



THOHUN

ANNUAL MEETING

2019

Abstract book

AUGUST 22-23, 2019
THOHUN - NCO



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SCHEDULE

August 22, 2019

08.30 - 09.00 Registration

One Health at Work: Policy and National Implementation

09.00 - 09.20	Welcome Speech and Group Photo	Assoc. Prof. Parntep Ratanakorn Chairman, THOHUN
09.20 - 09.40	Policy and Strategy for One Health Workforce Development in Thailand	Dr. Ratanaporn Tangwangvivat Ministry of Public Health Thailand
09.40 - 10.00	Simulation of Multi-sectoral Coordination for Rabies Outbreak Response	Asst. Prof. Dr. Saengduen Moonsom THOHUN Coordinator
10.00 - 10.30	National Strategic Planning and One Health Actions for Antimicrobial Resistance	Dr. Julaporn Srinha Department of Livestock, Ministry of Agriculture and Cooperatives
10.30 - 10.40	Coffee Break	
10.40 - 11.00	Global Trends and Workforce Need	Daniel Schar, VMD Regional Emerging Infectious Diseases Advisor, USAID



August 22, 2019

Community Outreach

11.00 - 11.20	Communication of One Health Knowledge and Application to Village Health Volunteers and One Health Knowledge Dissemination to Villagers and Students	Asst. Prof. Dr. Sivapong Sungpradit Faculty of Veterinary Science, Mahidol University
11.20 - 11.40	International Short Course on Ecosystem Health (THOHUN-TELI): Perspective of a Facilitator of the Course	Dr. Pannamas Maneekan Faculty of Tropical Medicine, Mahidol University
11.40 - 12.00	Developing a Short Training Course for Public Health Personnel in Thailand on Surveillance and Rapid Response of Emerging Infectious Disease Outbreaks in Communities	Prof. Dr. Akeau Unahalekhaka Faculty of Nursing, Chiang Mai University
12.00 - 13.00	Lunch	



SCHEDULE

August 22, 2019

Curriculum Mapping for BioRisk Management

13.00 - 14.30	Curriculum Mapping for BioRisk Management	Asst. Prof. Dr. Saengduen Moonsom Moderator
14.30 - 14.45	Coffee Break	
14.45 - 16.00	Curriculum Mapping for BioRisk Management (Cont.)	



August 23, 2019

08.30 - 09.00 Registration

Future One Health Workforce Development

09.00 - 09.20	Development of Future One Health Workforce of Thai University Network by Community-based Learning on Infectious Diseases Prevention	Asst. Prof. Dr. Weerapol Taweenan Faculty of Veterinary Medicine, Khon Kaen University
09.20 - 09.40	Using One Health Approach to Address the Challenges of Antimicrobial Resistance and Irrational Use of Antibiotics Through Training of Future Health Workforces	Dr. Penkarn Kanjanarat Faculty of Pharmacy, Chiang Mai University
09.40 - 10.00	Training for Future One Health Workforce for Responding to Eemerging Infectious Diseases in Companion and Exotic Animals	Asst. Prof. Dr. Witthawat Wiriyarat Faculty of Veterinary Science, Mahidol University



SCHEDULE

August 23, 2019

Current One Health Workforce Development

10.00 - 10.20	Short-Course Training for In-Service Healthcare Professionals in Primary Care Settings on AMR and RUA Using a OH Interdisciplinary Approach	Asst. Prof. Dr. Wasan Katip Faculty of Pharmacy, Chiang Mai University
10.20 - 10.30	Coffee Break	
10.30 - 10.50	Development of Multi-disciplinary Training Modules on Antimicrobial Stewardship and AMR for One Health Professionals	Asst. Prof. Dr. Nlin Arya Faculty of Veterinary Science, Mahidol University
10.50 - 11.10	Capacity Building and Professional Laboratory Networking for Zoonotic Disease Control	Asst. Prof. Dr. Praphan Luangsook Faculty of Associate Medical Sciences, Chiang Mai University



August 23, 2019

Educational Development

11.10 - 11.30	One-Health Core Competencies Development of Multi-disciplinary University Students by Blended Classrooms	Asst. Prof. Dr. Ouaypon Tungthongchai Faculty of Education, Kasetsart University
11.30 - 11.50	Development of e-learning Modules for Fundamental Knowledge of THOHUN-TELI International Short Course: Integration of e-learning with Field-based Learning of One Health Workforces	Asst. Prof. Dr. Saengduen Moonsom THOHUN Coordinator
11.50 - 13.00	Lunch	
13.00 - 13.20	Program Development for One Health and Public Health Management	Asst. Prof. Dr. Cheerawit Rattanapan ASEAN Institute for Health Development, Mahidol University



SCHEDULE

August 23, 2019

Students' Experience at One Health Network

13.20 - 13.35	Training of One Health Ambassadors for Rabies Control	Asst. Prof. Dr. Natapol Pumipuntu Faculty of Veterinary Science, Mahasarakham University
13.35 - 13.50	Student One-Health Camp for Rabies Control	Mr. Yutthana Homket Faculty of Environmental Management, Prince of Songkhla University
13.50 - 14.05	International Short Course on Ecosystem Health (THOHUN-TELI)	Ms. Chatthasuda Suntisuk Faculty of Associated Medical Sciences, Chiang Mai University
14.05 - 14.20	Coffee break	



August 23, 2019

Global Connections and One Health Research

14.20 - 14.40	Regional Network and Sustainability of SEAOHUN	Dr. Vipat Kuruchittham Executive Director, SEAOHUN
14.40 - 15.00	Insect Vectors and Their Infecting Viral Agents in the Zoological Parks in Thailand	Asst. Prof. Dr. Ronald Enrique Morales Vargas Faculty of Tropical Medicine, Mahidol University
15.00 - 15.20	Antimicrobial Resistance in <i>Enterobacteriaceae</i> among Healthy Pre-school Children in Thailand	Asst. Prof. Dr. Usanee Anukool Faculty of Associate Medical Sciences, Chiang Mai University
15.20 - 15.40	THOHUN Scholarship 2019 at International Commission on Occupational Health 2019: the 21st International Conference in One Health	Ms. Varangkana Thaotumpitak Faculty of Veterinary Science, Chulalongkorn University
15.40 - 15.50	Open Discussion on Future of THOHUN	Asst. Prof. Dr. Saengduen Moonsom Moderator
15.50 - 16.00	Closing Speech	THOHUN Chairman/ THOHUN Coordinator



ORAL PRESENTATIONS

ONE HEALTH AT WORK:
POLICY AND NATIONAL IMPLEMENTATION



Policy and Strategy for One Health Workforce Development in Thailand

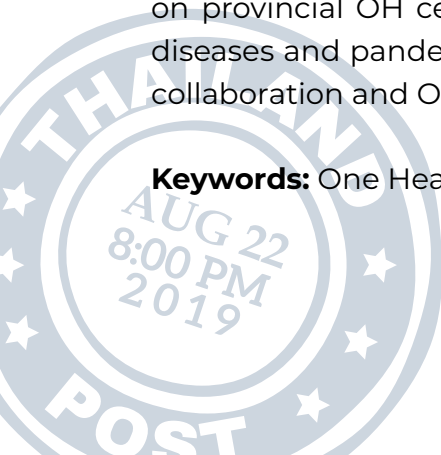


Ratanaporn Tangwangvivat

Veterinary officer, Bureau of General Communicable Diseases, Department of Disease Control, Ministry of Public Health

The administrative structure of the Ministry of Public Health consists of one secretariat and three clusters of Medical Service Development, Public Health Service Support and Public Health Development, including Department of Disease Control (DDC) cluster. DDC's vision is to provide people with international standard services on disease prevention and control within the year 2036. The DDC has many projects related to OH such as development and collaboration with national and international stakeholders and networks; innovation, intervention, standard and knowledge development for prevention and control of disease and health hazards; implementation of risk communication and public relations to reach all target populations; and preparedness or response to public health emergencies and disasters. Moreover, DDC has 20-year strategic plans for 2016 to 2036 with the goal of healthy people, happy employee and sustainable health system that is divided into 4 phases including phase 1: Reforming the system; phase 2 Strengthening, phase 3 Sustainability and phase 4 Ranking among top three in Asia; together with 4 excellence strategies, including prevention and promotion excellence, service excellence, people excellence and governance excellence. Most of OH implementation is in areas of prevention and promotion excellence strategy and OH at provincial level in order to reduce the rate of illness and death from emerging infectious diseases. Four-jigsaw activities related to the OH are a) citizen center (to educate people on how to prevent themselves from the infectious diseases), b) health literacy and international standard (to provide people with knowledge to align with international standard), c) Emergency Operations Center (EOC) system (personnel training and emergency rehearsal plans to prepare them emerging/ outbreak of infectious diseases along with disease investigation and prevention, focusing on the border seam), and d) OH multi-sectoral collaboration, in which DDC has coordinating unit for One Health in the past 4 years ago and now focusing on provincial OH center as well as preparedness and response to emerging infectious diseases and pandemic influenza preparedness. Network strengthening, cross-sectional collaboration and OH workforce is also including in the mission of DDC.

Keywords: One Health, Department of Disease Control, Emergency Operations Center



Simulation of Multi-Sectoral Coordination for Rabies Outbreak Response



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Irwin F. Chavez^{1,3} and Pratap Singhasivanon¹**

¹ Faculty of Tropical Medicine Mahidol University

² Institute of Molecular Biosciences, Mahidol University

³ THOHUN National Coordinating Office, Faculty of Tropical Medicine, Mahidol University

Rabies was identified as a priority zoonosis in Thailand under the WHO's joint external evaluation, International Health Regulations Core Capacities in 2007. To strengthen multi-sectoral coordination to respond to rabies outbreaks, THOHUN coordinated with 7 Thai ministries (Ministry of Agriculture and Cooperatives, Ministry of Natural Resources and Environment, Ministry of Interior, Ministry of Social Development and Human Security, Ministry of Labor, Ministry of Education, Ministry of Public Health) and Thai Red Cross to identify gaps using OH-SMART, and develop a map for multi-sectoral coordination and risk communication. On 24-26 April 2019, 42 representatives from eight organizations gathered with faculty from THOHUN member universities. Workshop participants were informed of the rabies situation, existing guidelines, and rabies response plans in Thailand. Ban Han Yai sub-district, Pol District, Khon Kaen province succeeded in the control and response to rabies. The simulation demonstrated practices of agencies and stakeholders involved in rabies response (e.g. villagers, sub-district administrator, district hospital staff, Public Health Office, and staff from the department of livestock development). Lessons learned from the simulation in Pol District were used as a model to develop national plans for rabies response and risk communication involving the eight organizations using the scenario "students bitten by a dog suspected of rabies". The coordinating plans developed are expected to be adopted by other provinces and as national action plan for rabies control and response in the future.

keywords: multi-sectoral coordination, rabies control, simulation, outbreak response





National Strategic Planning and One Health Actions for Antimicrobial Resistance



Julaporn Srinha

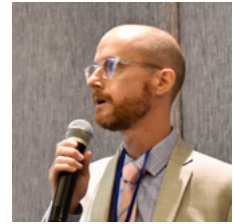
Division of Animal Feed and Veterinary Products Control, Department of Livestock Development, Ministry of Agriculture and Cooperatives

As the antimicrobial resistant (AMR) is become a big problem at global and national levels, Thailand's national strategic plan on AMR was launched and approved by the cabinet on August 17, 2016. The major role of Department of Livestock Development (DLD) in the plan is to 30% reduction in antimicrobial use in animal within year 2021 and to establish policies and national multi-sectoral mechanisms to support effective and sustainable AMR management system, focusing on AMR prevention, control and antimicrobial stewardship in agriculture and animals. Committee of National Politic on AMR consists of Deputy prime minister as a chair of committee and representatives of Ministry of Public Health and Ministry of Agriculture and Cooperatives as well as academic, professional societies and civil society organizations (One Health approach). Moreover, DLD is also cooperative with multi-stakeholders on AMR, such as international organization, academic, governmental sectors, NGO, council and associations, and private sectors. To drive national action plan on AMR, DLD joined World Antibiotics Awareness week in 2017 and 2018 with theme of "Thailand marks the spot to stop AMR" and "Livestock stakeholders handle antibiotics with care" and also participated in Second OIE Global Conference on Antimicrobial Resistance and Prudent Use of Antimicrobial Agents in Animals at Morocco in October 2018. Many of drugs used in animal feed were totally banned in February 2016 upon the Notification of the Ministry of Agriculture and Cooperatives for Medicated Feed under Feed Quality Control Act B.E. 2558 (2015) that was effective since September 25, 2018. Currently, medicated feed manufactures require a license issued by DLD to ensure appropriate antibiotic use in animal feed and also have AMR surveillance system to enhance laboratory capacities of AMR detection in livestock.

Keywords: antimicrobial resistance, national strategic planning, feed quality control



The Future is Coming! Is One Health Ready?



Dr. Daniel Schar

Regional Emerging Infectious Diseases Advisor, USAID

As the world moves quickly into the future, the role of OH grows with it. In order to properly prepare employees, it is necessary to understand the future's trends and its consequences, as well as the implications for OH. In general, the OH future can be compared as rainbow dispersing from light shining through a prism, including population changes, urbanization, economic growth, globalization, protein supply, environmental changes and technology. By 2050, trends and consequences are drastic shift in the proportions of humans and land due to the increasing population, and together with the elderly group as the dominant percentage, leading to increase in healthcare expenses. The city will be over-crowded, since 50-75% of the population is anticipated to live in urbanized cities. The population will become wealthier with an increasing in middle class, leading to increase of consumptive ability. Globalization will be greatly facilitated by the convenience of international transportation and digital communication with almost unlimited information at our fingertips. The demand for protein supply will increase enormously to feed the growing population. It is also expected that environmental and climate changes will have a significant impact, with increased pollution, emerging vector-borne diseases, starvation due to drought and flooding due to rising global temperatures. Finally, technological transitions to artificial intelligence are expected to occur in all aspects of life. Regarding to OH, the impacts of these trends include rise in emerging zoonotic diseases, the rapid growth of epidemics/outbreaks and extensively spreading of AMR. To tackle these issues, it needs to prepare future OH workforces with the proper set of skills, the big data, design of effective organizational framework and policies, and strong partnerships with the private sectors. In this way, the OH workforce is expected to be ready to face with the future.

Keywords: One Health, globalization, vector-borne diseases, antimicrobial resistance



ORAL PRESENTATIONS

COMMUNITY OUTREACH



Communication of One Health Knowledge and Application to Village Health Volunteers and One Health Knowledge Dissemination to Villagers and Students



Sivapong Sungradit^{1*}, Sookruetai Boonmasawai¹, Sakdichod Kimsakulvech¹, Dulyatad Gronsang¹, Arpron Leesombun¹, Shutipen Buranasinsup¹, Nathita Phumthanakorn¹, Ladawan Sariya², Metawee Thongdee², Benjaporn Bhusri², Weena Paungpin², Parut Suksai², Nareerat Sangkachai², Kunaporn Homyok³, Sineenard Jiemtaweeboon⁴, and Saengduen Moonsom⁵

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² The Monitoring and Surveillance Center for Zoonotic Diseases in Wildlife and Exotic Animals, Faculty of Veterinary Science, Mahidol University

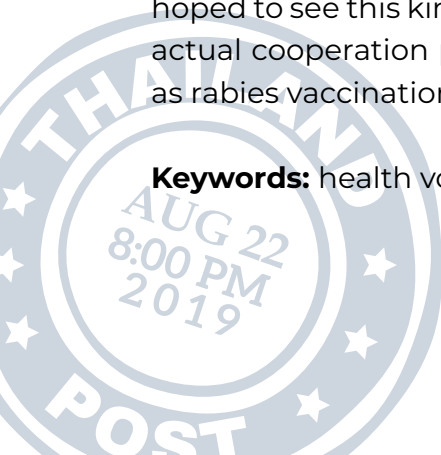
³ Center for Veterinary Diagnosis, Faculty of Veterinary Science, Mahidol University

⁴ Department of Clinical Sciences and Public Health, Faculty of Veterinary Science, Mahidol University

⁵ Department of Protozoology, Faculty of Tropical Medicine, Mahidol University

There was a big gap between academics and villagers in terms of communication, especially zoonotic diseases from wildlife and livestock and a lot of reports of those diseases in Kanchanaburi province. This project is aim to educate participants to have a better understanding of zoonotic diseases under the concept of OH and to give advice on the appropriate practices to other villagers and children. The activities were arranged to give villagers and junior students in local communities an opportunity to learn about the OH concept and rabies. The trainers had an opportunity to use their learned skills to educate others under experts' guidance. Community members and junior students from seven sub-districts were invited to attend the workshops. The local rabies situation was used as a model for learning about zoonosis and the application of the OH concept for problem management. After the activities, the percentage of the mean score of the knowledge was found to have increased. They recognized the importance of rabies and learned to manage health problems by working with relevant agencies. However, participants hoped to see this kind of activity generated in every village continuously. They want to see actual cooperation projects between the university and local community agencies such as rabies vaccination for pets or sterilization of animals to control their populations.

Keywords: health volunteer, rabies, One Health concept, zoonotic disease



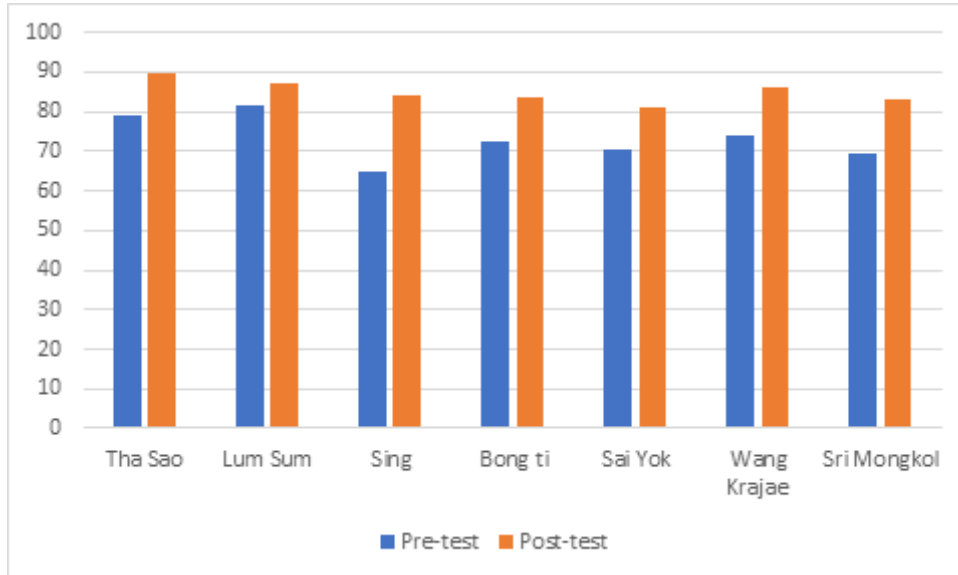


Figure 1. Percentage of average score from villager's test

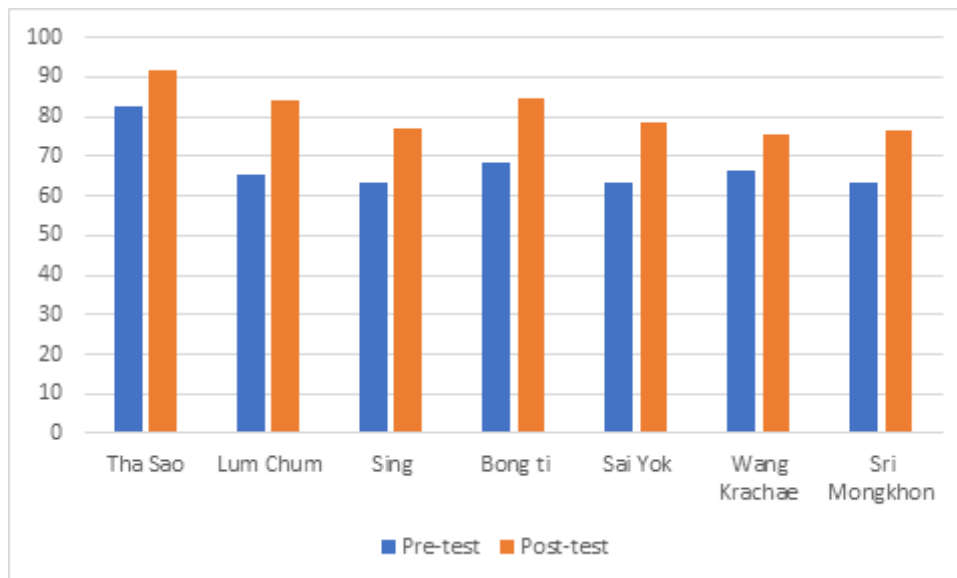


Figure 2. Percentage of average score from junior student's test





International Short Course on Ecosystem Health (THOHUN-TELI)



Pannamas Maneekan

Faculty Of Tropical Medicine, Mahidol University

This course was adapted from the Tufts Environmental Literacy Institute (TELI). With experts in medical, veterinary, and environmental fields from leading Thai universities as facilitators, the course was organized over a total of 3 weeks. Fundamental skills and knowledge were covered during the first week via e-learning and the following two weeks through field practice. By coordinating with the local community hospital, local government unit, and the Department of National Parks, Wildlife and Plant Conservation, the course was able to mobilize village authorities and health volunteers and gain access to the target communities. The participants carried out their tasks as follows: 1) community assessment, 2) data/specimen collection and analysis, 3) formulation of potential solutions through social innovation, and 4) dissemination of results and plans. The goals of the course are to apply One Health through community-based learning and need participants gain essential knowledge and practice diagnostic skills within a One Health (OH) framework in order to develop strategies to address health problems identified within the community, and could have communication potential solutions for the community. The training was held from 1-9 June (e-learning) and 10-21 June 2019 (field-based) at Tha Kradan Sub-district, Sri-Sawat, Kanchanaburi, Thailand. Participants approached the community health problems through an initial village meeting, employing participatory techniques. Data on the following were collected using questionnaires developed with Epicollect 5 - elephant-human conflict, KAP for vector-, food- and water-borne diseases, and samples of water, foods and stools were collected using standard techniques and data were analyzed and used to develop potential solutions for specific problems faced by the respective communities. Potential solutions developed by the groups were communicated back to the villagers through creative and innovative means. The villagers received the participants' suggestions well and showed their appreciation of their efforts to help solve health issues in their community. Throughout a course, we learned that proper coordination with local authorities (health and non-health) could lead to high response and participation among the villagers and group-level tasks using multi-sectoral engagement could help participants understand the dynamics of leader-member roles.

Keywords: food-borne, vector-borne, water-borne disease, One Health concept, human-elephant conflict, Tufts Environment Literacy Institute, TELI





Developing a Short Training Course for Public Health Personnel in Thailand on Surveillance and Rapid Response of Emerging Infectious Disease Outbreaks in Communities

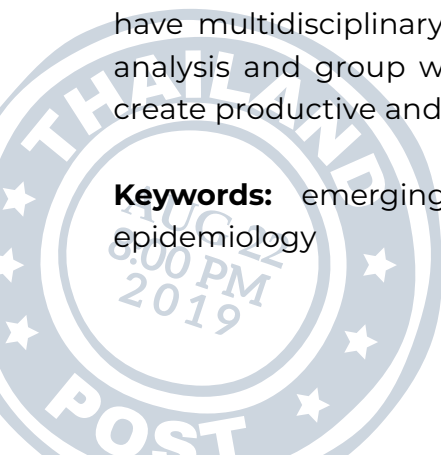


Akeau Unahalekhaka

Faculty of Nursing, Chiang Mai University

Public health personnel need to have knowledge and understanding on epidemiology, disease surveillance, One Health and have to use information from disease surveillance in their work. The more surveillance information is utilized; the more health problems can be effectively prevented. The goal of the project is to develop a short training course and a training manual on surveillance and rapid response of emerging infectious disease outbreaks in communities for public health personnel in Thailand and to evaluate an established course. Three 2-day workshops were conducted in Bangkok to develop the short training course with a total of 28 participants. The course developed was a 3-day course, consisting of 8 topics - Principles of Epidemiology and One Health Concept; Epidemiological Surveillance; Data Management and Statistics in Epidemiology; Epidemiological Investigation and Public Health Emergency Response; Principles of Infection Prevention and Control and Use of Related Laws; Emerging and Re-emerging Infectious Diseases in Humans and Animals; Strategies in Working with a Community and Application of Epidemiology and the One Health Concept in Prevention of Emerging and Re-emerging Infectious Diseases. Three 3-day training workshops were conducted in Chiang Mai and Khon Kaen provinces with a total of 105 participants to evaluate the appropriateness and effectiveness of the course, including participant opinions towards course contents, course duration, training methods and educational materials. Knowledge was assessed before and after training. The opinions and suggestions were collected using a self-administered questionnaire and via discussions. After training, the majority of participants gained higher scores and mean scores of knowledge increased significantly. Participants suggested that the course should have more time and have multidisciplinary on epidemiology, data collection, epidemiology programs for data analysis and group work. All over the project have learned that working together could create productive and valuable success and strong networking.

Keywords: emerging infectious disease, disease surveillance, One Health concept, epidemiology





ORAL PRESENTATIONS

FUTURE ONE HEALTH WORKFORCE
DEVELOPMENT



Development of One Health Workforce of Thai University Network for Community-based Learning on Infectious Diseases Prevention



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² Division of Pathobiology, Faculty of Veterinary Medicine, Khon Kaen University

³ Division of Livestock Medicine, Faculty of Veterinary Medicine, Khon Kaen University

Health problems among humans and animals in rural areas of the North-East of Thailand are current issues, with many organizations participating to try to solve them. Many infectious diseases are still causing economic losses, health problem and deaths in the rural communities. To prevent infectious diseases, we need to educate people and collaborate with experts from government, academia and leaders in the community. During 11-22 July 2016, a total of 40 academic staff and 93 participants from 10 universities respectively from different backgrounds, disciplines and sectors joined to form a workforce planning group. The project was divided into 3 phases. 1) Students were initially prepared and trained at the Faculty of Veterinary Medicine, Khon Kaen University, on OH concepts, prevention and control of infectious diseases, basics of community-based learning approach and basic epidemiology and its tools, including questionnaire preparation and data collection. 2) On-site activities at Ban Tha Lard, Nong Ruea subdistrict, Non Sang district, Nong Bua Lam Phu province, consisted of collaborating with the community, collecting data using questionnaires, evaluating and analyzing the data, developing plans and activities with the community, establishment of community activities to solve community problems and discussion and conclusion of what they had learnt and successes with the community. 3) Project evaluation included conclusion and evaluation of the project, determining problems and solutions of the project, developing a model to solve other community problems from zoonosis and writing a report. The community-based learning model provided students One Health workforce development learning in: a) life styles of people in the community, how to make community diagnosis b) observations of humans, animals and the environment helped students develop ways to get various types of community information using tools they had created, c) Students learnt how to present problems and short/long term solutions to the community leaders to find community consensus solutions.

Keywords: community-based learning, One Health concept, zoonosis, epidemiology





Using One Health Approach to Address the Challenges of Antimicrobial Resistance and Irrational Use of Antibiotics Through Training of Future Health Workforces



Wasan Katip¹, Penkarn Kanjanarat^{1*}, Raktham Maktrirat², Nongyao Kasatpibal³, Usanee Anukool⁴, Tongkorn Meeyam⁵, Peninnah Oberdorfer⁶

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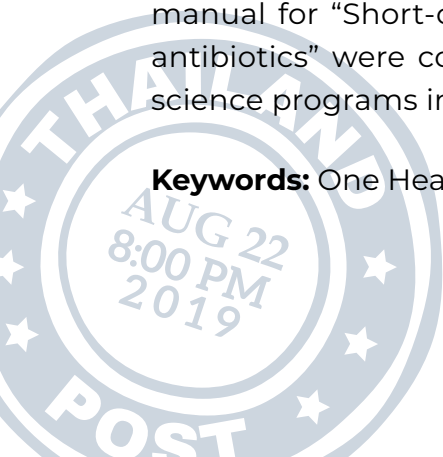
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⁶ Division of Infectious Diseases, Department of Pediatrics, Faculty of Medicine, Chiang Mai University

Antimicrobial resistance (AMR) has been recognized as an important, serious, and urgent health threat in Thailand over the past few decades. Half of all antibiotics used are prescribed from hospitals, with high prevalence of antibiotic prescribing by nurse practitioners and public health personnel at primary care settings. Moreover, the consumption of antibiotics dispensed by community drugstores and retail shops. One of Thailand's national strategies to control AMR is to strengthen and educate the health workforce. Training to health science students could play a major role in antibiotic stewardship in primary care settings and community facilities in the future such as awareness and knowledge of AMR and rational use of antibiotics in common illnesses related to their practice when entering their careers. We developed the concepts and structure of a two-day training course and offered to 3rd-6th year students as a curriculum requirement before their first professional clerkship at community-level facilities. With the training on AMR in ambulatory care settings, students are able to identify and prescribe antibiotics for common illnesses appropriately. The training modules and manual for "Short-course training on antimicrobial resistance and responsible use of antibiotics" were completed and suggest to be included in the curriculum of health science programs in Thailand.

Keywords: One Health concept, antimicrobial resistance, AMR, antibiotic prescribing



Knowledge and skill	Topics
Module 1: General concepts of AMR and RDU	Epidemiology of antimicrobial resistance in Thailand
	Rational drug use concept and policy briefs on AMR
Module 2: Responsible use of antibiotics in common illnesses in OPD	Upper respiratory infection (URI) <ul style="list-style-type: none"> - Pharyngitis - Rhino sinusitis - Acute otitis media - Acute diarrhea (AD) - Fresh traumatic wound (FTW) - Antibiotic prophylaxis in vaginal delivery of normal term labor (APL)
Module 3: Team building and communications	Communication skills needed to promote rational use of drugs
Module 4: Integrated care in OPD, IPD, and environment, using case studies	Principles and importance of rational use of antibiotics in outpatient, and inpatient services, and impact of antibiotic use on environment, organized in 5 learning stations
Module 5: Health promotion	Alternative care in health promotion and reduction of risks of infections

Structure and content topics of the short-course training program on AMR and RUA



Training for Future One Health Workforce for Responding to Eemerging Infectious Diseases in Companion and Exotic Animals



**Sarin Suwanpakdee¹, Nareerat Sangkachai¹, Metawee Thongdee¹,
Ladawan Sariya¹, Phirom Prompiram¹, Jarupha Taowan¹, Parut Suksai¹,
Rassmeepen Phonaknguen¹, Weerapong Thanapongtharm², Pranee
Panichabhongse², Pahurat K. Taisuwan ³, Saengduen Moonsom ⁴, Irwin F.
Chavez ⁴ and Witthawat Wiriyarat^{1*}**

¹The Monitoring and Surveillance Center for Zoonotic Diseases in Wildlife and Exotic Animals, FAO Reference Center for Zoonotic and Wildlife Diseases, Faculty of Veterinary Science, Mahidol University

² Department of Livestock Development

³ Department of Diseases Control

⁴ THOHUN NCO, Bangkok, Thailand

From the recent outbreaks of emerging infectious diseases (EIDs) around the world, several types of animals were infected with those virulent pathogens. Not only livestock and wildlife but also companion and exotic pets may serve as intermediate hosts to expand the extent of human contact. To respond quickly and effectively to new outbreaks of zoonotic infectious diseases, well-trained current workers, and a new generation of a One Health workforce should be prepared with adequate skills to handle suspected or infected companion and exotic animals. In 2016, we created and provided a training course for current One Health (OH) workforce to respond to EIDs in companion and exotic animals, and in 2017 the training was provided to the future OH workforce (university students from THOHUN member universities), to prepare them to be a competent workforce who can respond effectively to these threats in the future. In the training, students learned about the knowledge necessary for EID control in pets and exotic animals including important EIDs outbreaks, soft skills for One Health, risk assessment, animal isolation and quarantine, PPE usage, sample collection and transport, and risk communications. Hands on practice using potential scenarios developed by the trainers were used to ensure that the participants would be able to work together when faced with real events in the future. From the training and those of student suggestion, the awareness of EIDs importance should be promoted to practitioners and pet owners. This kind of knowledge should be included in veterinary curricula and the participants should have a chance to practice with several types of animals.

Keywords: emerging infectious diseases, EIDs, One Health, exotic animals, zoonosis





ORAL PRESENTATIONS

CURRENT ONE HEALTH WORKFORCE
DEVELOPMENT



Short-Course Training for In-Service Healthcare Professionals in Primary Care Settings on AMR and RUA Using a OH Interdisciplinary Approach



Wasan Katip^{1*}, Penkarn Kanjanarat¹, Raktham Maktrirat², Nongyao Kasatpibal³, Usanee Anukool⁴, Tongkorn Meeyam⁵

¹ Department of Pharmaceutical Care, Faculty of Pharmacy, Chiang Mai University

² Department of Veterinary Bioscience and Veterinary Public Health, Faculty of Veterinary Medicine, Chiang Mai University

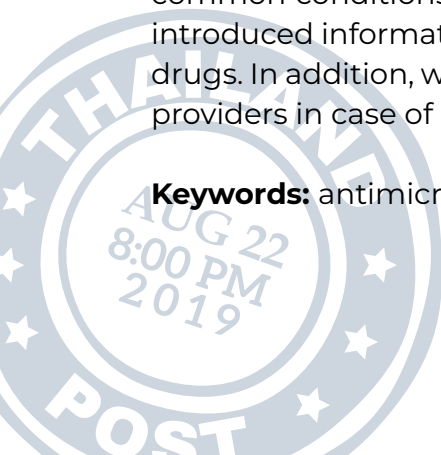
³ Division of Nursing Science, Faculty of Nursing, Chiang Mai University

⁴ Department of Medical Technology, Faculty of Associated Medical Sciences, Chiang Mai University

⁵ Veterinary Public Health Center for Asia Pacific, Faculty of Veterinary Medicine, Chiang Mai University

Antimicrobial resistance (AMR) is emerging and spreading globally, threatening our ability to treat common infectious diseases, resulting in prolonged illness, disability, and death. Antimicrobial resistance occurs naturally over time, usually through genetic changes. However, the misuse and overuse of antimicrobials is accelerating this process. In many places, antibiotics are overused and misused in people and animals, and are often given without professional oversight. Currently, training courses on AMR and RUA for health care professional are limited. The goal of this training are determination of participant knowledge and awareness of AMR and RUA with long-term change and benefits anticipated RUA practices that improved AMR threat reduction. The workshop was conducted based on the training plan. We recruited 91 participants from 8 provinces from health service region 1 by advertising through the continuous pharmacy training channel of the Ministry of Public Health, and 20 participants from 10 pharmacy preceptor sites. Since there was immense interest from pharmacists from other health service regions we decided to admit another 11 participants from lower north, north eastern, central, and southern Thailand. The participants from outside of health service region 1 have good potential to deliver AMR and RUA knowledge and OH skills to their colleagues at their work places. We also trained 21 farmers and village community leaders at the temple in the center of the community in Pannaram Village in Fang District, Chiang Mai. We introduced how to reduce risk of infections by teaching hand cleaning and self-care in common conditions, i.e., upper respiratory infections, fresh wounds, acute diarrheas. We introduced information about the differences between antibiotics and anti-inflammatory drugs. In addition, we educated the farmers on assertive communication with health care providers in case of antibiotic prescription.

Keywords: antimicrobial resistance, AMR, responsible use of antibiotic, RUA, One Health





Development of Multi-disciplinary Training Modules on Antimicrobial Stewardship and AMR for One Health Professionals



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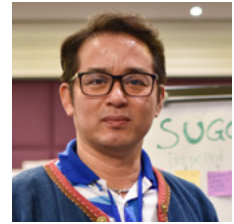
Antimicrobial resistance and antimicrobial usage may not be new subjects for OH professionals, however there is still a big gap from expert knowledge to OH professional implementation. In order to fill the gap and need, AMU/AMR training module, a OH professional's handbook and a 3-day workshop were developed and implemented. However, due to time and budget limitations, only three groups were included in the training program - small animal practitioners, aquaculture industry workers, and dairy cow practitioners. The goal of workshop is to develop AMR/AMU training module for OH professionals; after attending the training workshop, current OH professionals should have more knowledge and awareness of antimicrobial stewardship. Gaps and needs were identified and used for developing the AMR/AMU training module for OH professionals. A 3-day workshop program and AMR/AMU training module handbook were developed for OH professionals who working in small animal practice, aquaculture, and dairy cow practice. From the evaluation form and pre- and post-test scores, most of the OH-professionals who attended the workshop were satisfied and had more knowledge and awareness of antimicrobial stewardship. The workshop gave the lesson that different animal species have their own veterinary disciplines. The training module should be modified for each discipline and there should be more topics about antibiotic stewardship in OH professional undergraduate curricula.

Keywords: antimicrobial resistance, AMR, antimicrobial use, AMU, One Health





Capacity Building and Laboratory Professional Networking for Zoonotic Disease Control: Intensive Training in Identification of Pathogenic Bacteria



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This training was focused on enhancing knowledge of the One Health concept and knowledge and laboratory skills for identification of zoonotic bacteria. The workshop aimed to create a network among professionals from Thailand and 3 other Southeast Asian countries (Myanmar, Malaysia and Vietnam). This training also included soft skill competency training. Finally, we established a small laboratory network for zoonotic disease control. The workshop was set up so that all participants could be trained in both soft skills (competencies) and hard skills (technical skills). The One Health concept and knowledge about zoonoses were taught. Many soft skills were also trained. In the laboratory training, participants were provided with unknown samples of zoonotic bacteria with some history details. We had a group discussion about the history details and result of unknown bacteria. Two-week training for identification of pathogenic bacteria was more successful because all participants had to identify pathogenic bacteria by themselves. They also learnt about specimen handling and laboratory biosafety. All participants learnt about soft skills and were involved in the group discussion to set up a network for zoonosis control. The presentations from every group were excellent. At the end of the workshop we established a small laboratory network for zoonotic disease control. In summary, this workshop trained participants in both soft skills and hard skills at the same time. All participants very excited and enthusiastic to do both. The inclusion of multidisciplinary participants was the key to the success of this workshop, as they helped each other to discuss, suggest and share ideas using their own disciplinary expertise. We recommend that THOHUN should support further workshops like this to enable multidisciplinary professionals to understand about the One Health concept and zoonotic disease control.

Keywords: capacity building, One Health concept, zoonotic bacteria, THOHUN



ORAL PRESENTATIONS

EDUCATIONAL DEVELOPMENT



OHCC Blended e-Learning Course for Multi-disciplinary University Students of THOHUN



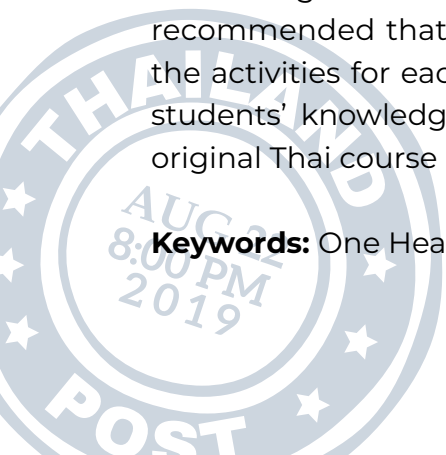
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A One Health Core Competencies (OHCC) blended e-Learning Course was successfully developed and implemented at Kasetsart University (KU) in 2018, with the collaboration of professionals from multi-disciplinary fields. In this project, 112 multi-disciplinary students from universities in THOHUN, including Chulalongkorn University (CU), Mahidol University (MU), Thammasat University (TU), Chiang Mai University (CMU), Khon Kaen University (KKU), and Mahasarakham University (MU) were provided with 7 modules of OHCC using innovative teaching methodologies. The project aimed to establish and provide a set of OHCC using innovative teaching methodologies, the OHCC activities-based learning approach and blended e-Learning courses to 112 multi-disciplinary students of THOHUN. The results were interpreted as a successful project. The students understood the basic concepts of information and applications of the OHCC blended e-Learning Course and did well on OHCC's content assessments. Moreover, with 2 days of OHCCs training, students demonstrated how they developed and promoted effective relationships with multidisciplinary colleagues and team members as well as dealt constructively with conflicts. They realized that One Health concepts were useful for the daily lives of every discipline and how they could be applied for better individual health outcomes. The students were encouraged by the facilitators to develop their competencies through One Health concepts and to apply what they learned, skills that are very much valued in today's study/working life. Summing up, the OHCC blended e-Learning course provides a new and up-to-date set of resources for multi-disciplinary university students of THOHUN and can be used to strengthen their capacity in the future. Implications drawn from this project show that the OHCC blended e-Learning Course could play a vital role in meeting multidisciplinary students competency development needs. However, it is recommended that the OHCC e-Learning system be updated continuously to improve the activities for each of the 7 modules, along with the assessment tools for evaluating students' knowledge and performance learning. Also, this course should develop the original Thai course into an English version.

Keywords: One Health core competencies, blended e-learning, soft skills





Development of e-learning Modules for Fundamental Knowledge of THOHUN-TELI International Short Course: Integration of e-learning with Field-based Learning of One Health Workforces



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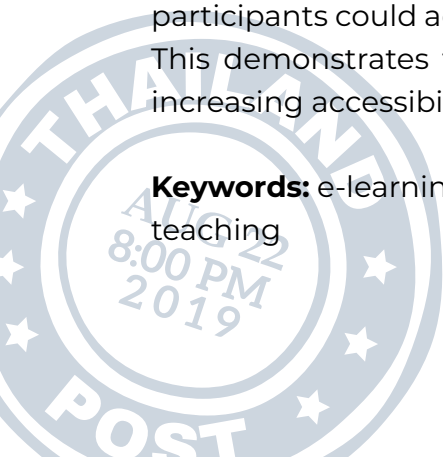
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Lectures and field/community-based learning are considered as the best platforms to improve knowledge and skills, respectively. THOHUN-Tufts Environment Literacy Institute (THOHUN-TELI) was developed as a three-week short course to strengthen One Health Core Competencies, fundamental knowledge, and technical skills required for infectious disease detection in human, animal, and environmental samples, and risk analysis and communication at the community level. The course initially included on-site lectures for a week followed by a field practicum for two weeks. Multidisciplinary participants were recruited from Thailand, Malaysia, Vietnam, Indonesia, Myanmar, Bangladesh, Lao PDR and Cambodia. To reduce costs and time, contents of the first week were adapted into an e-learning platform, which was piloted during THOHUN-TELI 2018. The current revision is composed of 3 modules: “Module I: One Health problems on infectious diseases in humans and animals, diseases or health problems that are related to environmental changes, anti-microbial resistance, human-wildlife conflict and risk communication”; “Module II: risk detection by standard laboratory methods and risk analysis”; and “Module III: Social innovation, One Health concepts and OHCCs, risk communication and community outreach”. The modules were implemented as part of THOHUN-TELI 2019. About 48%, 93%, and 69% of the participants passed modules I, II, and III within three attempts, while the rest of them passed after completing additional assignments or re-examination. In the later field practicum, facilitators observed that the participants could accurately perform laboratory techniques learned from the e-learning. This demonstrates the platform’s feasibility for improving knowledge and skills, while increasing accessibility and reducing time and resources required.

Keywords: e-learning, field-based learning, One Health workforce development, blended teaching





Program Development for One Health and Public Health Management



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Sustainable strengthening of One Health capacities also requires thinking about “the next generation” and the development of One Health academic programs involving public health, veterinary public health, social science and environmental health disciplines to develop a new culture of interdisciplinary and systems thinking. The goal of this program is to demonstrate how program development on One Health and public health management can contribute to and support sustainable development in the academic section. Firstly, an in class-training course on the principles and practices of One Health was organized by ASEAN Institute for Health Development (AIHD), Mahidol University during one week in 2016, supported by Thailand One Health University Network (THOHUN). This course aimed to apply interdisciplinary team-oriented approaches to solve complex health problems. Next, One Health implementation of dengue control and prevention in the central part of Thailand was continued by master students under THOHUN research grant support in 2017. For One Health concept fulfillment, knowledge from in-class training and practical applications from the research should provide an intensive One Health experience. Three batches of training programs on principle concepts and practices of One Health for emerging disease management were conducted from 2017-2019 by AIHD, supported by Thailand International Cooperation Agency (TICA). In 2018, Masters students supported by South East Asia One Health University Network (SEAOHUN) worked with households in Kayin State, Myanmar to improve household awareness of malaria prevention and control measures using a One Health approach. International cooperation with Hokkaido University Research Center for Zoonosis Control on community strengthening for public health prevention and control supported the activities of two further master students. Finally, the lessons learned led to the inclusion of an elective subject on “principles, concepts and practice of One Health” in the Doctoral Program of Health and Sustainable Development, Mahidol University.

Keywords: One Health, public health management, interdisciplinary, zoonosis, THOHUN



ORAL PRESENTATIONS

STUDENTS' EXPERIENCE
AT ONE HEALTH NETWORK



Training of One Health Ambassadors for Rabies Control



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The project was developed to enable students from multidisciplinary fields from many universities to engage in inter-professional education to increase their One Health knowledge, especially for rabies and rabies control, including communication of risks and appropriate practices for rabies at the community level. Furthermore, the objectives were to strengthen and enhance the core competencies that are necessary to cope with a rabies outbreak in the community as well as building new generations of students to be ambassadors, with good knowledge, abilities and creative thinking about Rabies control to be a mainstay for dissemination of knowledge in the future. This project was established via a 2-day training in March 2018 at Phukhaongam resort, Nakhon Nayok province, Thailand. Participants were 40 students who were divided into 4 groups, with each member in the group coming from a different disciplinary field. They learnt and did activities together such as knowledge gaming, ice breaking, community-based learning, community investigation, presentation of animal reservoir information and the problem of rabies to the targeted community. The results from this project showed that all participants emphasized and realized the importance of rabies control in Thailand. They understood how to protect communities from rabies and they improved their soft skills, leadership, critical thinking, and learnt how to work together as a team. They also planned for rabies control program as "One Health Ambassador for Rabies Control".

Keywords: One Health ambassador, rabies control, risk communication, rabies



*STUDENTS' EXPERIENCE
AT ONE HEALTH NETWORK*

ORAL PRESENTATIONS



Student One Health Camp for Rabies Control

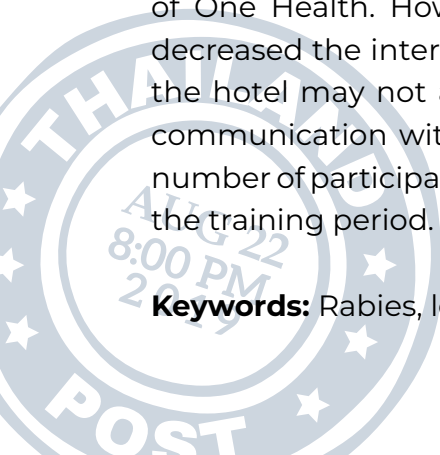


Yuttana Homket

Faculty of Environmental Management, Prince of Songkla University

Thailand encounters cases of rabies almost every year. Problem solving requires integration of both science and art. Therefore, increasing knowledge and skills is an important aspect for sustainable disease prevention, especially in the younger generation. The objective was to enable students from multiple disciplines to gain knowledge and understanding of One Health, including community risk communication, to enhance their core competencies needed to cope with rabies outbreaks. The activity was held over 2 days in Mueang District, Khon Kaen Province, which was an area at risk of rabies outbreaks. The participants were 186 students, 17 previously trained One Health ambassadors and 14 facilitators who developed and implemented the learning process to train both hard and soft skills. Students were divided into 4 groups; each group shared activities such as ice breaking, role-playing, games, learning base, community survey and presentation, along with developing guidelines for solving rabies problems by stakeholders. The results revealed that creating good knowledge and understanding of rabies could be developed through group activities. Moreover, over 90 percent of participants gained knowledge and understanding of rabies control in a holistic and inclusive way. They also improved their soft skills for learning, teamwork planning for all activities and performing the tasks assigned to succeed. Developing leadership and systems thinking skills, understanding different cultures or professions and being able to develop health risk communication messages are the mainstay of disease management and health hazards at the community level. Instilling the concept of One Health in youth groups from multiple disciplines is a cost-effective investment that can stimulate the target group to have more awareness and understanding of rabies control. This in turn can improve their performance for prevention and control of infectious diseases linked to people, animals and the environment as well as encouraging the ambassadors to perform their duties regularly. This work is to effectively promote the development of ambassadors to apply their knowledge and contribute to the sustainable development of One Health. However, training activities with an excessive number of participants decreased the interest, collaboration and cognition of the group. Including activities in the hotel may not achieve the spirit of problem management and learning health risk communication with the community. Therefore, training activities should consider the number of participants, similar ages and use the community as a learning area throughout the training period.

Keywords: Rabies, leadership, system thinking, One Health, risk communication



*STUDENTS' EXPERIENCE
AT ONE HEALTH NETWORK*

ORAL PRESENTATIONS



International Short Course on Ecosystem Health (THOHUN-TELI)



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One Health is a procedure for designing and implementing programs, policies, legislation and research in which multiple sectors communicate and work together to achieve better public health outcomes. THOHUN has developed an annual program called THOHUN Tufts International Short Course on Ecosystem Health (THOHUN-TELI), integrating One Health into field- and community-based learning. This course is a high-impact platform to train multidisciplinary students and professionals to prepare them to identify and respond to existing and current infectious disease threats and public health issues. On this course THOHUN-TELI builds on the knowledge and experiences of students, the future Thai One Health workforce, together with health workers/professionals and enhances vital skills through hands-on and applied learning opportunities. The fourth TELI program was held on 10-22 June 2019 at Tha-Kradan subdistrict, Sri Sawat district, Kanchanaburi, Thailand. This area has many health and ecosystem problems especially water-borne disease and human-elephant conflict. For the field practicum, participants were divided into four multidisciplinary groups and each was given a different problem water-borne disease, food-borne disease, vector-borne disease and human-elephant conflict. Villagers' health problems and ecosystem problems were determined by interview, survey and sample collection. The results showed that participants used both soft skills (core competencies) and hard (technical) skills for detecting and responding to problems. Results showed that the main health problems in this area are diarrhea and dengue. Coliform bacteria were found in water and food from the villages, which may be related to diarrhea. Additionally, from mosquito collection, *Aedes* spp., a vector of dengue was identified by microscopy. Wild elephants are also significant problems in this area because they destroy agricultural products such as sugar cane, cassava and banana crops. After identifying villagers' problems, participants reported results and suggested solutions to villagers by oral presentations and role-playing. One negative aspect was that the course had many participants from multiple disciplines such as Medicine, Science and Social Science and this causes some conflicts between participants and participants had less time for field activities. In future, the organizers should adjust more time for group planning and field practicum.

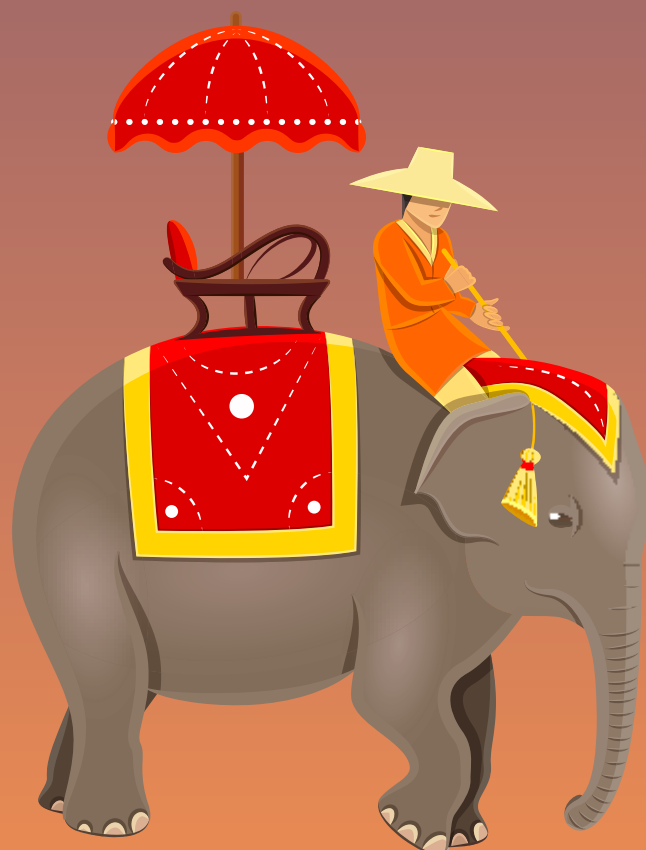
Keywords: THOHUN-TELI, water-borne, food-borne, vector-borne disease, human-elephant conflict, infectious disease





ORAL PRESENTATIONS

GLOBAL CONNECTIONS
AND ONE HEALTH RESEARCH



Insect Vectors and Their Infecting Viral Agents in The Zoological Parks in Thailand



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With a unique assemblage of free roaming and captive wildlife, both domestic and exotic animal species, as well as humans and insect vectors, zoos provide suitable environments for maintenance and establishment of transmission cycles for local and exotic arboviruses. This project aims to identify potential insect vectors in the zoological parks of Thailand and to identify any viral agents associated with them. Biting flies were collected in zoological parks located in Northern (Chiang Mai), Northeastern (Khon Kaen) and central (Bangkok) regions of Thailand. Collections were carried out from May 11-18 and September 22-26. Biting flies were collected using two different types of traps, light traps (at night time) and BG Sentinel traps (at night and day time). Among the mosquito species collected, important zoonotic and human pathogen vectors were identified, including *Aedes aegypti*, *Ae. albopictus*, *Armigeres* spp., and *Mansonia* spp. Furthermore, Phlebotomine and Culicoides flies were also identified. Arboviruses infecting biting flies breeding in the zoological parks were identified. Dengue viral RNA was detected in mosquito pools of *Ae. albopictus*, and *Aedes* sp., and *Mansonia* sp. Furthermore, *Flavivirus* spp. RNA was detected in different mosquito species. These results allow us to recommend that zoological parks are included as places for monitoring the circulation of insect-borne viruses for the risk management of virus infections in animals and humans (visitors and zoo staff), and for the implementation of appropriate preventive and control strategies to minimize zoonotic transmission.

Keywords: arbovirus, *Aedes aegypti*, *Armigeres*, *Mansonia*, *Flavivirus*, *Culicoides*





Antimicrobial Resistance in *Enterobacteriaceae* among Healthy Preschool Children in Chiang Mai, Thailand



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A high rate of antimicrobial-resistant *Enterobacteriaceae* (AMRE), especially extended spectrum beta-lactamase producing *Enterobacteriaceae* (ESBLE), has been reported in Southeast Asia but the rate and risk factors for AMRE carriage among preschool children in Thailand are still unclear. Aims of this project is to 1) Determine the intestinal colonization prevalence of AMRE in Thai children in Chiang Mai province, 2) to investigate risk factors for AMRE colonization among Thai children, and 3) to determine the extent of existing antimicrobial resistance among isolates. A total of 320 fecal swabs and 304 data sets from pre-school children (2-6 years old) in Chiang Mai province were collected from Muang Chiang Mai District (MCM), Saraphi district (SPH), and San Pa Tong District (SPT). ESBLE were screened using culture methods, and identified using biochemical tests, antimicrobial susceptibility testing and multiplex PCR. Statistical analysis was performed by Stata version 14.0. The overall prevalence of ESBLE in preschool children in Chiang Mai was 38.75% (124/320). Provincial prevalence's of 42.68% (102/239) were found in MCM and 27.16% (22/81) were found in SPT and SPH. ESBL-producing *Escherichia coli* (ESBLEc), ESBL-producing *Klebsiella pneumoniae* (ESBLKp) and co-colonization of both species were found at 38.43%, 1.25% and 0.93%, respectively. High rates of resistance to tetracycline (87%), gentamicin (86%) and chloramphenicol (88%) were found in ESBLEc. Carbapenem-resistant *Enterobacteriaceae* were found at 2.19%. Among 154 ESBLEc isolates, 47.4% were positive for the CTX-M group 1; 25.97% were positive for the CTX-M group 9 and 3.4% were positive for both CTX-M group 1 and 9. About 75% (3/4) of ESBLKp isolates were positive for the CTX-M group 1. Statistical analysis showed that education area (urban vs. rural, P

= 0.016), attitude ($P = 0.043$) and anxiety ($P = 0.027$) of caretakers on antibiotic use were significantly different between ESBL-positive and ESBL-negative population. Multivariate logistic regression analysis suggested that education area: urban vs. rural (OR = 2.06, 95%CI = 1.13-3.76, $P = 0.017$) and history of fever sickness (OR = 2.56, 95%CI = 1.24-5.31, $P = 0.011$) were associated to ESBL colonization in children. The identification of the level and risk factors of antimicrobial resistance in fecal *Enterobacteriaceae* among preschool children in Thailand will improve strategies for effective treatment and control of AMRE infection.

Keywords: *Enterobacteriaceae*, antimicrobial resistance, tetracycline, gentamicin



Effects of Environmental Parameters on *Salmonella* Contaminated in Harvested Oysters (*Crassostrea lugubris* and *Crassostrea belcheri*)



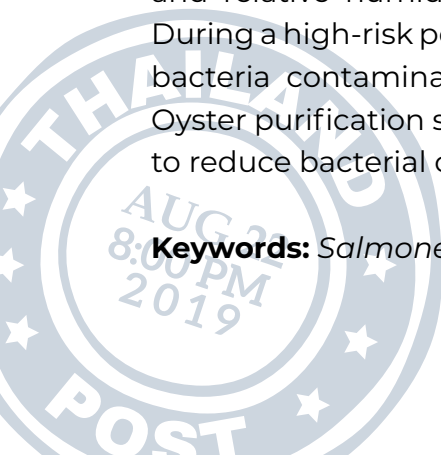
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Environmental contamination from wastewater and anthropogenic activities supports the accumulation of enteropathogenic bacteria in aquatic animals, especially in bivalves and aquatic harvesting areas. The consumption of raw or partially cooked oysters can be a risk for seafood-borne diseases in humans. *Salmonella* is one of the main human pathogens causing foodborne disease with high morbidity and some deaths. Multiple outbreaks caused by *Salmonella* contamination in shellfish have been reported worldwide. This study aimed to evaluate the relationship between the presence of *Salmonella* in oyster meat samples, and environmental factors (ambient air temperature, relative humidity, precipitation, gust wind speed, average wind speed, tidal conditions, precipitation and season) by using principal component analysis. One hundred and forty-four oyster meat samples were collected from four oyster-harvesting areas in Phang Nga province, Thailand from March 2016 to February 2017. The prevalence of *Salmonella* in oyster meat from each site ranged from 25.0-36.11%. The results of PCA showed that ambient air temperature, relative humidity and precipitation were significant factors correlated with the presence of *Salmonella* in oysters. A positive relationship was observed between *Salmonella* in the oysters and relative humidity (PC1=0.413) and precipitation (PC1=0.607), while a negative association was indicated between ambient air temperature (PC1=0.338) and the presence of *Salmonella* in oyster samples. The study indicated that the burden of *Salmonella* in oysters is influenced by season. Lower temperature and higher precipitation and relative humidity are associated with *Salmonella* contamination of oyster meat. During a high-risk period, harvesting of oysters should be prohibited to reduce pathogenic bacteria contamination and to minimize the occurrence of salmonellosis in human. Oyster purification strategies should be implemented during post-harvesting processing to reduce bacterial contamination.

Keywords: *Salmonella*, seafood-borne diseases, enteropathogenic bacteria






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