

Southeast Asia and Western Pacific Bi-Regional FETP COVID-19 Online Conference

November 10–12, 2020



Contents

Welcome Messages	1
From TEPHINET	1
From the Ministry of Health and Welfare, Taiwan	2
From SAFETYNET	3
From the Centers for Disease Control, Taiwan	4
From Prof. Martyn Kirk	5
From Dr. Manoj Murhekar	6
Agenda	7
Selected Abstracts	15
In-Flight Transmission of SARS-CoV-2 During a Long-Haul Flight: Results from an Outbreak Investigation in Vietnam and Implications for Future Air Travel	15
Ha-Linh Quach, MAE, Australia	
Frontline Response for the First Coronavirus Disease Cluster in the Largest State of India	16
Surendra Mohan Prajapati, EIS India	
Zonal Approach to Contain the Spread of COVID-19 Infections in a District of Bangladesh: a Piloting Alternative Approach for Containment	17
Debasis Kumar Shaha, FETP, Bangladesh	
Use of Cycle Threshold (Ct) Values in Predicting Infectivity of the Individual in Transmission of COVID-19: Cross Sectional Study, Tamil Nadu, August 2020	18
Suganya Barani, FETP-Chennai	
Epidemiology of COVID-19 in Kerala State, India, 2020	19
Ajan MJ, EIS India South	
Effectiveness of Airport Screening for COVID-19 at Taoyuan International Airport, Taiwan, January to June 2020	20
Ching-Yuan Tseng, Taiwan FETP	

Characteristics and Determinants of the Confirmed-Asymptomatic, Suspect, and Probable COVID-19 Case in Bali Province, Indonesia	21
Ni Putu Ayu Naraswari Nesa, Indonesia FETP	
COVID-19 Cases in Three Detention Jails: A Case-Control Study — Metro Manila, Philippines, April 2020	22
Kasmira Maramag, FETP Philippines	
Investigating COVID-19 Transmission in a Tertiary Hospital in Hanoi, Vietnam Using Social Network Analysis	23
Ngoc-Anh Hoang Thi, MAE, Australia	
Epidemiological Investigation of the First Locally-Acquired Case of Coronavirus Disease 2019 (COVID-19) Identified by Influenza Surveillance — Taiwan, February 2020	24
Yang Li, Taiwan FETP	
Review of Five Years (2014–2018) Tuberculosis Mortality in Kedah, Malaysia: How Far Are We in Achieving the Sustainable Development Goal (SDG) Target?	25
Tan Seok Hong, EIP Malaysia	
An Investigation of Healthcare Associated Measles Infection in a Regional Hospital, Phuket Province, July to October 2019	26
Ratchadaporn Papwijitsil, International FETP, Thailand	

Welcome Message from TEPHINET

The Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET) congratulates the South Asia Field Epidemiology and Technology Network (SAFETYNET) and the Taiwan Field Epidemiology Training Program (FETP) on the fruition of their collaboration to host the first online scientific conference for the Southeast Asia and Western Pacific regions.

Collaboration is key to TEPHINET's mission of developing, connecting, and mobilizing a global field epidemiology workforce to strengthen public health systems and advance health security. We salute the FETPs, alumni and residents in the region who rallied to the call to respond to COVID-19. Conference participants will take advantage of this opportunity to share their experiences, exchange knowledge and consolidate their learning. In doing so, they will gain valuable insights and inspiration for their future work.

Whilst the current COVID-19 pandemic provides incredible field learning opportunities, it has also revealed numerous challenges and opportunities for field epidemiology capacity building in the Asian and Pacific regions. TEPHINET reiterates our commitment to support and facilitate efforts to expand field epidemiology training, adapt existing training to reflect current needs (including vaccine surveillance and safety) and harness the support of partners and stakeholders to ensure FETP preparedness and response for whatever lies ahead.



Carl Reddy, MB.BCh, FCPHM, MSc (Epi)

Director

TEPHINET

Welcome Message from the Ministry of Health and Welfare, Taiwan

Dear Colleagues,

It is my great honor to welcome you all to the Southeast Asia and Western Pacific Bi-Regional Field Epidemiology Training Program COVID-19 Online Conference.

With COVID-19 still spreading in communities around the world, I regret that the 2020 FETP conference, originally planned to be an in-person conference in Taipei, had to be moved online. However, this also reflects the world has ingenuity, flexibility, and resilience in facing the pandemic.

The world changed, literally overnight, when COVID-19 cases were reported on December 31, 2019. Field epidemiology training programs around the globe sprang into action to detect, investigate, and respond to the pandemic. Each program has responded slightly differently, because our respective communities have different disease spread patterns, different public health and healthcare systems, and the general public has different experiences with emerging diseases.

Because of Taiwan's experience during the SARS outbreak in 2003, we have had early success in COVID-19 response and have been touted as an example of such. However, I am reminded time and time again that our success was only achieved through the collaboration of all the people on this island, who reported cases, who were quarantined or isolated, and who complied with our disease prevention measures. I am humbled by the solidarity shown by our citizens.

Other countries in our region have had successes in responding to much larger outbreaks of COVID-19, which are even more difficult to control.

This conference serves as a good platform for us to share our strategies and experiences, as we head into the next phase of the COVID-19 pandemic.

Finally, I would like to thank you for your participation, and I wish you a successful conference.

Sincerely,



Shih-Chung Chen

Shih-Chung Chen, DDS

Minister

The Ministry of Health and Welfare, Taiwan

Welcome Message 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, MERSCoV, 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 can not 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!



A handwritten signature in black ink, appearing to read 'mmy mm' with a long, sweeping flourish at the end.

Maria Consorcia Lim-Quizon, MD

Executive Director

South Asia Field Epidemiology and Technology Network, Inc.

Welcome Message from the Centers for Disease Control, Taiwan

Dear Colleagues,

It is with great pleasure that I welcome you to the Southeast Asia and Western Pacific Bi-Regional Field Epidemiology Training Program COVID-19 Online Conference.

The Taiwan Centers for Disease Control, which hosts the Taiwan Field Epidemiology Training Program (Taiwan FETP), has been inundated with COVID-19 response, in addition to our regular infectious disease control activities. However, we understand the importance of having this FETP conference, where we all can come together to share our work and help each other acquire further knowledge. Thus, against all odds, we have organized this conference in collaboration with SAFETYNET.

FETPs have played a pivotal role in the global COVID-19 response. Through the sharing of our experiences during the pandemic at this conference, we can learn from each other and thrive as a network.

As an alumnus of Taiwan FETP, I remember the excitement and trepidation when I joined conferences like this one as a trainee eager to learn from others who received similar training, yet worked on different real cases in their countries.

I look forward to sharing and discussing COVID-19 experiences and information with you all. Once again, welcome to this online conference, and enjoy the conference.

Sincerely,



A handwritten signature in black ink that reads 'Jih-Haw Chou'.

Jih-Haw Chou, DDS, MPH

Director-General

The Centers for Disease Control, Taiwan

Welcome Message from Prof. Martyn Kirk

Welcome to this bi-regional conference of TEPHINET; the first one we are conducting online!

While we are disappointed that we can't meet in wonderful Taiwan, it is great that we can hear from each other and connect online. There are so many wonderful presentations from Field Epidemiology Training Program (FETP) fellows from different parts of the two regions: the Western Pacific and South-East Asia. I am looking forward to hearing the interesting work that FETP fellows have conducted, particularly in controlling the COVID-19 epidemic in the two regions. The work of FETP fellows and alumni have been critical in understanding the nature of this emerging infection and controlling transmission. The epidemic has disrupted so much of our normal lives, which justifies our intense work over the last nine months. I hope you enjoy the conference, make some friends, and learn some new skills.

I hope to meet you at a future conference where we can join in person.

Warmest regards



Martyn Kirk, PhD

Acting Advisory Board Chair, TEPHINET

Professor

National Centre for Epidemiology and Population Health,

Australian National University, Australia

Welcome Message from Dr. Manoj Murhekar

Dear Colleagues,

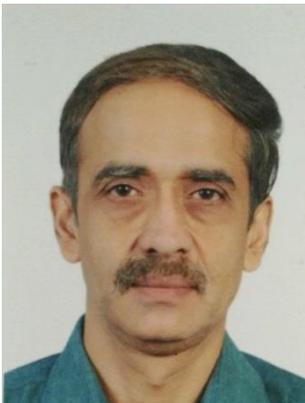
It gives me immense pleasure to welcome the participants of the first ever online SEAR/WPRO Bi-regional TEPHINET scientific conference.

We are living in perhaps the most uncertain time of the 21st century so far. The entire world is reeling with the effects of the COVID-19 pandemic, and the end is not yet in sight. Continued transmission and the rising number of cases are increasingly burdening our healthcare systems. In every country, healthcare professionals have been at the forefront of our fight against this virus. A large number of doctors, nurses, and paramedical staff have been working around-the-clock to save lives in hospitals. Epidemiologists, public health professionals and frontline workers have been tirelessly implementing response measures to contain the spread of the virus. At this juncture, we must recognize the efforts of these professionals to help their communities despite a great personal risk.

The pandemic and our subsequent response towards it has generated vast amounts of data and knowledge. This knowledge must be discussed and disseminated, not only to improve our response to COVID-19, but also to develop strategies to combat an epidemic in the future. Our fight against the pandemic has underscored the importance of having strong field epidemiologists who were involved in fighting COVID-19 to share the knowledge and experience they gained to further our fight.

Adapting the conference to a virtual format is an organizational challenge. I appreciate the **Taiwan Ministry of Health and Welfare and SafetyNet** in organizing this important event so we can all benefit from sharing our knowledge.

I wish this conference a great success.



Manoj Murhekar, MBBS, MD

Advisory Board Member, TEPHINET

Scientist G and Director

ICMR-National Institute of Epidemiology

Chennai, India

Agenda

Monday, November 9

Canberra	Port Moresby	Seoul, Tokyo	Taipei, Manila, Kuala Lumpur	Hanoi, Bangkok, Phnom Penh, Vientiane, Jakarta	Yangon	Dhaka	Delhi	Program	Presenter(s)	Moderator
14:00	13:00	12:00	11:00	10:00	9:30	9:00	8:30	Pre-Conference Workshop: Understanding Infectious Disease Modelling	<p>Strengthening Preparedness in the Asia-Pacific Region through Knowledge (SPARK) Modelling Network</p> <p>Prof. Jodie McVernon, The Peter Doherty Institute for Infection and Immunity, Australia</p> <p>Dr. Patricia Campbell, The Peter Doherty Institute for Infection and Immunity, Australia</p> <p>Dr. Michael Meehan, James Cook University, Australia</p>	Strengthening Preparedness in the Asia-Pacific Region through Knowledge (SPARK) Modelling Network

Tuesday, November 10

Canberra	Port Moresby	Seoul, Tokyo	Taipei, Manila, Kuala Lumpur	Hanoi, Bangkok, Phnom Penh, Vientiane, Jakarta	Yangon	Dhaka	Delhi	Program	Presenter(s)	Moderator
14:00	13:00	12:00	11:00	10:00	9:30	9:00	8:30	Opening	Dr. Carl Reddy, Director of TEPHINET Dr. Maria Consorcia Lim-Quizon, Director, SAFETYNET Dr. Jih-Haw Chou, Director-General, Centers for Disease Control, Taiwan	Dr. Maria Consorcia Lim-Quizon, Director, SAFETYNET
14:30	13:30	12:30	11:30	10:30	10:00	9:30	9:00	Country Presentation: Taiwan	Dr. Wan-Chin Chen, Centers for Disease Control, Taiwan	
14:45	13:45	12:45	11:45	10:45	10:15	9:45	9:15	Country Presentation: Thailand	Dr. Chawetsan Namwat, International FETP, Thailand	
15:00	14:00	13:00	12:00	11:00	10:30	10:00	9:30	Country Presentation: Malaysia	Dr. Rohani Ismail, Disease Control Division, Ministry of Health, Malaysia	
15:15	14:15	13:15	12:15	11:15	10:45	10:15	9:45	Country Presentation: Philippines	Dr. Alethea R. De Guzman, Epidemiology Bureau, Department of Health, Philippines	
15:30	14:30	13:30	12:30	11:30	11:00	10:30	10:00	Break		

Tuesday, November 10

Canberra	Port Moresby	Seoul, Tokyo	Taipei, Manila, Kuala Lumpur	Hanoi, Bangkok, Phnom Penh, Vientiane, Jakarta	Yangon	Dhaka	Delhi	Program	Presenter(s)	Moderator
16:00	15:00	14:00	13:00	12:00	11:30	11:00	10:30	Country Presentation: Bangladesh	Prof. Sabrina Flora, Directorate General of Health Services, Bangladesh	Dr. Maria Consorcia Lim-Quizon, Director, SAFETYNET
16:15	15:15	14:15	13:15	12:15	11:45	11:15	10:45	Country Presentation: India	Dr. SK Singh, National Center for Disease Control, Delhi, India	
16:30	15:30	14:30	13:30	12:30	12:00	11:30	11:00	Country Presentation: Viet Nam	Dr. Dang Quang Tan, Department of Preventive Medicine, Ministry of Health, Viet Nam	
16:45	15:45	14:45	13:45	12:45	12:15	11:45	11:15	Country Presentation: Australia	Prof. Paul Kelly, Australian Government Department of Health, Australia Dr. Philippa Bins, ASEAN-Australia Health Security Fellowship Program, NCEPH, Australian National University	

Tuesday, November 10

Canberra	Port Moresby	Seoul, Tokyo	Taipei, Manila, Kuala Lumpur	Hanoi, Bangkok, Phnom Penh, Vientiane, Jakarta	Yangon	Dhaka	Delhi	Program	Presenter(s)	Moderator
17:00	16:00	15:00	14:00	13:00	12:30	12:00	11:30	Panel Discussion	Dr. Orville Solon, School of Economics, University of the Philippines, Quezon City, Philippines Dr. Christopher Lee, National Advisor for Infectious Diseases for the Ministry of Health, Malaysia Prof. Daniel Fu-Chang Tsai, Graduate Institute of Medical Education and Bioethics, National Taiwan University, Taiwan	Dr. Maria Consorcia Lim-Quizon, Director, SAFETYNET
17:45	16:45	15:45	14:45	13:45	13:15	12:45	12:15	End of day 1		

Wednesday, November 11

Canberra	Port Moresby	Seoul, Tokyo	Taipei, Manila, Kuala Lumpur	Hanoi, Bangkok, Phnom Penh, Vientiane, Jakarta	Yangon	Dhaka	Delhi	Program	Presenter(s)	Moderator
14:00	13:00	12:00	11:00	10:00	9:30	9:00	8:30	In-Flight Transmission of SARS-CoV-2 During a Long-Haul Flight: Results from an Outbreak Investigation in Vietnam and Implications for Future Air Travel	Ha-Linh Quach, MAE, Australia	Dr. Thilaka Chinnayah, Disease Control Division, Ministry of Health, Malaysia
14:20	13:20	12:20	11:20	10:20	9:50	9:20	8:50	Frontline Response for the First Coronavirus Disease Cluster in the Largest State of India	Surendra Mohan Prajapati, EIS India	
14:40	13:40	12:40	11:40	10:40	10:10	9:40	9:10	Zonal Approach to Contain the Spread of COVID-19 Infections in a District of Bangladesh: a Piloting Alternative Approach for Containment	Debasis Kumar Shaha, FETP, Bangladesh	
15:00	14:00	13:00	12:00	11:00	10:30	10:00	9:30	Use of Cycle Threshold (Ct) Values in Predicting Infectivity of the Individual in Transmission of COVID-19: Cross Sectional Study, Tamil Nadu, August 2020	Suganya Barani, FETP-Chennai	
15:20	14:20	13:20	12:20	11:20	10:50	10:20	9:50	Discussion		
15:30	14:30	13:30	12:30	11:30	11:00	10:30	10:00	Break		

Wednesday, November 11

Canberra	Port Moresby	Seoul, Tokyo	Taipei, Manila, Kuala Lumpur	Hanoi, Bangkok, Phnom Penh, Vientiane, Jakarta	Yangon	Dhaka	Delhi	Program	Presenter(s)	Moderator
16:00	15:00	14:00	13:00	12:00	11:30	11:00	10:30	Epidemiology of COVID-19 in Kerala State, India, 2020	Ajan MJ, EIS India South	Dr. Samsad Rabbani Khan, Institute for Epidemiology, Disease Control and Research (IEDCR), Bangladesh
16:20	15:20	14:20	13:20	12:20	11:50	11:20	10:50	Effectiveness of Airport Screening for COVID-19 at Taoyuan International Airport, Taiwan, January to June 2020	Ching-Yuan Tseng, Taiwan FETP	
16:40	15:40	14:40	13:40	12:40	12:10	11:40	11:10	Characteristics and Determinants of the Confirmed-Asymptomatic, Suspect, and Probable COVID-19 Case in Bali Province, Indonesia	Ni Putu Ayu Naraswari Nesa, Indonesia FETP	
17:00	16:00	15:00	14:00	13:00	12:30	12:00	11:30	COVID-19 Cases in Three Detention Jails: A Case-Control Study — Metro Manila, Philippines, April 2020	Kasmira Maramag, FETP Philippines	
17:20	16:20	15:20	14:20	13:20	12:50	12:20	11:50	Discussion		
17:30	16:30	15:30	14:30	13:30	13:00	12:30	12:00	End of day 2		

Thursday, November 12

Canberra	Port Moresby	Seoul, Tokyo	Taipei, Manila, Kuala Lumpur	Hanoi, Bangkok, Phnom Penh, Vientiane, Jakarta	Yangon	Dhaka	Delhi	Program	Presenter(s)	Moderator
14:00	13:00	12:00	11:00	10:00	9:30	9:00	8:30	Investigating COVID-19 Transmission in a Tertiary Hospital in Hanoi, Vietnam, Using Social Network Analysis	Ngoc-Anh Hoang Thi, MAE, Australia	Prof. Martyn Kirk, National Centre for Epidemiology and Population Health, Australian National University, Australia
14:20	13:20	12:20	11:20	10:20	9:50	9:20	8:50	Epidemiological Investigation of the First Locally-Acquired Case of Coronavirus Disease 2019 Identified by Influenza Surveillance — Taiwan, February 2020	Yang Li, Taiwan FETP	
14:40	13:40	12:40	11:40	10:40	10:10	9:40	9:10	Review of Five Years (2014–2018) Tuberculosis Mortality in Kedah, Malaysia: How Far Are We in Achieving the Sustainable Development Goal (SDG) Target?	Tan Seok Hong, EIP Malaysia	
15:00	14:00	13:00	12:00	11:00	10:30	10:00	9:30	An Investigation of Healthcare Associated Measles Infection in a Regional Hospital, Phuket Province, Thailand, July to October 2019	Ratchadaporn Papwijitsil, International FETP, Thailand	
15:20	14:20	13:20	12:20	11:20	10:50	10:20	9:50	Discussion		
15:30	14:30	13:30	12:30	11:30	11:00	10:30	10:00	Break		

Thursday, November 12

Canberra	Port Moresby	Seoul, Tokyo	Taipei, Manila, Kuala Lumpur	Hanoi, Bangkok, Phnom Penh, Vientiane, Jakarta	Yangon	Dhaka	Delhi	Program	Presenter(s)	Moderator
16:00	15:00	14:00	13:00	12:00	11:30	11:00	10:30	SARS-CoV-2 Infections in Animals	Prof. Chen-Hsuan Liu, Adjunct Professor and Former Dean, Graduate Institute of Molecular and Comparative Pathology / Department of Veterinary Medicine, School of Veterinary Medicine, National Taiwan University, Taiwan	Prof. Yi-Lun Tsai, Department of Veterinary Medicine, National Pingtung University of Science and Technology, Taiwan
16:40	15:40	14:40	13:40	12:40	12:10	11:40	11:10	Awards Ceremony and Closing	Prof. Martyn Kirk, National Centre for Epidemiology and Population Health, Australian National University, Australia Dr. Manoj Murhekar, National Institute of Epidemiology, Indian Council of Medical Research, Chennai, India Dr. Jih-Haw Chou, Director-General, Centers for Disease Control, Taiwan	Dr. Angela Song-En Huang, Centers for Disease Control, Taiwan
17:00	16:00	15:00	14:00	13:00	12:30	12:00	11:30	End of conference		

Selected Abstracts

Wednesday, November 11

In-Flight Transmission of SARS-CoV-2 During a Long-Haul Flight: Results from an Outbreak Investigation in Vietnam and Implications for Future Air Travel

Ha-Linh Quach, Nguyen Cong Khanh, Ngoc-Anh Hoang Thi, Pham Quang Thai, Phung Cong Dinh, Tran Nhu Duong, Le Thi Quynh Mai, Ngu Duy Nghia, Tran Anh Tu, La Ngoc Quang, Tran Dai Quang, Trong-Tai Nguyen, Dang Duc Anh, Florian Vogt

Background: In early March 2020, we detected a large COVID-19 cluster associated with a commercial 10-hour flight from London, UK to Hanoi, Vietnam. We aimed to investigate potential in-flight transmission of SARS-CoV-2 on that flight.

Methods: We conducted detailed epidemiological investigations that involved contact tracing, PCR testing, quarantine and structured interviews among 217 passengers and crew members, plus their close contacts. We calculated risk ratios (RR) and 95 percent confidence interval (95% CI) to identify factors associated with the risk of in-flight transmission risks.

Results: We detected a total of 16 flight-associated cases. The probable index case was a 27-year-old woman who was symptomatic while on the plane and tested positive three days after arrival. Twelve (75%) cases were seated in business class together with the probable index case (attack rate 62%) and developed symptoms within a median of 8.8 days (IQR 5.8–13.5) after arrival. Seating proximity in business class of two seats or less from the index case was strongly associated with an increased risk of infection (RR 7.3, 95% CI 1.2–46.2, p-value 0.03). There was no evidence supporting alternative transmission scenarios other than in-flight transmission. We detected five secondary cases among 1,311 close contacts from the flight-associated cases.

Conclusions: Our findings strongly suggest that a large COVID-19 cluster was caused by transmission on board a long haul flight from a single symptomatic passenger. SARS-CoV-2 has the potential to spread effectively even in business class-like settings with spacious seating arrangements and well beyond the established distance used to define close contacts on airplanes and other public transport. Guidelines for the prevention of COVID-19 among flight passengers should take into consideration the pre-flight infection risk for individual passengers, the number of passengers traveling, and the duration of the flight.

Wednesday, November 11

Frontline Response for the First Coronavirus Disease Cluster in the Largest State of India

Surendra Mohan Prajapati, Binoy Surendra Babu, Mukesh Kumar Prasad, Azarudeen M J, Kanica Kaushal, Tanzin Dikid, Sushma Chaudhary, Simmi Tiwari, Sudheer Kumar Jain, Sujeet Kumar Singh

Background: Agra district of Uttar Pradesh state reported first clusters of coronavirus disease (COVID-19) cases on March 4, 2020. Four Epidemic Intelligence Service Officers (EISO) from National Centre for Disease Control were deputed to strengthen the district's COVID-19 response and implement containment measures.

Methods: We constituted rapid response teams (RRT) to identify cases, track contacts and monitor surveillance activities. As per the Government of India guidelines containment zones were established for COVID-19 surveillance and district control room to coordinate field response to track contacts. We did descriptive epidemiological analysis of laboratory confirmed cases of the district.

Results: We established three containment zones (having three kilometers radius) around initially reported COVID-19 cases and mapped them for surveillance. In these containment zones 1,787 two-member teams with 310 supervisors did door-to-door survey for Influenza Like Illness (ILI) cases. Teams covered 2,32,952 households in 17 days and found 3,561 ILI cases. Four ILI cases with foreign travel history were tested for COVID-19 by Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) and found negative. We identified eight confirmed (5 males) cases with median age 38 years (range: 15–70). Three cases (37.5%) had foreign travel history, four (50%) were direct contacts of COVID-19 confirmed cases and one (12.5%) was indirect contact (second-generation case).

District control room along with RRT tracked 1,035 contacts of eight laboratory confirmed cases, followed them for 14 days for symptoms suggestive of ILI. Contacts who developed ILI (112) were tested by RT-PCR and found negative.

Conclusions: EISO along with district officials set up containment zones, searched cases, tracked contacts and strengthened ILI surveillance and testing in district Agra following identification of COVID-19 cluster linked to imported cases. Timely containment measures prevented new cases beyond second generation. We recommended continued intensive case-based surveillance and contact tracing for each laboratory confirmed case of COVID-19.

Wednesday, November 11

Zonal Approach to Contain the Spread of COVID-19 Infections in a District of Bangladesh: a Piloting Alternative Approach for Containment

Debasis Kumar Shaha, Mallick Masum Billah, Mahbubur Rahman, Sayeda Farhana Kawnine, Mohammad Ibrahim Titon, Tilovatul Khondaker, Ahmed Nawsher Alam, Tahmina Shirin, Anir Chowdhury, Shams El Arifeen, Meerjady Sabrina Flora

Background: On June 9, 2020, considering gradual restoration of all economical activities the Government of Bangladesh updated containment strategy from locking down the whole country to locking down high risk zones/areas to mitigate COVID-19 spread. All rural subdistricts divided their union and wards into zones having ≥ 30 cases/100,000 population in cities and ≥ 10 cases/100,000 population in rural areas in last two weeks as red zone. We compared COVID-19 case incidence and test positivity rates by real-time RT-PCR before and after zonal lockdown to assess whether zonal lockdowns can be used as alternative to country lockdown to contain COVID-19 spread.

Methods: Zonal containment was implemented in wards 4 and 5 in Narsingdi Sadar subdistrict from June 12 to July 3, 2020. Movements were restricted by placing a temporary physical boundary around the area. Entry and exit points were guarded by police and volunteers. Each entry/exit point had a COVID-19 testing booth operating 24 hours every day. Any person who have fever or cough or sore throat or loss of smell were tested by real-time RT-PCR methods and reported within 24 hours of collection. To compare rate of active cases and positivity rate by weeks, we performed z-test for two proportions and set $p < 0.05$ as level of significance.

Results: The red zone had 33,373 persons in 1.25 square kilometers. The rate of active COVID-19 cases significantly decreased ($p < 0.0001$) during intervention — from 72/100,000 population pre-containment time to 18/100,000 population after first three weeks of lockdown. The COVID-19 positivity rate also decreased significantly ($p < 0.0001$) from 29% (24/78) pre-containment to 6% during containment. A total of 26 people were tested in following two weeks of intervention and all were COVID-19 negative.

Conclusions: Zonal containment approach reduced COVID-19 transmission in a rural subdistrict. We recommended this type of intervention to reduce the COVID-19 infection spread.

Wednesday, November 11

Use of Cycle Threshold (Ct) Values in Predicting Infectivity of the Individual in Transmission of COVID-19: Cross Sectional Study, Tamil Nadu, August 2020

Suganya Barani, B Baranidharan, Tarun Bhatnagar, TS Selvavinayagam

Background: Viral load is an important factor determining the likelihood of transmission of COVID-19. With an underlying assumption that Cycle threshold (Ct) values of the diagnostic RT-PCR assay are a surrogate marker of viral load of the individual, we wanted to determine whether Ct values can be used to estimate the infectivity in terms of secondary attack rate among COVID-19 positive individuals in order to inform public health surveillance.

Methods: We conducted a cross sectional study to compare cycle threshold values by secondary attack rates, age, gender, symptom status and comorbidity of COVID-19 individuals. We extracted data of Ct values from the sample referral form (SRF) for three districts of all 485 COVID-19 positive individuals tested in the state public health laboratory in three days. We extracted patient details like symptom status, number of contacts who tested positive for COVID-19 available with the district as a record in surveillance. We reported median with interquartile range of Ct values and tested between groups using Mann-Whitney test.

Results: There was no statistically significant difference in median Ct values across sub groups of secondary attack rate. COVID-19 positive individuals with symptoms had lower Ct value in all three genes with statistically significant difference in E gene (21.8; IQR 18.5–24.6) vs 23; IQR 19.7–26.1, $p < 0.02$) and in RDRP gene (21.4; IQR 18.5–25) vs 22.7; IQR 19.3–26, $p < 0.03$). There is no significant difference in median Ct values between individuals with and without comorbidity.

Conclusions: Our study found that Ct values have no relationship with secondary attack rates. Symptomatic COVID-19 positive individuals have a significant lower Ct values corroborating with a higher viral load among them. Based on our findings, it is recommended that Ct values of RT-PCR assay cannot be used in public health surveillance to predict transmission of COVID-19.

Ajan M J, Savitha A K, Ganeshkumar P

Background: Following reporting of 2019-nCoV outbreak in China, first case of COVID-19 in India was reported on January 30, 2020 at Thrissur district of Kerala state. A surveillance system was established in Kerala on January 24, 2020. Around 23613 cases were reported in Kerala as on July 31, 2020. We analysed the data to describe the epidemiology of COVID-19 in Kerala state of India.

Methods: We conducted a cross sectional study to describe the epidemiology of COVID-19 in Kerala between January and July 2020. A case was defined as a person with laboratory confirmation of COVID-19 irrespective of clinical signs and symptoms. Apart from time, place and person we also calculated test positivity of COVID-19, case fatality ratio, median number of contacts traced per case and distribution of possible source of infection.

Results: Among 23613 cases, Thiruvananthapuram district reported highest number of cases and incidence per lakh population was 127.3. Cases were reported more among males and in age-group of 21–40 years. Of the reported cases, 54.3% (12828) were from contacts and 5.1% (1205) were unlinked cases at the time of reporting. Overall, each case tracing had 7.1 contacts and Thrissur district traced the most with 19.5 contacts per case. During the period, 109 deaths occurred with case fatality ratio of 0.46% and doubling time was 15.2%. Overall test positivity during the period was 2.96% and the test positivity as on 31 July 2020 was 5.75%.

Conclusions: Contacts were the commonest source of infection. Thiruvananthapuram district and 21–40 age group reported more cases with predominance among males. Intensified surveillance with wider testing was recommended to identify more cases. Tracing all contact with strict isolation and quarantine measures were suggested to prevent the spread in the community.

Wednesday, November 11

Effectiveness of Airport Screening for COVID-19 at Taoyuan International Airport, Taiwan, January to June 2020

Ching-Yuan Tseng, Meng-Yu Chen, Mei-Jung Chen, Kun-Bin Wu

Background: Since December 31, 2019, Taiwan has operated entry screening for COVID-19 at international airports to detect COVID-19 cases and prevent secondary transmission into the community. We evaluated the effectiveness of airport screening for detecting travelers entering Taiwan with COVID-19 infection.

Methods: All inbound passengers were screened by infrared thermometer and evaluated by quarantine officers. Passengers arriving from COVID-19 epidemic areas who showed COVID-19 symptoms were required to undergo a RT-PCR swab test. Testing criteria evolved to include all relevant travel or contact history and COVID-19 symptoms. We abstracted data from the National Quarantine Surveillance System. Data of all inbound passengers at the Taoyuan International Airport and of all cases of COVID-19 during January 1 to June 30, 2020 were analyzed. We calculated case detection rate (as the number of confirmed cases of COVID-19 detected at the airport per 1,000 passengers screened), sensitivity, and positive predictive value of airport screening and examined the changes by month.

Results: Of the 2,891,971 inbound passengers during the period, 6,047 (0.2%) were symptomatic and received testing; 131 were confirmed to have COVID-19, resulting in a case detection rate of 0.5‰ (95% CI, 0.4–0.6‰). Additional 218 imported cases passed through the airport without testing, giving screening a sensitivity of 37.5% (95% CI, 32.6–42.7%) and a positive predictive value of 2.2% (95% CI, 1.8–2.6%). Throughout the period, the sensitivity increased from 10% in February to 88% in May, and positive predictive value varied by month, ranging between 0.2% and 2.6%.

Conclusions: Airport screening had moderate sensitivity, detecting over a third of imported cases of COVID-19. In addition to adjusting the screening criteria for emerging diseases like COVID-19 during the outbreak, post-entry quarantine and health monitoring for travelers are essential to detect sufficient cases and to prevent local transmission.

Wednesday, November 11

Characteristics and Determinants of the Confirmed-Asymptomatic, Suspect, and Probable COVID-19 Case in Bali Province, Indonesia

Ni Putu Ayu Naraswari Nesa, Anak Agung Sagung Sawitri

Background: Coronavirus Disease 2019 (COVID-19) was a global pandemic. Indonesia reported 10.118 cumulative COVID-19 cases and Bali Province as a tourist spot had 222 cases as of 30 April 2020. The trend of cases was increasing. This study aims to determine the distribution and the determinants of COVID-19 in Bali.

Methods: Secondary website data of the Bali Provincial Health Office [19 January–30 April 2020] was analyzed with the sample units of confirmed asymptomatic, suspect, and probable cases. Data were analyzed descriptively and the bivariate analysis with the Chi-square test was continued on data that had PCR status (459 samples) to the infection status of COVID-19. Variables with $p < 0.25$ were tested by logistic regression.

Results: A total of 208/459 (45.31%) were confirmed with COVID-19. Most samples were men (65.6%), 26–35 years old (29.4%), work as cruise-ship crews (35.5%), domiciled in Denpasar (23.1%), and having a history of contact with COVID-19 cases (32.7%). The majority of the sample were reported from Denpasar, Gianyar, and Badung. The highest probable case was reported in Denpasar (26.9%); the highest suspect case was in Gianyar (21.9%), and the highest confirmed asymptomatic case was in Bangli (19.9%). Bivariate analysis on 459 samples (PCR +/- = 208/251), showed that the occupation of cruise-ship crew (OR = 8,119; $p=0,000$) and having contact history with COVID-19 case (OR = 1,436; $p = 0,000$) were risk factors for having COVID-19 infection.

Conclusions: Work as cruise-ship crew and the history of contact play a role in the incidence of COVID-19 in Bali. Screening efforts at point of entry, health quarantine and self isolation need to be intensified.

Wednesday, November 11

COVID-19 Cases in Three Detention Jails: A Case-Control Study — Metro Manila, Philippines, April 2020

Kasmira Maramag, Johnette Peñas, Alethea De Guzman, Vikki Carr delos Reyes, Nemia Sucaldito, Agnes Segarra

Background: On April 18, 2020, the Department of Health received report of confirmed COVID-19 cases in three Metro Manila jails. Investigation was done to verify COVID-19 outbreak and identify risk and protective factors.

Methods: We conducted a 1:2 unmatched case-control study in the three jails. We interviewed persons deprived of liberty (PsDL) and jail personnel, reviewed medical records, and inspected jails. Naso / Oropharyngeal swabs were collected for COVID-19 confirmatory testing via Polymerase Chain Reaction. Cases were respondents positive for COVID-19 confirmatory test. Controls were close contacts of case and tested negative.

Results: Of 120 cases identified, 96 (80%) were PsDL, 80 (67%) females, 39 (32%) had comorbidities. Ages ranged from 20–83 years (Median: 47). Jails locked down by March 10 but allowed personnel to go home after end of duty as well as visitations for PsDL. Jail cells were congested; double beds placed <1 meter apart; 2 PsDL occupants per bed. Meals were rationed. Respiratory illnesses seen at jail infirmary but not reported nor tested. Infirmary staff did not use appropriate personal protective equipment. First identified confirmed cases were PsDL with severe disease referred to hospitals. Significant risk factors identified were sharing a meal with a case (O.R. 19.46, 95% Confidence Interval [CI] 5.88–64.36), being diabetic (O.R. 11.02, 95% CI 3.28–37.01). Daily oral Vitamin C (O.R. 0.20, 95% CI 0.09–0.42), not smoking (O.R. 0.37, 95% CI 0.19–0.75), and hand rubbing with alcohol-based sanitizer (O.R. 0.36, 95% CI 0.17–0.76) were protective.

Conclusions: The COVID-19 outbreak in jails may be due to personnel or PsDL visitors who imported the infection into this closed setting. Poor implementation of minimum health standards, infection prevention protocols, and case detection sustained the transmission. We recommended establishing surveillance and referral systems and infection control protocols through health and exposure screening, masking, physical distancing, and immediate isolation of cases and close contacts.

Thursday, November 12

Investigating COVID-19 Transmission in a Tertiary Hospital in Hanoi, Vietnam Using Social Network Analysis

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

Background: A cluster of 45 COVID-19 cases was identified in a large referral hospital in Hanoi, Vietnam on 18 March 2020, constituting the first SARS-CoV-2 outbreak in a healthcare setting nationwide. We assessed transmission patterns during this outbreak using social network analysis.

Methods: We investigated COVID-19 cases using contact tracing, PCR testing, and movement monitoring through mobile tracking and video surveillance. We conducted network analysis using degree centrality to identify cases with the highest number of connections; betweenness centrality to reveal cases that connect sub-clusters; and closeness centrality to indicate how close a case was to other cases in the network.

Results: A total of 7,200 tests were performed among 1,982 persons at day 0, day 3–4, and day 14 after last exposure to a known case. Overall, 26 (57.8%) ancillary support staff, seven (15.6%) caregivers, five (11.1%) out-patients, two (4.4%) nurses, two in-patients (4.4%), and three (6.7%) secondary cases outside the hospital tested positive. We identified a total of 67 connections between 45 cases. Three cases (a caregiver, an ancillary support staff, and a patient) had the highest score in each social network metric (degree, betweenness, and closeness centrality). The highest degree centrality was detected in one ancillary support staff who was linked to ten (22.2%) other cases. Among the ten most important cases selected by each network metric, transmission dynamics clustered in 15 cases. Among these, nine (60.0%) cases were ancillary support staff, three (20.0%) were caregivers and three (20.0%) were patients.

Conclusions: Our analysis revealed the importance of ancillary support staff in transmission dynamics during this outbreak. This study shows the potential of social network analysis techniques to understand SARS-CoV-2 infection patterns in hospitals and similar contexts. All employees of health facilities with high-frequency movements should be monitored regularly for SARS-CoV-2 infection regardless of their profession.

Thursday, November 12

Epidemiological Investigation of the First Locally-Acquired Case of Coronavirus Disease 2019 (COVID-19) Identified by Influenza Surveillance — Taiwan, February 2020

Yang Li, Chia-ping Su, Shih-Tse Huang, Wan-Chin Chen, Wan-Ting Huang

Background: Because COVID-19 and influenza share similar clinical presentation, using existing influenza surveillance could help track COVID-19. On February 15, Taiwan Centers for Disease Control retrospectively identified the first locally-acquired COVID-19 case with an unknown source through influenza surveillance. We conducted epidemiological investigation and contact tracing to prevent virus transmission.

Methods: We interviewed family members, healthcare workers (HCWs), and others who had contact with COVID-19 cases, defined as persons who tested positive for SARS-CoV-2 by RT-PCR. We reviewed infection control practices and identified aerosol-generating procedures (AGPs) performed during index's hospital stays. We defined close contacts as persons who had contact with cases within 1.5 meters for ≥ 15 minutes while cases were symptomatic, or HCWs who provided medical care or performed AGPs without appropriate personal protective equipment (PPE). Close contacts were tested for SARS-CoV-2 by RT-PCR based on the risk of infection, quarantined for 14 days after last exposure, and re-tested if they became symptomatic.

Results: The index patient became ill with influenza-like illness on January 27 and was hospitalized on February 3 with pneumonia of unknown etiology; airborne precaution was implemented during February 3–13. Inadequate PPE was used when caring for the patient during February 14–15. We identified and tested 39 close contacts of the index patient, including 11 family members and 28 HCWs. Four family contacts tested positive for SARS-CoV-2; all 4 had eaten with the index patient on the day of his illness onset. No HCWs tested positive for SARS-CoV-2. An additional 84 close contacts of the four cases were identified and traced; none became sick.

Conclusions: We found COVID-19 transmission within the family but not among HCWs. To prevent outbreaks, we recommend enhancing COVID-19 surveillance by testing influenza-like illness patients for SARS-CoV-2 and using appropriate PPE when caring for patients with pneumonia of unknown etiology.

Thursday, November 12

Review of Five Years (2014–2018) Tuberculosis Mortality in Kedah, Malaysia: How Far Are We in Achieving the Sustainable Development Goal (SDG) Target?

SH Tan, M Jikal

Background: Tuberculosis (TB) is one of top ten causes of mortality both globally and in Malaysia and the leading cause from a single infectious agent. The SDG target is 90% reduction in TB deaths by 2030. But since 2014, TB mortality rate in Kedah state is higher than the national average. A situational analysis was conducted to identify associated factors and to recommend measures to reduce TB mortality.

Methods: Secondary data from Malaysian TB surveillance registry (MyTB) 2014 to 2018 was analysed for trend and characteristics of TB mortality. Case fatality rates (CFR) were calculated for socio-demographic factors and co-morbidities.

Results: Total deaths recorded in five years were 862. Mortality rate initially decreased from 8.6 to 6.7/100,000 population from 2015 to 2017 but increased to 8.5/100,000 in 2018. Mortality during intensive phase of treatment was 68.9% with 41.9% occurring within the first 14 days. Among them, 90.5% were newly diagnosed cases and 64.6% presented with moderate to advanced chest radiological changes. PTB smear positive contributed 70.7% of deaths, PTB smear negative 16.5%, extra-pulmonary TB 12.7% and drug resistant TB 0.2%. Higher CFR was reported among aged above 65 years (27.3%) vs less than 35 years (17.0%); male (15.6%) vs female (9.9%); staying in rural area (15.2%) vs urban (11.5%) and with no permanent income (17.1%) vs with permanent income (8.9%). Cases with HIV had higher CFR (36.5%). Diabetics had a higher CFR compared to smokers (smokers 13.2% vs diabetics 17.1%).

Conclusions: Kedah is not on track to achieve SDG target of 90% reduction in TB deaths by 2030. The findings suggest that cases presented and/or were diagnosed late. Diabetes emerging as a risk factor is a cause of concern. The state is enhancing the screening strategies for early detection focusing more on elderly, in rural areas with comorbidities to reduce TB mortality in Kedah.

Thursday, November 12

An Investigation of Healthcare Associated Measles Infection in a Regional Hospital, Phuket Province, July to October 2019

Ratchadaporn Papwijitsil, Panupong Tantirat, Rutchayapat Samphao, Nuengruethai Srisong, Tanyawan Chatchana, Rattagorn Pandoung, Kusuma Swangpun, Thapanee Choolue, Phatcharakan Sangthong, Thanit Rattanathumsakul

Background: On 15 August 2019, the Department of Disease Control was notified that during the previous month, there were 12 measles cases admitted to a pediatric ward of a regional hospital, Phuket Province. Joint Investigation Team conducted an investigation in order to describe epidemiological characteristics of the outbreak and provide appropriate control measures.

Methods: Descriptive study was performed by reviewing the situation of measles in Phuket Province. Active case finding was conducted among patients, healthcare personnel, and care-takers. Suspected case was defined as anyone who worked or visited the regional hospital and then developed fever with rash and at least one of the following signs and symptoms: cough, coryza, conjunctivitis, or Koplik's spot. Probable case was the suspected case who had history of contact with confirmed case. Confirmed case was suspected or probable case who had positive laboratory testing for measles. Environmental study was carried out by behavioral surveying and interviewing. Social network analysis was done to identify the risk area of transmission.

Results: A total of 31 cases with no death were identified. Nineteen cases (67.7%) were confirmed. Six cases (19.4%) were healthcare personnel. Under 9-month-old was the most affected age group (41.9%). Gastroenteritis was the most common complication (54.8%). Unrecognized diagnosis and delayed isolation were found in the first case and in some inpatient cases. Inadequate screening and isolation protocol were observed at pediatric outpatient department (OPD). Social network analysis indicated that pediatric OPD and pediatric ward were the places that many cases shared a social connection.

Conclusions: This outbreak was the healthcare associated measles infection in the regional hospital, Phuket Province. Pre-vaccinated children were mostly affected. Unrecognized diagnosis and delayed isolation contributed to the spread of disease. Infection control in healthcare setting should be strengthened.

