early one health activities involved joint trainings that allowed many sectors to learn to solve Emerging Infectious Diseases (EID) problems together. A continuing support to epidemiological “One Health” teams in 5 provinces and then expand into 14 provinces. Thailand has developed National Strategic Plan for EID Preparedness, Prevention and Control since 2013. Interdisciplinary and multi-sectoral collaboration for zoonotic disease control and prevention has been assembled during the plan. Currently, Thailand One Health MoU was signed by organizations in ministry level. There are several examples that show the success of using one health approach to control the animal diseases such as Nipah virus, rabies, HPAI, Brucellosis, etc. Animal disease control that uses one health approach are usually zoonosis. Non-zoonosis cases also have challenges in using one health. Thailand is driving veterinary work force development to be a force that enhances the functioning of one health and to better control animal diseases.
Dr. Chen-Chih Chen
Associate Professor, Institute of Wildlife Conservation, College of Veterinary Medicine, Pingtung University of Sciences and Technology, Taiwan

Education and Experience

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<tr>
<th>Year</th>
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<tr>
<td>2019–Present</td>
<td>Associated Professor, Institute of Wildlife Conservation, College of Veterinary Medicine, Pingtung University of Sciences and Technology, Taiwan</td>
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<tr>
<td>2015–2019</td>
<td>Assistant Professor, Institute of Wildlife Conservation, College of Veterinary Medicine, Pingtung University of Sciences and Technology, Taiwan</td>
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<tr>
<td>2013–2015</td>
<td>Postdoctoral Fellow, Institute of Wildlife Conservation, College of Veterinary Medicine, Pingtung University of Sciences and Technology, Taiwan</td>
</tr>
<tr>
<td>2004–2009</td>
<td>Chief Veterinarian, Endangered wild animals rescue center, National Pingtung University of Science and Technology</td>
</tr>
<tr>
<td>2009–2013</td>
<td>Ph.D. Program, Department of Large Animal Clinical Science, WCVM, University of Saskatchewan</td>
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<tr>
<td>2000–2003</td>
<td>Master of Biological Science, Department of Biological Science, National Sun Yat-Sen University, Kaohsiung, Taiwan</td>
</tr>
<tr>
<td>1998–2000</td>
<td>Bachelor of Science, Department of Wildlife Conservation, National Pingtung University of Science and Technology, Pingtung County, Taiwan</td>
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Integrating the Knowledge of Epidemiology and Wildlife Ecology for Understanding the Ecology of Wildlife Origin Pathogens

Pathogens distributed in the population of wildlife are considered as a major threat to wildlife population and primary source of emerging infectious diseases. Therefore, for recognizing and managing the risk, it is essential to understand the epidemiology of wildlife diseases. The objectives of disease surveillance are to detect the distribution of disease occurrence, identify the factors affect the distribution, and to assess its impact on a specific population. Due to the hiding nature of wild animals in their habitat and carcasses removed rapidly by scavengers, the majority of disease occurrences in wild animals are invisible and unrecognized. Furthermore, although we can sometimes notice the disease-induced mass die-offs on the population of wild animals, evaluation of the disease impact in a specific geographic region or time period is usually a challenge. This situation is commonly seen especially in the passive surveillance program. Wildlife disease surveillance is essential information for managing the wildlife mediate zoonotic diseases and conservation strategies. However, without the input from the discipline of wildlife ecology, the puzzle of wildlife disease would be impossible to complete. In this talk, I present studies focus on wildlife disease surveillance and explain how the research methods adopted from wildlife ecology be integrated into the research of wildlife diseases.

Keywords: wildlife diseases, epidemiology, population dynamics, wildlife ecology
### Plenary Session 3: Field Epidemiology Training Development Strategies

**Dr. Carl Reddy**  
Director, TEPHINET

#### Education

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<tr>
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<tr>
<td>2000–2002</td>
<td>MSc. (Epidemiology) at the National Institute of Public Health (INSP), Cuernavaca,</td>
</tr>
<tr>
<td></td>
<td>México</td>
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<tr>
<td>1998</td>
<td>Diploma in Health Services Management, University of Natal, Durban, South Africa,</td>
</tr>
<tr>
<td></td>
<td>in the Department of Community Health</td>
</tr>
<tr>
<td>1995</td>
<td>Diploma in Anaesthetics, University of Natal</td>
</tr>
<tr>
<td>1987</td>
<td>MBChB – Nelson R Mandela School of Medicine, University of Natal, South Africa</td>
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#### Experiences

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<th>Year</th>
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<tr>
<td>2016–2019</td>
<td>Director – South African Field Epidemiology Training Programme (SAFETP), National</td>
</tr>
<tr>
<td></td>
<td>Institute of Communicable Diseases (NICD), JHB</td>
</tr>
<tr>
<td>2011–2013</td>
<td>Director Technical Panel – UNAIDS Technical Support Facility (TSF), Health</td>
</tr>
<tr>
<td></td>
<td>Development Africa, Johannesburg</td>
</tr>
<tr>
<td>2010–2011</td>
<td>Technical Officer, UNAIDS, Geneva</td>
</tr>
<tr>
<td>2009–2010</td>
<td>Senior Technical Officer, Global Fund, Geneva</td>
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**Dr. Kip Baggett**  
Medical Officer, Centers for Disease Control and Prevention, Atlanta, USA

#### Education and Experiences

<table>
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<tbody>
<tr>
<td>2016–Present</td>
<td>Chief, Workforce and Institute Development Branch, Division of Global Health Protection (DGHP), CDC</td>
</tr>
<tr>
<td>2004–2005</td>
<td>Preventive Medicine Residency, CDC</td>
</tr>
<tr>
<td>2003–2004</td>
<td>Master of Public Health, Epidemiology, Univ. Washington School of Public Health and Community Medicine, Seattle, WA</td>
</tr>
<tr>
<td>2000–2002</td>
<td>Epidemic Intelligence Service, CDC</td>
</tr>
<tr>
<td>1997–2000</td>
<td>Pediatric Internship and Residency, Johns Hopkins Children’s Center, Baltimore, MD</td>
</tr>
<tr>
<td>1992–1997</td>
<td>Doctor of Medicine, University of North Carolina School of Medicine, Chapel Hill, NC</td>
</tr>
<tr>
<td>1987–1991</td>
<td>Bachelor of Science, Duke University, Durham, NC</td>
</tr>
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The Global Field Epidemiology Roadmap—From concept to Action

In 2018, key leaders and partners in field epidemiology capacity building developed the Global Field Epidemiology Roadmap to address longstanding challenges to field epidemiology training programs (FETPs) and accelerate growth of the global FETP partnership. A second meeting in February 2019 generated an implementation plan for the Global Field Epidemiology Roadmap. Formation of a Strategic Leadership Group (SLG) was the first of eight recommendations set forth in the Roadmap. The SLG serves to provide high-level leadership and accountability for the Roadmap and will drive progress toward the Roadmap vision that “every country in the world has the applied epidemiology capacities needed to protect and promote the health of its own population, and to collaborate with others to promote global health.” The SLG is comprised of 14 global health leaders and is co-chaired by senior leaders in CDC and WHO, with TEPHINET serving as Secretariat. After pandemic-related delays, the SLG was launched in April 2021 and has convened quarterly. Eight working groups (WGs) have been established, one for each of the eight Roadmap recommendations. The WGs have developed goals and begun to map activities to achieve these goals. In this session, we will describe the Global Field Epidemiology Roadmap and the progress to date through the SLG and its WGs.
Thursday, November 4

Plenary Session 3: Field Epidemiology Training Development Strategies

Dr. Manickam Ponnaiah
Scientist E (Epidemiology), ICMR-National Institute of Epidemiology, Department of Health Research, Indian Ministry of Health and Family Welfare, Chennai, Tamil Nadu, India

Education
2012 PhD, Epidemiology, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, India
2010 Certificate of Advanced Studies ‘Health District Management: Priority Setting, Planning and Programme Design’, Swiss Tropical and Public Health Institute; University of Basel, Basel, Switzerland
1999 Master of Science in Epidemiology (MSc), Christian Medical College (CMC) and Hospital, Vellore, Tamil Nadu, India, The Tamil Nadu Dr. MGR Medical University, Tamil Nadu, India
1997 Bachelor of Siddha Medicine and Surgery (BSMS), Government Siddha Medical College, Palayamkottai, Tamil Nadu, India, The Tamil Nadu Dr. MGR Medical University, Tamil Nadu, India

<Siddha system of medicine is one of the two Indian systems of medicine, the other being Ayurveda>

Experiences
ICMR-National Institute of Epidemiology (ICMR-NIE), Chennai, India
2016— Scientist E (Epidemiology); Head, Division of Online Courses; Core faculty, ICMR School of Public Health
2012–2016 Scientist D (Epidemiology); Core faculty, ICMR School of Public Health
2008–2012 Scientist C (Epidemiology); Core faculty, ICMR School of Public Health
2003–2008 Scientist B (Epidemiology); Core faculty, ICMR School of Public Health
2002–2003 Research Officer (WHO leprosy chemotherapeutic trial)
2000–2002 Research Associate (WHO leprosy chemotherapeutic trial)
Christian Medical College and Hospital (CMCH), Vellore, Tamil Nadu, India
2000 Associate Research Officer (Health Information System)
1999 Research Fellow, IndiaCLEN-National pulse polio programme evaluation

Learning in the Global FETP Community: FETP Learning Strategy Implementation Updates and Strategies during the Pandemic

While the new network-wide TEPHINET 2020-2030 Learning Strategy is well-timed in light of much needed COVID-19 public health response work and training/learning needs, the strategy is built on foundational strategic guidance for both TEPHINET and the FETP Enterprise, developed in response to the goals set forth by the TEPHINET Strategic Plan (2021-2026) and that of Global Field Epidemiology Roadmap with inputs from a wide range of stakeholders. Under the TEPHINET’s guidance, the FETP Learning Advisory Council (FLAC) and its Learning Working Groups have completed a prioritization process to identify initial key initiatives related to each of the strategy’s goals and thus begun creating implementation plans.
Emerging key initiatives of the FETP learning strategy include: FETP staff professional development, learning outcomes measurement, modernized learning solutions and experiences, learning quality criteria and guidelines,
continuous learning for alumni, and network learning technology updates. The aim of the session is to provide an update since the launch of the Global Learning Strategy in October 2020 and engage programs and other stakeholders in a discussion about the key initiatives and related implementation plans. The session will include discussions on the impact of the pandemic on programs and their training priority areas at the regional/national levels.
Thursday, November 4

Plenary Session 3: Field Epidemiology Training Development Strategies

Dr. Tambri Housen
Infectious Disease Epidemiologist, Field Epidemiology in Action

Education and Experience
PhD, MPhil (Applied Epidemiology), MPH&TM, Dip Tropical Nursing, BSc (Nursing)

2017–2021 Curriculum Convenor of the MAE program
2013–2017 National Epidemiologist, Medecins Sans Frontieres India
Prior to this role I worked in a number of applied public health roles and as a paediatric registered nurse

Berry Ropa
Acting Manager, Disease Control & Surveillance Branch
Program Manager, Surveillance & Emergency Response
Focal Person: International Health Regulations
Field Epidemiology Training Director, Division of Public Health, Department of Health, Papua New Guinea

Completing the Journey—Field Epidemiology Training Program in Papua New Guinea

During this session we will discuss the history of the field epidemiology training program in Papua New Guinea, current developments in the program and the future vision for a comprehensive training program with a focus on trainees, faculty and alumni.
**Education:**
- 1973–1979: M.D., Siriraj Faculty of Medicine, Mahidol University, Thailand
- 1986–1987: M.P.H., Faculty of Public Health, Mahidol University
- 1991–: Thailand Board of Preventive Medicine (Epidemiology), Medical Council, Thailand

**Experiences:**
- 1990–2001: Director, Field Epidemiology Training Program (FETP), Thailand
- 2001–2008: Director, Bureau of Epidemiology, Department of Disease Control, Thailand
- 2005–2008: International Health Regulation, Focal Person, Thailand
- 2008–2015: Senior Advisor, Department of Disease Control, Ministry of Public Health
- 2015–2020: Board Member, Thai Health Foundation, Thailand
- 2018–: Member, WHO STAG-IH (Strategic Technical Advisory Group, Infectious Hazard)

**The Many Aspects of Policy Communication in Health Emergencies**

Respond to public health emergency of national and international scale needs support from policy makers at Ministry or Government level. Policy makers at higher level need timely and good situation assessment to decide on policy options. To convince policy makers at these levels, health professional need to consider at least two important aspects, i.e., proposing policy options and understanding policy decision process. In term of proposing policy options, health professional focus on technical and ethical aspects and want to do it transparency. But for policy makers at political level, they are more concerned on economic impact, social impact and political impact or their popularity. In term of understanding policy decision process, key decision makers and the normal process are not always straightforward as we see in the organogram especially in panic or crisis phase. They are both internal and external players that exercise their role openly and secretly. Health professional normally use internal and technical-based advising process which may not enough. It is necessary to understand the public mood, identify partners that can lead public opinion in support of the proposed policy option. They also need to work with trusted and credible social leader/activist to put pressure on policy makers by emphasizing value-based approach. The age of social media is in favored of health professional to share internal information to public and propose appropriate policy option for public support. In this presentation we will share some examples from COVID-19 in Thailand.
Assoc. Prof. Steven Peng-Lim Ooi

Senior Consultant, Infectious Disease Research and Training Office, National Centre for Infectious Disease
Associate Professor, Saw Swee Hock School of Public Health, National University of Singapore

Education and Experiences:
Assoc. Professor (Dr.) Steven PL is a medical epidemiologist and senior consultant at the National Centre for Infectious Diseases, and programme director of the Singapore field epidemiology training programme which is administered jointly with the School of Public Health. His specialist interests are in urban health security, outbreak management, and communicable diseases control. Steven previously served in past appointments as head of surveillance, epidemiology and response in the Ministry of Health, senior assistant commissioner of public health in the Ministry of the Environment, and deputy director of the Institute for Environmental Epidemiology, a WHO Collaborating Center for environmental epidemiology. His basic degree and postgraduate medical training were at the National University of Singapore and the Johns Hopkins University. He has been a long-standing fellow of the Academy of Medicine, Singapore, member of the New York Academy of Sciences, and honorary member of Delta Omega, the US National Public Health Honor Society.

Emergency Response: Communications, Ethics, and FETP’s Role

This session shares case studies and practical experiences in Singapore’s epidemic intelligence service with emergency response and outbreak management, building on the key concepts of public health surveillance and disease control. Unwelcome events as they are, outbreaks occur from time to time and represent natural experiments which afford opportunities for us to derive valuable information about health threats. In responding to these emergencies, we can learn a whole lot about field epidemiology as applied to risk assessments on the ground - the extent and pattern of public health problems, sources of exposure, modes of transmission, periodicity, which neighborhoods, and which groups of people are most at risk. Outbreak investigation forms a crucial element in the control of communicable diseases and environmental hazards. It enables the identification of disease source, and informs subsequent management steps to prevent additional spread. In a world rocked by the Covid-19 pandemic, capacity building of investigative skills becomes more relevant than ever. This session will also touch on FETP’s role in risk communications and some ethical considerations, such as applying the precautionary principle when there is risk of ongoing transmission.
Friday, November 5

Plenary Session 4: Communication, Ethics, and Equity in Public Health Emergencies

Prof. Nina T. Castillo-Carandang
Health Social Scientist and Professor in the Department of Clinical Epidemiology, College of Medicine, University of the Philippines Manila

Education and Experiences:
Nina T. Castillo-Carandang's career as a sociologist in the University of the Philippines began in the agricultural sciences campus (Los Baños) before she joined the health sciences campus (Manila) and went into the fields of health social science, clinical epidemiology, and global health. She has looked into sociocultural dimensions of health and health care—the perceptions of laypersons, patients, health care providers, policymakers, and how such can affect health-seeking behavior, clinical practice, as well as policy (clinical, public health). Her current work looks at different facets of quality of life, and the Filipinos' search for Kagalingan (well-being, happiness, and health), and living well and being well. She and her colleagues have studied the impact of cardiovascular diseases, malaria, tuberculosis, and asthma and allergies on the lives of Filipino communities, families, and individuals.

Nina is a practitioner and an advocate for transdisciplinary teaching, education, research, advocacy and policy work. She believes that achieving a good quality of life and good health outcomes are only possible if teamwork/collaboration and constant dialogue are done within and across:

- professions (physicians & allied health professionals, policy and communications experts, social scientists, epidemiologists, agricultural & physical scientists, engineers, etc.) in solidarity with the public (lay people and communities, and civil society)
- sectors (health, agriculture, environment, business, etc.)
- organizations (government/public, private, academe, NGO, industry, etc.) at the local, regional, national & global levels.

From February 2020 to September 2021, Nina has given over 50 talks, interviews for various groups (including media outfits) on the socio-cultural aspects of COVID-19; vaccine confidence in the Philippines; and promoting health behaviors amidst the threat of the pandemic.

As of end August 2020, Nina has been a member of the World Health Organization's Social Science Working Group for COVID-19.

In December 2020 she was appointed as a member of the Republic of the Philippines’ National Immunization Technical Advisory Group (NITAG) for the COVID-19 Vaccine.

Nina has a Bachelor of Arts degree in Sociology (University of the Philippines Los Baños, Philippines), a Master of Arts major in Sociology degree (Ateneo de Manila University, Philippines), and a Master of Science in Clinical Epidemiology (McMaster University, Canada). Her PhD in Social Sciences and Global Health was from the University of Amsterdam, The Netherlands.
It's a Small World After All: Health Equity in Public Health Emergencies

In most parts of the world our current circumstances are marked by various crises. The continuing COVID-19 pandemic (amidst other health concerns); and emergencies due to climate change, environmental degradation, and socio-political and economic upheavals have caused much suffering for people across all walks of life. It is a small world after all.

Health is a fundamental human right. “Health equity is defined as the absence of unfair and avoidable or remediable differences in health among population groups defined socially, economically, demographically or geographically”\(^1\). People and groups who experience health inequities lack power (political, social, economic). Interventions such as vaccination programs need to be effective & sustainable as access to the vaccine alone is insufficient. Systemic changes (e.g., policy reforms, changes in economic or social relationships) are imperative to help empower marginalized groups & ensure that No one is left behind in public health emergencies and beyond.

\(^1\) World Health Organization. [https://www.who.int/health-topics/social-determinants-of-health#tab=tab_3](https://www.who.int/health-topics/social-determinants-of-health#tab=tab_3) (accessed 07 Oct 2021)
Characteristics and Risk Factors Associated with Severe Coronavirus Disease 2019 (COVID-19), Taiwan, January–June 2020

Yang Li, Chia-ping Su, Wan-Chin Chen

Background
COVID-19 has caused more than 2.4 million deaths globally. Early identification of patients at risk of severe COVID-19 is important for prevention and resource allocation. We aimed to describe characteristics of COVID-19 patients in Taiwan and identify risk factors associated with severe disease.

Methods
Public health authorities investigated patients tested positive for SARS-CoV-2 using RT-PCR within 24 hours and collected patients’ demographics, symptoms, comorbidities, and epidemiological information. All COVID-19 patients were hospitalized for isolation and treatment. We monitored their clinical courses and recorded outcomes at COVID-19 clinical database. We enrolled COVID-19 patients aged ≥ 20 years who were diagnosed during January to June 2020. We defined severe cases as COVID-19 patients who had severe pneumonia or acute respiratory distress syndrome based on WHO criteria. We reviewed investigation reports and clinical database. We conducted univariate and multivariate analyses to identify risk factors associated with severe cases.

Results
Of the 422 COVID-19 patients, 213 (50%) were male. The median age was 33 (IQR, 25–51) years. We identified one or more comorbidities in 104 (25%) patients; cardiovascular disease (n = 42, 10%) was the most prevalent comorbidity. Thirty-eight (9%) were severe cases and seven (1.7%) died. Severe cases were significantly older than patients with mild illnesses (median age, 61 vs. 31 years, p < 0.05). Univariate analyses adjusted for age showed severe cases were more likely to have fever (aOR = 4.3, 95% CI: 1.9–9.9) and comorbidities (aOR = 5.3, 95% CI: 2.2–12.9). In multivariate analyses, fever (aOR = 4.0, 95% CI: 1.7–9.5) and cardiovascular disease (aOR = 5.6, 95% CI: 2.2–14.1) were associated with severe cases.

Conclusions
COVID-19 patients with older age, fever and cardiovascular disease were prone to develop severe disease. We recommend implementing targeted prevention and control measures, including vaccine prioritization, early identification and treatment for these populations.
Background
Our world is still facing and fighting the COVID-19 pandemic. The COVID-19 vaccine is intended to provide acquired immunity against the disease. In Indonesia, health workers are among the first group to receive the vaccination. Therefore, the study aimed to determine the acceptability of COVID-19 vaccine by the health workers.

Methods
A cross-sectional online survey was conducted between October 8 and November 9, 2020, among the health workers in North Sumatera province, Indonesia. Data were collected through a self-administered questionnaire. It required 8–10 minutes to complete the survey. A two-step logistic regression analysis was employed to assess the association of participants’ demographic data, length of work, perceived risk of infection and perception of government measures and efforts to prevent of COVID-19 with COVID-19 vaccine.

Results
A total of 360 respondents were collected. Age ranged 22–66 year (median = 31 year), length of work 1–40 year (median = 9 year), male was 63.9%. We found that 298 respondents (82.8%) would like to be vaccinated. Fifty out of 62 respondents (80.6%) stated that the vaccine safety was the main reason for not being vaccinated. In multivariate model, we found that those who having perception that COVID-19 is a serious disease and those who having higher perceived risk of infection were the most related factors (adjusted PR 3.24 (95% CI = 1.62–6.49) and adjusted PR 0.43 (95% CI = 0.24–0.77)), respectively.

Conclusions
The level of acceptability of COVID-19 vaccine was high. Findings from the study will be useful for policy-makers to make decision of COVID-19 vaccination in Indonesia especially for the health workers.
Impact of COVID-19 on Diagnosis and Treatment of Pulmonary Tuberculosis in Tianjin, China, 2020

Guoqin Zhang, Mingting Chen, Fan Zhang

Background
During the emergency response to COVID-19 in Tianjin, China, tuberculosis (TB) patients faced inconvenience in care-seeking. This study was to understand the impact of COVID-19 on TB diagnosis and treatment.

Methods
An anonymous survey was conducted for TB patients conveniently selected from all 11 TB clinics in Tianjin during June to November in 2020. Characteristics were compared between patients with and without self-reported delay for care-seeking due to COVID-19 using conventional tables and tested by $\chi^2$ test. Multivariable logistic regression was used to identify factors associated with the delay by calculating adjusted odds ratios (aOR) and 95% confidence intervals (CIs) ($\alpha = 0.05$).

Results
A total of 518 TB patients completed the survey. Among 358 (69.1%) patients diagnosed with TB during the COVID-19 response, 61 (17.0%) delayed their care-seeking visit, of whom 39 (63.9%) cited fear of COVID-19 infection as the reason. Patients who were female (aOR = 2.0, 1.1–3.7), previously treated for TB (aOR = 3.2, 1.4–7.6) and diagnosed during the highest-level emergency response (January 24–April 29) (aOR = 3.2, 1.7–6.2) had higher risk of delay for care-seeking. Among all 518 patients in treatment, 57 (11.0%) reported delay for a scheduled visit to TB clinic, of whom, 34 (59.6%) were because of fear for COVID-19; 197 (38.0%) had no supervision by healthcare providers; 32 (6.2%) reported interruption of anti-TB treatment. Patients diagnosed before COVID-19 response (aOR = 10.4, 4.2-25.5), during the highest-level response (aOR = 3.5, 1.1-11.0), and without in-person supervision (aOR = 2.0, 1.1-3.6) were more likely to delay for scheduled visits due to COVID-19.

Conclusions
The COVID-19 epidemic caused delay of care-seeking and interruption of treatment for TB patients, mainly due to patients’ fear and lack of adequate treatment supervision. We suggest to strengthen health education, avoid repurposing TB service for COVID-19, ensure treatment supervision and anti-TB drug supply, to minimize the impact of COVID-19 epidemic.
Background
The lingering effect of COVID-19 on health status of individuals that lasts weeks to months after initial recovery is termed as ‘long COVID’. Our objectives were to describe the functional health status and associated factors and estimate the incidence of persistent symptoms at multiple time points following recovery from COVID-19.

Methods
We conducted a cross sectional study based on structured telephone interviews on a sample of 749 individuals (190, 196, 175 and 188 across 15, 30, 45 and 60 days post-recovery, respectively) selected by simple random sampling from list maintained by the health department. We administered the Post-COVID-19 Functional Status (PCFS) scale developed by Klok et al and defined poor PCFS as below median of the calculated PCFS score. We used logistic regression to calculate crude and adjusted odds ratio (OR) with 95% confidence interval (CI) to determine factors associated with poor functional health status.

Results
In all, 26.8%, 24.5%, 20.6% and 13.3% individuals reported persistent clinical symptoms at 15, 30, 45 and 60 days respectively. Fatigue (10%, 11.7%, 4.3% at 15, 30, 60 days respectively) and headache (5.1% at 45 days) were the most commonly persistent symptoms. Poor PCFS was seen in 48–57.1% across four time points. ICU stay was significantly associated with poor PCFS in days 15, AOR 10.3 (2.3–46.8) and days 30, AOR 5 (1.04–24.1). Pre-existing co-morbidity was significantly associated with poor PCFS in 45 days, AOR 3.9 (1.7–9.2). Persistent symptom was significantly associated with poor PCFS in 60 days, AOR 3.3 (1.05–10.14) and in 15 days, AOR 3.25 (1.35–7.79).

Conclusions
Persistence of clinical symptoms decreased over time. Half of recovered individuals had poor PCFS. We recommend that COVID-19 affected individuals with persistent symptoms, admission in ICU for COVID-19 and pre-existing comorbidity to be prioritized for follow-up post-recovery and managed actively to improve their functional health status.
Background
There is a global consensus that the socio-economic impact of the COVID-19 crisis has a devastating effect on health programs, health insurance, and healthcare systems. Also, the losses of jobs and rising prices that have accompanied the pandemic are causing growing poverty. Due to the exhausted Iraqi healthcare system and the lack of trust in its efficiency, many COVID-19 patients are choosing to be treated at home, exerting even more financial pressure on Iraqi families. The objective of this study is to estimate the out-of-pocket expenditure spent on the management of COVID-19 patients exclusively treated at home, Iraq, 2020.

Methods
This is a cross-sectional study that involved patients who were diagnosed by the physician as a COVID-19 based on clinical manifestations, real-time PCR, CT of the lung, and who were exclusively managed at home. A snowball sampling technique was used to enroll COVID-19 patients during November and December 2020. A questionnaire was developed to collect data on basic demographics, clinical manifestation, severity, disease duration, and the estimated total expenditure on consultation fees, radiological and laboratory investigations, medicines, disinfectants, personal protective equipment, oxygen device, and other direct costs.

Results
The total number of participants was 589; 328 (55.7%) were women. The average total expenditures calculated in Iraqi Dinars was 643,304 (range: 505,096–5,595,000). The highest average expenditure was for medicine cost (191,138), followed by the consultation fees (117,951), CT scan (102,084), laboratory investigations (70,000), medical devices (58,285), personal protective equipment (50,388), chest x-ray (mean=39,437), and disinfectants (37,849). The average expenditure was significantly higher among governmental employees (p=0.024), married patients (p<0.001), and patients who reported inadequate monthly income (p<0.001). Patients’ gender, residence, and having comorbidities did not affect the average expenditure (p>0.05).

Conclusions
The management of COVID-19 patients at home imposed a significant financial burden on them and the government should consider measures that mitigate this burden like financial support.
Surveillance of Vaccine-Preventable Diseases in Iraq during the COVID-19 Pandemic: How much were They Affected?

Aqeel Ismaeel, Hanan Abdulghafour, Faris Lami

Background
The COVID-19 pandemic has a serious negative impact on all essential healthcare services including, but not limited to, the surveillance of vaccine-preventable-diseases (VPDs) and provision of immunization services. Negative consequences on both services can lead to future outbreaks of VPDs. Therefore, maintaining a sensitive surveillance system is essential in preventing and controlling such outbreaks and evaluating the impact of the pandemic on the surveillance of VPDs is a first step in that direction. In Iraq, there was no analysis of how COVID-19 affected surveillance of VPDs. The objectives of the study were to assess and map the impact of COVID-19 on the reported incidence, completeness, and timeliness of surveillance of seven VPDs in 2020 in all Iraqi governorates.

Methods
We conducted a descriptive desk review of secondary data at the surveillance section in the Iraqi Ministry of Health. We calculated and compared incidence of seven VPDs (hepatitis B, measles, mumps, rubella, diphtheria, pertussis, and tetanus) in 2020 with the median incidence for 2017–2019. In addition, we compared the completeness and timeliness of the surveillance reports of these VPDs in 2020 with 2019.

Results:
In 2020, the VPDs with highest decline in the reported incidence were pertussis (-91%), measles (-81%), mumps (-76%), and hepatitis B (-64%). The range of decline in reported incidence among Iraqi governorates varied from 0% to 100%. The governorates mostly affected were Dahuk, Kirkuk, and Baghdad-Rusafa. At the national level, the change in completeness and timeliness were -8.4% and -16.2% respectively. The decline in completeness and timeliness were highest in Dahuk, (-94.7%, -95%), Erbil (-36.7%, -41.1%) and Kirkuk (-14.9%, -43.43%).

Conclusions
There was a clear decline in the surveillance reporting of VPDs in all governorates with varying severity over the course of 2020, during the COVID-19 pandemic. Risk assessment and enhanced surveillance and vaccination activities are necessary to mitigate the potential of VPDs outbreaks for years to come.

Ha-Linh Quach, Ngoc-Anh Hoang, Khan Cong Nguyen, Thai Quang Pham, Dinh Cong Phung, Son Hong Le, Thanh Cong Le, Florian Vogt

Background
Misinformation about COVID-19 has been spreading widely on the internet since the beginning of the pandemic. A better understanding of these ‘online infodemics’ is crucial to improve public health interventions and communication.

Methods
We conducted a longitudinal analysis of publicly available user-generated online information about five distinct public health interventions that were implemented in response to a large COVID-19 outbreak in Da Nang, Vietnam between July and August 2020. We compared the volume, dynamics, sentiment polarity, engagements, and influence scores of online posts across the before, during and after outbreak periods using negative binominal and logistic regression, and assessed the content validity of the 500 most influential posts.

Results
Most of the 54,528 online posts included in this analysis were generated during the outbreak (46,035; 84.42%) and online newspapers were the dominant medium (32,034; 58.75%). Among the 500 most influential posts, 316 (63.20%) contained genuine information, 10 (2.00%) were classified as misinformation, 152 (30.40%) were non-factual opinions, and 22 (4.40%) contained unverifiable information. All misinformation posts were made during the outbreak, mostly on social media, and were of predominantly negative sentiment. Higher numbers of engagement were observed for unverifiable information (incidence rate ratio [IRR] 2.83, 95% confidence interval [CI] 1.33–0.62), information posted during the outbreak (IRR before the outbreak 0.15, 95%CI 0.07–0.35; IRR after the outbreak 0.46, 95%CI 0.34–0.63), and information with negative sentiment (IRR 1.84, 95%CI 1.23–2.75). Negatively-toned posts were more likely to be misinformation (odds ratio [OR] 9.59, 95%CI 1.20–76.70) or unverfied information (OR 5.03, 95%CI 1.66–15.24).

Conclusions
The overall volume of misinformation and unverified information was low and clustered in the outbreak phase, with social media platforms being particularly affected. This first in-depth assessment of user-generated online information demonstrates the value of analyzing ‘online infodemics’ during a COVID-19 outbreak to inform real-life public health interventions.
Background
Globally hypertension is a major public health problem and the leading cause of mortality and disability in developing countries. Self-care practice is a dynamic and active process that hypertensive patients undertake intending to improve their health. Uncontrolled hypertension is higher in South Gondar Zone patients attending at Debre Tabor Referral Hospital. The purpose of this study was to assess self-care practice and associated factors among hypertensive patients in Debre Tabor Referral Hospital, Northwest Ethiopia.

Methods
An institution-based cross-sectional study was conducted at Debre Tabor Referral Hospital from October 5/2020 to November 15/2020. A total of 392 participants were recruited through an interview administered structured questionnaire using a systematic random sampling technique. Descriptive statistics were expressed as percentage, frequency and tables. Finally, multivariable logistic regression was used to identify factors associated with good hypertension self-care practice with a p-value of < 0.05.

Results
Self-care was practiced in 54.1% (95% confidence interval [CI]: 49.1%–59%) of the study participants. Basic knowledge on hypertension control was 48.5%. Urban residency (adjusted odds ratio [aOR]: 2.17, 95% CI: 1.2–3.9), social support (aOR: 2.12, 95% CI: 1.13–3.39), knowledge, aged 40–64 years (aOR: 3.15, 95% CI: 1.19–8.3, age ≥ 65 years (aOR: 3.8, 95% CI: 1.35–10.7), and stress control (aOR: 1.6, 95% CI: 1.06–2.67) were predictors of hypertension self-care practice.

Conclusions
In this study, the prevalence of good hypertension self-care practice and knowledge on hypertension control was low. Good social support age greater than 40 years, urban residency, good basic knowledge, and having stress control were positively associated with hypertensive self-care practice. Healthcare providers and hypertensive patients could benefit from establishing institutions like hypertensive association and building teams to learn lifestyle counseling.
Background
Malnutrition is one of the leading causes of childhood deaths in developing countries like Ethiopia. The Federal Ministry of Health of Ethiopia has included malnutrition as one of the reportable diseases in the surveillance system. Routine analysis of surveillance data is a key function for detecting outbreaks, monitoring disease trends, and evaluating the effectiveness of disease control programs and policies. Objectives of this study is to assess the magnitude of severe acute malnutrition (SAM) and describe the distribution in East Hararghe Zone, Oromia during 2011–2015.

Methods
A cross-sectional study design was used to collect surveillance data. A case of SAM was defined as a child aged 6 to 59 months with MUAC < 11cm and/or a child with bilateral edema of feet regardless of his or her MUAC. We collected data by TPP. Data were analyzed using MS excel 2010.

Results
A total of 147,169 SAM cases were reported in 2011–2015. Among these cases, 145,544 (98.9%) of them were newly-admitted. Children aged 6–59 months constituted 145,412 (99.9%) of all new admissions. Admitted SAM cases increased from 2011 to 2015, from 25,863 to 34,228. Among all districts, the highest SAM incidence was in Fedis (19.6%). The zonal incidence was (6.3%). From 2011–2015, 382 deaths were reported, with a case-fatality rate of 0.26%. The annual case-fatality rate declined from 0.95% in 2011 to 0.10% in 2015.

Conclusions
Malnutrition is a major public health problem of the East Hararghe Zone; SAM cases had increased over the past five years. However, the annual case-fatality rate had declined. To reverse this trend, the case management of MAM should be improved. The programs should consider women empowerment and child feeding practice. Partners working on Nutrition Program should be mobilized to supply feeding nutrients with scarce areas. Further study is required in order to find risk factor associated with malnutrition specifically in the most affected area.
Background
In 2018, Vietnam Government set ambitious goals that by 2025 up to 95% of commune health stations (CHSs) will have functional hypertension management program. However, with limited resources, it would be challenging for the health system in the Central Highland Region to achieve such goal without careful planning and preparation. We aimed to assess the availability and readiness of hypertension management services at primary health facilities in the region to facilitate evidence-based planning for the program in the future.

Methods
Availability and readiness of hypertension management services was assessed using WHO's service availability and readiness assessment (SARA) tools. We conducted the self-administer SARA questionnaire at all 579 CHSs in the region. We also conducted 20 in-depth interviews of key informants (hypertension program focal points at communal, district and provincial level) in all 4 provinces. Descriptive analysis of quantitative data was done using Epi-Info 7.1. Qualitative data were analyzed using NVivo.

Results
General hypertension diagnosis and management services were available at 65% of CHSs. Only 41% of CHSs had all medicines and commodities or trained staff available; 86% of CHSs had all basic amenities; and 93% had all essential equipment. On the day of assessment, 63% of CHSs had hypertension diagnosis and management services ready, of which 33% CHSs had all medicines and commodities ready. The qualitative results showed that hypertension services at primary healthcare facilities were not sufficient due to lack of financial support, lack of doctors at CHSs, insufficient supply of basic medicines and program guidelines.

Conclusions
The overall availability and readiness for hypertension diagnosis and management service at CHSs in Central Highland was low, reflecting the weak capacity of primary healthcare facilities. To strengthen hypertension program in the region, health authorities should increase financial support, ensure adequate supply of basic medicines, and issue more specific guidelines.
Background
The New Horizons Rehabilitation Program began at the National Psychiatric Hospital in 2006, its goal is detoxification and induction of change in underage drug users. The high relapse rate is one of the most important problems for the program, with great social and economic impact. The objective of this research was to determine the time elapsed until relapse to drug use in adolescents, who participated in this rehabilitation program.

Methods
We conducted a cohort study in a population of adolescents, who participated in the New Horizons Rehabilitation Program from 2014 to 2018; adolescents were defined as a case if they completed rehabilitation. Descriptive statistics and a survival analysis were performed using the Kaplan-Meier method, 95% CI. The response variable was the time, which elapses from the moment of completion of rehabilitation, until the occurrence of relapse to drug use. The censoring variable was defined by adolescents, who did not relapse to drug use until the end of the period.

Results
Of 215 rehabilitated adolescents, 140 (46%) met the case definition; the average time of drug use, for which they received the treatment, was 32 months; minimum consumption was 6 months and the maximum was 96 months. 80% presented relapses to drug use; 75% relapsed three months after completing their rehabilitation; 50% at six months and 25% at 12 months. Relapse in 61.3% was due to cannabis use; 35% for multiple drugs and 4% for cocaine. Male sex predominated (75%). Aged 16–17 years consisted of 65%, and 42% had incomplete schooling.

Conclusions
Relapses to drug use occur during the first year after rehabilitation and a relationship is established with the use of cannabis and cocaine. It is recommended to consider relapses as a determining factor to achieve abstinence and to monitor the adolescent who completes their rehabilitation, reinforcing multidisciplinary care, in the periods of time with the highest risk of relapse.
Background
In July 2019, the Department of Health received reports of clustering of dengue cases in San Andres, a coastal municipality of Catanduanes. We conducted an investigation to determine the existence of an outbreak, identify source of transmission, and determine risk and protective factors.

Methods
An unmatched 1:1 case-control study was done. We reviewed medical records and interviewed residents of San Andres. A suspect case was any previously well resident with sudden onset of fever and two or more of the following: rashes, headache, retro-orbital pain, myalgia, body malaise, nausea, vomiting, anorexia, and abdominal pain from April 1 to August 1, 2019. Sera were collected for dengue confirmatory testing via IgM ELISA and/or PCR. Controls were asymptomatic residents who tested negative. We conducted entomological and environmental surveys.

Results
Of 139 suspect dengue cases, 73 (53%) were male. Ages ranged from 1 to 51 years (Median: 13). Twenty-six (58%) of 45 cases with specimen were confirmed dengue. Two local areas were classified as dengue high risk [Breteau index of 28 and 39]. We saw uncovered water containers and garbage around the area (e.g., used tires, coconut shells). Having history of travel (OR = 19.96; 95% CI =1.85–214.81) and being a student (OR = 8.60; 95% CI: 3.82–19.35) were among the significant risk factors identified. Being usually at home (OR = 0.09; 95% CI: 0.02–0.46), emptying water container not in use (OR = 0.22; 95% CI: 0.09–0.52), and emptying garbage containers (OR = 0.22; 95% CI: 0.09–0.56) were found to be significantly protective.

Conclusions
There was dengue outbreak in San Andres. There were mosquito breeding sites in the community. High Aedes indices demonstrated proliferation of vectors that transmit dengue. School had unscreened and open windows. We recommend strong community engagement to practice regular search and destroy of breeding sites and adherence to self-protection measures against mosquito bite in dengue prevention.
Background
On January 3, 2020, the Department of Health received report on clustering of measles cases in Mati City. Investigation was done to verify measles outbreak, gaps on immunization program and identify risk and protective factors.

Methods
We conducted a 1:1 case-control study. We interviewed cases from Mati City, reviewed records, and collected specimen for Measles IgM antibody on enzyme linked immunosorbent assay (ELISA) or by Polymerase Chain Reaction (PCR) testing. Cases were those positive for measles confirmatory test. Controls were well residents of Mati City.

Results
Of 83 cases identified, forty-three (52%) were males. Age ranged from one month to 44 years old (Median = 2 years old). Forty-six (55%) were under 5-year-old. There were two deaths (CFR = 2.4%). In 2018 there were outbreaks in selected areas within Davao Region. Mati City had the lowest coverage in the same year. Starting August 2019, due to armed conflict from neighboring municipality, some internally displaced person moved to Barangay Matiao, Mati City. Also, in the third quarter of 2019, there was a stock out of MCV. Among 32 respondents interviewed, reasons for non-vaccination were child was not eligible, fear of side effects, child was sick, and religious belief. In Barangay Matiao, most of the houses are close to each other with poor ventilation. Significant risk factor was living with infected person (OR: 10.3, 95% CI: 3.07–36.81, p-Value: < 0.0001) while protective factor was at least 1 dose of MCV. (OR: 0.06, 95% CI: 0.01–0.28, p-Value: 0.00001).

Conclusions
There was a measles outbreak in Mati City. The low vaccination coverage, refusal to vaccination of some group, transient dwellers from area with low MCV coverage, congestion in the community led to the outbreak. We recommended to ensure that there will be no stock out of MCV vaccine to improve EPI coverage and conduct health promotion activities.
Oral Presentation Session 3: Outbreak Investigation and Response

The Effectiveness of Class Suspension on Containing Enterovirus Infection Clusters in Preschools — New Taipei City, Taiwan, 2013–2017

Yu-Neng Chueh, Wei-Liang Shih, Chia-ping Su

Background
Enterovirus infection (EVI) could cause severe complications and deaths in children, which poses significant threat. Class suspension is considered for controlling EVI clusters in schools given that limiting contact among children could prevent transmission. However, the effectiveness is controversial. We aimed to evaluate the effectiveness of class suspension on containing EVI clusters in preschools.

Methods
We identified EVI clusters during 2013–2017 from school-based surveillance system in New Taipei City, Taiwan. We defined an EVI cluster as ≥ 2 children in the same class diagnosed with EVI within 7 days, and class suspension as class activities cancelled ≥ 1 day. We reviewed the cluster reports and recorded several epidemiological characteristics, including class size, attack rate (AR), time to notification and cluster period. We conducted bivariate analysis to compare these factors of clusters with and without class suspension then used multiple linear regression to model the association between explanatory variables and AR and cluster period. The $p$ value < 0.01 was considered statistically significant.

Results
Of 5,485 EVI clusters, 3,457 implemented class suspension. The median number of infected children in clusters was 3 (range: 2–22). Class suspension was more likely to be implemented in public preschools (OR= 2.3, 95% CI: 2.1–2.6), with larger class size (median: 25 vs 24, $p < 0.01$) and higher AR at notification (12.0% vs 10.7%, $p < 0.01$). We found class suspension had no significant effect on reducing AR ($\beta$ coefficients: -1.87–0.63, $p > 0.01$) and cluster period ($\beta$ coefficients: -0.88–0.16, $p > 0.01$). Larger class size, higher AR when notified, longer decision-making time of class suspension were associated with increase of AR ($\beta$ coefficients: 0.1–2.5, $p < 0.01$) and cluster period ($\beta$ coefficients: 0.1–0.6, $p < 0.01$).

Conclusions
The effectiveness of class suspension on containing EVI clusters might be limited. Preschools should simultaneously consider other interventions, including personal hygiene enhancement, environment disinfection, and timely notification for containing EVI cluster transmission.
Background
On May 14, 2021, Playen I Health Center (PHC) reported an alleged outbreak of food poisoning on May 13, 2021, at the Al-I’tisham Islamic Boarding School, after eating the takbiran dinner. Investigation was done to ensure outbreak, identify the risk factors and prevention measure.

Methods
We interviewed whole people of Islamic boarding schools and observed a restaurant in Gunungkidul Regency who served food at the event. Analytical study was carried out with case-control study by a person experience symptoms of food poisoning such as diarrhea, nausea and vomiting after consuming meal package at takbiran night during May 12-15, 2021 as a case while the control was an asymptomatic person who consuming meal package at takbiran night and calculated odds ratio (ORs) to determine food with highest risk of getting ill. The food samples that were obtained were checked by Yogyakarta Health Laboratory.

Results
Of the 480 people on the list, 406 were successfully interviewed. There were 226 cases (AR 57.30%) with the main symptoms of watery diarrhea (77.43%) and nausea (48.23%). The incubation period was 1–54 hours with an average of 12 hours. Of all types of food served, only chili sauce on a meal package associated with food poisoning (O.R. 3.19, 95% CI 1.75–5.83). *Proteus mirabilis* bacteria were found in the chili sauce. The chili sauce was already stale for some people, and environmental investigation found unsanitary process of storing foodstuff.

Conclusions
*Proteus mirabilis* was found in chili sauce which can cause diarrhea in this outbreak and the process of storing foodstuffs can also lead to bacteriological contamination. We encourage local governments to emphasize proper hygiene certificates for restaurants in accordance with the Gunungkidul Regency Regulation Number 3 of 2016.
Background
Yemen is currently facing an increasing trend of poverty and nutritional deficiencies due to war, conflict and siege since 2015. The Nutrition Surveillance System (NSS) was launched in 2018 to monitor malnutrition trends. We analyzed 2019 NSS data to describe the pattern of malnutrition in children under five years.

Methods
NSS Data that contains demographic, anthropometric, anemia and breast-feeding variables was obtained in excel format. After cleaning, data was analyzed where odds ratio (OR) with 95% confidence interval (CI) and \( p \) value < 0.05 were calculated.

Results
A total of 100,155 under five children from seven governorates were screened during 2019. While the prevalence of global acute malnutrition (GAM), stunting and underweight were 20%, 40% and 48% respectively, the prevalence of severe acute malnutrition (SAM), severe stunting, and severe underweight were: 5%, 18% and 21% respectively. Males had significantly higher GAM (OR = 1.4, CI: 1.3–1.4, \( p < 0.0001 \)), stunting (OR = 1.2, CI: 1.17–1.23, \( p < 0.0001 \)) and underweight (OR = 1.3, CI: 1.25–1.32, \( p < 0.0001 \)). Furthermore, children 24–59 months had significantly higher GAM (OR = 1.13, CI: 1.11–1.17, \( p < 0.0001 \)), stunting (OR = 1.94: 1.89–1.99, \( p < 0.0001 \)) and underweight (OR = 1.04, CI: 1.01–1.06, \( p < 0.01 \)). GAM, SAM and underweight were highest in Al-Hodaidah (33%, 10%, 61% respectively), while stunting was higher in Dhamar (55%). One quarter of the screened children had anemia where females had significantly higher prevalence (OR = 1.1, CI: 1.04–1.12, \( p < 0.0001 \)). Among under six months children, 42% was exclusively breastfed and among under 24 months children 28% was still breastfeed.

Conclusions
In the NSS targeted governorates, the severity of the nutritional situation is considered of high public health concern as GAM and stunting are exceeding the very high cutoff prevalence of 15 % and 30%. Both immediate and long-term interventions such as provision of complementary feeding together with encouraging appropriate breastfeeding practices must be considered.
Background
Notification of communicable diseases to surveillance system by private facilities was limited by traditional methods of reporting in Poonamallee health district, Tamil Nadu, India. We determined consistency of mobile and email-based methods of reporting to daily disease surveillance system (DDSS) from private health facilities.

Methods
We randomly allocated private reporting units to two methods of reporting with inclusion criteria as reporting units with admission and laboratories testing at least one notifiable disease. The data handlers from these units were assigned to mobile [through Open data kit (ODK) application] or email based reporting. We trained them on surveillance system operations and invited to report using DDSS. Both groups received weekly reminders to report daily. The primary endpoint was consistency of reporting to DDSS. We calculated proportion of consistency and tested significance by chi-square. We measured secondary outcomes of proportion completeness, timeliness, sensitivity, simplicity, acceptability and usefulness. We used repeated measures ANOVA (Greenhouse Geiser) to analyze time trend of reporting methods. Ethics Committee of ICMR, National Institute of Epidemiology approved the trial.

Results
We randomized 43 willing reporting units of 48 reporting units to mobile (n = 22) or email (n = 21) based reporting. The consistency of reporting through mobile (77%) was higher than that of email (62%) based [p = 0.33]. As compared to email method (94%), completeness of reports was almost equal to mobile based reporting (96%) [p < 0.05], whereas timeliness (92% Vs. 88%) and sensitivity (96% vs 93%) were higher in mobile based method. There was no difference in weekly reporting (p = 0.43). Reporting by mobile was reported to be easier (82%); favoured repeated use (96%) and useful (64%) than email-based units (62%, 81% and 57% respectively).

Conclusions
Both reporting methods were similar in terms of consistency of reporting by private health facilities. Reporting by ODK method was found to be more complete and maintained timely than email reporting.
Background
Leptospirosis, a potentially fatal zoonosis, but preventable with adequate protection, is endemic in Malaysia. With incidence rate of 30.2/100,000 and fatality rate 0.31/100,000 population respectively, mortality is high in Penang, yet least studied. Every notified case of leptospirosis needs to be investigated. Only those that meet the case definition are registered. The objective here is to describe the trend of leptospirosis in Seberang Perai Utara, Penang from 2015–2019 to determine shortfalls in investigation with aim for overall better management of cases.

Methods
This is a cross-sectional study using secondary data from the online disease notification system, investigation reports, laboratory records and fatality records from 2015–2019. The demographic, clinical presentation, laboratory result and clinical outcomes data were analyzed using SPSS v25. Data calculated in frequencies and percentages. Chi square tests used for categorical data. Significance is at p<0.05.

Results
From 364 cases notified between 2015–2019, 63(17.3%) were registered. The IR showed an increasing trend and in 2019, the IR was 3.53. Cases were mainly among those in the working age group. IR for male was 4.9 and female 1.7. The ethnicity-specific rates for Malay, Chinese and Indians respectively were 5.4, 5.3 and 3. Cases were more among Malaysians (IR 3.2) than non-Malaysians (IR 2.8). There were 6 mortalities (9.5%). No specific risk factor was identified. Mortality data was reported from public hospitals and was limited despite every case undergoing mortality review. Mortality records were incomplete.

Conclusions
The increasing trend suggests increasing importance of the disease. There was wasted effort in investigation of non-cases. It is recommended that better record keeping and training, including to the private sector would improve notification and wasted resources on investigations. Investigators to ensure completeness of data. Training to private sector is done annually but halted during the pandemic. This is expected to continue soon.
Enhanced Event-Based Surveillance for Infectious Diseases during the Tokyo 2020 Olympic and Paralympic Summer Games in Japan, 2021


Background
The 2020 Tokyo Olympic and Paralympic Summer Games (the Games) were held from 23rd July to 5th September 2021. A large number of participants from around the world might have increased the potential for importation and spread of COVID-19 as well as other infectious diseases. Enhanced event-based surveillance (EBS) for international mass gatherings is widely acknowledged as a useful tool for early detection and response. However, its implementation could be challenging under the COVID-19 pandemic due to the overwhelming burden on the national surveillance and response team. Here, we describe how we managed the enhanced EBS for the Games.

Methods
The emergency operation center was set up for the Games at the National Institute of Infectious Diseases in Japan. As part of its work, three staff members and 15 fellows of the Field Epidemiology Training Program (FETP) conducted EBS from July 1 to September 19, 2021. In addition to pre-existing national surveillance systems and EBS, EBS aiming at evaluating non-COVID-19 infectious diseases and importation risk were enhanced in collaboration with the World Health Organization Western Pacific Regional Office and BlueDot's surveillance and risk assessment platform. Detected signals were verified when needed. Events and risk assessments were published in daily reports and distributed to local governments and stakeholders.

Results
During the provisional period of July 1 to September 5, 240 domestic events (COVID-19: 228, non-COVID-19: 12) and 32 international events (COVID-19: 16, non-COVID-19: 16) were screened and assessed. Among these, 95 domestic and zero international events were published in daily reports. Twenty events detected were monitored, one of which was investigated in the field.

Conclusions
Integrated EBS and information sharing with stakeholders provided confidence in risk assessments, even during a pandemic. Collaborating with other organizations overseas for surveillance of non-COVID-19 infectious diseases enabled us to focus our resources on COVID-19 surveillance and response.
Background
During 8–25 August 2020, the Department of Disease Control (DDC), Ministry of Public Health (MOPH) was notified about a cluster of Coronavirus disease 2019 (COVID-19) patients from India. This study aimed to describe the characteristics of the cases and identify possible risks of infection.

Methods
We conducted a cross-sectional study on all 209 passengers on the flight from India to Thailand on 8 August 2020. A case was any person on this flight with positive SARS-CoV-2 detection from RT-PCR from nasopharyngeal/throat swabs. We reviewed medical records, interviewed the passengers, and conducted an environmental survey at the state quarantine to determine infection risks after arrival. Multivariable logistic regression was applied to determine the association between COVID-19 infection and potential risks.

Results
There were twenty-three patients with positive SARS-CoV-2 test (attack rate = 11%). The cycling time (CT) varied between 16.01 and 39.45 (median, 34.76). Twenty-two cases were Thai (95.65%), while the rest was Indian. The patients’ ages ranged from 11 to 72 years (median, 35). The male-to-female ratio was 1.09. Seventeen cases (73.9%) were asymptomatic. There were no deaths. Visiting crowded areas in India was significantly associated with COVID-19 infection (adjusted odds ratio = 3.63; 95% confidence interval, 1.22–10.80). The management of quarantine centers strictly followed the standards of the MOPH, which brought no further transmission. The risk of infection on board was minimal as there was no clustering pattern of infectees sitting close to each other and the CT value of most patients was quite high.

Conclusions
It was likely that the patients contracted the disease before arriving in Thailand. Supporting evidence comprised high CT values in most patients, indicating that the infection was not recent; and that the strict quarantine procedure prevented in-country transmission. The campaigns that raise awareness of overseas Thais to avoid crowded areas were recommended.
Timeliness of Contact Tracing among Flight Passengers during the COVID-19 Epidemic in Vietnam

Ngoc-Anh Hoang, Thai Pham Quang, Ha-Linh Quach, Khanh Nguyen Cong, Florian Vogt

Background
International air travel plays an important role in the global spread of SARS-CoV-2, and tracing of close contacts is an integral part of the public health response to COVID-19. However, evidence about contact tracing performance is scarce. We aimed to assess the timeliness of contact tracing among airline passengers arriving in Vietnam on flights containing COVID-19 cases and investigated factors associated with timeliness of contact tracing.

Methods
We included data from 2,228 passengers on 22 incoming flights between 2–19 March 2020. Contact tracing duration was assessed separately for the time between the date of index case confirmation and date of contact tracing initiation (interval I), and the date of contact tracing initiation and completion (interval II). We used log-rank tests and multivariable Poisson regression models to identify factors associated with timeliness.

Results
The median duration of interval I and interval II were one day (IQR: 1–2) and three days (IQR: 2–5), respectively. The contact tracing duration was shorter for passengers from flights where the index case was identified through mandatory entry testing directly upon arrival (median = 4; IQR: 3–5) compared to flights with index case detection through self-presentation at health facilities after arrival (median = 7; IQR: 5–8) (p-value = 0.018). Cumulative hazards for successful tracing were higher for Vietnamese nationals compared to non-Vietnamese nationals (p < 0.001), and for passengers arriving on flights with smaller numbers of passengers, compared to flights with larger passenger volumes (p < 0.001).

Conclusions
Contact tracing was timely overall but slower on high workload days and for international passengers. Mandatory SARS-CoV-2 testing at arrival may reduce contact tracing duration and should hence be considered as an integrated screening tool for flight passengers from high-risk areas when entering low-transmission settings with limited contact tracing capacity. We recommend a standardized risk-based approach for tracing flight passengers during the COVID-19 epidemic.
Background
The Delta variant is predominant in Singapore and identifying preventable risk factors for superspreading events is critical for COVID-19 control. Between 21 July and 9 August 2021, 62 COVID-19 cases were identified in staff, visitor-patrons and close contacts of a restaurant in Singapore. All visitor-patron cases had visited the restaurant on 19 July 2021. A thorough investigation was conducted to determine preventable risk factors contributing to the event.

Methods
A mixed-method study comprised a case-control study, a qualitative study through phone interviews and environmental field visits. Cases were defined as staff or patrons with SARS-CoV-2 positive who worked at or visited the restaurant between 19–23 July 2021, the exposure and infectious period. SARS-CoV-2 negative staff or patrons with exposure between 19–23 July 2021 were selected as controls. Logistic regression analysis was used to estimate the odds ratios (ORs) and 95% confidence intervals (95% CIs) of association between underlying risk factors and COVID-19 infection.

Results
Of 37 cases and 62 controls, COVID-19 infection was significantly associated with mask-off activities when not eating or drinking (adjusted OR 7.4, 95% CI 2.2–25.1, p=0.001), lack of social distancing between staff and patrons (adjusted OR 4.4, 95% CI 1.4–13.9, p=0.011) and being not fully vaccinated (adjusted OR 4.0, 95% CI 1.2–13.2, p=0.021). Among 84 patrons (26 cases and 58 controls), significant environmental risk factors included visited the food display counter (adjusted OR 16.3, 95% CI 1.6–162.5, p=0.017) and exposure to items associated with seafood dishes (adjusted OR 5.8, 95% CI 1.5–23.3, p=0.013). In addition, discreet observations and interviews reported lapses in standard precautionary measures and hygiene practices.

Conclusions
The findings confirmed a point source outbreak on 19 July with sequential infection among staff prior to the event. Environmental fomites probably served as vehicles in the superspreading event. The study support differentiated COVID-19 measures for dining in based on vaccination status in Singapore.
The Impact of Arbaeenia Mass Gathering on the Trajectory of COVID-19 in Iraq, 2020

Mohammed S. Abdulwahid, Faris Lami, Bashar Abdullateef

Background
Religious mass gatherings like Arbaeenia are common in Iraq and usually attracts millions from within and outside Iraq. According to World Health Organization, mass gatherings have the potential to amplify the COVID-19 infection in countries with community transmission. The objectives of this study are to determine the impact of the Arbaeenia mass gathering on the pattern of COVID-19 morbidity and mortality in Iraq, 2020.

Methods
A descriptive desk review study of secondary data obtained from the Ministry of Health and compiled from all the governorates except Kurdistan region. The following COVID-19 morbidity and mortality indicators were calculated: daily new cases, daily PCR tests, daily rapid tests, daily active cases, admitted inpatient cases, intensive care unit admissions, average daily cases, average recovered cases, and the ratio of positive cases. These were calculated for the two months before and the two months after the event and were also compared between the involved and the non-involved governorates in the Arbaeenia mass gathering.

Results
There was a significant decrease in daily number of new and active cases (p<0.001), a significant decrease in number of patients admitted to the hospitals and in the intensive care unit (p<0.001), a significant decrease in the average deaths (p<0.001) and a significant decrease in the ratio of positive cases to all PCR tests (p<0.05) in the involved governorates. Although there was a significant increase in a number of indicators in some of the non-involved governorates (p<0.05), the overall results for the indicators were significantly decreased (P<0.001).

Conclusions
Although the risk assessment forecasted an increase in the morbidity and mortality following the Arbaeenia mass gathering, the study findings did not reveal any effect of the mass gathering on the COVID-19 trajectory in the country. However, we recommend adhere to World Health Organization recommendations on prohibition of activities that interfere with physical distancing.
Epidemiological Features of Human Brucellosis — Georgia, 2015–2019

Mariam Pashalishvili, Angeliki Lambrou, Giorgi Chakhunashvili, Nana Mebonia, Khatuna Zakashvili, Paata Imnadze

Background
Brucellosis, a zoonosis caused by ingestion of unpasteurized milk or undercooked meat from infected animals, or close contact with their secretions, is endemic to Georgia. According to the National Center for Disease Control and Public Health of Georgia (NCDC), the median annual incidence rate is 4.7/100,000 population. Vaccination campaigns in regions with livestock have been held since 2015. We aimed to describe the epidemiology of brucellosis for the years 2015–2019 in Georgia to prioritize public health interventions.

Methods
We extracted case-based information on brucellosis during the years 2015–2019 from the NCDC’s Electronic Integrated Disease Surveillance System (EIDSS). We conducted a descriptive analysis of demographic and possible exposure data using STATA16.

Results
During 2015–2019, 999 cases (17 confirmed, 982 probable) of brucellosis were reported. The median annual incidence was 5.5/100,000 population (range: 4.6–5.7/100,000). The median age of cases was 36 years (IQR = 30), and the highest median annual incidence was observed in the 15–19 (7.6/100,000) and 30–59 (7.0/100,000) age-groups. Among cases, 76% (757) were male. The highest incidence was found in the region of Kakheti (26/100,000), Kvemo Kartli (12/100,000), and Mtskheta-Mtianeti (7.5/100,000), where livestock is farmed. Among cases with known exposure information, 64% (516/802) reported consuming unpasteurized milk/dairy products and 40% (295/732) undercooked meat; 94% (345/368) reported direct contact with sick animals. Occupation was reported in 27% (n = 269) of cases and 63% (169/269) worked in agriculture.

Conclusions
During the 5-year period, brucellosis annual incidence remained rather stable and infection was more frequent in young adults aged 15–19 years, males, and among individuals residing in regions where livestock is farmed. More than half of the cases consumed unpasteurized dairy products. Evaluating high-risk population groups’ awareness and educating them on brucellosis and risk factors are recommended. Public health professionals need retraining for data quality improvement, and enhancing vaccination campaigns would be beneficial.
Case Investigation of Animal Rabies Near Thai-Myanmar Border, Northern Thailand, February–March 2020

Suwitcha Panchakhan, Paisin Lekcharoen, Sith Premashthira, Surapong Wongkasemjit

Background
Animal rabies cases sporadically occur in Chiang Rai, a province located nearby Thai-Myanmar border. On February 20, 2020, a district livestock office was notified of a suspected rabid dog attacking students. The dog’s brain tested positive for rabies using fluorescent antibody test. An investigation was conducted to identify exposed animals and humans, determine extent of the event, and identify possible source of rabies infection.

Methods
Villagers and local livestock officers were interviewed about index case presence’s history. Sets of definitions were used for addressing animal and human cases and in-contacts. Existing rabies investigation reports, post-exposure prophylaxis (PEP) records, and surveillance database were reviewed to determine related epidemiological data and current situation. Epidemiological characteristics were described using descriptive statistics. Relevant spatio-temporal information was visualized in Google Maps.

Results
The only animal case between February to March 2020 was a female stray dog with unknown history and, found 3.6 kilometers from the border. The dog was recognized on February 19, when it showed aggression and attacked people. Spatio-temporal extent of the dog’s wandering was 1.42 square kilometers, along 5.93 kilometers of distance, within 24 hours. Considering high population density in urban area, 23 free-roaming owned dogs and 15 people, of which, 40% (6/15) had Category III exposures, from 3 villages were exposed to the index case and received complete PEP. Control measures included a declaration of 5-km radius epidemic area around the outbreak site, animal movement restriction, and ring vaccination. However, sources of this dog and rabies infection were inconclusive.

Conclusions
Due to a movement of rabid dog, the magnitude and extent of affecting people and animals is considerably high and required timely response and control intervention. In spite of only immunization and population control, effective management to determine and prevent possible sources of dog and rabies infection across border is highly recommended.
Epidemiological Profile of the Rift Valley Fever in Ruminants — Mauritania, 2002–2014

Yacoub Ould Sidi Moctar, Mohamedou Hmeied Maham, Nicolas Meda, Yanogo Pauline, Sidi Mohamed Hama, Djibril Barry, Nah Tolba, Bezeid Ould El Mamy

Background

Rift Valley Fever (RVF) is a zoonotic arbovirus that severely affects ruminants as well as humans. This disease is characterized by high mortality rates in young animals and abortions in pregnant ruminants. The disease occurs during heavy rains followed by heavy outbreaks of vector mosquitoes. The objective of the present study was to analyze the database of Rift Valley Fever in ruminants in Mauritania, 2002–2014.

Methods

We conducted a retrospective cross-sectional study on RVF epidemiological surveillance data in ruminants in Mauritania from 2002 to 2014. The study population consists of suspected cases of RVF in ruminants recorded on the database in Mauritania, 2002 to 2014. We analyzed the data in time, place, and animal using Epi Info. Proportions, frequencies, and rates were calculated.

Results

A total of 3,897 suspected cases of RVF were reported in ruminants in Mauritania from 2002 to 2014. The age group of 10 to 12 years old was the most affected with (17/43) positive RVF cases (39.5%) followed by (221/664) confirmed RVF cases (33.3%) in the 5 to 10 years old age group. The frequency of Rift Valley Fever appears to be higher in females (24.45%) than in males (19.18%). Hodh Chargui and Adrar regions recorded the highest number of RVF cases, 55.88%, and 32.58% respectively in this study. The highest prevalence by species was recorded in dromedaries at 67.5%, followed by goats at 30.8%. The highest abortion and mortality rates were recorded in 2002 respectively at 46.85% and 35.95%.

Conclusions

Our study shows that Rift Valley Fever is endemic in Mauritania. Despite the completeness of the data, there are some useful data that have not been filled in such as geographical coordinates, animal density, and mosquito pressure.
Background
*Mycobacterium tuberculosis* complex (MTBC) can cause disease in various species including human and elephants. On 15 November 2018, a captive Asian elephant from an elephant camp located in Kanchanaburi died and was diagnosed with tuberculosis based on necropsy and PCR results. An investigation was conducted to describe and control the outbreak.

Methods
We used questionnaires to collect data of all animals (index case, 6 elephants, 8 dogs, a monkey and a goat), owner and workers (*n* = 17) in this camp and collected blood samples from all elephants for antibody tests; elephant interferon gamma release assay (elephant IGRA) and multi-antigen print immune-assay (MAPIA). All camp workers were screened using clinical criteria and the suspected was subjected to laboratory investigation. Probable elephant TB case was an elephant positive either by elephant IGRA or MAPIA and human was classified as presumptive, probable or confirmed TB case.

Results
Index case was a 62-year-old elephant kept with other 6 female elephants. These remaining elephants were apparently healthy; however, 33.3% (2/6) of them were probable cases, and 16.7% (1/6) was positive by both methods. Any elephant could share aerosol-generating activities with workers and tourists during elephant feeding and bathing. The cohabitating dog had close-contact with elephants, but did not have any clinical sign, and had a negative TB ELISA result. A total of 17 camp workers (70.6%) had a history of contract with elephants, 6 (35.3%) of them had contract with the index. Three workers (17.7%) showed TB-like symptoms (presumptive TB) but no evidence consistent with TB was detected based on chest X-ray results and sputum culture.

Conclusions
Although the source of the disease was unable to be identified, corresponding authorities were emphasized to monitor both human and elephant health accordingly. The probable elephants should be confirmed by culture and PCR from trunk wash samples.
Background

India has targeted measles elimination by 2023. To achieve the target, sub-district analysis of measles surveillance and immunization program data is necessary for prioritizing activities. We analyzed measles surveillance data of Madhubani district, Bihar, India, to describe the epidemiological characteristics of measles outbreaks and cases.

Methods

We reviewed the Integrated Disease Surveillance Program’s measles surveillance data for 2015–2018 and analyzed WHO monitoring data for measles-containing-vaccine (MCV) coverage status. We conducted key informant interviews using an open-ended questionnaire and performed a strengths, weaknesses, opportunities, and threats (SWOT) analysis for the elimination program.

Results

During 2015–2018, Madhubani District reported 34 suspected outbreaks, increasing from five in 2015 to 15 in 2018. Among these 34 outbreaks, 19 (56%) were laboratory-confirmed as measles, and 16 (47%) were reported by frontline health workers. Among the 19 laboratory-confirmed outbreaks, 312 cases (52% female) and six deaths were reported; 303 (97%) cases were < 15 years; 193 (62%) belonged to the Muslim community, and 38 (12%) received at least one dose of measles-containing-vaccine (MCV). The average coverage of MCV1 and MCV2 was 80% and 63%, respectively. The most common reasons for non-vaccination with MCV (n = 8679) were awareness gap (40%) and adverse effect apprehension (19%). In the SWOT analysis, the strengths identified were the high proportion (95%) of children receiving vaccination at the public health facility and the ready availability of updated immunization microplans. The vacant positions (45% medical officer and 28% nurse position) were a weakness. Opportunities include training for health staff to support new vaccines like rotavirus and tetanus-diphtheria. Low MCV coverage and non-reporting of outbreaks from 5/22 (23%) sub-districts are potential threats.

Conclusions

Madhubani measles surveillance facilitates outbreak reporting. However, low MCV coverage and the silent sub-districts indicate the need for additional support to achieve the elimination targets.
Background
Diphtheria is a vaccine preventable disease, reemerged in Yemen at the end of 2017, and many governorates were affected. On 19 September 2020, an increased number of diphtheria cases from Sahar district, Sa’adah governorate was reported. On 23 September 2020, a team from Yemen field epidemiology program (YFETP) was sent to confirm the existence and determine the magnitude of the outbreak, vaccination status of affected people and recommend control measures.

Methods
A descriptive study was carried out, active search from house to house was performed by using case definition for diphtheria (any person from Sahar district of Sa’adah governorate who had suffered from adherent membrane of the tonsils, pharynx and/or nose and suffered from laryngitis, pharyngitis, or tonsillitis) since 1 September 2020. A pre prepared line list was used. Data was collected through face-to-face interview with doctors and household of cases. Frequency was used for proportions and rates calculation.

Results
Thirty-eight cases met the case definition. Of these, 61% were females; 82% were aged 5–15 years; 99% had tonsils adherent membrane, 24% and 18% of the cases were from Al-Talh and Waid-Allaf sub-districts respectively. The overall attack rate was 17/100,000 population and the case fatality rate was 8%. The majority of cases (95%) were unvaccinated and 87% lived in remote area that located in the third level of health facilities catchment area.

Conclusions
Diphtheria outbreak was clinically confirmed in in Sahar district of Sa’adah governorate. Unvaccinated children were more affected. The case fatality was low compared to standard WHO estimate (10%). An urgent vaccination campaign against diphtheria is crucial. Reactivation of vaccination outreach activities in remote areas, raising community awareness for the importance of vaccination are recommended for long-term intervention.
Background
Despite the Philippines being certified polio-free in 2000, since 2014 it has been at high risk for polio virus re-infection. Since July 2019, environmental samples (ES) positive for vaccine derived polio viruses (VDPV) have been reported in Metro Manila and Mindanao. Several VDPV type 2 cases were reported in Mindanao. Response measures include mass vaccination of children <5 years with monovalent oral polio vaccine (OPV) 2 and enhanced acute flaccid paralysis (AFP) surveillance. On November 26, a VDPV type 1 case was detected in a southern Mindanao Island. We conducted an investigation.

Methods
We conducted detailed case investigation, community AFP surveillance through active case finding and stool collection among healthy children in nearby households, health facility retrospective records review, and environmental survey.

Results
The case is a nine-year-old unvaccinated girl. Sudden onset of paralysis was noted three days after fever onset. No additional AFP case was identified on community surveillance. Two previously unreported AFP cases seen in health facilities were found. Only 14 (24%) of 58 under-five surveyed had three OPV doses; one (2%) had inactivated polio vaccine. Open defecation is practiced. Households are on stilts along the coast. Human waste is deposited directly into the river below. Genetic sequencing showed that this case is not closely related to the positive ES samples reported in another region. Laboratory results of healthy children stool survey were negative.

Conclusions
There is a polio event in Southern Mindanao. This is the first VDPV1 case aged > 5 years. The event is due to prolonged circulation of the poliovirus because of poor hygiene and environmental sanitation in an area with low immunization coverage. Our investigation results led to immediate provision of bivalent OPV among those aged up to 10 years in the affected municipality. Sustained AFP and environmental surveillance will establish whether there is circulation.
Background

Measles is a highly contagious vaccine-preventable disease. In Yemen, it is endemic, recurrent outbreaks are occurred and the last Immunization campsions was implemented in February 2019. This study aims to describe the epidemiology, magnitude of measles and determine the immunization status of affected patients.

Methods

We used a descriptive analytical study. Secondary data of confirmed measles covering 2018–2019 was obtained from Measles and Rubella Surveillance Program. Variables for age, sex, district, date of onset, vaccine doses and outcome were included. Population from Central Statistical Organization was used for calculating rates per 100,000 population, P value < 0.05 was used as cutoff point for significant.

Results

Out of 22,828 confirmed measles, 13,554 (59%) were reported in 2018 and 9,274 (41%) were in 2019, two-thirds (65%) were < five years, 52% were females and 76% were not vaccinated, more in 2018 than 2019 (85% vs 64%, P < 0.001). The incidence rate (IR) was significantly higher in 2018 (50 vs 32, p < 0.001). The overall case fatality rate (CFR) was 1%. It was significantly higher in 2018 (1.7% vs 0.6%, p < 0.001), among < 1 year (7% vs 0.08%, P < 0.001) and patients with zero dose vaccination (1.5% vs 0.3%, p < 0.001) compared to the relevant groups. After the immunization campaign in 2019, 14 governorates reported lower IR (33 vs 71, P < 0.001), and eighth governorates reported higher IR (30 vs 21, P < 0.001) than IR in 018, respectively.

Conclusions

Measles is an important health problem in Yemen with a high mortality among those aged < 1 year. Therefore, strategies to increase measles vaccination coverage, targeting children < 9 months of age, increase public health awareness regarding measles vaccination and encouraging research for the risk of infection after vaccination campaign are recommended.
Background
COVID-19 is an unprecedented pandemic affecting 213 countries. Udupi (1.3 million population) is one of the five districts in Karnataka having highest number of COVID-19 cases. We analyzed surveillance data of COVID-19 in Udupi District.

Methods
We did a cross-sectional study among persons tested for COVID-19 in Udupi from May 2020 to January 2021. Data source included COVID-19 laboratory reports, cases and death registers maintained electronically at district. We described the cases by person, place, time, and analyzed the positivity rate, exposure history, testing delays and outcomes.

Results
Among 309,755 (238,273/million) tested in Udupi, 7.5% (n = 23,177) were positive for COVID-19 (incidence: 17,828/million). Of 23,177 positive patients, 56.6% (n = 13,126) were male, 50.3% (n = 11,664) aged 15–44 years, and 20.7% (n = 4,808) were symptomatic. Of the seven administrative blocks, Udupi contributed 27% (n = 6,224) of the cases. About 14% (n = 3245) of the cases reported co-morbidities (hypertension-55%, diabetes: 45% and cardiac disease: 10%). Seven-day running-average confirmation rate peaked in July 2020 (28%), which declined to below 1% after Nov 2020. Overall, 10.3% (2,385) of the cases reported travel history. Among cases reported before 15 June, 99.5% (1,014/1,019) had travel history compared to 6.2% (1375/22,158) thereafter. The average daily testing was 1,122 (863/million) during the study period. Median delay in time-to-result improved from 5 days (IQR: 1–20) before 15 June to 1 day (IQR: 0–3) thereafter. By 31 January 2021, 99% (22,944) of the cases recovered and 0.8% (189) died, of which 97% (183/189) had comorbidities. Case fatality increased with age; patients above 55 years had higher case fatality (2.5%, 144/5745) compared to those below 35 (0.04%, 4/9,536). Pre-existing liver disease, renal disease, and malignancy had much higher mortality (47%, 30% and 24% respectively).

Conclusions
Case fatality was more among higher age-groups and co-morbid patients. While the pandemic was initially driven by travelers, community transmission is evident later. We recommended targeted screening among elderly and co-morbid suspects.
Assessment of Dengue Disease Surveillance in One of the High Prevalent Districts in Maharashtra, India, 2020

Rahul Shimpi, Valan Siromany, Ismeet Kaur, Kevisetuo Dzeyie, Pankaj Bhatnagar, Tran Minh Nhu Nguyen, Pradip Awate

Background
Severe dengue is one of the leading causes of serious illness and death in India due to high endemicity. India formulated its mid-term plan for prevention and control of dengue in 2011. In November 2020, we evaluated dengue surveillance system in Pune district, Maharashtra, which reported the highest number of dengue deaths and third highest number of cases, to define the surveillance system’s functioning and its usefulness.

Methods
We assessed simplicity, acceptability, data quality, representativeness, timeliness, and the stability of dengue surveillance system in Pune using updated US CDC guidelines for evaluation of surveillance systems. We conducted interviews of staff members working in the National Vector Borne Disease Control Programme and clinicians who treated dengue cases. Attributes were rated as good (> 80%), fair (60–80%) and poor (< 60%) based on the performance score. We reviewed dengue surveillance data of 2017–2019 reported from two municipal corporations and rural area of the district.

Results
All 8 (100%) staff members interviewed knew dengue case definition, reporting protocol and reported system as simple and acceptable. Demographic details were present in 99% of cases, clinical manifestation was missing in 100% cases in the line list. Representativeness was poor; only 26% of facilities in the Pune district reported in all quarters. Of the 33% cases reported from private hospitals, laboratory confirmation was available only for the critical cases. Stability was poor; 27% of the positions were vacant; 25% were untrained. Data from 2015–17 showed an increasing trend in the number of dengue cases in rural areas; 40-50% cases and deaths due to severe dengue among 20–40 years of age.

Conclusions
The system is functional in case detection and reporting, contributing to meeting the objectives of mid-term plan for prevention and control of dengue. However, severity of illness could not be assessed. We recommend ensuring critical staffing, training and periodic monitoring, evaluation to improve usefulness.
Background
In response to COVID-19 pandemic the Central Surveillance Unit (CSU) of the Integrated Disease Surveillance Program, Government of India, introduced the COVID-19 National Health Portal (COVID-19 nhp) in February 2020. We evaluated the usefulness of the COVID-19 nhp, a new system, to make recommendations to strengthen it.

Methods
We assessed surveillance units of Maharashtra and Mumbai City which had reported maximum number of COVID-19 cases for simplicity, flexibility, data quality, acceptability, representativeness, stability and timeliness attributes from updated Centers for Disease Control and Prevention, Atlanta, USA guidelines for surveillance system evaluation. We conducted stakeholders’ interviews using semi-structured questionnaire. We calculated proportions and interpreted them using allocated values: good (80–100%), moderate (70–79%), poor (< 60%). We compared extracted data using COVID-19 Case Investigation Forms (CIF) to calculate proportions of mismatch of six selected critical fields and missing values to assess data quality. Timeliness was assessed for lag between data entry and receipt of CIF.

Results
Simplicity, flexibility, acceptability, representativeness, and stability were ‘good’. Data quality was poor due to missing critical fields and data mismatch. Least filled field was ‘date of onset of symptoms’ (0.85%, 89/10498). No variable for time of data entry found in portal, hence stakeholders were interviewed for the lag. Timeliness was moderate in CSU, but poor in SSU and DSU.

Conclusions
Data quality issues and delayed reporting could compromise the ability of the COVID-19 nhp to provide reliable data for monitoring trends and initiate public health action. We recommend: auto-capturing date of entry of data, making critical fields mandatory and routine validation of COVID-19 data.
Background
In February 2020, the MV Diamond Princess cruise ship docked in Yokohama, Japan. Had 14-day quarantine after detection of SARS-CoV-2 among 10 passengers and crew. Several others onboard tested positive during quarantine. On February 25, 2020, the Philippines sent government team to facilitate repatriation of Filipino workers and passengers. Upon return, repatriates and government team went on quarantine from February 26 to March 10, 2020, in Capas, Tarlac. We established disease surveillance to detect COVID-19 cases.

Methods
Repatriates and government team were categorized as person under monitoring (PUM). We profiled PUM through a self-administered questionnaire. All PUM were monitored daily for signs and symptoms. A patient under investigation (PUI) was any PUM with sudden onset of fever, or any of the following: cough, colds, sore throat, or diarrhea. Nasopharyngeal and oropharyngeal swabs were collected for SARS-CoV-2 confirmatory testing via PCR.

Results
Of 458 PUM quarantined, 440 (97%) were crew. Age ranged from 22 to 64 years (median: 40). Thirty-nine (9%) PUIs were referred to hospital. All tested negative for SARS-CoV-2. On day 12 of quarantine, all PUM were swabbed. On day 14, results showed two (0.04%) confirmed COVID-19 cases. Both were brought to hospital for monitoring. Aside from quarantined PUM, four medical staff in the quarantine facility were identified as contacts. Medical staff went into quarantine and tested negative.

Conclusions
Two asymptomatic repatriates were confirmed COVID-19 cases. They were only discharged upon negative laboratory result; hence, introduction of COVID-19 in the community by infected repatriates was averted. However, not all asymptomatic business travelers were tested. Hence, importance of maintaining physical distance, hand hygiene, and masking to prevent infection must be emphasized. Strengthened disease surveillance through systematic investigation on exposure history aside from signs and symptoms, is essential to facilitate isolation, testing and treatment of every case, and tracing every contact.
Oral Presentation Session 9: Therapeutics

Effects of Hydroxychloroquine with or without Azithromycin on SARS-CoV-2 Clearance in COVID-19 Patients, Taiwan, March–June 2020

Yi-Ting Yang, Tsung Pei Tsou, Yang Li, Meng-Yu Chen

Background
Hydroxychloroquine (HCQ) with or without azithromycin (AZI) was found to have antiviral activities against SARS-CoV-2 in vitro. In Taiwan, all COVID-19 patients are hospitalized till viral clearance. We evaluated the effects of these drugs on shortening the time to viral clearance in COVID-19 patients.

Methods
We conducted a retrospective cohort study among all laboratory-confirmed COVID-19 patients confirmed during March–June 2020 in Taiwan. Demographic, clinical, epidemiological and laboratory data were extracted from case review forms and the National Notifiable Disease System. Disease severity of patients was determined following WHO guidance. Patient treatments were classified into: hydroxychloroquine alone (HCQ), hydroxychloroquine with azithromycin (HCQ + AZI), and neither. Outcome was days from symptom onset to viral clearance as determined by first RT-PCR negativity on two or three consecutive negative swabs. We compared the outcomes between the three treatment groups using survival analysis with Kaplan-Meier estimates.

Results
Of the 353 patients included (median age 30 years, 52% men): 117 (33%) received HCQ, 137 (39%) received HCQ + AZI, and 99 (28%) received neither. Among 353 patients, 331 (94%) had mild to moderate disease; disease severity did not differ between treatment groups. All patients achieved viral clearance, with median of 24 days (IQR 18–34) from symptom onset. One patient in HCQ + AZI group died 52 days after disease onset (18 days after viral clearance) from complications. Compared to other groups, patients in HCQ group had a shorter time to viral clearance (median: HCQ: 23 days, HCQ + AZI: 25 days, neither drug: 25 days, P = 0.50). The probability of viral clearance at 30 days was 66% in HCQ group, 67% in HCQ + AZI group, and 69% in neither (p = .61).

Conclusions
Among COVID-19 patients in Taiwan, the use of hydroxychloroquine, alone or with azithromycin, did not shorten time to viral clearance. This result does not support recommending the use of these drugs in COVID-19 patients.
Background
Antiretroviral therapy (ART) is the core of Acquired Immunodeficiency Syndrome (AIDS) care and treatment. ART saves the lives of people living with the Human Immunodeficiency Virus (HIV) and prevents the development of opportunistic infections and transmission of HIV from mother-to-child. Yemen is one of the low prevalence countries for HIV/AIDS. ART initiated in 2007, and limited information is available. This study aims to describe the ART cases, enrollment, retention, and attrition rate among ART cases.

Methods
A retrospective descriptive analysis for the data of ART cases who were treated at ART sentinel centers in Sana’a Capital and Al-Hodeida city. Hard copies of the ART cards covering the period from January 2018 to October 2020 were obtained. Proportion, retention and attrition rates were calculated and p-value < 0.05 was used as the significant cutoff point.

Results
A total of 946 cases were enrolled in the two ART centers and 3% of them were pre-ART. Out of 920 ART cases, 629 (68%) were males, 600 (65%) were between 25–49 years old, 51% were married, 224 (24%) had a family member infected with HIV, and 433 (47%) presented with unknown clinical stage. 40% of all cases enrolled to ART within 3–7 days (43% in Sana’a Vs 24% in Al-Hodeida, pP < 0.001). 52% were treated with tenofovir/lamivudine/dolutegravir and 30% substituted the initial regimen within the 1st line. The ART retention rate was 92% and 83% at 12 and 24 months compared to 8% and 17% attrition rate, respectively.

Conclusions
The ART retention rate is high in Yemen. Increase the pre-ART counseling, improve recording data based on updated ART guidelines, and further study for defaulter risk factors is highly recommended.
Background
Hypertension is a key risk factor for cardiovascular disease and around a third of people with hypertension are undiagnosed, and of those diagnosed, half are not taking antihypertensive medications. Access to medicines is a universal right and this right denied by low availability and low affordability of medicines. In Ethiopia, lack of access to essential drugs is major challenge.

Methods
Facility-based cross-sectional survey was conducted from March 16, 2020–March 30, 2020 at 40 primary health care unit drug outlets of West Gojjam. Data was collected with an interviewer administered structured data collection tool and analyzed using SPSS version 23 ad Microsoft Excel 2016. Medicine prices were compared with facilities and sectors. The daily wage of the lowest paid government worker was used to measure affordability.

Results
The mean availability of essential drugs and diagnostic technologies at the primary health care units of West Gojjam was 62.5% and 67.5% respectively. The number of days wage needed for getting essential antihypertensive medications was two or more working days. All the available essential antihypertensive medications were in generic brands and not affordable for one month course of treatment. The private sector median price was two and more than two times the public sector price. The mean availability of essential diagnostic technologies at public and private sector was 69.3%, and 65.7% respectively.

Conclusions
Essential antihypertensive medications and diagnostic medical technologies for the clinical measure and treatment of hypertension are available at fairly high, but unaffordable for the wage of unskilled government worker, and for many peoples living under the poverty line of the country. The national NCD program should give an emphasis on improvement of access to affordable essential antihypertensive medications and diagnostic technologies for the diagnosis and treatment of hypertension at primary health care units.
Background

Community pharmacies can play a major role in public health services owing to their wide geographical distribution and location in the heart of community. Little is known about community pharmacists' role in public health in Egypt. This study aimed to determine the extent of community pharmacists' involvement in Assiut and identify barriers to their participation in public health activities.

Methods

Study was conducted in 150 randomly selected pharmacies, June–August 2019. Pharmacists working in the selected pharmacies were debriefed about the study objectives, asked to fill a self-administered questionnaire that include socio-demographic information, involvement, and barriers to providing public health services. Descriptive and inferential statistical data analysis was performed using SPSS.

Results

Overall 150 pharmacists filled the questionnaire; their mean age was (32.1 ± 7.7); 52.0% were males, and 62.7% had experience > 5 years. Overall level of involvement was (82.7%); it was higher for patients counseling (97.3%), dental health (90.0%), measuring blood pressure (83.4%), family planning (83.3%), measuring blood glucose (79.4%), normal body weight (77.8%), smoking cessation (77.4%) and infectious disease prevention (74.6%). Level was low for vaccination campaign (15.3%) and infectious disease surveillance (10.6%). Higher level of involvement was found in experienced compared to relatively new pharmacists (62.7% vs 37.3%, p < 0.01). Lack of knowledge (76.7%) and lack of profit (73.3%) were the most reported barriers for participation in public health services. Most of participants (90.6%) expressed their willingness for participation in future vaccination campaigns and 84.6% in infectious disease surveillance if requested.

Conclusions

Study showed that community pharmacists are playing important roles in public health services in Egypt especially in counseling and screening services. Training and motivation are required to better integrate community pharmacists into future public health programs especially in infectious disease surveillance and vaccination campaigns.
Investigation of COVID-19 Deaths among the Staff of a University in Aligarh, Uttar Pradesh, India, May 2021

Mukesh Kumar Prasad, Davendra Kuma, Sushma Choudhary, Vikasendu Agrawal, Tanzin Dikid

Background
Following multiple casualties at a University in Uttar Pradesh and 18 of the 20 COVID-19 positive samples randomly selected, had B.1.617.2 lineage, a team of two India Epidemic Intelligence Service Officers was deployed for epidemiological investigation of deaths in the university and to guide public health response based on findings to prevent deaths.

Methods
A COVID-19 death was defined as the death of an Aligarh university employee between 1 April to 14 May, 2021, who presented with symptoms of COVID-19 preceding death. We obtained a line-list of deceased university staff and reviewed their hospital records. We did verbal autopsies of COVID-19 deaths from their family members and collected information on co-morbidities, hospitalization, vaccination, and COVID-19 testing during illness. We collected information on monthly targets and achievements of COVID-19 vaccination in the University campus.

Results
We identified 29 COVID-19 deaths of university staff, all were males with a median age of 54 years (range: 37–62), 29/29 (100%) were symptomatic with 26/29 (90%) having fever, and 17/25 (68%) had comorbidities. The mean duration between onset of illness to sample collection and hospitalization was 7 days and mean oxygen saturation at the time of hospitalization was 78%; 26/29 (90%) of the deceased were on oxygen support; 16/29 (55%) availed ventilatory support; 5/29 (17%) were vaccinated with a single dose of COVID-19 vaccine. COVID-19 vaccination coverage was 11%, 37%, and 58% during March, April, and May 2021 respectively. Two of the deceased were healthcare staff and none were vaccinated. 14/21 (67%) were positive for COVID-19 by RT-PCR and 7/10 (70%) had B.1.617.2 lineage.

Conclusions
COVID-19 deaths among the University staff during April–May 2021 affected males and mostly those not vaccinated for COVID-19 and having pre-existing co-morbidity. We recommend prioritizing high-risk groups for vaccination and early diagnosis and timely hospitalization of COVID-19 suspects.
Sex-Based Variations in Clinical Manifestations, Co-morbidities, and Outcome of COVID-19 Patients in Baghdad, Iraq, 2020

Nameer A. Ali, Faris Lami

**Background**
A higher incidence of COVID-19 in males has been widely reported. However, whether clinical manifestations, comorbidities, severity, and outcome differ between males and females remains an area of active investigation. The objectives of this study are to compare the clinical features, comorbidities, severity, and outcome between male and female COVID-19 patients, Baghdad, Iraq, 2020.

**Methods**
We performed a records-based cross-sectional study by extracting sociodemographic, clinical manifestations, severity, and outcome data from the records of COVID-19 patients who tested positive for SARS-CoV-2 using the RT-PCR test and admitted to two COVID-19 hospitals (AlKarkh and AlFurat General Hospitals) in Baghdad, Iraq between June and August 2020.

**Results**
We reviewed a total of 2111 patient records with a history of COVID-19, and 1175 patients (55.7%) of them were males. We found that the following manifestations were significantly more common in females than males: respiratory symptoms (90.5% vs 87.6%; \( p = 0.034 \)), sore throat (14.0% vs 10.7%, \( p = 0.023 \)), and gastrointestinal manifestations (11.5% vs 7.2%; \( p = 0.002 \)). No significant difference was noted for fever, nasal congestion, conjunctival congestion, headache, and musculoskeletal manifestations. Generally, female patients had a significantly higher proportion of comorbidities than males (42.7% vs 36.0%; \( p = 0.002 \)). The proportion of severe and critical cases was not significantly different between males and females (\( p >0.05 \)). The mean time from diagnosis to the outcome was significantly longer in females (\( p = .034 \)), but the duration of the hospital stay showed no significant difference between males and females (\( p >0.05 \)). Finally, the case fatality ratio was higher in males (16.1%) than females (13.2%) (\( p = 0.022 \)).

**Conclusions**
Patients’ sex affects the clinical course and outcome of COVID-19 patients. Male patients may need more attention considering the higher case fatality ratio.
Background
Kerala, India’s southern state, reported the first case of COVID-19 in India at Thrissur district on 30 January 2020. Till 28 February 2021, Kerala reported 1,059,403 cases of COVID-19 and 4,197 deaths. Clinical manifestations of COVID-19 range from asymptomatic to acute respiratory distress syndrome and death. There is a lack of understanding of the epidemiology of COVID-19 deaths. We described the COVID-19 deaths in Kerala by time, place, and person.

Methods
We did a secondary data analysis of the deaths reported among the case-patients who tested positive for COVID-19 using rt-PCR. WHO definition for COVID-19 deaths was employed for the study. We collected the demographics and clinical information from the medical bulletins reported by the District Surveillance Units to the State Surveillance Unit between January and December 2020. We plotted the distribution of COVID-19 deaths by age, gender, comorbidity, hospitalization duration, and estimated deaths per million population by the district. Data was entered in MS Excel and analyzed using Epi Info version 7.2.3.1.

Results
Total COVID-19 deaths between January and December 2020 were 3,072. The maximum number of deaths occurred during October (821, 26.7%). Thiruvananthapuram District reported the maximum (21.4%) deaths. Among the reported deaths, 2,063 (67.2%) were males. The case fatality rate was highest during May 2020 (1.1%) and above 80 years of age (3.45%). Population mortality rates were also highest among above 80 years of age (593 per million). Of the COVID-19 deaths, 2,904 (95%) had comorbidities, with diabetes mellitus being the commonest comorbidity (54%). Also, 73% of the patients had category-C symptoms at the time of hospitalization.

Conclusions
The case fatality rate was higher among males and during May 2020. We recommend that early diagnosis and management of cases, especially in persons with comorbidities, is to be ensured.
Background
An indigenous baby born in a developing country is 14 times more likely to die in the first month of life than a baby born in an industrialized country. Infant mortality of indigenous children all over the world is higher than non-indigenous children. Geographical distance, access to biomedical services and healthcare practices are the main causes. This study describes children's diseases and mortality representations in indigenous communities living in the Colombian Amazon. It aims to understand the meanings and representations of the disease/sickness and the “native diseases” in children, and how these representations lead families to use or not biomedical services or being treated by shamans, specifically in three symptoms: diarrhea, fever, and respiratory problems.

Methods
This study presents findings based on participant observation in Uitoto, an Amazon native community and qualitative interviews with three groups of actors: pediatric healthcare professionals, three families from the Uitoto community and two shamans.

Results
Besides the reasons of indigenous infant mortality, another important factor is that the system does not include the Uitoto indigenous representations. Therefore, the community finds within their traditional medicine answers that biomedicine does not offer. Healthcare practices with the shaman are holistic and consider the different components of what they judge to be the origin of the disease: the individual, the family, the society, the jungle, and the spiritual world; consequently, indigenous population express to suffer from diseases that are not known by biomedicine and cannot be cured. They distrust biomedical practices and are more confident of their shaman. In addition, they state that ignorance of their health practices from health professionals is considered as discrimination.

Conclusions
The study shows the urgency of providing an adequate mediation between their representation of biomedicine and traditional medicine to provide an inclusive healthcare system, more so in the context of the COVID-19 pandemic.
Kluang Prison Acute Gastroenteritis Outbreak — February 2020

Jeyanthini Sathasivam, Thilaka Chinnayah, Harishah Talib, Shaharom NorAzian Che Mat Din, Noorhaida Ujang, Linayanti Rosli

Background
Prisons or correctional facilities offer fertile settings for the transmission of diseases due to overcrowding, lack of hygienic conditions and poor health care systems. On the 4 February 2020 at 3:00 pm, Kluang District Health Office received the first notification of a surge of acute gastroenteritis cases in the prison. After verification an outbreak investigation was done to identify the risk factors and institute appropriate control measures.

Methods
The clinic outpatient registry was reviewed, and active case detection (ACD) done to identify cases. Data was collected through interview and observation. Any person with history of three or more episodes of loose stools in a day AND fever or abdominal pain or headache or vomiting or nausea was included. A case control study with 3 cell mate contacts to a case was carried out. Logistic regression analysis was done to identify food habits, water habits and/or hygiene practices that contributed to the outbreak. Clinical samples, environmental samples were taken to determine the causative pathogen.

Results
Amongst 1494 prisoners in the affected blocks, 242 (16.2%) were ill. All reported diarrhea with 69.4% and 67.8% reporting fever and abdominal pain, respectively. Sharing drinking water with cell mates (OR = 2.77, CI: 1.41–5.46) and washing the water vessel twice daily (OR = 7.47, CI: 2.92–19.14) was associated with illness. Storage of water only in drinking cups was protective (OR = 0.27, CI: 0.12–0.61). Six stool samples were positive for rotavirus. Concurrent leptospirosis infection detected among three cases. Clinical samples, environmental samples, food and water samples detected Escherichia coli and Staphylococcus aureus.

Conclusions
This acute gastroenteritis outbreak was a mixed event of a rotaviral outbreak and a concomitant leptospirosis outbreak highlighting poor hygiene and sanitation practices contributing to the outbreak. Actions taken by elevating the level of hygiene and empowering the inmates to be responsible for own health.
Background
During August 2–5, 2020, Taiwan CDC was notified of > 120 travelers with gastroenteritis after dining at a buffet restaurant in Yilan. We investigated to identify implicated foods and causative pathogen.

Methods
We conducted a case-control study using an online questionnaire among two groups that ate on July 30 (group A) and August 1 (group B), with 111 and 65 diners, respectively. We defined cases as diners having any of the following symptoms ≤ 72 hours after eating at the restaurant: diarrhea, abdominal pain, nausea or vomiting. We conducted univariate and multivariate analyses of 103 foods consumed. We inspected restaurant and interviewed food handlers. Stool specimens from cases and restaurant workers, and environmental specimens were tested.

Results
Of the 78 and 42 respondents from two tour groups, 18 (23%) and 28 (67%) met case definition. In groups A and B, the most common symptoms were vomiting (n = 11, 61%) and diarrhea (n = 27, 96%), and median incubation periods were 43 (range: 2–62 hours) and 13 hours (range: 2–55 hours). Illness was associated with French fries (n = 9, OR = 10.5, 95% CI: 2.0–54.5) and apple juice (n = 9, OR = 5.1, 95% CI: 1.1–23.7) for group A; no associated foods were found for group B. Environmental investigation found daily chlorine levels of chlorinated groundwater sources used by the restaurant were < 0.2ppm during July 9–August 4; water samples were negative for norovirus. Eight restaurant employees were positive for norovirus; six were symptomatic (onset during July 28–August 3); seven diners tested positive for norovirus; all viruses were genogrouped GI.4.

Conclusions
Because few diners ate the epidemiologically implicated foods, transmission of norovirus most likely resulted from cross-contamination by sick restaurant employees. We recommend ensuring sick food handlers do not work, to maintain food safety.
An Outbreak of Food Poisoning after Consumption of Chicken Curry Contaminated with *E. coli* in an Old-Age Home, Kannur District, Kerala, India, 2019

Sachin KC, Rubeshkumar Polani, Deepak Rajan, Shaj MK, Mohankumar Raju, Prabhdeep Kaur

**Background**

WHO South-East Asia Region reports 150 million cases and 175,000 deaths of foodborne illness a year. *Escherichia coli* is one among the 31 organisms causing the foodborne disease. On December 31, 2019 medical officer of a Primary Health Centre in Kannur District Kerala, notified a cluster of food poisoning cases following reunion in an old-age home. We investigated the cluster to identify potential exposures and propose recommendations.

**Methods**

We defined a case as occurrence of loose stools (≥ 3 episodes) or vomiting in any attendees of the reunion party, December 30–31, 2019. We searched cases actively and described the cases by time, place, and person. We interviewed key informants to generate hypothesis. We conducted retrospective cohort study of the attendees of reunion party and computed relative risk (RR), 95% confidence interval (CI) and population attributable risk (PAR). We sent the food samples for laboratory analysis of microorganisms and synthetic food colors.

**Results**

Reportedly, 102 attended the reunion party, among them 40 (39%) developed food poisoning. Median age of the cases was 40 years (range: 8–92 years). Attack rate of food poisoning was 39% (40/102). Attack rate was higher among males [48%; (29/60)] than females [26%; (11/42)]; and among residents of orphanage [81%; (25/31)]. Among the cases, 25 (63%) were hospitalized and 2 (5%) died. Loose stool (95%) and vomiting (53%) were the most common symptoms reported by cases. Attack rate was higher among those who ate chicken curry [95%; (38/40)] than others [3%; (2/62); RR = 29.2; 95% CI = 7.5–115.3; PAR = 92%]. Chicken curry food sample was positive for *Escherichia coli*. During the investigation, we found that attendees ate the leftover chicken curry for dinner.

**Conclusions**

Outbreak of food poisoning among the attendees of reunion party was due to consumption of chicken curry contaminated with *E. coli*. We recommended to consume freshly prepared food items.
Clostridium Perfringens Suspected as Causative Pathogen of Foodborne Outbreak in a Wedding Party-Bantul District, Indonesia, March 2021

Fitriana Puspitarani, Yampa Ekxa Daidella Ghilari, Samsu Aryanto, Riris Andono Ahmad

Background
Foodborne disease still counts as one of morbidity and mortality in Indonesia. On 30th March 2021, Jetis 2 Public Health Center (PHC) was notified of 3 suspected food poisoning cases with diarrhea after eating packaged food at a wedding party. Investigation was initiated to confirm the outbreak and identify risk factors for control measures.

Methods
A 2:1 case-control study was conducted. Case was a person with one or more following symptoms: diarrhea, abdominal pain, and nausea after eating packaged food from a wedding party on 30th March 2021. Control was those who did not develop any symptoms after eating packaged food from a wedding party on 30th March 2021. Interview was conducted using structured questionnaires to the wedding guest, food handlers and those received food based on the distribution list. Environmental observation was done on the kitchen and delivery point of catering N. Food samples were collected and sent to the laboratory.

Results
There were a total of 400 packaged food distributed, of which only 109 people can be interviewed. A total of 72 cases identified with symptoms that mostly occur were diarrhea (88%), abdominal pain (57%) and nausea (19%). The incubation period was 3–23 hours with median 11 hours. Stir fry beef tongue (OR=4.33; 95% CI: 1.43–13.51) was the food item with the highest risk. We suspected Clostridium perfringens as the main pathogen according to incubation period and mode of transmission, however laboratory result indicated otherwise due to improper food sample processing. Contamination might have occurred as a result of poor processing practices, such as inappropriate food storage.

Conclusions
There was a food poisoning outbreak following a wedding party caused by stir-fry beef tongue that contaminated with Clostridium perfringens. Implementation and training regarding standard health and safety food handling need to be done for food caterer by district health office.
Background
Nairobi fly dermatitis is an unusual form of contact dermatitis caused by pederine, a secretion of insects belonging to the genus *Paederus*, which has higher concentration in tropical and subtropical areas. In Ethiopia, more particularly in Wolaita, Nairobi fly dermatitis is uncommon previously. Hence, the current study was to describe and identify the clinical characteristics and risk factors prone to the disease.

Methods
We conducted an unmatched case-control study (ratio 1:2). Individuals were defined as a case if he/she developed localized skin lesion in at least one or more exposed areas of the body from April 5 to 14, 2019. Controls were randomly selected asymptomatic lesion-free households during the outbreak period in the village. We interviewed participants and reviewed medical records for exposure and calculated odds ratios (ORs) for the association between illness and potential exposures. The environmental assessment had been carried out.

Results
A total of 45 cases of Nairobi fly dermatitis were identified, of which 27 (60%) were females. The commonly affected age groups were 8-15 years (n = 14, 31%). The common clinical manifestations were the erythmatovesicular lesions (18, 40%), burning sensation (32, 71%), and pruritus (28, 62%) respectively. Use of light during sleep (aOR = 8.5, 95% CI: 1.03–64.8), disposing of wastes near vicinity (aOR = 5.44, 95% CI: 2.09, 14.12) and proximity of dense vegetation or fruit in the vicinity (aOR = 7, 95% CI: 1.143–43.78) were independent predictors to contract Nairobi fly dermatitis.

Conclusions
Light on while sleeping, disposing of wastes near vicinity, and proximity of dense vegetation and/or fruits in the garden were the most likely risk factor for Nairobi fly dermatitis outbreak. We recommend organized vector control and light off while sleeping, clean excess vegetation and/or fruits, and disposing of wastes properly away from the accommodation.
Background
Scrub typhus (ST), a rickettsial disease, is an under reported and fatal illness accounting for 23% of all febrile illnesses. Sixteen Indian states reported ST outbreaks under central Integrated Disease Surveillance Programme (IDSP) between 2015–2019. After Mizoram, Rajasthan reported maximum cases (4,904) during 2018–2019 in their state reporting system. We described and evaluated the ST surveillance system in Alwar district, Rajasthan for selected attributes, descriptively analyzed lab confirmed cases and provided evidence-based recommendations.

Methods
To describe and evaluate the system, we reviewed IDSP records and conducted key informant interviews at district and block level. We framed the indicators for selected attributes using US Centers for Disease Control guidelines. Based on average performance of indicators, attribute score was ranked as excellent (90–100%), very good (80–89%), good (70–79%), average (60–69%) and poor (< 60%). We analyzed ST cases reported by state IDSP from 2017–2019.

Results
Suspected cases were referred to district hospital by passive or active surveillance for diagnosis and treatment. Line list of diagnosed cases was shared at block level for preventive measures. On reviewing records and conducting 26 key informant interviews, system scored flexibility (100%), acceptability (92%) and usefulness (100%), simplicity (79%) and stability (79%), data quality (48%), representativeness (48%) and timeliness (33%). Median age of cases was 35 years (range: 4 months to 93 years) with 70% males and maximum cases were reported between August to November 2019.

Conclusions
Active and passive surveillance are core interventions of ST surveillance system. We recommend regular monitoring of surveillance reports and registers at block and district level and ensure timely reporting of ST cases through IDSP. Preventive measures and active case search should be strengthened for high transmission months between August to November.
Background
The COVID-19 pandemic represents the greatest public health challenge in the last century. As SARS-CoV-2 spread around the world, its circulation overlapped with that of other pathogens, including the dengue virus. The outcome of the coinfection by these two viruses, in terms of diagnosis, treatment and prognosis, is not clear yet.

Methods
In this case series, patients with a positive result for SARS-CoV-2 and dengue virus, by RT-PCR, were identified in the special surveillance systems of the General Directorate of Epidemiology, between February 28 and July 23, 2020.

Results
Three cases are presented, with clinical manifestations ranging from mild to death. All three cases required supplemental oxygen and hospital management. The case that ended in death had a history of obesity and diabetes.

Conclusions
In Mexico, SARS-CoV-2 coexists temporally and geographically with dengue virus, the simultaneous infection of both viruses constitutes a diagnostic and therapeutic challenge. Knowing the clinical presentation of this coinfection represents the first step in proposing a clinical approach and a public health response to this challenge.
Dengue Outbreak — Ipil, Zamboanga Sibugay Province, Philippines, 2019: A Case-Control Study

Ma. Kasmira Maramag, Ludina Insigne, Ma. Ivy Rozeth Saavedra-Iturralde, Alethea De Guzman

Background
On July 16, 2019, the Department of Health received report on dengue clustering in Ipil, Zamboanga Sibugay. Investigation was done to determine the existence of an outbreak, identify source and mode of transmission, and determine risk factors.

Methods
Unmatched 1:2 case-control study was done. We conducted active case finding and entomologic survey in two barangays with high attack rate. We collected blood specimens from cases/controls to test for dengue polymerase chain reaction and enzyme-linked immunosorbent assay. Suspect cases were residents with fever for 2-7 days plus two of the following: rashes, flushed skin, headache, nausea/vomiting, body pain, abdominal pain, mucosal bleeding, and low platelet count from May 1 to July 25, 2019. Controls were asymptomatic residents and negative for confirmatory test.

Results
Cases started to increase in January and peaked in May. We identified 243 cases. Age ranged from 1–61 years (Median: 13). Majority (53%) were females. Three mortalities (CFR: 1.23%) were < 10 years old. Cases had fever, 160 (66%) headache, 159 (65%) abdominal pain, and 114 (47%) vomiting. Ipil had dry season (March–April) followed by intermittent rains (May). Water stored were uncovered. Garbage were collected weekly. Uncollected trash was left in backyards. Two barangays were dengue high risk: 60%–67% house index, 85–102 Breteau index, and 20–24 pupae per person. On multivariate analysis, top factors with increased odds of getting ill were: < 18 years old, 41.94 (95% CI: 7.44–236.60, p-value: < 0.0001); students, 21.15 (95% CI: 3.91–114.35, p-value: < 0.0001); and lived with suspect dengue cases, 18.22 (95% CI: 3.21–103.50, p-value: 0.0010). Twenty-two of 65 specimens were dengue IgM positive. Ten were PCR positive (Dengue 1–3).

Conclusions
There was a dengue outbreak. Intermittent rains, uncovered water containers, and uncollected trash contributed to increased mosquito breeding sites. Students were susceptible because they are usually out when Aedes spp. are active. We recommended protective measures—wearing long sleeves, using mosquito repellant, and strictly implementing mandatory clean-up drive.
Background
By 15 March 2020, India recorded 105 COVID-19 cases and 2 deaths. The first COVID-19 cases in Maharashtra were a couple with history of international travel. As the disease was new in India, we investigated to describe the epidemiology of initial case clusters.

Methods
We defined confirmed case as any person residing in Maharashtra from 1–23 March, 2020, with history of international travel in last 14 days or severe acute respiratory infections (SARI) of unknown cause or contact of confirmed case; and one nasopharyngeal swab test positive for SARS-CoV-2 by Reverse Transcription Polymerase Chain Reaction (RT-PCR). Contact was defined by National Centre for Disease Control India guidelines. We identified cases and contacts through Integrated Disease Surveillance Programme COVID-19 case investigation forms and telephonic interview.

Results
We identified 89 COVID-19 cases (median age = 38 years, range = 3–75; males = 65%, CFR = 2.2%) in Maharashtra from March 9 to 23, 2020. Of the cases, 64% were symptomatic and 17% had comorbidities. Mumbai district had the highest number of cases (36, 40.4%). Among cases, Mumbai airport was point of entry (PoE) for 66.3% (59/89) and 70% (62/89) were international returnees. Median days of symptom onset after arrival was 2 days (0 to 15 days). Contacts were traced for 46% (41/89). No exposure (history of international travel/contact with COVID-19 patient) was found in 4.5% (4/89). Mean contacts traced per case was 5 (range = 0–33) among 41 cases. Nearly half of the cases (53%) were from 15 clusters (size: 2 to 16).

Conclusions
The initial COVID-19 cases in Maharashtra were among adults, mostly international returnees landing in Mumbai. The case fatality rate was low. Contact tracing was incomplete. We recommended strengthening surveillance at PoE and initiate early contact tracing for all cases. No identified exposure in few cases raised the possibility of community acquired infection.
Background
Call centers are vulnerable settings to spread of COVID-19; due to employees’ main jobs being calling and talking during their whole working hours. However, two call center outbreaks in March 2020 in Korea displayed different outcomes; one came to be the biggest outbreak during the time period while the other came out much smaller. It was absolutely necessary to analyze the cause of difference between two events.

Methods
With analysis of the records obtained through investigations and outbreak control measure review, attack rates were analyzed by individual working seats, symptoms, age, and sex, and period of office-wide exposure to COVID-19 was estimated. Infection prevention and control measures implemented in each call center prior to outbreaks were assessed and individual seats were illustrated.

Results
In one call center (call center A), there were 94 confirmed cases of COVID-19 among a total of 216 workers (43.5%) and 84 confirmed cases among 109 workers working in a big room as part of teleworking group (77.1%). In the other center (call center B), there were 5 confirmed cases among a total of 69 workers and 5 confirmed cases among 66 workers in teleworking department. Exposure period of the teleworking department in call center A to COVID-19 was more than 4 times longer than that of call center B due to relatively late detection of the index case. Based on ‘Field Risk Assessment Checklist for COVID-19’, call center A was assessed to have higher risk compared to call center B in terms of prevention measures in business settings.

Conclusions
Active monitoring for COVID-19 and appropriate and timely infection prevention and control measures need to be implemented accordingly to business characteristics to prevent mass outbreaks of COVID-19.
Background
Pathanamthitta, a southern district in Kerala, reported 7,834 cases and 46 deaths due to COVID-19 between March and September 2020. To understand the spread and to guide the further course of action, we described the COVID-19 cases and deaths reported in Pathanamthitta district by time, place and person.

Methods
We extracted data on COVID-19 from the surveillance system of Pathanamthitta from March to September 2020. We defined a COVID-19 positive individual as a person tested positive for COVID-19 using RT-PCR/CBNAAT/Rapid Antigen test, irrespective of clinical symptoms. We calculated test positivity percentage (TPP) as the proportion positive among samples tested. We estimated the incidence of COVID-19 per million population and case fatality rate (CFR) by age, gender and local self-government (LSG) area.

Results
Of 7,834 COVID-19 positive individuals, the mean (SD) age was 38 (18) years, 60% were males, 16% travelers. The overall incidence of COVID-19 in Pathanamthitta was 234 per million population. The incidence was ten times higher in urban areas (13,210 per million) than in rural areas (1398 per million). CFR was 0.5% (46/7,834), higher among males (0.7%) than females (0.4%) and highest among individuals > 70 years (7%). Diabetes (67%) was the most common comorbidity among individuals who died due to COVID-19, followed by hypertension (65%). During the last week of September, TPP was 8%. However, TPP among the LSG areas varied between 4% and 40%.

Conclusions
Higher incidence in the urban area than in rural area could be due to high population density in the urban area and a well-established public health system in the rural area. Hence, increasing the workforce in urban areas and training them for surveillance and contact tracing can reduce transmission. Regular analysis of TPP at the LSG level will help identify the high transmission areas and priority areas for increased testing.
Assessment of Baseline Knowledge and Attitude of COVID-19 among Hotel Staff in Kigali, Rwanda, 2020

Aphrodix Hagabimana, Olivier Nsekuye, Noella Benemariya, Jared Omolo, Albert Ndagijimana

Background
The World Health Organization declared coronavirus disease 2019 (COVID-19) a global pandemic on 11 March 2020. By 17 July 2020, there were over 13, 616,593 cases and 585,727 deaths had been reported worldwide. Hotels and other public establishments have been associated with higher transmission rates. Sensitization of staff and strengthening of Infection Prevention and Control (IPC) practices in such settings are important interventions. This study assessed the baseline knowledge and attitudes on COVID-19 among staff in selected hotels in Kigali, Rwanda.

Methods
This cross-sectional study was conducted among hotel staff during the third week of July 2020. A structured questionnaire was self-administered to 104 consenting participants. Knowledge and attitudes were determined using a number of questions and mean scores used to dichotomize participants’ responses as satisfactory or unsatisfactory. Data were entered into Epi info software and analyzed in Stata v13. Findings were summarized using frequencies and bivariate and multivariate analyses performed to identify predictors of satisfactory knowledge and attitudes.

Results
All 104 hotel staff completed the questionnaire. Sixty-seven percent (n = 70) were male, 58% (n = 60) were aged 30–44 years, and 35% (n = 36) worked in food and beverage. The overall score for satisfactory knowledge was 63% (n = 66) with SD of 6.75 and overall satisfactory score for attitude was 68% (n = 71) with SD of 7.
Compared to those with secondary education or less, participants with university education were more likely to have satisfactory knowledge (AOR: 2.6, 95% C.I: 1.07–0.658). While those working in the front office (AOR: 0.5; 95%, C.I: 0.006–0.541) and housekeeping (AOR: 0.09; 95% C.I: 0.01–0.8) were less likely to have satisfactory attitudes compared to administrative staff.

Conclusions
Hotel staff with unsatisfactory knowledge and attitudes need to be trained on appropriate infection prevention and control practices in order to mitigate the risk of COVID-19 transmission in such settings.
Background
Approximately 300 persons were hospitalized in Eluru city district hospital in West Godavari district with seizures or sudden loss of consciousness (LOC) in early December 2020 soon after the area was hit by cyclone Nivar. We conducted a public health investigation to describe the epidemiology, identify the cause and recommend preventive measures.

Methods
We defined a suspect case-patient as a West Godavari district resident with an episode of seizure or LOC during December 1–15, 2020. We reviewed medical records and performed home visits to identify cases. We conducted a 1:1 case-control study among Eluru city cases. A control was an Eluru City resident aged > 1 year with no history of LOC or new-onset seizure during December 1–15, 2020. We also reviewed blood, urine, and household water sample tests conducted by state reference laboratories as part of a separate investigation.

Results
The first case was reported on December 1, 2020, with 545 cases (56% males) reported during December 1–15, including one death. Cases rapidly increased, peaked on December 5 and gradually declined thereafter. The median age was 27 years (range: 1–80), and 88% (478) were from Eluru city (59 of 62 wards affected). Among cases, 90% (491) reported seizures, 10% (54) LOC; 90% (310) reported complete recovery. Case-patients (90%) were more likely than controls (66%) to report only drinking municipal water (OR = 4.8, CI: 2.2–10.3). Test results revealed the presence of organophosphorus/organochlorine in 74% (67) of collected blood samples, 89% (8) urine samples, and all 20 household water samples.

Conclusions
Our investigation revealed an outbreak of self-limiting, acute neurological illness associated with drinking municipal water contaminated with organophosphorus/organochlorine following Cyclone Nivar. We recommended continued surveillance for acute neurological illness, routine water testing, and future protection of municipal water supplies following natural disasters.
Background
Leyte has several schistosomiasis endemic areas. On November 26, 2018, the Epidemiology Bureau received a report of confirmed schistosomiasis cases in a non-endemic area in Leyte Province. An FETP team was sent to verify the diagnosis, identify source, and determine risk factors.

Methods
A 1:2 case-control study was done. A suspect case was any previously well individual of Baybay City with non-specific abdominal symptoms, blood in stool or hepato(spleno)megaly from June to December 2018. A confirmed case is an individual of Baybay City with presence of eggs in stool (Kato Katz test) and were included in the analytic study. Controls were asymptomatic individuals with negative Kato Katz test results. We conducted malacological and environmental surveys.

Results
There were sixty-eight cases identified. Thirty-six (53%) were males. Age ranged from 5 to 77 years (Median: 47). Cases started to appear on August 15, 2018, and peaked by end of November. Open defecation was practiced. Farmers usually go to nearby schistosomiasis-endemic municipalities for trade. Residents engaged in farming, gardening, and domestic and recreational activities in nearby rivers without using personal protective equipment. *Oncomelania quadrasi* snails infected with schistosomiasis were identified in marshland and streams. Bathing in open water sources (OR = 5.11, 95% CI = 1.99–13.07) and history of travel to endemic areas (OR = 2.51, 95% CI = 1.02–6.18) were risk factors.

Conclusions
There was emergence of intestinal schistosomiasis in a previously non-endemic area. Most of cases were farmers who were probably exposed to bodies of water positive for infected snails when they engaged in agricultural activities in schistosomiasis-endemic municipalities. Infected individuals practicing open defecation in their hometown increased the risk for schistosomiasis transmission. Cases found have been treated. We recommended that sanitary toilets be built in the area, and residents be educated about the disease. Surveillance is being continued in the area.
Sudden Deaths due to Leakage of Lindane, a Hazardous Chemical, Jalalpur Village, Sitapur, Uttar Pradesh, India, 2020: A Field Epidemiological Investigation

Piyush Jain, Alka Sharma, Vikasendu Agrawal, Amit Kapoor, Prashant Bhat, Mohankumar Raju, Rubeshkumar Polani, Prabhdeep Kaur

Background
Accidental chemical leakages cause devastating effects on humans and animals. On February 6, 2020, seven deaths were reported following a hazardous chemical leakage in Jalalpur village. We investigated this event to identify the reasons for its occurrence.

Methods
We defined a case as sudden onset of breathlessness/headache/nausea/death in Jalalpur, February 6–7, 2020. We conducted a house-to-house case search, collected information on demographics and symptoms. We calculated attack rate and case-fatality rate (CFR) by age and gender. We conducted an environmental investigation and interviewed a few key informants about the sequence of events. We sent the chemicals from the leakage site for forensic analysis. We obtained the cause of death through autopsy reports.

Results
Out of 2,942 residents, we identified 23 cases (attack rate = 8 per 1,000). The median age of the case was 42 years (range: 2–64 years), and the attack rate was higher among males [13 per 1000, (19/1,402)]. Predominant symptoms were breathlessness (65%), headache (52%), nausea (52%), and metallic taste (43%). Among the 23 cases, seven were deceased (CFR = 30%). Among the deceased, five were males, and three were aged < 15 years. Attack rate was higher among those who slept/present at the leakage site < 4 hours [100%, (23/23)] than others [0%, (0/2919), p < 0.001]. Death was higher among those who slept within 150 meters of leakage [100%, (7/7)] than others [0%, (0/16), p < 0.001]. Environmental investigation revealed leakage of chemicals from the chemical waste storage tank and also identified the death of three dogs. Forensic analysis confirmed the leaked chemical as Lindane (gamma-hexachlorocyclohexane), and autopsy reports confirmed the cause of death as asphyxia.

Conclusions
The sudden deaths in Jalalpur were due to asphyxia following leakage of Lindane from the chemical waste storage tank. We recommend the usage of leak-proof tanks for the storage of chemical waste.
Background
The COVID-19 pandemic has shown that the protection of health workers is key to guaranteeing the proper functioning of the hospital system. The National Psychiatric Hospital has a population of 1,318 health workers, and is one of the national hospitals specialized in mental health in Costa Rica. During epidemiological week 27 the first case of SARS-CoV-2 was detected in one of the officials, initiating an outbreak that lasted until week 45, despite the use of protective measures. The objective of the study was to analyze the factors associated with the presence of the outbreak in order to contain it.

Methods
We conducted a case-control study with 140 cases and 280 controls. Characteristics of the outbreak are described, the OR 95% CI was obtained for the main associated epidemiological factors, and the risk attributable (RA) to the exposed of the significant variables is calculated.

Results
A total of 140 positive cases of SARS-CoV-2 were recorded during the 19 weeks. The index case was contagious at home, 40% of the cases were nursing personnel, 26% were security personnel, 14% were cleaning, 12% were maintenance, 8% were others. Mean age was 38 ± 9 years, 34% were asymptomatic, 67% had one or more symptoms. No significant differences were found regarding age and sex. Associated factors were sharing consumption of food (OR = 37; 95% CI [21–67], RAexp = 97 p < 0.05), use of informal spaces for feeding (OR = 21, 95% CI [13–37], RAexp = 95), and distance (OR = 4, 95% CI [2–7], RAexp = 76%). The highest concentration of cases occurred in epidemiological week 33; attack rate was 0.10.

Conclusions
Sharing food and the use of informal spaces for food were the means of spreading the outbreak. The elimination of informal spaces and redesign of the employee dining room to maintain social distancing during mealtimes were recommended, and sharing food was prohibited. The outbreak was controlled and its spread to patients was prevented.
Descriptive Epidemiology of COVID-19 Affected Health Care Personnel (HCP), from a Tertiary Care Cancer Hospital of Delhi, March–May 2020

Nishant Nirwan, Arvind Kamboj, Vaisakh TP, Sushma Choudhary, Tanzin Dikid, Sudhir Kumar Jain, Sujeet Kumar Singh

Background
Health Care Personnel (HCP) constitute a high-risk group for acquiring and spread of COVID-19. We investigated a cluster of COVID-19 affected HCP in a tertiary care cancer hospital (TCCH) of Delhi in March 2020, to describe the epidemiology and identify exposures.

Methods
A case was defined as nasopharyngeal swab positivity for SARS-CoV-2 by Reverse Transcription Polymerase Chain Reaction in an employee of TCCH from March 1–May 2, 2020. We interviewed index case for exposures and identified cases from a list of laboratory confirmed SARS-CoV-2 positive HCP. We collected information on demographics, exposures and PPE use in TCCH. PPE use was categorized as always, and others (sometimes or never) depending on reported usage frequency. We stratified cases into aerosol generating procedure (AGP) and non-AGP group. We analyzed data using EpiInfo-7, calculated median, interquartile range and proportions.

Results
Index case was a 33-year male physician working in TCCH, a non-COVID hospital. He was exposed to persons from COVID-19 affected countries and a patient admitted with respiratory distress. During physical examination, index case used standard precautions. We interviewed 25 HCPs. Cases (median age = 35 years, interquartile range = 31–39; 14 (56%) females) comprised of nurses (15, 60%), non-technical staff (5, 20%), physicians (4, 16%) and lab technician (1, 4%). Among cases, 18 (72%) worked in general ward and eight (32%) in emergency. Eighteen (72%) cases were symptomatic and 7 (28%) were asymptomatic. Of 25 HCPs, 18 (72%) were involved in AGPs. AGPs were done under standard precautions (16/18, 64% followed hand hygiene and wore gloves and mask; 14/18, 56% wore aprons), face-shields/goggles and N95 masks were not used. In non-AGP group, 7/7 (100%) followed hand hygiene and wore masks, 6/7 (86%) wore gloves and 2/7 (33%) wore apron.

Conclusions
To minimize occupational transmission of COVID-19, there is an urgent need to strengthen infection control practices in non-COVID hospitals.
Clusters of Hepatitis C Virus Infection among Patients Receiving Chronic Hemodialysis in Three Hemodialysis Facilities — Northern Region, Taiwan, 2019–2020

Pei-Yuan Wu, Ju-Hui Lin, Wei-Lun Huang, Chia-ping Su

**Background**
Hepatitis C virus (HCV) transmission in hemodialysis facilities has been reported. However, the transmission route of sporadic cases is difficult to clarify. Taiwan CDC received reports of 4 patients with acute HCV infection from facility A in May 2019, and a patient from facility B in March 2020. Preliminary investigation revealed that three of them had been hospitalized in hospital C during their incubation periods. To prevent further transmission, we conducted an investigation to identify possible cause for infection.

**Methods**
We defined cases as hemodialysis patients with anti-HCV antibody seroconversion within 12 months. Facilities with cases were required to screen anti-HCV antibody of all HCV negative patients every 3 months until 6 months after identified the last case. We checked HCV RNA for case patients then used gene sequencing and phylogenetic analysis to evaluate the similarity between patients’ viral genomes. Public health authorities interviewed patients and staff, reviewed medical records, and made multiple on-site observations to identify possible epidemiological link and infection control lapses.

**Results**
Facility A identified additional five cases (attack rate [AR] 1.2%) during August 2019–November 2020. Two of nine cases of facility A were linked with a case in facility B because their RNA similarity was > 95%. They had been hospitalized and dialyzed in the same inpatient hemodialysis facility of hospital C during their incubation periods.
Facility B identified two additional cases (AR 3.5%) in June 2020. Viral sequencing revealed that these two cases were genetically linked (RNA similarity > 97%) to a patient with chronic hepatitis C on the same shift. On-site inspections found nonadherence to safe injection practices, hand hygiene, and environmental cleaning protocols.

**Conclusions**
The investigation confirmed two different sources of infection among patients from three facilities. Gene sequencing for patients with acute HCV infection in hemodialysis facilities can help identify transmission linkage and recognize potential outbreaks.
Background

Traumatic injection neuropathy (TIN) is an injection induced paralysis; it can occur due to unsafe intramuscular (IM) injection practices into the buttock. However, the IM injection is a continuing problem and the incidence of TIN in Yemen was unknown from 2013–2018. Therefore, this study aimed to describe the epidemiological characteristics of the TIN and suggest recommendations for prevention.

Methods

This a descriptive study was based on the case records of acute flaccid paralysis (AFP) surveillance data collected between 1 January 2013 and 31 December 2019, which reviewed to identify the reported cases of TIN. EPI-INFO version 7.2 was used for data analysis.

Results

Out of 3,887 cases of AFP were reported, 1,049 cases were TIN. The most affected group by TIN was 1–5 years, males were significantly more than females ($P = 0.00004$) (male/female rate ratio, 1.8: 1). The overall incidence rate was high (13.6/1000,000 of population) and the highest rate was in Souqatra followed by Alhudaidah and Hajjah governorate (35, 33, 30/1000,000 of population), respectively. Some seasonality was observed with 29% of cases occurring in winter and the peak was in January. Residual paralysis 60 days after the onset of paralysis was more common in 40% of TIN cases.

Conclusions

In conclusion, this study showed TIN is the most common cause of AFP in Yemen followed by Guillain-Barré Syndrome. Increasing community awareness on the dangers of unnecessary and unsafe injection is recommended.
Background
Malaria remains a serious public health issue globally, even though it is preventable and curable. In 2018, there were an estimated 228 million cases of malaria, with 405,000 deaths worldwide. In Cambodia, malaria has been endemic since the 1950s, and improvements in control and access to care have reduced its burden. However, malaria persists with changing epidemiology and resistance to antimalarials. This study aimed to describe how malaria has evolved spatially from 2006 to 2019 in Cambodia.

Methods
We undertook a secondary analysis of existing malaria data from all government healthcare facilities in Cambodia. The epidemiology of malaria was described by sex, age, seasonality, and species. Spatial clusters at the district level were identified with a Poisson model.

Results
A total of 737,210 malaria cases were notified to the HMIS between 2006 and 2019. Overall, incidence decreased from 7.4 cases/1000 population in 2006 to 1.9 in 2019. The decrease has been drastic for females, from 6.7 to 0.6/1000. Adults aged 15–49 years had the highest malaria incidence among all age groups. The proportion of Plasmodium falciparum + Mixed among confirmed cases declined from 87.9% (n = 67,489) in 2006 to 16.6% (n = 5,290) in 2019. Clusters of P. falciparum + Mixed and P. vivax + Mixed were detected in forested provinces along all national borders.

Conclusions
There has been a noted decrease in P. falciparum cases in 2019, suggesting that intensification plan should be maintained. A decline in P. vivax cases was also noted, although less pronounced. Interventions aimed at preventing new infections of P. vivax and relapses should be prioritized. All detected malaria cases should be captured by the national surveillance system to avoid misleading trends.
Background
The World Health Organization World Malaria Report of 2019 indicates that an estimated 228 million cases of malaria occurred worldwide in 2018. More than 75% of the total area of Ethiopia is malarious, making malaria the leading public health problem in Ethiopia. Adherence to clinical guidelines improves the quality of care received by the patients, thus improving patient outcomes. This study investigated healthcare workers’ adherence to malaria testing and treatment guidelines in selected private clinics of Gambela town, Ethiopia.

Methods
A mixed study design involving retrospective review of 425 patient files and 20 healthcare worker interviews was implemented. Data were collected using pre-tested data collection forms. The collected data were then cleaned and entered into statistical software for analysis, with a level of significance set at < 0.05. A qualitative analysis was also conducted using healthcare worker interviews to identify the existing barriers to guideline adherence.

Results
Among the 430 cases of suspect malaria, only 65% were tested (by microscopy or RDT) for malaria. Of those tested, 78.4% tested positive and 25.5% tested negative for malaria. The most common co-morbidity in the patients treated for malaria was anemia (29.9%) followed by gastroenteritis (9.9%). Patients with co-morbidities were more likely to receive appropriate treatment (p = 0.03) compared with those with none. All healthcare workers interviewed were aware of the existence of the malaria treatment guidelines. However, many were not aware of the contents of the guidelines and only 40% had been trained on the guidelines. Overall, 85% of the workers claimed to adhere to guidelines, with 15% claiming non-adherence.

Conclusions
The gap between knowledge of the malaria treatment guidelines and their application by healthcare workers remains wide. The level of knowledge of these guidelines was also low. Continuous training, follow-up, supportive supervision, and improved adherence to the malaria guidelines are therefore recommended.
Background
The national health situation is characterized by high morbidity and mortality with a high incidence of malaria. Nationally, malaria was the leading cause of consultation (45.7%), hospitalization (45.6%) and death (25.2%). At regional and health district levels, we have an increase in incidence. The main findings observed are, among others, the increase in incidence and the large discrepancy between surveillance data and routine data.

Methods
This was a cross-sectional descriptive study. The target population consisted of health facilities, health workers from the DS and cases of malaria. Systematic random sampling made it possible to choose 8 health workers and the reasoned choice of 26 health workers. The interview and the document review were the techniques used with a questionnaire and a content analysis grid as tools. Data analysis was performed using Epi info software version 7.2.3.1

Results
In view of the attributes that we assessed, we can state that the malaria surveillance system is performing well in the ND of N’dorola. Indeed, 61.54% of agents found the system to be useful. The steps/procedures were found to be simple and easy to use. Regarding acceptability, the completeness of TLOH and RMA reports is 100% for all health facilities; as for promptness, some health facilities were not prompt during the year 2018. Also, the confirmation of all malaria cases by RDT was taken into account by the surveillance system in 2018 and many other aspects.

Conclusions
The evaluation resulted in a satisfactory performance of the malaria surveillance system in the health district of N’dorola in 2018.
Background
In Yemen malaria still a serious public health concern. On September 29, 2020, electronic Integrated Diseases Early Warning System reported an increasing of malaria cases in Bani Sa'ad district, Almahwit governorate. On September 30 2020, a team from field epidemiology training program was sent to confirm the outbreak, determine risk factors and recommend control measures.

Methods
Descriptive study followed by case-control study (1:2 ratio) was conducted. Case was any person had fever with positive RDTs. Control was a person with no fever, negative RDTs and lived in the same area. Data were collected on individual, environmental and behavioral risk factors. OR, 95% CI were calculated. P value < 0.05 was considered as significant cut point. 24 blood samples were collected for lab confirmation.

Results
Twenty-four cases met case definition. Males were 58%. Age group of 9– < 18 years old was 33%. High density of adult anopheles was found inside houses (27.8/ one room). There were significant associations between malaria and presence of opened water tanks (OR 5.6, CI: 1.9–16.3) and no use of ITNs (OR 7.6, CI: 2.3–25.8).

Conclusions
Malaria outbreak was laboratory confirmed. The identified risk factors have been proven to contribute in malaria infection. Implementation of control and prevention measures to alter related factors as removing vector's breeding sites, making regular spray campaigns and distributing mosquito nets were recommended.
Oral Presentation Session 17: Vaccine Safety

Incidence of Adverse Events Following Yellow Fever Mass Immunization Campaign — Katsina State, Nigeria, 2019

Amadu Lawal, Suleiman Kabir, Shamsu Yahaya, Nafisa Sani, Alhaji Aliyu, Muktar Tukur, Sufiyan Muawiyya Babale, AbdulHakeem Olorukooba, Ahmad Umar Ayuba, Lawal Biliaminu, Muhammad Shakir Balogun, Patrick Nguku

Background
Yellow Fever (YF) outbreak has remained a public health problem despite the availability of effective vaccine. On August 20, 2019, the Katsina State Primary Health Care Agency reported an outbreak of YF. By October 11, 2019, 16 confirmed and 80 suspected cases had died. In response to the outbreak, a massive immunization campaign was conducted from September 25–October 10, 2019, in addition to early reactive vaccination. YF vaccination carries a risk of inducing Adverse Event Following Immunization (AEFI). We, therefore, conducted AEFI surveillance to detect, confirm, report, and respond to it in a timely manner.

Methods
We conducted a prospective study among individuals aged 9 months–44 years who were vaccinated with the YF vaccine. All health workers who participated were trained before the campaign to identify, confirm and respond to AEFI cases, complete case report forms, and send daily reports to the State Emergency Operation Center electronically. All serious AEFI cases detected were fully investigated. The time interval for detecting AEFI was from vaccination to 42 days after vaccination. Data collected were analyzed to describe the incidence and distribution of AEFI cases.

Results
A total of 6,857,826 doses of the YF vaccine were administered to all persons aged 9 months to 44 years. The administrative vaccination coverage recorded was 86.6%. The overall incidence of AEFI was 29.6/1,000,000 doses with no death. The incidences of non-serious and serious AEFI were 28.0/1,000,000 doses and 1.6/1,000,000 doses respectively. Males accounted for 2,915,863 (45.7%) of persons immunized, with 99 (48.8%) of them constituting non-serious cases and 5 (45.5%) serious cases of AEFI. Anaphylactic shock constituted 72% of the serious AEFI.

Conclusions
The incidence of AEFI recorded was lower than what was reported in other African settings, indicating that YF vaccine is still safe. We recommend enhanced AEFI surveillance during both routine and supplemental immunization activities.
Background
An efficient immunization program is key to containing the COVID-19 pandemic. To increase vaccine coverage, it is important to understand factors influencing willingness to vaccinate in general population and target groups.

Methods
We performed a population-based, random telephone survey to assess the knowledge, attitude and behavior of adults aged ≥ 18 years toward COVID-19 vaccine during January–February 2021. We collected participants’ demographic information, including age, gender, and occupation. To understand the acceptance in priority groups, we included ≥ 500 healthcare workers and 250 first-line public health practitioners. We measured the willingness by asking if they would accept a COVID-19 vaccine when the emergency use authorization is issued and factors that can increase their willingness to vaccinate. We assessed the associations between sociodemographic characteristics, perceived effectiveness and safety with acceptance of COVID-19 vaccine by chi-square test.

Results
Of the 1,522 participants surveyed, 1,005 (66%) reported willingness and 424 (28%) reported unwillingness to vaccinate; 93 (6%) were unsure or unknown. The acceptance of a COVID-19 vaccine among healthcare workers and first-line public health practitioners were 65% and 75%, respectively. Compared to other age groups, participants aged 36–45 years were less likely to receive a COVID-19 vaccine (78% vs 65%, p < 0.01). Only 32% of the participants intended to vaccinate as soon as possible 59% of the participants will delay the vaccination for at least one month. Participants who believed vaccine is effectiveness were more likely to receive COVID-19 vaccine (83% vs 59%, P < 0.01). In addition, the willingness to vaccinate was increased in 30% of the participants when the effectiveness and safety of COVID-19 vaccine has been confirmed.

Conclusions
The acceptance of a COVID-19 vaccine varied by age, occupation, perceived effectiveness and safety of the vaccine. Continued promotion and education about vaccine in different target groups are needed to increase the acceptance of COVID-19 vaccine.
Analysis of Death Cases and Adverse Events Following Immunization (AEFI) with Influenza Vaccines in the 2020–2021 Season in the Republic of Korea — Focused on Social Panic and the Reported Rate of Adverse Events

Hee Kyoung Kim, Seokkui Lee

Background
The number of reported cases of serious adverse events following influenza immunization increased rapidly in the 2020–2021 season that the cold-chain issue related to vaccine safety occurred. The purpose of this study is to compare the differences of adverse events reported following influenza immunization between the 2019–2020 and 2020–2021 seasons and analyze media coverage and severe adverse events reported in the 2020–2021 season.

Methods
We investigated adverse events reported within 4 weeks after influenza immunization from September 8, 2020 to February 28, 2021. We conducted case-case study to analyze adverse events reported in the 2019–2020 season (control group) and 2020–2021 season (experimental group) by age and International Classification of Diseases (ICD-10). We retrieved the weekly number of press articles in 2020 that contained the following keywords: “influenza” AND “vaccination” OR “immunization” OR “death”.

Results
The number of reported adverse events per 100,000 population vaccinated were 14.8 cases in 2020–2021 season and 1.07 in 2019–2020 season respectively. It showed that the reported cases of AEFI in 2020–2021 were 14 times higher than those in 2019–2020. The most reported rate of adverse events by age was 3.39 (per 100,000 population vaccinated) in 70s in the 2020–2021 season and 0.23 under 10 and 60s in the 2019–2020 season respectively. The reported rate (1.1) of severe adverse events in 2020–2021 was increased 110 times than those (0.01) in 2019–2020.

Conclusions
There was a difference in the reported rate of adverse events following influenza immunization by age and ICD-10 in the 2019-2020 and 2020–2021 seasons. These differences show the necessity and importance of transparent risk communication and prompt investigation for adverse events following influenza immunization.
Background
Dengue is the most prevalent urban mosquito-borne viral disease with high public health burden in Singapore which experiences periodic dengue outbreaks despite maintaining the overall Aedes house index under 1%. In 2020, during the COVID-19 pandemic, a resurgence of epidemic dengue was observed, with the highest ever annual incidence reported in Singapore.

Methods
To understand the situation, we examined the changing epidemiology of dengue, with data on demographics (2014–18), dengue serotypes, severity (2014–20) and environment extracted from government websites.

Results
2020 saw 35,315 cases, which was a three-fold increase compared to the average number over previous years. From 2014–20, less than 1% of all cases were notified as severe dengue ($p$-for-trend = 0.358) with a case fatality ratio of less than 0.2% ($p$-for-trend = 0.125). Cases were predominantly aged 25–44 years (47.1%) and male (62.5%), however the rates among those aged $\geq$ 65 years increased significantly ($p$-for-trend = 0.03). The incidence rate among foreigners was higher compared to residents from 2014 to 2016, but decreased thereafter. The number of clusters fell from 1,418 (2014) to 245 (2018), but rose to 3128 (2020). The predominant serotype was DEN-1 (79.4%) in 2014 but switched to DEN-2 from 2015 onwards (> 45%). DEN-3 and DEN-4 cases increased dramatically from 2014 (2.5%, 0.2%) to 2020 (24%, 27.2%).

Conclusions
Despite the spike of dengue in 2020, the number of severe dengue cases remained low. All four dengue virus serotypes were in circulation locally, but the predominant strain was found to have switched from DEN-1 to DEN-2. Multifactorial contributions to the observed resurgence in 2020 included changing dengue virus serotypes, low herd immunity in at-risk populations, favorable conditions for mosquito breeding brought on by warmer weather and increased rainfall, and reduced vector control activities by pest control operators during pandemic lockdown.
Background
After nineteen years of being free from wild polio virus, the Philippines reported a confirmed vaccine derived poliovirus type 2 (VDPV2) case on September 19, 2019. The case was a three-year-old girl from Marogong, Lanao del Sur. We conducted an investigation to look for evidence of circulation of the virus in the community.

Methods
We profiled the case, conducted a healthy children stool survey among children aged < 15 years and reviewed the vaccination status of children aged six weeks–59 months. An active search for acute flaccid paralysis (AFP) cases in health facilities and community was done. We also reviewed routine OPV and IPV vaccination coverage from 2014 to 2018 and interviewed local health authorities on sanitation and their water supply. We conducted an environmental survey and collected water samples from a nearby river.

Results
The case was born in Manila and received one dose of OPV before migrating to Marogong, Lanao del Sur. She was reported as an AFP case and stool samples collected. Her stool samples were positive for VDVP2. No VDPV2 was detected from close contacts nor healthy children surveyed. No other polio cases were found in the province. Among the surveyed children, only 8 (23%) were given OPV3 while 3 (8%) received IPV. Both OPV and IPV coverages for the last 5 years were < 90%. Households used a communal toilet and had a piped water supply. Solid waste was buried or burned. Open defecation was being practiced. River water samples were negative for poliovirus.

Conclusions
The VDPV detected from the case was classified as cVDPV2 since it was genetically-linked to VDPV2s from environmental samples in Manila and Davao. Low polio vaccination coverage and poor environmental sanitation facilitated circulation of VDPVs. Response measures included supplemental immunization activities using mOPV2, enhanced AFP surveillance and environmental surveillance.
Background
COVID-19 pandemic hit Bangladesh in March 2020 and the government declared general holidays from 26 March 2020 to contain the disease. However, considering the economic constraints, the ready-made garments industry, which contributes 11.2% of the National Gross Domestic Product, was opened from 26 April 2020. In such a situation, it was important to conduct a seroepidemiological survey to understand the extent of SARS CoV-2 infection and factors associated with it among the garment workers.

Methods
We conducted a cross-sectional seroepidemiological survey among randomly selected garment workers from five garments of Gazipur district during October 1–15, 2020. We collected 5 ml of blood from them for conducting the antibody test using Abbott Alinity™ SARS-CoV-2 IgG antibody kit (sensitivity 90.6% and Specificity 100%). We also interviewed them with a semi-structured questionnaire and analyzed the data calculating odds ratio and 95% CI.

Results
We enrolled 550 workers, among which 545 (99%) participated in the study. The mean age of the participants was 30.3 (SD = 8.7) years, and 51.1% (283) were female. Among the participants 16% (88) were tested positive for SARS-CoV-2 antibodies, of which 76.1% (67) were asymptomatic. Male had a higher possibility of being COVID-19 positive than female (OR: 2.7; 95% CI 1.6–4.4). Results also found that 40 + years of age (OR: 1.9; 95% CI 1.0–3.4), comorbid condition (OR: 6.8; 95% CI 4.0–11.5), past contact history (OR: 3.5; 95% CI 2.1–4.4), smoking (OR: 1.7; 95% CI 1.1–2.5) had higher odds of getting COVID-19 disease. The study also revealed that not using mask properly (OR: 2.0; 95% CI 1.2–3.0), not maintaining social distancing (OR: 1.9; 95% CI 1.2–3.4) had a higher chance of getting COVID-19 disease.

Conclusions
This study revealed evidence of SARS-CoV-2 transmission in garment workers. Findings suggested that maintaining healthy behaviors, mask use and social distancing, both inside and outside of the factory premises might help to reduce the transmission of SARS-CoV-2.
Background
SARS-CoV-2 infection produces a detectable immune response in most cases reported to date. A serological test can capture previously asymptomatic infections and help to assess the immune status of a subject. Iraqi healthcare workers are highly vulnerable to COVID-19 infection mainly because of the shortage of personal protective equipment (PPE). Al-Sader city is an overcrowded neighborhood in Baghdad which makes the healthcare workers serving there even more vulnerable to COVID-19. The objective of this study was to determine the seroprevalence of COVID-19 infection among healthcare workers working in Primary Healthcare Centers (PHC) in Al-Sader City, Baghdad, Iraq, 2020.

Methods
A cross-sectional study was conducted in nine PHCs selected by a cluster random sampling technique during November and December 2020. We developed a questionnaire to gather demographic variables, history and determinants of contracting COVID-19 infection, and training and use of the PPEs. All healthcare workers had COVID-19 rapid antibody test (IgM-IgG Rapid test).

Results
A total of 470 participants were enrolled in the study. We found that 125 (26.6%) participants had positive rapid tests, 104 (83.2%) of them had positive IgG, 5 (4%) had positive IgM, and 16 (12.8%) had positive IgG and IgM. Also, 101 (21.5%) had a history of COVID-9 infection )75.2% were diagnosed by real-time polymerase reaction chain (RT-PCR)). There was a significant association between positive rapid test and history of COVID-19 infection (P<0.001), and positive PCR test (P<0.001). The sensitivity and specificity of the rapid test as compared to PCR testing were 56.6% and 79.2%, respectively. Rapid test results and history of COVID-19 infection were significantly associated with smoking, comorbidity, training, and use of personal protective equipment, and households’ infection (P<0.05).

Conclusions
COVID-19 infection was common among the healthcare workers working in the Primary Healthcare Centers. Strong measures are needed to strengthen infection prevention and control activities including further training and enhanced use of personal protective equipment. Also, healthcare workers should be the priority group to have the COVID-19 vaccine.
A Case Report of a Child with Immunodeficiency-Related Vaccine-Derived Poliovirus Type 2, Laguna, Philippines, September 2019

Ludina Insigne, Nolie Rimando, Ma. Ivy Rozeth Saavedra-Iturralde, Denisse Lou Adriano, Jezza Jonah Aclan, Agnes Benegas-Segarra, Herdie Hizon, Alethea De Guzman, Vikki Carr de los Reyes, Ferchito Avelino

Background
On September 22, 2019, a vaccine-derived poliovirus type 2 (VDPV2) case detected through acute flaccid paralysis (AFP) surveillance in a private hospital was reported to the Epidemiology Bureau. We conducted a case investigation and assessed the risk of transmission.

Methods
We used the World Health Organization Detailed Epidemiologic Case Investigation form and the Jeffrey Modell Foundation 10 Warning Signs of Primary Immunodeficiency Disease (PID) in assessing the patient. Blood was collected for immunity deficiency (ID) testing. Another set of stool samples were collected for poliovirus isolation. An environmental surveillance site was identified in the area where the case resides.

Results
The case was a five-year-old, boy from Laguna, who previously received three doses of oral polio vaccine. Since 2015, he had several hospital admissions for various infections and was diagnosed with Hirschsprung’s disease and thalassemia. He was also malnourished. On August 25, 2019, he had sudden onset of fever, diarrhea and paralysis of both lower extremities. He was reported as an AFP case. Two stools were submitted which tested positive for VDPV2. The case had three of the 10 warning signs of PID. Stools collected 23 days after paralysis onset remained positive for VDPV2. Immunoglobulin panel showed decreased immunoglobulin levels. Three other AFP cases were identified in the municipality during enhanced AFP surveillance. All were negative for poliovirus. A river and creek were identified as environmental surveillance sites. Samples were positive for non-polio enterovirus.

Conclusions
This is the first case of immunodeficiency-related VDPV in the Philippines. Anti-viral therapy will be given since that follow up stool samples remain positive for poliovirus. There is no evidence of ongoing transmission in the municipality. However, survey among healthy children in Brgy. Lingga will be done every two months. To date no VDPV has been detected, so no evidence of circulation.
Background

*Chlamydia trachomatis* is a sexually transmitted infection, which has various clinical presentations including asymptomatic carriers and severe complications, such as pelvic inflammatory disease, ectopic pregnancy, and infertility. In Japan, genital chlamydia disease (GC) is one of the targeted sexually transmitted diseases under surveillance by law, with minimal information about GC collected through sentinel sites. In recent years, the number of GC cases have been increasing in both genders. To better understand the background of this trend, we describe the basic characteristics of GC cases reported by the national sentinel surveillance.

Methods

We used sentinel surveillance data about GC in the National Epidemiological Surveillance for Infectious Diseases (NESID) system, which approximately 1000 sentinel medical institutions of obstetrics & gynecology, urology and sexually transmitted disease clinics report to monthly. Basically, symptomatic patients who were diagnosed at these clinics/hospitals and with laboratory confirmation were reported. We extracted data from 2001 to 2020, which included gender and age-specific number of newly diagnosed cases of GC.

Results

In Japan, the number of GC cases reported continuously decreased from 2002 to 2015 by 40–54%, followed by a sharp increase until 2020. Men, in particular, increased by 23% in 2020, compared with 2015. People in their 20's and 30's showed increasing trend in the 2010s among both genders, while the age group 15–19 continuously showed decreasing trend throughout. The increase of cases in their 20's was particularly significant in the last three years, which showed more than 40% increase in men and 14–15% increase in women, respectively.

Conclusions

In Japan, the number of GC cases increased from 2016, particularly those in their 20's and 30's. Enhanced control measures, including providing frequent testing opportunities and sexual education among young people, need to be implemented. Unlike other diseases, influence of COVID-19 outbreak was not evident in sentinel reporting of GC.
Prevalence and Predictors of Renal Dysfunction among People Living with Human Immunodeficiency Virus on Antiretroviral Therapy in the Southern Highland of Tanzania: A Hospital-Based Cross-Sectional Study

Mololo Noah, Loveness Urio, Mtebe Majigo

Background
Human Immunodeficiency Virus (HIV) infection and antiretroviral therapy (ART) poses a significant risk of developing renal dysfunction in people living with HIV (PLHIV). Renal dysfunction contributes to the morbidity and mortality of PLHIV. There is limited information on renal dysfunction among PLHIV in the Southern Highland, the highest HIV prevalent area in Tanzania. We conducted a study to estimate the magnitude and predictors of renal dysfunction among PLHIV on ART.

Methods
A cross-sectional study was conducted at Njombe Town Council Hospital from December 2019 to April 2020, recruiting 396 participants. Serum was obtained to measure creatinine level then calculated glomerular filtration rate (GFR) using CKD-EPI and the Bedside Schwartz equations. The participants' information were collected using a structured questionnaire. Data analysis was performed using STATA version 15; a modified Poisson regression model was used to estimate prevalence ratios (PR). The level of significance was specified at 0.05.

Results
The overall prevalence of renal dysfunction defined as GFR less than 90 mL/min/1.73 m² was 20.7%, which increased by 4% as the age increases. The prevalence of renal dysfunction was higher in PLHIV on ART for more than six months to 24 months compared to their counterparts. Likewise, obese individuals had a 2.5 times higher prevalence of renal dysfunction than normal individuals.

Conclusions
There is a relatively high prevalence of renal dysfunction among PLHIV on ART, predicted by age, duration on ART, and nutrition status.
A Case-Control Study on the Melioidosis Outbreak in Isabela Province and Santiago City, Philippines, 2019

Karla May Manahan, Ludina Insigne, Alethea De Guzman, Agnes Benegas-Segarra, Ma. Nemia Sucaldito, Vikki Carr de los Reyes

Background
Melioidosis is caused by *Burkholderia pseudomallei*, a bacteria found in soil and water. There were increasing melioidosis cases in Isabela Province in August 2019. Farming is the most common livelihood. This study aims to determine the existence of an outbreak, identify source and mode of transmission, determine risk factors, and recommend control and preventive measures.

Methods
A 1:4 case-control study was done. We collected demographic data and factors associated with melioidosis. We used the following definitions. A suspect case was a previously well resident of Isabela Province who developed any of the following from May 1 to August 9, 2019: a) Acute pulmonary infection with high fever b) Acute or chronic localized infection c) A disseminated infection with fever and weight loss. A confirmed case was a suspect case positive for *Burkholderia pseudomallei* through culture of blood or swabs from abscesses.

Results
Twenty cases were identified. Eight died (CFR: 40%). Age ranged from 9 to 74 years (median = 53). Seven (35%) were disseminated infection, six (30%) with pulmonary infection, and three (15%) had localized infection. Fifteen (79%) were positive for *Burkholderia pseudomallei*. Risk factors were having chronic disease (OR = 101.5, 95% CI = 6.21–4713.69), drinking water from a communal stand post (OR = 78, 95% CI = 4.57–3711.39), bathing from a communal stand post (OR = 18, 95% CI = 1.59–865.84), having diabetes (OR = 14.5, 95% CI = 0.89–786.19), frequent alcohol drinker (OR = 23, 95% CI = 1.63–1179.62), and gardening in a moist soil (OR = 6.13, 95% CI = 0.73–53.12). Drinking water from a water refilling station was a protective factor (OR = 0.03, 95% CI = 0.00–0.40).

Conclusions
There was an outbreak of melioidosis in Isabela Province. Direct contact with water from a level 1 system, contact with moist and paddy soil, and having co-morbidity were associated with melioidosis. Drinking water from water refilling station protects individual from melioidosis. We recommended boiling contaminated water before drinking, avoid contaminated water if with open wound, and wear gloves when gardening.
Background
Antibiotic resistance is an emerging global public health issue and antibiotics are prescribed and used daily in health care settings. Overprescription of antibiotics leads to increased treatment cost, waste of resources, increased risk for adverse drug reaction and global threat of antimicrobial resistance (AMR). We determine the trend of antibiotic prescription pattern in primary health care centers (PHCs) of Bauchi State supported by performance-based financing (PBF) intervention.

Methods
Bauchi State has 20 Local Government Areas (LGA) and is situated in northeastern Nigeria with one main PHC per ward totaling 323 PHCs in the State. The State piloted PBF in the second quarter of 2017 in Dass LGA and scaled up to Bauchi and Katagum LGAs in the second quarter of 2018. Certified PBF supervisors assessed the quality of services rendered on quarterly basis using standard quality checklist. The national allowable proportion of consultations to be treated with antibiotics without clear evidence must be less than 30% of the last 100 patients treated. The health facilities (HF) quality score and their quarterly subsidy earnings are affected beyond this cut off. We analyzed the quarterly assessment data for antibiotic prescription pattern for all the 53 supported PHCs, 2017–2019 and calculated proportions using Microsoft excel.

Results
Of the 53 PBF intervention PHCs in three LGAs of the state, only 22 (41.5%) PHCs were prescribing antibiotics appropriately at baseline. The proportion improved from 46.2% to 98.1% for quarter 1 and 7 of the intervention respectively. The proportion of HFs with appropriate prescription pattern by LGAs were 33.3%, 44.4% and 45.0% at baseline, 60.0%, 83.3% and 80.0% at one year of intervention, 100%, 94.4% and 95.0% at two years of intervention for the Dass, Katagum and Bauchi LGAs respectively.

Conclusions
Rational antibiotic prescription has greatly improved in the PHCs in Bauchi State supported by PBF intervention.
Background
There is very little information on Corona Virus Disease-2019 (COVID-19) transmission specific to the different clusters reported across India. From June to September 2020, a cluster of 45 COVID-19 cases was notified to the Institutional COVID-19 Response Committee, of a Medical Research Institute in Chennai, India. We epidemiologically investigated the cluster to effect control measures.

Methods
We defined a person with a positive RT-PCR (Reverse Transcriptase-Poly Cyclomerase Reaction) for SARS-CoV-2 as a confirmed COVID-19 case-patient. Testing was done in the institute’s COVID-19 lab. We conducted contact-tracing and testing inside and outside the institute. We collected information through telephone interviews and abstraction of laboratory records. We described the cluster using Epi-curve, attack rate, and spot maps. We hypothesized that working in proximity increased the risk of contracting COVID-19. We defined cases as COVID-19 positive staff-members of the institute and compared each of them to three un-matched controls recruited among COVID-19 negative staff-members. We computed Crude-Odds Ratio (OR) with 95% confidence interval (CI) by comparing attack rates among cases and controls.

Results
Cases were reported starting from 8 July 2020, peaked on 9 July, with 3 more peaks till September 4, 2020. The attack rate was highest among the malaria research staff (AR = 10/14) and billing staff (AR = 6/9). We identified 5 sub-clusters corresponding to the peaks in the epi-curve. We identified clustering of cases by time (date of reporting) and location in the bills section, dining hall, and the Malaria research lab of the institute. Males (OR: 2.0; 95% CI = 0.7–5.4), and diabetics (OR: 3.4; 95% CI = 0.8–14.8) were more likely to be COVID-19 positive. Mask compliance (19%) and maintaining physical distance (19%) were poor outside institute than at institute (82%, 59% respectively) or during commute to institute (86%, 86% respectively).

Conclusions
We suggest improving physical distance and ventilation in certain sections of the institute. Strict adherence to infection control practices both outside and inside the institute might prove effective in controlling transmission.
Characteristics and Risk Factors Associated with COVID-19 Infection Severity among Health Care Workers — Iraq, 2020

Inam Hameed

Background
Coronavirus disease 2019 (COVID-19) pandemic is a global health emergency that continues to spread around the world. The front line for this crisis is health care workers (HCWs) who are exposed to hazards of infection through pathogen exposure. Limited data present for risk factors that make the COVID-19 infection become worse among HCWs. This study aims to identify the risk factors associated with the severity of COVID-19 infection among HCWs in Iraq.

Methods
An epidemiological survey was conducted among HCWs with positive respiratory samples for SARS-CoV-2 by real-time polymerase chain reaction (RT-PCR), and/or positive IgG, IgM test from 6 July to 31 October 2020. The questionnaire included demographics, clinical features, and information related to risk factors. Categorical variables were analyzed by Pearson's χ² test by four levels of severity that ranked as asymptomatic, mild, moderate, severe, and critical. Generalized linear model was used to identify the independent predictors of severity. A P-value of less than 0.05 was considered statistically significant.

Results
Among 6331 HCWs enrolled, 52% (3298/6331) were paramedical staff and 71% (4237/6331) were moderate and 14% (836/6331) were severe and critical. Many comorbidities have a significant association with severity as asthma (OR = 2.619, CI: 2.080–3.297), renal disease (OR = 2.143, CI: 1.413–3.253), hypertension (OR = 1.410, CI: 1.165–1.707), diabetes mellitus (OR = 1.531, CI: 1.198–1.956), age (OR = 1.013, CI: 1.007–1.019) and BMI (OR = 1.012, CI: 1.001–1.023).

Conclusions
This survey concludes that comorbidities like hypertension, diabetes, asthma, renal disease, and overweight are independent variables to predict the severity of COVID-19 infection among HCWs, which may be helpful for early clinical surveillance of disease severity among HCWs. Good management of chronic diseases which make the infection worse were recommended. Furthermore, a case-control study will be of value to identify the risk factors of getting COVID-19 infection among HCWs.
COVID-19 Cluster in a Coastal Fishing Community: A Case Control Study — Poonthura, Kerala, India 2020

Lipsy Paul, Binoy Babu, Sushma Choudhary, Anoop Velayudhan, Meenakshy V, Tanzin Dikid

Background
Coronavirus disease (COVID-19) is an ongoing pandemic with high transmissibility. A cluster of COVID-19 cases was reported in a fishermen community by the Integrated Disease Surveillance Programme Unit, Poonthura, Kerala, in July 2020. We described the cluster's epidemiology, identified risk factors for illness and provided recommendations to prevent transmission.

Methods
A case was defined as a resident of Poonthura confirmed with SARS-CoV-2 infection, through Reverse Transcriptase Polymerase Chain Reaction or rapid antigen test, between June 17–July 25, 2020. We conducted hypothesis-generating interviews and performed a 1:2 unmatched case-control study. Cases (both symptomatic and asymptomatic) and controls (those COVID-19 negative) were selected randomly from those tested for any reason between June 17–July 25, 2020, at the Community Health Center, Poonthura. Phone interviews were conducted using a standardized questionnaire. Data was analyzed using Epi info version 7.2.3.1.

Results
We identified 620 cases with median age of 34 years (4 months–91 years). Fifty percent were females and 37% of cases were in the age group 21-40 years. Among 2226 tested, 620 (28%) were positive. The overall attack rate was 1.9%. Of the 16 cases interviewed for hypothesis generation, 11 (69%) had fishing exposure, either personally or by a family member. This case-control study showed that 31% (15/49) of cases had exposure to the fish market compared to 10% (9/49) of controls (OR 3.9, 95% CI 1.4–10.7), and 37% of (18/49) cases had a family member in the fishing business compared to 16% (15/49) of controls (OR 2.8, 95% CI 1.2–6.7).

Conclusions
This cluster of COVID-19 cases was associated with visiting the fish market or having family members involved in fishing, suggesting unrecognized transmission in these settings. We recommended reinforcement of surveillance and contact tracing and testing among persons exposed to these settings, with quarantine and isolation as appropriate.
Description of Cases of a COVID-19 Outbreak in a Care Home for Young People Living with Human Immunodeficiency Virus in Mexico City, 2020

Evelyn Guadalupe Pineda Lopez, José Luis Alomía Zegarra, Celia Mercedes Alpuche Aranda, Irma López Martínez, Ana Lucía De la Garza Barroso, Lucia Hernández Rivas, Rodrigo Aparicio-Antonio, Nilza Aslim Rojas Arroyo, María del Rocío Muñoz Hernández, Noris Marlene del Socorro Pavia Ruz

Background
COVID-19 is a disease that has significantly impacted Mexico. As of January 1, 2021, there were 1,437,185 cases and 126,507 cumulative deaths (CFR 8.8%). There is little evidence of the presentation of COVID-19 in people living under certain physical and environmental conditions, such as pediatric patients, people living with Human Immunodeficiency Virus (HIV) or those living in confinement.

Methods
A series of cases describing COVID-19 outbreak in a care home in Mexico City for young people living with HIV (23 beneficiaries) were enrolled. A database was created with the epidemiological study of suspected case of SARS-CoV-2, applied surveys, serological results emitted from a first test by private laboratory and second by the Epidemiological Diagnostic and Reference Institute (InDRE).

Results
A total of 72% (n=16) were women with median age of 15 years. All of them with perinatal transmission and antiretroviral treatment; 56% (n=14) presented one or more comorbidities. The median CD4+ count was 794 cell/ml [353–1,394] and the viral load was < 40 copies. Sixty percent (n=12) met operational definition of suspected viral respiratory infection (VRI), of these 10% (n=2) corresponded with severe acute respiratory infection (SARI) according to Epidemiological Surveillance System for Viral Respiratory Diseases (SISVER). None were hospitalized. In 76% (n=19) tests showed evidence of antibodies against SARS-CoV-2. No differences in treatments, social dynamics or comparative behavior were identified in negative patients. In the bivariate analysis, no statistical significances were found.

Conclusions
In these patients COVID-19 had a satisfactory evolution. Due that the main limitation found was sample size, especially of those without evidence of SARS-CoV-2 infection, it is recommended to conduct further analytical studies with individuals who share the same characteristics. The study of COVID-19 outbreaks in confined spaces such as care homes could be an opportunity to learn more about the dynamics of COVID-19 disease.
Evaluation of Point of Entry Surveillance for COVID-19 — Mumbai International Airport, India, July 2020

Khyati Aroskar, Rajesh Sahu, Sushma Choudhary, Achhelal Pasi, Pragati Gaikwad, Binoy Babu, Tanzin Dikid, Sudhir Kumar Jain, Sujeet Kumar Singh

Background
India started Point of Entry (PoE) surveillance at Mumbai International Airport from January 18, 2020, by screening passengers returning from COVID-19 affected countries using infrared thermometers. We evaluated PoE surveillance with Centers for Disease Control and Prevention evaluation framework to make recommendations for system strengthening.

Methods
We conducted cross-sectional evaluation in July 2020 for surveillance data collected during March 1–22, 2020. We conducted key informant interviews, reviewed passenger self-reporting forms (SRFs) (randomly selected) and relevant records from Airport Health Organization Mumbai and Integrated Disease Surveillance Program (IDSP) Maharashtra.

Results
Of the 165,885 passengers screened, three COVID-19 suspects were detected and all tested negative by RT-PCR. Line-list of passengers kept under quarantine; passenger SRFs were sent to State officials, and not available in the paper-based PoE system, 392/400 SRFs were completely filled: 49/49 had newly added variables filled. There were eight written complaints: 6/8 regarding inconvenience of filling SRF; 3/8 related to no inflight announcements made about filling SRFs and standing in long queues for their submission. Screened passenger reports were sent daily to IDSP. Among screening staff, 128/150 (85.3%) were deployed from other agencies. The staff to passenger screening ratio was 1:300. IDSP reported 59 COVID-19 confirmed self-reported cases against zero detected at PoE during screening in the reference period. Of the 15 key informants, 2/2 reported the system was easy to use and 11/11 informed pooling of resources for surveillance establishment.

Conclusions
PoE surveillance was simple, timely, flexible, and useful since it created awareness among passengers, provided information to follow up by IDSP. It missed cases at PoE and had poor stability. We recommend dedicated manpower, logistics for PoE surveillance and data integration with IDSP.
Background
In 2020, the whole world was confronted with the COVID-19 pandemic. Burkina Faso registered its first case on March 9, 2020. Accordingly, the Ministry of Health developed and implemented a communication plan for the population. However, it is clear that there is an increase in cases despite the actions taken. In order to improve the quality of the response to combat the pandemic, we conducted a survey on knowledge, attitudes and practices in five regions of Burkina.

Methods
We carried out a cross-sectional study from September 20 to October 10, 2020. The data were collected through a semi-structured interview. We collected the socio-demographic and qualitative variables on knowledge, attitudes and practice. The data was recorded on Epi-info. We calculated proportions.

Results
Out of 497 people questioned, all had heard of the disease, 88.13% of which had been heard from the radio. Those saying the disease is very dangerous were 91%. Those who identified regular hand washing with soap and water to protect against disease was 87.32%. On the other hand, 38.83% of respondents replied stating that they greet each other by shaking hands. One quarter (25%) of respondents perceive COVID-19 as a political affair, or a disease only concerning Western populations and the rich.

Conclusions
The population has fairly good knowledge of COVID-19 as well as the methods of prevention. However, certain preventive measures are not respected. Some people do not believe the disease exists. It is therefore necessary to increase awareness campaigns on the respect of barrier measures with the use of several communication channels.
Background
Persistent and new-onset symptoms among individuals recovered from COVID-19 have been reported in many countries, including India. The morbidity attached with the COVID-19 recovered individuals is significant. We did this study to estimate the prevalence of symptoms, factors associated and rehabilitation needs among survivors of COVID-19 three months after their recovery in Puducherry district, India.

Methods
We defined “post-COVID syndrome” as any signs and symptoms that develop during or following COVID-19 infection and continue for more than 12 weeks. We conducted a cross-sectional study in December 2020 among all the individuals recovered from COVID-19 in Puducherry between April and August 2020. Trained medical officers interviewed the participants using a semi-structured questionnaire prepared by adopting COVID-19 Yorkshire Rehabilitation Screening (C19-YRS) tool to the local context. We estimated the proportion with symptoms and self-reported severity among those who had symptoms. We did multivariate binomial regression to determine the factors associated with “Post-COVID syndrome” using the adjusted prevalence ratio (aPR).

Results
We interviewed 972 individuals recovered from COVID-19, of which 58% were males, and 23% had comorbidity. The mean (SD) age and follow-up period after COVID-19 infection were 40 (18) years and 116 (20) days, respectively. Of 972 individuals, 97 (10%) had post-COVID symptoms, the commonest symptoms being cough (2.7%), fatigue (2.1%) and breathlessness (1.4%). Hospital admission (aPR-1.8), treatment with oxygen (aPR-2.4), diabetes mellitus (aPR-1.3), and sore throat (aPR-2.6), breathlessness (aPR-1.6) and body pain (aPR-2.0) during COVID-19 illness were significantly associated (p-value < 0.05) with post-COVID symptoms.

Conclusions
Symptomatic people, who required oxygen supplementation during hospital admissions, should be given due care and follow up. We recommended setting up post-COVID clinic to address the rehabilitation needs of the COVID-19 survivors.
**Poster Session: COVID-19**

**Role of Event-Based Surveillance (EBS) in Early Detection of COVID-19 — Egypt, 2020–February 2021**

Mohamad Fawzy, Fatma Osman, Hanaa Abuelseoud

**Background**

Egypt launched Event-based Surveillance (EBS) as a main component of Early Warning And Rapid Response System (EWAR) since Nov 2015. Egypt adopted the one health approach for implementation of EBS. COVID-19 pandemic spread rapidly around the globe since late Dec 2019. EBS detected the first COVID-19 case that reported from Egypt in 14 February 2020. Egyptian EBS is based on detection of any public health threat including human, animal and environmental signals. This report aims to highlight the importance of EBS in early detection of COVID-19 and any public health threat.

**Methods**

A descriptive analysis was conducted using EBS data from all sources (media, community-based surveillance (CBS), national hotline, health facilities and EIOS). Signals were reported through EBS online platform with two reporting levels (national, subnational). Database imported in 1 March, 2021 to excel and analyzed by Microsoft Excel 2013. Data analyzed by residence governorate, filtered signals, verification, report source and signal classification.

**Results**

Out of 8342 reported signal, hotline was the main reporting source (n = 3948, 47.9%), followed by media (n = 3076, 37.5%) and CBS (n = 1131, 13.7%). Health facilities and EIOS were the lowest reporting sources, (n = 59, 0.7%) and (n = 29, 0.4%) respectively. Signals could be classified into human (72.5%), animal (1.7%) and environmental (13.2%). Out of the total signals, 83.5% were sent for verification. Verification resulted in 73.5% true events. Fifty-two percent of the total reported signals (n = 4313) were COVID-19 signals, 93.5% were true events. Seventy-three percent of true events (4322) were COVID-19 signals and early detected by EBS.

**Conclusions**

EBS proved the capability of early detection of COVID-19 cases. Hotline was the main source of reporting during the pandemic. Public health workers were loaded with multiple tasks because of the pandemic so hotline data wasn't all recorded. Assign a dedicated team to hotline is highly recommended.
Background
COVID-19 is an ongoing worldwide pandemic which needs global public health concern and collaborative effort to prevent the rapid spread. In Indonesia, the first COVID-19 confirmed case was reported on 2 March 2020. One month after the first case was reported, COVID-19 cases gradually increased and spread widely in 31 provinces in Indonesia. This study aims to identify epidemiological characteristics and outcome of the first month COVID-19 cases in Indonesia.

Methods
The study included the first month patients with laboratory-confirmed SARS-CoV-2 from 2–31 March 2020. The demographic, clinical, and epidemiological data from outbreak investigation report of Ministry of Health Indonesia were analyzed descriptively.

Results
A total of 1528 COVID-19 positive cases were dominated by male. The median age was 48 years (range, 0–88). 698 (45.68%) cases were symptomatic and the most common initial symptoms were cough, history of fever, and difficulty of breath. There were 80 imported cases and Java Island provinces contributed to 84% of the national cases. Eighty-one cases (recovery rate 5.3%) had been discharged in stable condition and 136 cases died (mortality rate 8.9%). Mortality was highest among the elderly. The relative risk of death among cases with at least one and two or more comorbidities were 2.30 (95% CI: 1.43–3.69) and 4.47 (95% CI: 2.79–7.17), compared with cases without comorbidity.

Conclusions
Our finding showed that in the first month COVID-19 cases in Indonesia, the mortality rate was higher than the recovery rate. Early diagnosis and prompt treatment for the elderly and people with comorbidity should be prioritized to reduce the mortality rate among these groups. Active case finding, increased testing capacity, intensive contact investigation, and restriction on population movement is needed to suppress the COVID-19 spread.
**Poster Session: COVID-19**

**Prevalence of Depression, Anxiety, and Stress and Associated Factors among Individuals Working at Military COVID-19 Quarantine Facilities in Northern Vietnam**

Dan Phan Tan, Kien Nguyen Xuan, Thuy Nguyen Phuong, Hung Pham Ngoc, Khanh Nguyen Cong, Pho Dinh Cong

**Background**

In Vietnam, over 175 military facilities have been used to quarantine approximately 170,000 returned Vietnamese nationals. It is a unique and effective measure to prevent COVID-19 transmission. However, staff working at these facilities may be psychologically distressed. We aimed to assess the prevalence of depression, anxiety, stress and associated factors among staff at quarantine facilities.

**Methods**

We conducted a cross-sectional study using the Depression Anxiety Stress Scale on 550 personnel at 14 military quarantine camps, from July to September 2020, in Northern Vietnam. The cut-off points of Depression, Anxiety, Stress were 8, 10, and 15 respectively. The association between DAS and related factors was determined using multivariate logistic regression analysis.

**Results**

Amongst 550 subjects, 94.4% was male, mean age 32.1 ± 9.6, and 12% was healthcare workers. Around 6.2% of subjects suffering at least a chronic condition, and 1.1% having a family history of psychological problems. Prevalence of depression, anxiety, and stress were 2.7%, 6.6%, and 3.5% respectively; most of them were mild and moderate. Factors associated with depression included having a family history of psychological conditions (OR: 93.6; 95% CI: 3.0–292.1), family members being discriminated against (OR: 7.8; 95% CI: 1.38–44.8), and being quarantined (OR: 0.1, 95% CI: 0.01–0.66). Anxiety was associated with having a chronic disease (OR: 4.2; 95% CI: 1.36–13.1), having direct contact with quarantined people (OR: 2.3; 95% CI: 1.03–5.24), having a SARS-CoV-2 test (OR: 0.22; 95% CI: 0.09–0.54), and having PPE training prior to deployment (OR: 0.32; 95% CI: 0.12–0.85). Stress was associated with a family history of a psychological condition (OR: 49.6; 95% CI: 4.9–498.8), direct contact with quarantined people (OR: 4.46; 95% CI: 1.20–16.6), being discriminated against (OR: 5.03; 95% CI: 1.20–21.2), and being quarantined (OR: 0.19; 95% CI: 0.05–0.73).

**Conclusions**

A low prevalence of DAS and several associated factors were found amongst serving personnel. Our results could help to identify opportunities for improving mental health for staff at military quarantine facilities.
Background
In April 2020, Thailand Department of Disease Control was notified a confirmed COVID-19 case in a train repair factory in Bangkok. We investigated to verify the diagnosis and identify cases associated with index case and describe possible behavioral factors contributing to transmission in the workplace.

Methods
A descriptive study, including active case finding and contact tracing in both workplace and household settings, was conducted. Cases and close contacts were interviewed. A laboratory-confirmed case was defined as any persons who worked in fixing diesel building or being close contact with case between 1st March and 7th May 2020 with a laboratory positive for SAR-CoV-2 by real-time reverse transcription polymerase chain reaction. We interviewed confirmed cases and high-risk contacts about inappropriate behaviors in the aspect of prevention and control disease such as social distancing and mask-wearing. Walk-through survey was done to identify possible environmental risks of transmission.

Results
A total of 8 laboratory-confirmed cases were identified (overall attack rate = 3.6%). Of eight cases, three cases worked together in the same building and the other five cases were from two workers’ families. The attack rates among the workplace and two households were 2.7%, 30%, and 16.7% respectively. The potential source case was from index’s household which transmitted to workplace and then the other household. Potential behavioral factors included talking within 1 meter (77.4%), staying together in poorly ventilated rooms (51.6%), talking without mask-wearing (32.3%), physically closed working (45.2%), and dining together (29.0%). Additionally, sharing glass, sharing cigarettes and crowded room were found.

Conclusions
The outbreak was associated with a household-workplace-household transmission. Prompt identification and isolation of potentially infectious worker should be emphasized to halt household-workplace transmission. Ventilation rates in break room and good hygiene and infection control practice of workers should be improved. Hazards in workplace which could lead to transmit the disease should be removed.
Charuttaporn Jitpeera, Phanthanee Thitichai, Mondha Kengganpanich, Deliana Kostova, Chuleeporn Jiraphongsa

**Background**
Hypertension is the most important factor for cardiovascular disease (CVDs). The HEARTS technical package is a set of interventions to strengthen CVD management in primary care. In March 2019–March 2020, Thailand applied a version of the HEARTS technical package in a quasi-experimental setting with two main interventions: Motivation Interviewing (MI) by Village Health Volunteers (VHVs) and Home Blood Pressure Measurement (HMBP).

**Methods**
Context-Input-Process-Product (CIPP) Model was used to evaluate the program. In-depth interviews were conducted among stakeholders, researchers, VHVs and patients with purposive sampling. The comparison of mean difference between month 0 and month 12 with independent T-test among the experimental site (Nong Mae Kai community) and the control site (Muang Tia community) in each outcome (blood pressure, knowledge-attitude-practice (KAP) and Thai CVD Risk score) were done with statistical significance set at \( p \)-value < 0.05. A program cost analysis was conducted using the HEARTS Costing Tool.

**Results**
The baseline characteristics of patients and VHVs between experimental site and control site were not significantly different. After the one-year implementation, there was no difference in all expected outcomes between Nong Mae Kai and Muang Tia. However, evaluation limitations occurred due to unevaluated MI-training and program changes related to questionnaire, self-monitoring record form, supervision and reporting. Additionally, Muang Tia Health Promoting Hospital has skilled and experienced staff on MI and caring hypertension patients. The total cost of the program after one year implementation was 5,620 USD (152 USD/person). Over half (56%) of the cost was attributed to essential medicines and technologies with most of this component attributed to purchasing equipment for patients and 26% of the program cost was training VHVs.

**Conclusions**
Post-training evaluation for VHVs should be done to ensure quality of the intervention. Revising KAP questionnaire and self-monitoring record form are also recommended to enable accurate evaluation.
Background
Task-shifting is one of the plausible solutions for decentralization of non-communicable diseases (NCD) services. Task shifting aims at training the non-physician healthcare workers (NPHWs) to perform less technical tasks, which are traditionally performed by the physicians. This study aims to identify the barriers and facilitators for providing services to hypertensive patients through the auxiliary nurse midwives (ANMs) who are the NPHWs at the subcenters.

Methods
We conducted 24 in-depth interviews (IDI), and six focus group discussions with ANMs selected from the 34 subcenters of the Bhopal district during November-December 2018. The interview guide was developed to explore the knowledge of ANMs on managing hypertensive patients, infrastructure availability, type of services delivered and the health-seeking behavior of the community. MS Excel was used to conduct thematic analysis on the verbatims prepared under the two major themes – facilitating and hindering factors.

Results
All the study participants were females aged between 25–45 years. Subthemes identified under the facilitating factors were knowledge, community outreach, and drug availability at the sub-center level. Hindering factors included multiple job responsibilities of the staff, non-availability of NCD drugs in the ANMs drug kit, and cultural barrier. ANMs reported to have adequate knowledge on measuring the blood pressure and to have good community outreach. Subcenters have been the delivery points for maternal and child health programs and the same is creating an inhibition among males in assessing the services offered at the subcenters.

Conclusions
Despite certain challenges, task shifting from physicians to ANMs was showing good acceptability, and a viable option to be implemented. System needs to be further strengthened by appointing adequate manpower, drugs and by educating the males to avoid the stigma and start utilizing the subcenter services.
Background
Background: Hypertension is an important public health problem worldwide and is the most widely recognized modifiable risk factor for cardiovascular disease, cerebrovascular disease and end-stage renal disease. A meta-analysis study in Ethiopia found that an estimated prevalence of hypertension among adult was 19.6% in Addis Ababa. A community-based study conducted in 2017 showed the prevalence of hypertension was 24.43% in Dire Dawa. Little is known about the picture of hypertension situation from secondary data. This study assessed the secondary data to determine the magnitude, trend and pattern of hypertension of the past five years.

Methods
Descriptive cross-sectional study was used. The study was conducted from November 25 to December 30, 2020. Data was obtained from HMIS and DHIS2 report from 2015 to 2019. Data completeness was checked by reviewing all data elements to identify missing value and consistency was also checked through comparing the reported values between health facilities report and regional health bureau database. Data was entered in to a computer and analyzed using Microsoft Excel 2013 and data cleaning was done to fix incorrect, and duplicated data. The data was analyzed by time, place and personal characteristics. The magnitude and trend was described using ratio, rate, percentage and proportion. Tables and graphs were used for summary.

Results
Result: A total of 30,623 hypertensive cases were reported between 2015 and 2019. The prevalence of hypertension among adult ≥15 year was 3.7%. Out of 30,623 reported cases, 97.5% were urban dwellers. Hypertension prevalence among females is higher (359 per 10,000) than males (285 per 10,000). The trend of prevalence increased from 2.2% in 2015 to 3.7% in 2019. Death to case ratio is 17 per 10,000.

Conclusions
Conclusion: The overall prevalence of hypertension presented in this report is very low with higher burden in urban setting. I recommended efficient screening and promoting healthy lifestyle.
**Background**
Nethajinagar, a village with 10,000 square meters and 392 residents, reported 33 fever cases with joint pain in January 2020. On initial investigation Chikungunya (CHIKV) outbreak was confirmed. We investigated this outbreak.

**Methods**
We followed the classical 10 outbreak investigation steps. After confirming the outbreak, cases were defined as residents of Nethajinagar with fever and joint pain from 01 December, 2019 to 31 March, 2020. Four cases were confirmed by CHIKV-IgM. Door-to-door case search along with larva survey were carried out concurrently. Time-place-person analysis was done. A spot-map of vector breeding and CHIKV suspects was plotted. The emerging hot spot of cases and vector breeding were analyzed by spatiotemporal method. Environmental study was performed to guide further public health actions.

**Results**
Of 392 residents, 109 (attack rate: 27.8%) were cases. While index case was reported on 17th December 2019, surge in cases was observed in last week of January 2020. Spot map showed 12 houses in the middle of second lane had maximum vector breeding (Breteau index: 67%) and 48 houses in and around (two houses on all sides) this high breeding zone had maximum cases (hotspot, 80 cases; AR: 39%). There is not much difference in attack rates among age groups and genders (25%–29%). Average house, container and Breteau indices were 14%, 5% and 19% respectively. On spatiotemporal analysis, of 206 residents in the hotspot, 80 developed illness, compared to 29 among 186 in non-hotspot area (Mantel Haenszel Chi-square test 26.24, p < 0.05, OR: 3.4 [95% CI: 2.1–5.6]). The village received water twice daily through community taps. Instead of being emptied, the water containers were topped-up every time. Thirty houses had overhead tank, six of which didn’t have lids.

**Conclusions**
CHIKV outbreaks can be quick and explosive. A robust and sensitive routine surveillance system is warranted to contain spread of infection at the early stages.
**Background**

Dengue Fever (DF) is an increasing health problem in Yemen where recurrent outbreaks are reported recently with destruction of water and sanitation infrastructure by the protracted conflict. In September 2020, Taiz governorate surveillance officer reported an increase in DF cases in Al-Hurriya village and team from Field Epidemiology Training Program was deployed to investigate. The aims were to confirm and describe DF outbreak, identify possible risk factors, and recommend control measures.

**Methods**

Active house-to-house search was performed using a modified WHO case definition. Forty-one cases that found positive by anti-dengue non-structural protein 1 (NS1) test were matched for age and gender with controls (1:1) who have no symptoms and negative by anti-dengue NS1. Data were collected on individual, environmental and behavioral risk factors. Sixteen houses with 209 water containers were examined for mosquito larvae. Odds Ratios (OR) and 95% confidence interval (CI) were calculated.

**Results**

Seventy-three percent of cases were males and 51% were 15–29 years old. Attack rate was 3.9/1,000 population. All cases suffered from fever, headache and fatigue, while hemorrhagic manifestations were reported in 10%. House, water container and Breteau indexes were 88%, 82% and 1068%, respectively. While poor environment around house (OR = 8.4, CI: 3.1–22.8), and not using bed nets (OR = 3.1, CI = 1.2–7.9) were found to be risk factors, having piped water was found to be protective (OR = 0.3, CI = 0.1–0.9).

**Conclusions**

DF outbreak was confirmed in Al-Hurriya village where water containers were found to be the main source. Poor environment around house and not using bed nets were the main risk factors. Improving environment around house and encouraging using of bed nets together with supplying houses with piped water were recommended. Improving dengue surveillance and rapid response with increasing community awareness regarding transmission and prevention were recommended.
Investigation of High lethality Associated with Severe Malaria in Children under 5 years at Dori Regional Hospital Center — Sahel Region, Burkina Faso

Berenger Kabore, Noaga Sawadogo, Souleymane Porgho, Yelbeogo Dénis, Sawadogo Bernard, Sidwaya Hamed Ouédraogo, Pegdwende Hamadou Seogo

Background
Malaria is a public health problem in Sahel region of Burkina-Faso. In 2018 it was the major reason of death of the region causing 38.6% of deaths. An alert was given during surveillance week number 34 of year 2020 with the notification of high lethality of 3.7% linked to malaria in children under 5 years by the regional hospital center (CHR) of Dori. Investigation was conducted to determine the main reasons of the outbreak.

Methods
A case-control study was carried out from September 10 to 15, 2020 in the pediatric department of the Dori CHR, with 150 samples, including exhaustive sampling of 50 cases and random selection of 100 controls. We have chosen two controls for one case. The data collection tools consisted of a questionnaire and an interview guide. We calculated means, proportions, odds ratios, and performed statistical tests using Chi-square test

Results
Fifty deaths due to severe malaria were recorded out of 316 children under 5 hospitalized with severe malaria during period as a lethality of 15.82%. Not taking seasonal malaria chemoprevention (OR = 6.14 [2.92–12.93] p = 0.0000004), non-availability of labile blood products at Dori's CHR (OR = 3.22 [4.02–43.47] p = 0.0000048) and the treatment of malaria cases in non-compliance with guidelines (OR = 2.77 [1.12–6.86] p = 0.015) were associated with occurrence of death.

Conclusions
The high case fatality associated with Dori's CHR is partly linked to insufficient coverage of seasonal malaria chemoprevention, rupture of labile blood products and insufficient management of malaria cases according to national guidelines. Strong actions would be necessary for adequate care of children with severe malaria and the application of preventive measures.
Background
Globally malaria remains one of the highest burden diseases particularly in developing countries. Malaria is a major public health problem in Ethiopia and reported as one of the three leading causes of morbidity and mortality. In September 2020, Nono Benja woreda health office was notified of a suspected malaria outbreak. The aim of this study was verification, investigation and control of outbreak.

Methods
Descriptive cross-sectional study and unmatched case control study with 1:1 ratio cases and controls, with sample size of 136, (68 cases and 68 controls). An interviewer-administered questionnaire was used to collect data. Data was entered to Epi-data version 3.1 and export to SPSS version 25.0 for analysis. Bivariate analysis was used to choose candidate variables with a cutoff of 25% p-value and multivariable analysis was done to fit final model. AORs with 95% CIs were estimated and 5% p-value significance were reported and interpreted.

Results
A total of 687 cases were detected and overall attack rate was 1%, but no death. The mean age of affected population (cases) was 21.71 years. Identified risk factors were, not having insecticide treated nets (AOR = 3.060, 95% CI = 1.047–8.93), living in house not sprayed by indoor insecticide residual spray, (AOR = 4.46, 95% CI = 1.250–15.927), presence of stagnant water in living area (AOR = 4.055, 95% CI = 1.343–12.241), not getting health education on malaria in last one year (AOR = 3.709, 95% CI = 1.207–11), poor knowledge of malaria prevention (AOR = 5.457, 95% CI = 1.647–18.083). Educational level of grade 9–12 reduces risk of having malaria by 93% compared to higher than grade 12 (AOR = 0.070, 95% CI = 0.006–0.806).

Conclusions
Poor knowledge of malaria prevention, presence of stagnant water, not having ITNS, no indoor insecticide residual spray, not getting health education on malaria were significantly associated with this malaria outbreak. Therefore, Woreda health office should supply ITNS, spray insecticide-chemical and provide health education on malaria.
Background
Dengue is transmitted by female mosquitoes of mainly *Aedes aegypti* and *Aedes albopictus* with four distinct serotypes of dengue virus; DENV-1,2,3 and 4. The incidence of dengue has increased in Malaysia and similarly in Perlis. This study was conducted to describe the epidemiology of dengue disease in Perlis between 2015 and 2019.

Methods
A cross-sectional study was conducted. The socio-demography, clinical presentations, prevention and control activities, entomological data, case progression status and weather information from 2015 to 2019 were retrieved from surveillance data. Linear regression and logistic regression were used in analysis.

Results
The highest dengue incidence rate (IR) was 148.5 per 100,000 populations in 2018. There were 1276 dengue cases with mean (SD) age of 31.15 (17.95) years. Majority were Malay with male to female ratio of 1:1. A total of 164,177 premises being inspected, 180,947 premises were fogged with 1,689 fines and 781 cleaning orders given as a response to dengue cases (*p*-value of 0.021 to < 0.001). As the amount of rainfall increases, the dengue cases significantly reduced (*p*-value = 0.032). Cases with interval from onset to first control activities of five days or more had 1.45 times the odds of an outbreak than if the duration was shorter (95% CI: 1.003,2.101; *p*-value = 0.048). Diagnostic delay contributed 41.1% while patient delay in seeking medical treatment contributed 19.8%.

Conclusions
Significant preventive and control activities towards the dengue cases were recorded for past 5 years. However, cases were still not effectively reduced. The quality and amount of activities need to be monitored closely particularly after heavy rains. Early case detection and control intervention program will prevent outbreaks, thus continued training for medical practitioner and health education programs for community are ongoing.
Clinical Manifestations, Laboratory Characteristics and Treatment of Toxocariasis Patients Treated with Albendazole: A Cross-Sectional Study in Northern Vietnam

Nguyen Thu Huong

Background
Human toxocariasis is caused by nematode *Toxocara canis* and *T. cati*. In Vietnam, there are few studies on *Toxocara* infection status as well as clinical, subclinical, and treatment characteristics of Toxocariasis focusing on epidemiological features.

Methods
A cross-sectional study was performed on *Toxocara* patients between 2018 and 2019 in two hospitals. A total of 103 Toxocariasis participants over 16 years-old, were examined to diagnose with at least two clinical symptoms and positive for anti-IgG *Toxocara* ELISA. *Toxocara* patients were treated with albendazole 800mg/day for 14 days. The data on clinical manifestations were obtained from personal health records. Clinical performance data collected from personal health profiles were analyzed and evaluated for pre-and post-treatment efficacy of albendazole.

Results
The median age of patients was 43.6 years. The most common symptom groups were the skin and mucosa (88.3%), followed by neurological symptoms (44%). The number of infected larvae days before admission accounted for the highest proportion from 1 to 12 months with 36.9%. There are 76.7% of patients with risk factors of contact with pet dogs and cats. The majority (85.4%) of patients had eosinophil counts in the normal range (< 8%). The major results of the OD value of ELISA were in the group (≥ 0.3– < 1.5) accounted for 75.7%. Presence of skin and mucosa lesions in toxocariasis patients is significantly related to higher IgE values (p < 0.05). After one month treatment with albendazole, 48.1% of patients had symptom resolutions. It was statistically significant between contact with dogs/cats and the treatment outcomes on clinical symptoms (p < 0.05)

Conclusions
This study confirmed again that toxocariasis in humans is a common cause of poor health conditions affecting occupational health in the clinical symptoms of adults. Further research is needed to identify pathogens in cats and dogs in communities involving patients, to recommend preventive measures to limit transmission.
Background
HIV/AIDS continues to be a public health problem and a major global concern. West and Central Africa had 4.9 million cases in 2019, including 240,000 new cases and about 140,000 deaths related to HIV/AIDS. In Mauritania, in 2019, according to WHO estimates, the prevalence of HIV/AIDS is estimated at 0.2%. We evaluated the HIV/AIDS surveillance system in the Nouakchott region to describe its organization and functioning, determine its usefulness, and assess its attributes according to the updated guidelines of the Center for Disease Control and Prevention for the evaluation of public health surveillance systems.

Methods
This descriptive cross-sectional study was conducted from May to December 2020 and involved data from January 2019 to December 2019. The study population consisted of actors directly involved in surveillance at all levels of the country's surveillance system. Data were collected through document review and semi-structured interviews. Data analysis was done using Epi Info 7.2.2.6 and Excel. Proportions and rates were calculated. Attribute Appreciation Score was low (< 50%); Medium (≥ 50% < 75%); Good (≥ 75% ≤ 100%).

Results
The monitoring system is complex but useful, achieving its objectives. It is well structured, accepted, responsive, flexible, and of good data quality. Nevertheless, it is weakly representative and moderately stable. The sensitivity (95.80%) and the positive predictive value (96.24%) are high in 2019.

Conclusions
The monitoring system was found to be useful and met its objectives. Representativeness and funding need to be improved. We recommend to the national AIDS program to establish other HIV/AIDS testing centers and outpatient treatment centers at the district and regional levels, avoid breakdowns in laboratory reagents and consumables, train health care providers on HIV/AIDS, motivate those involved in the fight against HIV/AIDS, regularly supervise the outpatient treatment centers.
Resilience Social Factor Index to Earthquake at West Halmahera District, North Maluku Province, Indonesia, 2019

Febriyanti Abd Radjak, Atik Choirul Hidajah, Santi Martini

Background
West Halmahera is one of the districts in North Maluku Province, which frequently experienced earthquakes with large magnitudes recorded from 1907–2017. Resilience needs to be owned by people in this region to be able to avoid and minimize risk of becoming a victim. The aims to measure resilience social factor index owned by community to earthquake disasters.

Methods
Descriptive study conducted in August–September 2019 using the concept of Community Resilience Index. The indicators assessed in compiling index are level of education, age groups < 15 and ≥ 60 years, health insurance ownership, vulnerable groups (physical disabilities, mental disabilities, infants, pregnant women and elderly) and social capital. The cut point of each indicator was adopted from the study of Ainuddin and Routray, 2012. The index are divided by criteria of very high (0.81–1.00), high (0.61–0.80), moderate (0.41–0.60), low (0.21–0.40) and very low (0.00–0.20). Data was taken from 33 villages in 7 sub-districts in West Halmahera District.

Results
The most frequent education level was elementary school (18.59%) and least was college graduates (5.35%). Age groups < 15 years (25.60%) and ≥ 60 years (8.81%). Percentage of participants with ownership of public health insurance was 73.83%. The percentage of vulnerable groups was 14.54%, with the most common condition being elderly (11.51%) and the least common physically disabled (0.30%). Social capital was a community organization that allows keeping coordinating with related parties after an earthquake has a percentage of 56.41%. The value of resilience social factor index obtained was 0.93.

Conclusions
Resilience social factor index of community earthquakes in West Halmahera District was stated on higher criterion because high health insurance ownership, high social capital as well as the frequent intensity of earthquakes causing community to be more alert. However, lack of tertiary education reflects need in increase knowledge about earthquakes so it can increase preparedness and evacuation during an earthquake.
Background
Hepatitis B virus disease is a potentially life-threatening liver infection and a major global health problem. It causes chronic infection and puts people at high risk of death from cirrhosis and liver cancer. WHO estimated 257 million people are living with hepatitis B virus (HBV) infection and in 2015 alone HBV resulted in 887,000 deaths globally. We determined the prevalence and associated factors of hepatitis B virus infection among Antenatal Care (ANC) attendees in Gamawa Local Government Area, Bauchi State.

Methods
We conducted a descriptive cross-sectional, health facility-based study between March and April 2018. We used systematic random sampling technique to recruit 210 pregnant women aged 15–49 years. With a structured questionnaire, we interviewed the respondents and collected blood sample to test for hepatitis B surface antigen (HBsAg). We calculated frequencies, means, proportions, and tested for associations using Epi Info 7.2 and Microsoft Excel.

Results
The mean age of respondents was 24.5 ± 6.0 years; 112 (53%) of whom were younger than 25 years. All were married, 183 (87%) had no formal education and up to 190 (90%) were employed. Overall, 14 (6.7%) tested positive for HBsAg. Women aged ≥35 years had the highest prevalence (10%). None with tertiary education tested positive and women married before 18 years had 13 (6.2%) prevalence.

Conclusions
The prevalence of HBsAg among pregnant women in Gamawa LGA was 6.7% which is quite lower than the national prevalence reported. We recommended improved surveillance of HBV infection and screening of women attending ANC.
Stress, Anxiety, Depression and Related Factors of Healthcare Workers Directly Contacted COVID-19 Patients in Hospitals — Southern, Vietnam

Le Thi Ngoc Anh

Background
Healthcare workers (HCWs) at COVID-19 treatment hospitals may be psychologically distressed due to increased risk of infection, work pressure, and stigma. We aimed to determine the rate of depression, anxiety, stress, and related factors among HCWs who directly contact COVID-19 patients in hospitals.

Methods
A cross-sectional study, using Depression, Anxiety, and Stress (DAS) Scales (DASS-21), was conducted on 494 HCWs at 14 hospitals, from July to September 2020, in Southern, Vietnam. The cut-off score of DAS were 9, 7, and 14 respectively. We used multivariable logistic regression analysis (MLRA) to identify factors related to DAS with a significance level at $\alpha < 0.05$.

Results
Out of 494 participants, 239 (48.4%) were female, 85% aged $\leq$ 40 years old, 55.3% were married and 56.1% obtained university and graduate. Prevalence of DAS were 18%, 11.5% and 7.7%, respectively. The MLRA results showed that HWs > 40 years old had depression lower than $\leq$ 30 years old (OR = 0.3, 95% CI (0.1 –0.8)). Those with university and graduate had a higher rate of depression (OR = 2.0, 95% CI (1.1–3.5)) and stress (OR = 3.5, 95% CI (1.4–9.2)) than lower education. HCWs worked for more than 8 hours/day were more stressful than $\leq$ 8 hours/day (OR = 2.4, 95% CI (1.1–5.3)). HCWs weren’t trained on infection control prevention before care and treatment for COVID-19 patients had greater rate of depression (OR = 4.8, 95% CI 1.6–14.8), anxiety (OR = 4.1, 95% CI 1.4–12.7) and stress (OR = 7.8, 95% CI 2.2–27.5). People whose families were shunned and stigmatized had higher rate depression (OR = 3.2, 95% CI 1.8–5.8) and anxiety (OR = 3.2, 95% CI 1.7–6.1). Additionally, HCWs acquired symptoms after exposure to COVID-19 patients (as fatigue, sore throat, diaphysis, arthralgia, loss of appetite, insomnia) also increased the rate of DAS.

Conclusions
A high prevalence of DAS and some related factors were found amongst HCWs in COVID-19 hospitals. Health authorities should consider some intervention measures for these groups before treating and serving COVID-19 patients.
Incidence of COVID-19 in Quarantined Health Care Workers: A Single-Centre Retrospective Analysis of Hospital-Based Contact Tracing during Australia’s Second Wave

Chris Bailie, Vivian Leung, Liz Orr, Sheena Sullivan, Martyn Kirk, Cate Kelly, Caroline Marshall

Background
Hospital-based contact tracing aims to prevent the spread of COVID-19 within healthcare facilities. In large outbreaks, this can be resource intensive, and planners may have to consider workforce impacts of quarantining staff. To inform strategies for defining, quarantining, and testing health care worker (HCW) contacts, we aimed to determine the rate and timing of COVID-19 among quarantined HCWs, and to examine factors associated with infection.

Methods
We extracted data on HCW quarantined through hospital-based contact tracing from the contact tracing database of a large public healthcare facility in Melbourne, Australia, for the period June-September 2020. Close contacts were quarantined for 14 days following exposure and tested routinely on day 11. We used multivariate logistic regression to examine factors associated with diagnosis in quarantine. We fit gamma, lognormal, and Weibull distributions to symptom onset data for quarantined HCWs.

Results
COVID-19 was diagnosed in 11% (52/483) of instances in which HCW were quarantined due to close contact, accounting for 19% of all 270 HCW cases. In 361 instances with a clear index case, higher odds of infection were associated with contact with an infectious patient compared to an infectious HCW (OR: 4.69, 95% CI: 1.98–12.14). Contact external to the workplace was associated with higher odds of infection compared to workplace contact only (OR: 7.70, 95% CI: 2.63–23.05). We estimated 16–46%, 65–92% and 88–100% of symptomatic cases would develop symptoms by 3, 7, and 11 days since last close contact, respectively.

Conclusions
In our setting, hospital-based contact tracing detected and effectively contained a significant proportion of HCW cases, without resulting in furlough of an excessive number of non-infected staff. Contact between HCWs outside of the workplace must be recognized and responded to. Case detection strategies relying solely on routine testing of quarantined HCWs before 11 days since last exposure may be insensitive.