Indonesia’s Experience, Challenge and Needs: Ensuring Access to Equipment and Technology:

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Indonesia: Challenges in Promoting Capacity Building in Diagnosis and Detection of Infectious Diseases

- A maritime continent, 17,000 islands, 3,000 inhabited
- Have 700 languages – population very diverse
- A crossroad of ancient migration – influenced the genetic background of host and pathogen
- Hepatitis, Dengue, Malaria, Tuberculosis show disease complexity

Message - Management of disease is not simple, need a strong disease surveillance and fundamental research – some countries with diverse populations share same problem
Dengue Situation in Indonesia – Management of Disease is not Simple, Need a Strong Disease Surveillance and Fundamental Research

2007: 157,442 cases with 1,446 deaths (WHO SEARO)
Reported dengue cases is rising but case fatality rate is maintained below 1%

DENV Serotype Distribution in Indonesia

Four antigenically distinct serotypes: infection with one serotype does not provide protection to the other three

Corwin 2001; Suwando 2006; Porter 2005; Graham 1999; Richards 1997; Sukri 2003
Population Structure and Disease – Hepatitis B Virus

- **HB/C** major genotype in mainland Asia and Papua
- **HBV/B** dominant in Austronesian speakers
Preparedness for New Emerging Infectious Diseases

- **FROM BENCH TO BEDSIDE** - the capability to respond to a new emerging infectious diseases – i.e. designing new detection method for A/H1N1 on HA, NA and PB2 genes based on 133 sequences deposited at GISAID

- Adopt new detection protocol (CDC and SEARN – Oxford)

*Message – Strong Basic Research Support the Capability to Respond to New Emerging or Reemerging Diseases*
Building Capacity in Detection, Diagnosis and Tracking Outbreaks of Infectious Diseases

- Development of diagnostic tests (AI)
  - Hemaglutinating activity indicates the presence of influenza virus
  - Reverse Transcriptation-PCR assay for molecular identification
  - Positive test by RT-PCR should be confirmed by the second Institution - confirmation by sequencing analysis
  - RT-PCR and antigen testing carried out in BSL2

- Tracking outbreaks
  - BSL3 laboratory conditions are required for HPAI viruses culture - detection of viral sequence changes (infection with other subtypes have been associated with outbreaks in other species)
The Role of Science and Technology in Health Security – Preparedness for Pandemic

Risk Assessments carried out by:

- **Molecular Epidemiology study**
  - Grouping of viral in clades or subclades –
  - Surveillance - tracing sources of infection

- **Molecular Characterisation of Virus**
  - Alteration of interaction with host receptors i.e. pandemic need changing in specificity of avian type receptor into human-type
  - Change of virulence
  - Drug resistance – no sign

*Message:* Accurate diagnosis and pathogen characterization is a cornerstone in the control of disease. Improvements to detection and diagnostic capabilities are important.
National Actions to Promote Capacity Building

WHAT ARE WE FACING?
Indonesia – A rapidly developing country with serious challenges in infectious disease

WHAT ACTIONS SHOULD BE TAKEN?

I. Build a safe, secure and sustainable capacity
II. Best practices on biological safety and security
III. Build capacity to detect, diagnose and track outbreaks of highly infectious diseases
IV. Build effective and sustainable partnership between developed and developing countries
Capacity Building in Containment – BSL3 Facilities in Indonesia

Planning vision:
What is the long term plan to ensure sustainability?
What support (financial, collaborative activities/joint scientific programs, technical support and others) will be needed for?
National Capacity in Emerging Infectious Diseases Diagnostic and Laboratory Network

- 44 Reference laboratories for emerging infectious diseases were developed to increase national capacity in detection and diagnostic:
  - 2 National Central Laboratories:
    - Eijkman Institute (separate unit)
    - NIHRD of MOH
  - 5 of Microbiology Department School of Medicine - 5 provinces involved in AI Diagnosis
  - 3 MOH Hospital laboratories in different cities
  - District laboratories (the rest) – weakness: manpower lack basic molecular biology

Message: Quality control and sustainability of the operation is being questioned!
Research is an Essential Component of Response to Emerging Infectious Diseases – Maximize Existing Resources and Facilities to Enhance Effectiveness

- Role of Research Institution i.e. Eijkman Institute in national response to Emerging Infectious Disease
  - To provide scientific and technological support to the national diagnostic laboratory network, including capacity building
  - As the leading research laboratory, in particular in genomic research (viral as well as host) and pathology
  - As the major back up diagnostic facility in emergency situation, such as in pandemic response

- Prepare for future emerging infectious disease threat
Important Issues on Capacity Building in Containment, Disease Surveillance, Detection and Diagnosis of Infectious Disease

- Raising awareness of biologically threats globally – BWC, BTR, Dual Use, Code of Conduct
- Strengthening laboratory biosafety and biosecurity to protect laboratory capacity and safely combat infectious diseases – Risk assessment, training, building SOP
- Ensure the sustainability of maintenance and management
- Maximize existing resources and facilities to enhance effectiveness and efficiencies

Strengthening Basic and Translational Research
(Summary on Important Issues from International Workshop on BWC Supporting Global Health, Oslo, 18-19 June 2009)

- Expanding the use of safe and modern diagnostics – National capacity building in fundamental and translational research
- Participation in infectious disease surveillance networks – Sharing quality data/information – Need quality assurance of data collection - laboratory accreditation (?)
- New vaccines, antibiotics and a basic understanding of pathogenic nature of diseases are critical for health security - Invest in basic science and fundamental research
Capacity Building in Containment – Challenges in Best Practices

Good facilities and procedures are not sufficient if personnel are not adequately trained and do not clearly understand their roles and responsibility.

- Laboratory biosecurity training, complementary to biosafety training is provided - protection, assurance and continuity of operations.

- Should not be a one-time event – offered regularly and taken currently. To refresh memories and to learn about new developments and advances in different areas.

Message - Management System is the Key for a Good Laboratory Practice in Biosafety.
Laboratory Capacity and Capability Building to Overcome Deficiencies in Management System

- Establish an effective, best practice management system, incorporating safety and security management process and associated procedures
- Devise necessary document templates, training programs and material
- Develop a generic model of the system which can be applied in other Institutes in Indonesia and elsewhere
- Enhance communication around biorisk management and capacity building at all levels within SEA and beyond
- Concept and practices based on CWA 15793: 2008 Laboratory Biorisk Management Standard

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Manpower Development Should be Built through Training, Specific Workshops and Seminars in a Long Term Manner -

• Training for Laboratory Manager, Researcher, Technical Staff and Engineer
  i.e. Biosecurity and Biosafety Management since 2006 (APBA; ABSA; CDC and Emory University,- Atlanta; HPA, Porton Down, UK; DNV-Norway) organized in the country or abroad
• Workshops
  i.e. Lab Design for the 21st Century
• Conferences: i.e. SEA Influenza Clinical Research Network
Manpower Development through Specific Workshops in a Long Term Manner


- HPA to assist the EI on identifying, assessing and managing potential risks involved in bio-safety lab and manage the response in the event of an emergency
- Training for Laboratory manager, researcher, technical staff, engineer, law enforcement, forensic personnel, CBN unit of Army, fire brigade, General hospital, National center for infectious disease and Team of Nuclear Emergency Response
- Discussion on research collaboration on the way

Message: Sustainable workshops and exercises need commitment on long term financial and technical support
The Indonesian Academy of Sciences (AIPI) in partnership with the Royal Netherland Academy Sciences (KNAW) is developing a Code of Conduct on Biosecurity for Indonesia as required by BTWC (funding still not firmed)

- Raising Awareness, Safety and Security, Education and Information, Accountability and Oversight

Message: A modern and fully equipped BSL3 laboratory should also have biorisk reduction management through awareness of codes of conduct for responsible life science research – academia curricula
Enhancing Cooperation – Effective and Sustainable Partnership

- Regional and international cooperation is necessary not only in the field of bio-safety and bio-security but also in infectious diseases research and surveillance.

- Strengthening cooperation between developed and developing countries (Norway/USA/Japan/ and others – Indonesia) and opportunities among developing countries.

- Networking with interagency counterparts, personal in health, academia, law enforcement, defense and multiple stakeholders including industry, medical, professional organizations and the media.
Conclusion – Ensuring Access

- Ensure the sustainability of maintenance and management – Continuous funding support, maximize existing resources and facilities to enhance effectiveness and efficiencies
- Strengthening and improving laboratory biosafety practices and biosecurity – long term commitment
- Ensuring quality performance of laboratory – QA/QC
- Expand the use of safe and modern diagnostics – need to build national capacity in fundamental and translational research through joint activity
- Raise awareness of biologically threats globally - introduce Dual Use and Code of Conduct through academic curricula
Thank you and greetings from Indonesia