

# One Health Approach to Combat Emerging Zoonotic Diseases

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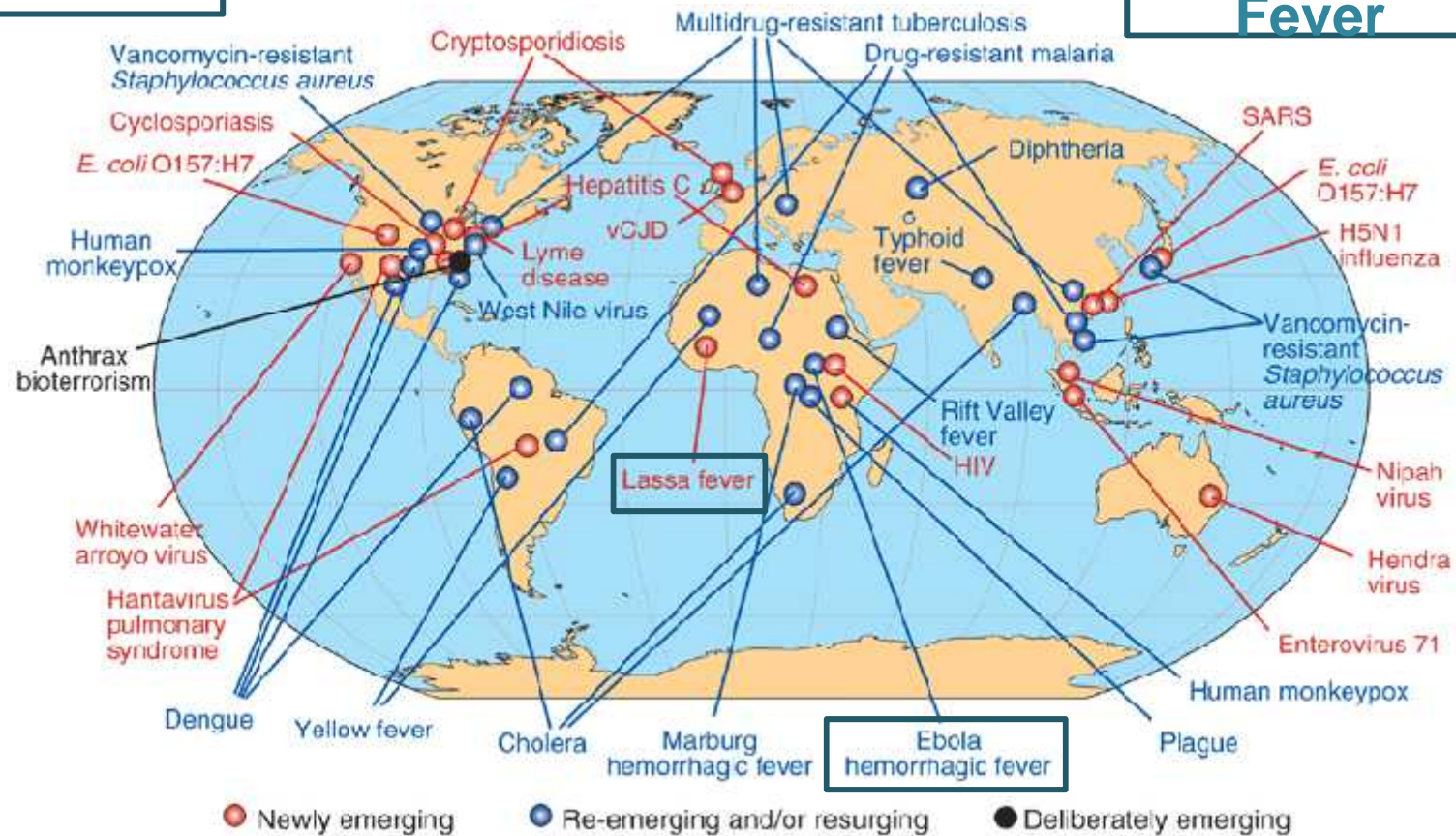
Sumber : **Emerging & Re-Emerging Infectious Disease Challenges**. Nature 430: 242-49 (Morenz. DM et al, 2004)

**Ebola**

**MERS-CoV\***

**Zika Virus\***

**Lassa  
Fever**

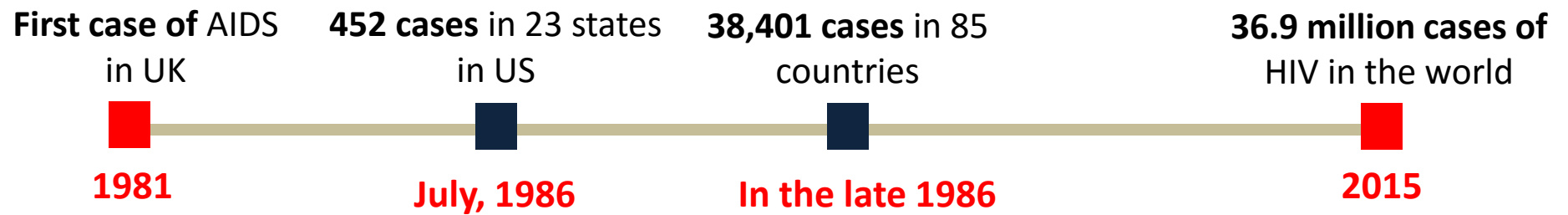


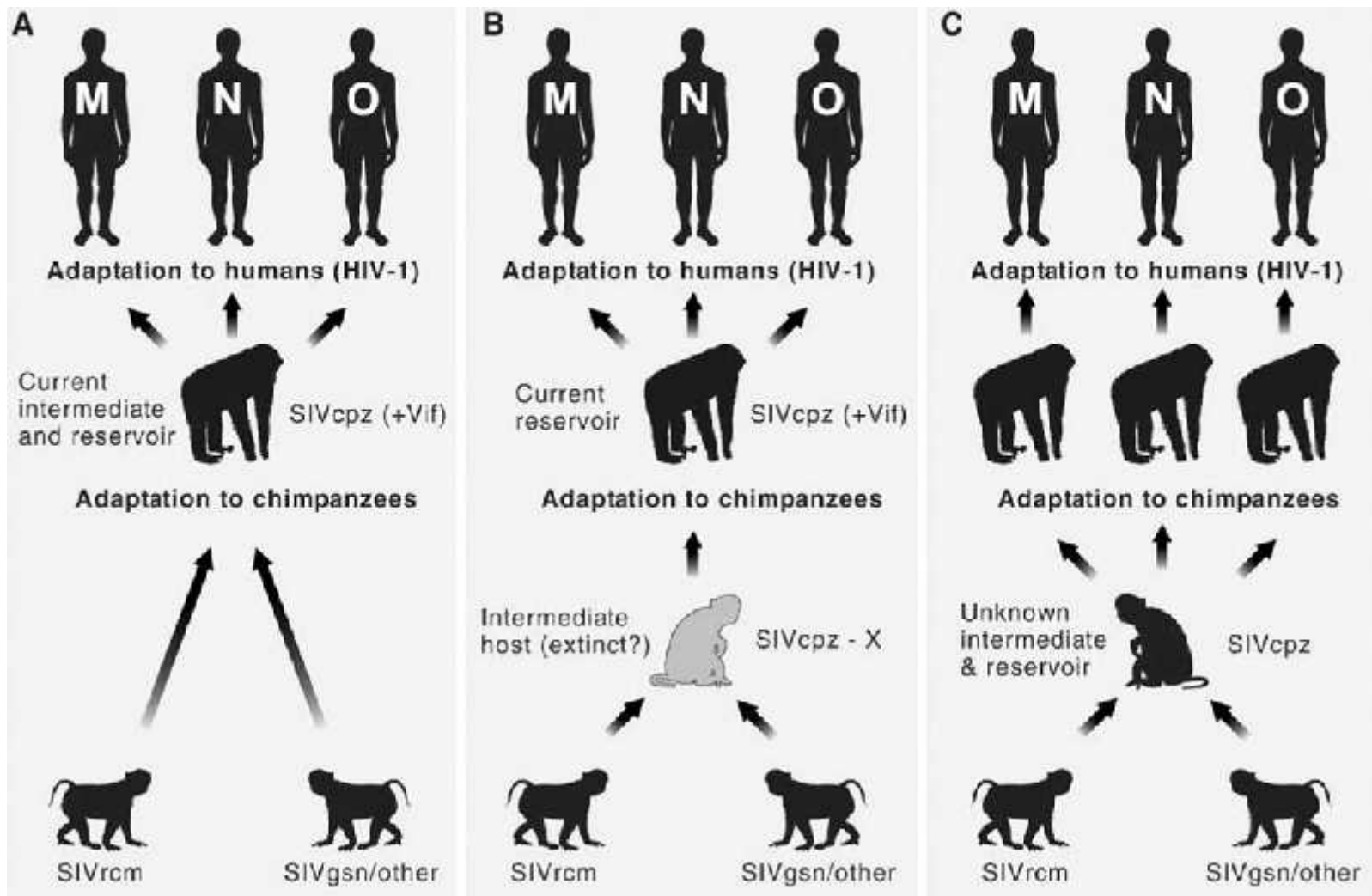
**\*New Emerging Infectious Disease**

# The Disease Evolution: HIV/AIDS



Interaction between human and chimp with SIV – *Simian Immunodeficiency Virus* in West Africa is discovered as the first cross of HIV from chimps to human





## The fact of HIV AIDS

## INFECTIOUS DISEASE

# From Pigs to People: The Emergence of a New Superbug

The discovery of a novel strain of MRSA able to jump from livestock to humans has sparked a multicountry effort to see how dangerous it might be



Pigs and other livestock commonly, and generally harmlessly, harbor *S. aureus*. But except for a single report buried in the scientific literature, no one had realized that pigs or other livestock harbored MRSA, and no MRSA strain had ever been known to jump from livestock to humans. If the Dutch doctors' fears were correct, a novel strain had just gained that ability, opening up a new route for a potentially dangerous superbug to spread among humans. "Initially, we were very much afraid that this would be a major problem that could spread to the entire population," says Jan Kluytmans, a microbiologist at VU University Medical Center in Amsterdam whom Voss recruited early on to help investigate.

Source: Science (329), 27 August 2010



# Zika Virus



<http://traveller24.news24.com/News/map-the-spread-of-the-zika-virus-20160208>



*"A recent study estimates that roughly 2.6 billion people in the region and Africa could be at risk of contracting the virus"*

Source: CNN, 2016

First identified in rhesus **monkeys** in Uganda.

The first human cases were detected in Uganda and United Republic of Tanzania in 1952

In 2007, Zika spreads causing first outbreaks in Pacific islands.

Currently, outbreaks are occurring in many countries including Singapore and Malaysia.

## ZOONOTIC DISEASE EMERGENCE IN INDONESIA

**70%** from *Emerging Infectious Diseases* worldwide are **ZOONOTIC diseases**

**Avian Influenza**

High risk in 13 from 34 provinces

**Rabies**

Endemic in 25 from 34 provinces

**Anthrax**

Endemic in 10 from 34 provinces

**Brucellosis**

High prevalence in 4 from 34 provinces

**Leptospirosis**

Endemic in 13 from 34 provinces

**Plague**

Endemic in 7 subdistricts

**Zika**

Identified in 5 districts

Jambi, Jakarta, Klaten, Bali, dan Lombok

**Indonesia:** A hotspot for zoonotic diseases

## Ebola: Failure in Early Response to Outbreak



- 26 Dec 2013 ■ Spread of the Disease
- 21 Mar 2014 ■ Ebola Identification
- 8 Aug 2014 ■ Ebola confirmed by PHEIC

A 'mysterious disease spread in Guinea on 26 December 2013, and identified as Ebola on 21 March 2014



### Failure in IHR 2005 implementation

- 2012 79% member countries failed to achieve targets
- 2014 69% member countries failed to achieve targets



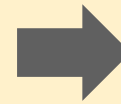
2014

GHSA declaration to accelerate the implementation of the IHR 2005

**Early diagnostic and surveillance** are keys to improve outbreak response

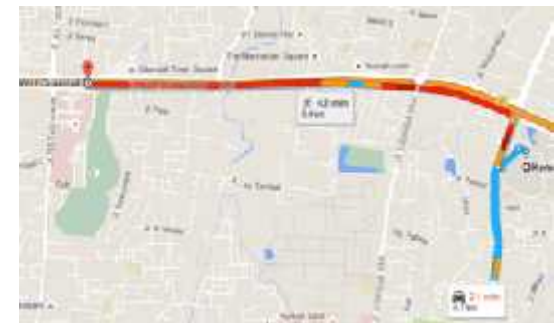


## Succeed to Respond, but Fail to Prevent (Jakarta, 2016)



*20 chickens killed by Avian Influenza in Cilandak, an area located nearby The Ministry of Agriculture*

- March, 15** ■ Chickens were first known to have died
- March, 16** ■ Laboratory checking
- March, 17** ■ It was determined that chickens died of AI  
Mass extermination was conducted to prevent further infection



**Required expertise:** *Field Epidemiology on public health and veterinary health*  
Leadership and soft skills  
Communication and cross-sectoral and cross-professions coordination

# Global Zoonotic Disease Control Commitments

## Global Health Security Agenda (GHSA)

	Action Packages	Activities
Prevent	1. Antimicrobial Resistance	12
	2. Zoonotic Disease	14
	3. Biosafety and Biosecurity	12
	4. Immunization	18
Detect	1. National Laboratory System	27
	2. Real-Time Surveillance	20
	3. Reporting	3
	4. Workforce Development	12
Respond	1. Emergency Operations Centers	23
	2. Linking Public Health with Law and Multisectoral Rapid Response	11
	3. Medical Countermeasures and Personnel Deployment	4

## International Health Regulation (2005)

	Area of Works	Strategic Approaches
Global Partnership	1. Fostering global partnership	5
Strengthen National Capacity	1. Strengthen National Disease Prevention, Surveillance, Control, and Response System	13
	2. Strengthen public health security in travel and transport	8
Prevent and Respond	1. Strengthen WHO global alert and response systems	6
	2. Strengthen management of specific risks	2
Legal Issues & Monitoring	1. Sustain rights, Obligations & Procedures	3
	2. Conduct Studies & Monitor Progress	4

### Indonesia Role

1. A model country to prevent and control Avian Influenza in 2003 with multi-sectoral coordination and collaboration
2. Leading country for zoonotic disease action package on GHSA
3. Global Chair for GHSA in 2016

*Strategic action to combat zoonotic diseases is needed to comply with global health commitments' goals*

## National Health System Resilience in Preventing Zoonotic Disease

National Health System							National Animal Health System					
Health effort	Health research and development	Health financing	Health workforce	Pharmaceutical, medical equipment, and food	Management, information, and regulation	Community empowerment	Animal health effort	Animal health research and development	Veterinary public health and animal welfare	Animal health workforce	Animal health information	Community participation

### WHO Six Building Blocks of Health System

1. Health services
2. Health workforce
3. Health Information
4. Medical products, vaccines, and technologies
5. Health financing
6. Leadership and governance

### Geography

### Demography

### Natural resources

### Ideology

### Economy

### Politics

### Social and culture

### Defense and

### OIE Performance of Veterinary Services

1. Veterinary legislation
2. Public or private partnership
3. Veterinary education
4. Laboratories

*These system are tested to improve Indonesia resilience in combating Zoonosis*

# Framework for Zoonotic Control in Indonesia



# Governance Challenges


## on Health and Animal Health

### 1. Act No. 23/2014 about Local Governance

#### Mandatory affairs- Article 12 Paragraph 1

Education
<b>Health</b>
Public works and spatial planning
Community housing
Tranquility and public protection
Social

#### Optional affairs - Article 12 Paragraph 3

Marine and fishery
Tourism
<b>Agriculture</b>
 <b>Animal health</b>
Forestry
Energy and Mining
Trading
Industry
Transmigration

### 2. Act No. 18/2009 on Livestock and Animal Health (**optional**) which has been revised to Act No. 41/2014 (**mandatory**)

- Article 68 paragraph 2: **central and local government** be under an **obligation to strengthen duty and function** of veterinary authority
- Veterinary authority and national animal health system should have been established **no later than 2 years** after 2014



## Current Coordination Challenge between Central and Local Government

### 9 Variation of Animal Husbandry/Animal Health Department in Province

Department of Agriculture	4
Department of Animal Husbandry	1
Department Agriculture and Animal Husbandry	4
<b>Department of Animal Husbandry and Animal Health</b>	<b>13</b>
Department of Agriculture, Plantation and Animal Husbandry	1
Department of Agriculture, Forestry and Animal Husbandry	1
Department of Fishery and Agriculture	1
Department of Plantation and Animal Husbandry	2
Department of Agriculture, Animal Husbandry and Food Security	1

## 51 variations in District Level

No.	Institutions	Institution
1	Animal husbandry, Fishery	80
2	Agriculture, Animal husbandry,	73
3	Agriculture	61
4	Animal husbandry	58
5	Marine, Fishery, Animal husbandry,	32
6	Agriculture, Fishery, Animal husbandry,	23
7	Agriculture, Animal husbandry, Perkebunan	20
8	Agriculture, Forestry	19
9	<b>Animal husbandry, Animal health</b>	<b>17</b>
10	Agriculture, Horticulture, Animal husbandry,	11
11	Agriculture, Fishery, Forestry	9
12	Agriculture, Animal husbandry, Plantation, Forestry	8
13	Agriculture, Marine	6
14	Agriculture, Forestry, Marine, Fishery	6
15	Agriculture, Food security	5
16	Agriculture, Fishery	4
17	Agriculture, Animal husbandry, Marine, Fishery	4
18	Animal husbandry, Plantation	3
19	Marine, Fishery, Agriculture	3
20	Horticulture and Animal husbandry,	3
21	Agriculture, Plantation, Forestry	3
22	Agriculture, Animal husbandry, Forestry	2
23	Agriculture, Plantation	2
24	Agriculture, Animal husbandry, Food security	2
25	Agriculture, Forestry, Plantation, Fishery, Marine	2
26	Agriculture, Animal husbandry, Animal health	2

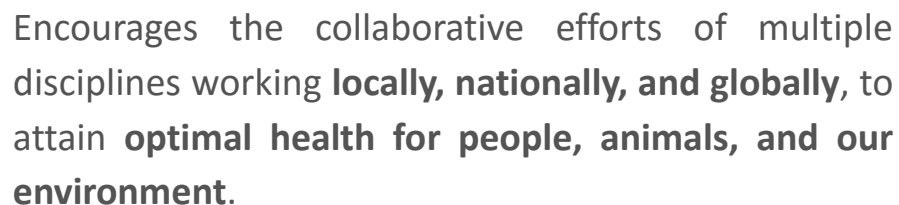
No.	Name	Institution
27	Agriculture, Horticulture, Plantation	1
28	Agriculture, Plantation, Forestry, Animal husbandry,	1
29	Agriculture, Forestry, Plantation, Animal husbandry,	1
30	Agriculture, Plantation, Animal husbandry, Marine	1
31	Public Economy	1
32	UMKM cooperation, Industrial, Trade, Agriculture	1
33	Agriculture, Plantation, Animal husbandry,, Fishery	1
34	Agriculture, Animal husbandry,, Marine	1
35	Industrial, Trade, Cooperation, Agriculture	1
36	Animal husbandry, Fishery, Forestry	1
37	Agriculture, Horticulture, Plantation, Animal husbandry,	1
38	Plantation, Agriculture, Horticulture, Animal husbandry, Fishery	1
39	Agriculture, Horticulture, Forestry	1
40	Plantation, Agriculture, Horticulture, Animal husbandry, Fishery, Forestry	1
41	Agriculture, Animal husbandry, Food security, Plantation	1
42	Marine, Fishery, Agriculture	1
43	Marine, Fishery, Animal husbandry, Animal health	1
44	Agriculture, Forestry, Marine	1
45	Agriculture, Plantation, Animal husbandry, Animal health	1
46	Fishery, Marine	1
47	Agriculture, Animal husbandry, Plantation and Holicultura	1
48	Animal husbandry, Horticulture, Plantation	1
49	Agriculture, Forestry, Fishery Animal husbandry, Plantation	1
50	Agriculture, Plantation,Animal husbandry, Forestry, Food security	1
51	Marine, Fishery, Agriculture, Forestry, Energy	1

**How to strengthen the coordination between central and local government?**



# ONE HEALTH APPROACH

A worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for **humans, animals and the environment.**



## 1

To ensure Health professional is well-trained and appropriately equipped

2

To ensure that professions have the skills to work collaboratively with various stakeholders and the community

(3)

To develop and restructure health systems to benefit from One Health

# THE ONE HEALTH APPROACH

Medical Doctor  
protects people  
from infectious  
diseases



Veterinarian protects  
animal from infectious  
diseases

Public Health prevents the  
infectious disease  
transmissions through  
health system  
improvement.





## SOME DISCIPLINES WHO MIGHT WORK TOGETHER IN RESPONSE TO AN OUTBREAK OF ZOOONOSIS





## ***Strategic Action to Combat Zoonotic Diseases***



# One Health Approach to Deal with Zoonotic Disease

## Identify

Identify the agent, source, mode of transmission, and associated risk of disease

- Strengthening laboratory capacity
- Report common animal and human pathogens

## Predict

Predict the disease manifestation, potential outbreak, through epidemiology investigation & surveillance

- Strengthening surveillance and laboratory capacities

## Prevent

Effort to prevent transmission & outbreak by minimizing contact & exposure with the risks

- Characterizing risks associated with disease transmission
- Developing risk-mitigation strategies

## Respond

Action to respond and to mitigate the outbreak by working collaboratively across-professions & sectors

- Strengthening outbreak response capacity with multi-sector work



# National and International Institutions who Work in Tackling Zoonotic Disease

## Ministry



Address public health issues, develop national guidelines and health regulations, conduct monitoring and evaluation in the field of health



KEMENTERIAN PERTANIAN  
REPUBLIK INDONESIA

Address food and veterinary issues, develop national guidelines and regulations, conduct monitoring and evaluation in the field of agriculture and veterinary health



KEMENTERIAN KOORDINATOR  
BIDANG PERENCANAAN MANUSIA DAN KEBERUSAHAAN  
REPUBLIK INDONESIA

Coordinating ministries and institutions to work across sector in addressing health, education, culture, and welfare challenges

## International Organization



Produce health guidelines and standards, help countries to address public health issues, tackle global health problems and improve people's well-being.



Responsible for improving animal health worldwide.



Achieve food security, make sure people have regular access to enough high-quality food, healthy lives and to raise levels of nutrition, improve agricultural productivity, better the lives of rural populations and contribute to the growth of the world economy.

## Strengthening diagnostic and surveillance capacity

# University One Health Laboratory Network (OHLN)

## Background

OHLN is laboratory network that will be tasked with rapid identification of zoonotic diseases emerging among human and animal populations

1. To assist with establishing and strengthening OHLN diagnostic and surveillance activities, linking university and government run laboratories.
2. To prevent spread and develop specialty centers with regional expertise where microbial libraries of unique reference strains, genotypes, and subtypes are held.



## OHLN IS A 5 YEAR PROJECT

### 1<sup>st</sup> YEAR FOCUS

- Linking nine regional laboratories
- Targeting specifically zoonotic diseases to enhance rapid detection
- Secure handling and storage
- Data collection and analysis
- Development of strategies for control
- Update and upgrade the level of laboratory sophistication in those most in need
- Undertake supplemental training of personnel through workshops, lab meetings, and on-line supplemental refresher courses



# FETP & FETPV IN INDONESIA

## Field Epidemiology Training Program

- The curriculum is adopted from CDC curriculum standard
- 2-year master's program



### University of Indonesia

- 4 semester-long program
- **44 credits (Indonesian credit standard)**

FETP in Indonesia	
1982	2 year non-degree program
1990	2 year master's degree program
2007	FETP revitalization



### Gadjah Mada University

- 4 semester-long program
- **48 credits (Indonesian credit standard)**

*Standardization of curriculum is needed for FETP programs in Indonesia*

## Field Epidemiology Training Program for Veterinarian

- Initiated in 2008 through a collaboration between the FAO and the Government of Thailand, supported by the USAID and European Union (EU)
- 2 year program

FETPV in Indonesia	
•	Currently there is <b>no FETPV</b> in Indonesia
•	Establishment of FETPV, however, is being <b>developed by Faculty of Veterinary Medicine at Gadjah Mada University</b>

The minimum number for Field Epidemiologists needed in Indonesia – 1:200,000 population



*How can we fulfill the workforce need?*

## Current Data of Field Epidemiologists in Indonesia

**300** Currently, there are only 300 field epidemiologist in Indonesia, and ***unevenly distributed***

**30** There are only 15 field epidemiology training graduates per year in two universities\*  
/year

**3** Tour of Duty policy for 3 years  
/year

*\*Source: FETP Indonesia*

## Future Need for Field Epidemiologists in Indonesia

**By 2020**

**1250** Field epidemiologists are needed by the 2020, with the density of 1 field epidemiologist per 200,000 population, and more are expected considering geographical aspects

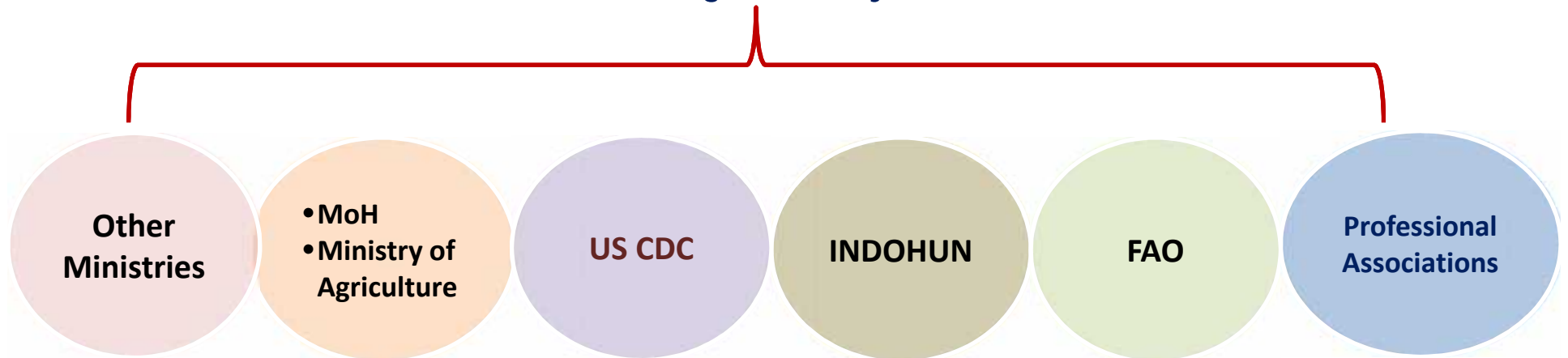
**420** Indonesia is expected to have only **420 field epidemiologists** with current program

# ONE HEALTH FIELD EPIDEMIOLOGY EDUCATION AND TRAINING PROGRAM

*OH Field Epidemiology Education  
Program*

*OH Field Epidemiology Training  
Program*

Strengthened by:



*One Health Field Epidemiology Education and Training Program* is being developed to **strengthen current FETPs in Indonesia** through **One Health approach** & to **meet the need for Field Epidemiologists** by 2020

*Integrated One Health Surveillance System is needed in combating zoonotic emerging disease.*

**THANK YOU**