Strengthening and Expanding VOHUN Workforce in Vietnam Through Applied Biorisk Management

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What Is Happening In The World? And How Can We Better Prepare Our Students?
Imagine that enemies possessed a class of weapons with which they attacked your people from time to time.

Decades go by with no attack, but eventually one would come
Where is our defense? Why are we not protected?
Natural Disasters
Man-made (Chem & Bio)

Syria 2013 - 2017
Spectrum of Biological Risk
Bioterrorism & Biocrime by motive

35 legitimate incidents involving biological agents from 1960 to 2016

- Mass Murder: 25%
- Further extremist objectives: 16%
- Assassination/Personal harm: 14%
- Political: 20%
- Unknown: 9%
- Anti-Government: 9%
- Revenge: 4%
- Eco-Terrorism: 0%
- Anti-Abortion: 1%
- Animal Rights: 1%
- Anti-Racism: 1%
- Industrial-sabotage: 1%

Jane’s Terrorism and Insurgency Centre [https://www.ihs.com/itic](https://www.ihs.com/itic)
National Consortium for the Study of Terrorism and Responses to Terrorism (START). (2016). Global Terrorism Database [Data file]. Retrieved from [https://www.start.umd.edu/gtd](https://www.start.umd.edu/gtd)
Is Laboratory Theft Real?
BILL GATES: A new kind of terrorism could wipe out 30 million people in less than a year — and we are not prepared

“Of all the things that could kill more than 10 million people around the world, the most likely is an epidemic stemming from either natural causes or bioterrorism.” New England Journal of Medicine in 2015
Now Imagine that there was a way to protect your people from these threats.
Control the diseases by having a **bullet proof system** to effectively manage and respond to outbreaks whether the cause is natural or manmade.

- **Improved Education Public/Veterinary System**
  - Prepare young professionals to strengthen zoonosis prevention and control programs, investigate emerging infectious diseases, enhance the public’s ability to respond to bioterrorism and biosecurity emergencies

- **Improved Disease Surveillance System**
  - Increase and improve laboratory capacity
  - Coordinate human and animal surveillance

- **Regulations**
  - Increased Safety
  - Increased Security
Vietnam At A Glance:

Population: ~ 96 million
GDP Growth: 6.8%
Unemployment: 3.7%
Labor Force ~55 million
Literacy rate: 97.3%
Goals:
• Become a MODERN AND INDUSTRIALIZED COUNTRY BY 2020 and achieve fast and sustainable development with average Gross Domestic Products (GDP) per capita of US $3000
• Become a responsible international player and AN INCLUSIVE PARTNER OF THE UNITED STATES
• Become a PROMINENT PLAYER IN REGIONAL AFFAIRS, e.g. as chair of the Association of South East Asian Nations (ASEAN)

Achievements:
• Met the Millennium Development Goals to ERADICATE EXTREME POVERTY AND HUNGER AND TO IMPROVE MATERNAL HEALTH
• REACHED LOW MIDDLE INCOME COUNTRY STATUS 2010
VIETNAM'S ECONOMY HAS GROWN AT A COMPOUND ANNUAL RATE OF 5.0% IN PER CAPITA TERMS.
Vietnam One Health University Network (VOHUN)
Veterinary and Public Health diagnostics laboratory system in Vietnam

RAHO 1 (Ha Noi)
RAHO 2 (Hai Phong)
RAHO 3 (Vinh)
RAHO 4 (Da Nang)
RAHO 5 (Daklak)
RAHO 6 (HCMC)
RAHO 7 (Can Tho)
National Center for Veterinary Diagnostics (NCVD – Ha Noi)
National Institute of Hygiene and Epidemiology (Ha Noi)
Institute of Hygiene and Epidemiology (Tay Nguyen)
Pasteur Institute (Nha Trang)
Pasteur Institute (HCMC)
Joint External Evaluation (JEE)

WHO JEE evaluation report

Recommendations for priority actions

- Strengthen capacity of provincial health departments to certify and inspect diagnostic laboratories (BSL-1/2).
- Commit resources to maintain key biosafety infrastructure, such as biosafety cabinets, in a sustainable manner.
- Implement targeted biosafety and biocid management training throughout the country in a coordinated manner, to develop a large network of trainers and trained laboratory workers who can regularly access expertise, tools and manuals to support biosafety practices.
- Develop and monitor implementation of the biosecurity regulatory framework, combined with targeted education and awareness of procedures among key stakeholders.

Not bad – but room for improvement
National approach to creating a world safe and secure from infectious disease threats
Vietnamese Regulation
State Perceptions of Laboratory Biosecurity and Biosafety in Vietnam

• The Nuclear Threat Initiative (NTI) cites sources from 2004 and 2007 to note that ‘Vietnamese officials have also publicly acknowledged Vietnam's need for more stringent biosecurity regulations and controls, which continue to lag behind those of other countries in the region’.

• Vietnam has a relatively low level of threat from terrorism and the more extreme biosecurity risks of biowarfare and bioterrorism compared to other more high-risk countries around the world.

• However, the significant gaps in Vietnam’s biosecurity regulatory framework still increases biosecurity risks relating to biocrime, accidental release and natural outbreaks.
State Perceptions of Laboratory Biosecurity and Biosafety in Vietnam

- Such risks may be exacerbated by Vietnam’s growing biotechnology industrial sector and its desire to strengthen this sector in its economy.

- For example, Vietnam has a fast growing vaccine research and manufacturing sector where also dual use technology is of great concern.

- As of 2015, at least four companies were operating in Vietnam and producing between them the licensed oral polio vaccine, DTP, BCG, Japanese encephalitis, hepatitis B, cholera, typhoid fever and measles vaccines, with vaccines for rotavirus, A/H5N1 influenza, seasonal influenza, dengue under development.
Vietnam is Leading

Laboratory guidelines

- Laboratory biosafety has been enhanced during recent years: A technical guideline, *List of Infectious Microorganisms and Requirements of a Biosafety Laboratory*, was approved by the Government. (2012).
- Additionally, biosafety and **biorisk assessments** in selected BSL2 laboratories were carried out in Vietnam in order to update biosafety procedures and practices, including decontamination and management of infectious waste (2011).
- A guideline addressing **issuing and reissuing certificates** for biosafety laboratories, was issued (2012).
- Guideline for **responsibility for implementation of Biosafety** (2012).
- Adjustment to guideline on **risk groups** (2015).
- Guideline on **biosafety inspections** every 3 years (2016).

Risk assessment and quality control

- Vietnam has incorporated **risk assessment** into guidelines and uses it for assessing national-level response.
- **External quality assurance** (EQA) reports for different diseases has been conducted (2012).
Vietnam is Leading

International Health Regulation (IHR)

- Vietnam has established a **zoonoses coordination mechanism** aimed at strengthening national and provincial capacity for responding to zoonoses outbreaks and for coordinating multisectoral risk reduction strategies’ (2012).
- Vietnam’s Ministry of Health and the Department of Animal Health jointly developed an **interministerial circular on coordination and collaboration between human and animal health** and piloted the APSED Performance Indicators, which are intended to facilitate quantitative assessment of national implementation of IHR core capacities (2012).
- **Laboratory capacity for surveillance and outbreak response** to diarrhoeal (e.g., cholera) and other priority diseases (e.g., dengue and chikingunya) has been strengthened at national and subnational levels (2012).
- Vietnam has established a **sub-committee on risk communication** within the Ministry of Health and identified a focal point for risk communications, which it mobilized during its 2012 hand, foot and mouth disease outbreak.
- Vietnam developed ‘a **national training curriculum on IPC** for physicians, nurses and microbiologists (...) in collaboration with the Vietnam Nurses Association, with technical support from WHO country office. (2012).
- Vietnam developed a **national Infection Prevention and Control (IPC) policy and master action plan**, and established a national IPC committee/working group. Vietnam’s Ministry of Health has developed a national action plan for public health emergencies and emerging disease outbreak control for 2014–2017 that includes specific diseases such as avian influenza, MERS-CoV and Ebola.
- Vietnam has developed and piloted a **web-based IBS system** for communicable diseases (2011-2012).
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Biosecurity Related Legislation in Vietnam

- Decision No 01/2011/QD-BCT dated 13 January 2011 by the Ministry of Trade on the pilot implementation of container transshipment services at Hai Phong Port. Hai City Medical City prohibits the transshipment of waste. Sanitary, medical, and veterinary technical equipment, used in the remediation process of the waste, are to be pre-freed from control and inspection.
- Decision No. 02/2011/QD-MYT dated 1 April 2011 by the Ministry of Finance on the ban of importing waste. Sanitary, medical, and veterinary technical equipment, used in the remediation process of the waste, are to be pre-freed from control and inspection.
- Decision No. 03/2011/QD-MB dated 15 April 2011 by the Ministry of Agriculture and Rural Development on the ban of importing waste. Sanitary, medical, and veterinary technical equipment, used in the remediation process of the waste, are to be pre-freed from control and inspection.
- Decision No. 04/2011/QD-MB dated 15 June 2011 by the Ministry of Agriculture and Rural Development on the ban of importing waste. Sanitary, medical, and veterinary technical equipment, used in the remediation process of the waste, are to be pre-freed from control and inspection.
- Decision No. 05/2011/QD-MB dated 15 September 2011 by the Ministry of Agriculture and Rural Development on the ban of importing waste. Sanitary, medical, and veterinary technical equipment, used in the remediation process of the waste, are to be pre-freed from control and inspection.
- Decision No. 06/2011/QD-MB dated 15 December 2011 by the Ministry of Agriculture and Rural Development on the ban of importing waste. Sanitary, medical, and veterinary technical equipment, used in the remediation process of the waste, are to be pre-freed from control and inspection.
- Decision No. 07/2011/QD-MB dated 15 February 2012 by the Ministry of Agriculture and Rural Development on the ban of importing waste. Sanitary, medical, and veterinary technical equipment, used in the remediation process of the waste, are to be pre-freed from control and inspection.
Biosafety Related Legislation in Vietnam


Article 2. Regulations detailing the implementation of some articles of the Animal Health Ordinance (Decree 13/2000/ND-CP).

Article 3. Law on prevention and control of infectious diseases (No. 03/2000/QH12).

Article 4. Law on prevention and control of infectious diseases (No. 03/2000/QH12).

Article 5. Law on prevention and control of infectious diseases (No. 03/2000/QH12).


Article 15. Customs Law (29/2001/QH10).


Article 24. Decision of the Minister of Agriculture and Rural Development Announcing the list of objects subject to plant quarantine pest risk analysis before importing into Vietnam (24/2001/QD-BNN).
If Out of Compliance......
Regulated Sectors

One Health

- Human Health
  - Hospitals
  - Labs
  - "CRISPR"
- Animal Health
  - Small Slaughter
  - Large Fish
  - Zoo's Pets
- Agriculture
  - GMO's Plant pests
  - Fungi
- Large Scale
  - Biologicals
  - Pharmaceuticals
  - Chemicals
Hierachy of Excellence

How do we provide them with tools to survive in their first jobs?

Where are the students when they graduate?
Laboratory Accidents

How do we prevent them from happening?

If they DO happen, how do we handle them?

Source: CDC newsroom
Vial of deadly virus missing at Texas bioterror lab

A Texas lab can’t find a frozen vial of virus that is a potential bioterror agent.

Officials at a maximum-security research lab in Texas report that a vial of a potential bioterror agent is missing, but they say it’s likely that the virus has been destroyed and poses no danger.

The incident, voluntarily disclosed by the Galveston National Laboratory, comes amid growing concerns about security and safety risks at labs researching germs and toxins that could be used as bioterror weapons.
Avoid.....

You only want to go home with your salary

- Biologicals will
  - Multiply
  - Difficult detection
  - Easy to obtain
  - Inexpensive to produce
  - Small amount
If Jobs are so Varied, What Can We Teach Them at the University?
The Basics! - A systematic Approach

- How to **identify hazards and threats**
- Assess what hazards/threats pose what **level of risks**
- **Evaluate** these identified risks. What is acceptable?
- Those risks that are not acceptable, how should they be **mitigated**?
- **Identify performance indicators** for monitoring how well the mitigation measures work.
- **Analyze** if the chosen mitigation has achieved an acceptable risk reduction and that the residual risk now is acceptable.
Common Themes

Biosecurity

Physical Security
Personnel Security
Material control & Accountability
Information Security
Transport Security

Biosafety

Eliminate / Substitute

Engineering Controls

Administrative Controls

Work Practices

PPE
General Risk Concepts

- Ethics
- Risk Identification
- Risk Assessment
- Risk Evaluation
- Risk Mitigation
- Performance indicators

One Health

- Human Health
- Animal Health

Large Scale

- Biochemicals
- Pharmaceuticals
- Chemicals

Small

- Slaughter
- Zoo’s
- Pets

GMO’s

Agriculture

- Plant pests
- Fungi

“CRISPR”

Diagnostic

Labs

Research
Different Curriculum Strategies at Universities

- **No curriculum change, but relevant BRM aspects integrated into existing courses**
  - Vietnam National University (VNU)
  - Hanoi School of Public Health

- **A specific dedicated BRM course added to existing curriculum**
  - Nong Lam University in HCMC

- **A new scientific degree specialized in BRM**
Thank You

Any Questions?