

# PREVALENCE OF LEPTOSPIROSIS AND THE ROLE OF CLIMATIC FACTORS AND AGRICULTURAL PRACTICES IN ITS CIRCULATION IN VIETNAM

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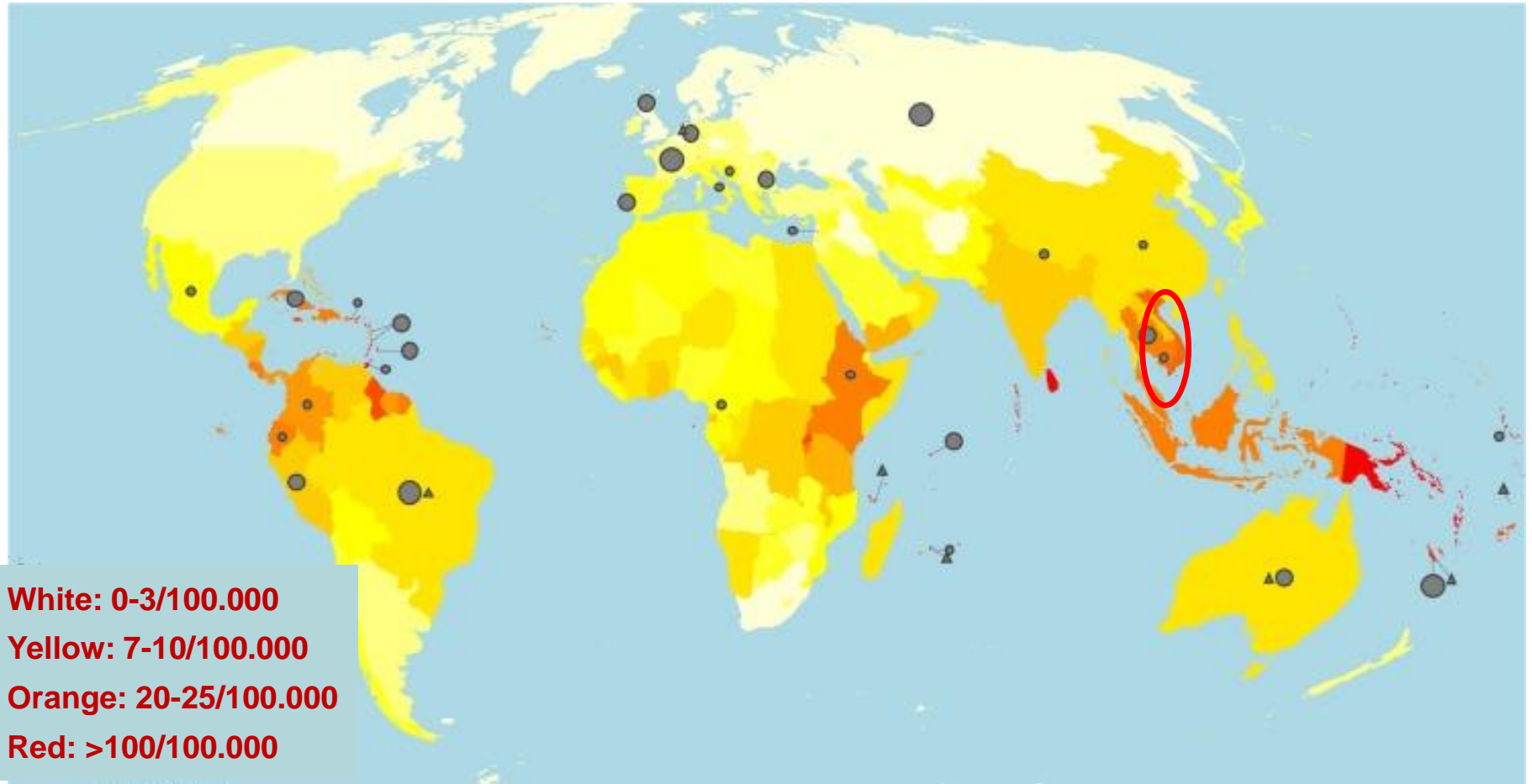


ECOMORE II



# Why Leptospirosis?

# Prevalence per 100,000 worldwide

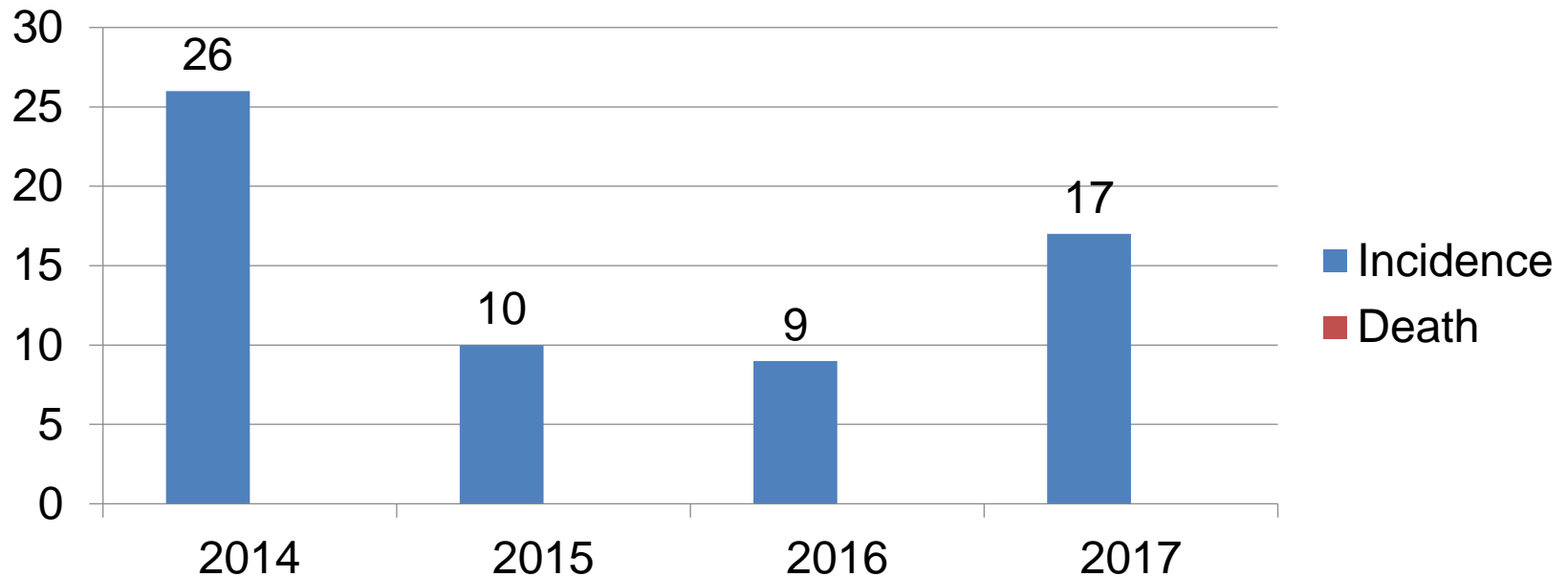


Source: Costa F, Hagan JE, Calcagno J, Kane M, Torgerson P, Martinez-Silveira MS, et al. (2015) Global Morbidity and Mortality of Leptospirosis: A Systematic Review. *PLoS Negl Trop Dis* 9(9):

# Leptospirosis in Viet Nam

Author	Time	Site	Study Subjects	Prevalence of Lepto
Ngu Duy Nghia et al. (2017)	2015	Hanoi	Healthy population aged 15-60 tuổi	24.0
Cao Thi Bao Van et al. (2017)	2013	Tien Giang, Bình Phước	Households raising pigs	7.8 và 19.6
Hoang Thi Thu Ha et al. (2016)	2014	Bệnh viện 103, Hà Nội	Patients aged 18-70 with fever	21.1
Cong Ngoc Long (2013)	2013	Thanh Hoa	Healthy population aged 18-60 tuổi	49.0
Hoang Kim Loan et al. (2013)	2004 - 2013	Các bệnh viện tại Hồ Chí Minh	Leptospirosis suspected patients	4.4
Thai et al. (2008)	2005	Bình Thuận	Students aged 7-12 tuổi	10.4
Thai et al. (2006)	2003	Bình Thuận	Students aged 7-14 tuổi	12.8
Hoang Manh Lam et al. (2001)	--	Đắc Lắc	Butcher, pig trader, farmer, forestry worker, student	18.0

# Leptospirosis in Viet Nam



Source: Health Yearly Statistic

**Insufficient report**

# Disease progress

Incubation	Disease progression	Post-disease sequelae
<ul style="list-style-type: none"> <li>➤ Bacteria enter the body through skin breaches, cuts or abrasions, conjunctivae, oral mucosae</li> <li>➤ 3-30 days, frequently 10-12</li> <li>➤ Then only, symptoms appear: usually a high fever of rapid onset.</li> </ul>	<ul style="list-style-type: none"> <li>➤ As soon as 3-5 days after disease onset</li> <li>➤ <i>Leptospira</i> reach target organs</li> <li>➤ <b>Liver</b>: high blood level of direct bilirubin (+ gastro-intestinal symptoms)</li> <li>➤ <b>Lung</b> hemorrhages</li> <li>➤ <b>Kidney</b>: lower Sodium reabsorption: hyponatremia &amp; hypokalemia and interstitial nephritis</li> <li>➤ <b>Brain</b> “aseptic meningitis” headache to altered mental status</li> <li>➤ <b>Severe Leptospirosis</b>:             <ul style="list-style-type: none"> <li>• Severe Pulmonary Hemorrhage Syndrome (SPHS)</li> <li>• Severe renal failure</li> <li>• Multi-organ failure</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Guillain Barre Syndrom</li> <li>➤ Persistent fatigue, myalgia, malaise, headache, weakness (&gt;24 months)</li> <li>➤ Depression or other neuro-psychiatric disorders</li> </ul>

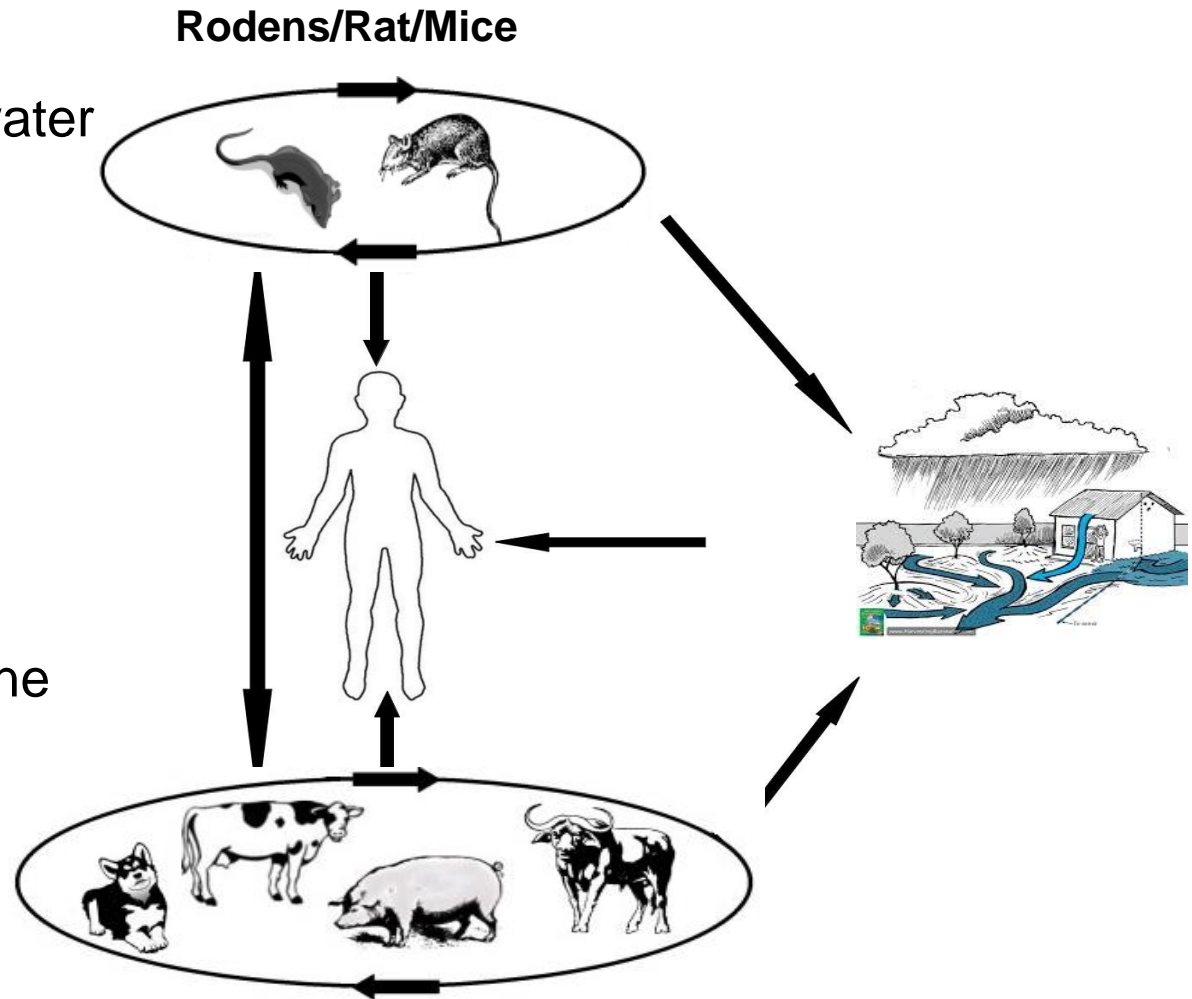
# Leptospira biological diagnosis

DoS-based biological diagnosis (number of Days since Onset of Symptoms)

	Onset =D0	D1	D2	D3	D4	D5	D6	D7	D8+
qPCR / culture	from blood								
					from urine				
ELISA / RDT	expected negative (or former infection). Usable as baseline for conversion					valid			To be compared to earlier if available
MAT	expected negative (or former infection). Usable as baseline for conversion							valid	

# Risk factors

- Contaminated soil, water
- Heavy rain, flooding
- Occupation:
  - Farming, agriculture
  - Veterinarians
  - Sewerage workers
  - Butchers
  - Water based sportman
- Livestock practices
- Environmental hygiene





# ECOMORE – One Health



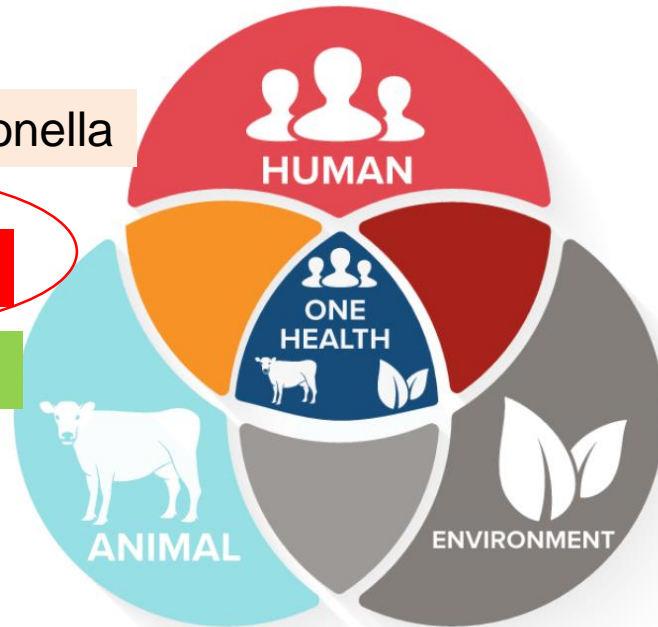
Campylobacter

Salmonella

**Leptospirosis**

Influenza

Hepatitis E



Ecoli

# OBJECTIVES

# GENERAL OBJECTIVES

- 1. Describe epidemiological status of Leptospirosis in Vietnam**
- 2. Define risk factors of Leptospirosis in varied social-economic and climate areas.**

# SPECIFIC OBJECTIVES

1. To estimate the incidence of Leptospirosis in hospitalization patients in selected areas in Vietnam
2. To describe the main Leptospirosis serogroups circulating in human and animal
3. To identify the main risk factors associated for Leptospirosis transmission
4. To improve capacity in laboratory testing, clinical diagnosis and management of Leptospirosis for participating institutions i.e. hospitals, provincial preventive medicine center and NIHE.
5. To improve inter-sectoral collaboration between health, veterinary and environmental authorities/private sectors

# METHODOLOGY

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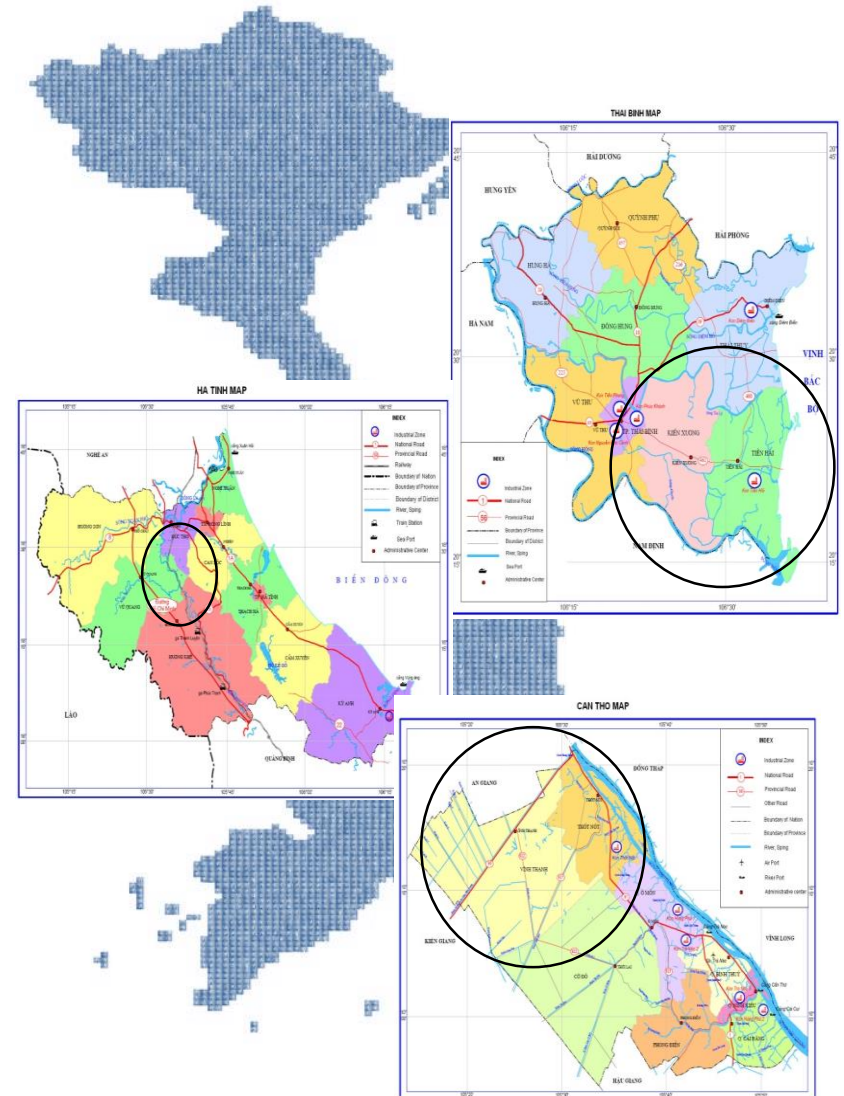
## ➤ Study sites

- 3 provinces belong to 3 different climate, populous and flooding areas: Thái Bình, Hà Tĩnh, Cần Thơ
- 2 districts in each provinces

## ➤ Study design:

1. Hospital-based surveillance in 12 selected hospitals
2. Case - control

**Duration: 1 year**



# 1. Hospital-based surveillance

## Study subject

- Patients in IPD and OPD meet case definition of Leptospirosis



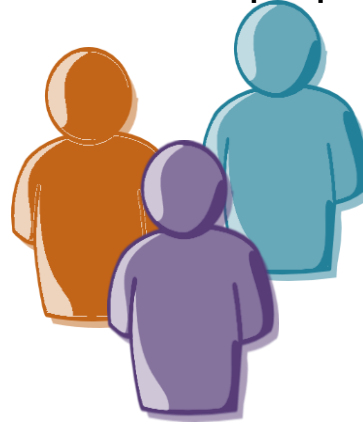
## Sample size

- Estimation of 4,000 cases

# 1. Hospital-based surveillance

Patients meet case definition of Leptospirosis

Blood sample collection



ELISA, MAT test



Leptospirosis confirmed cases

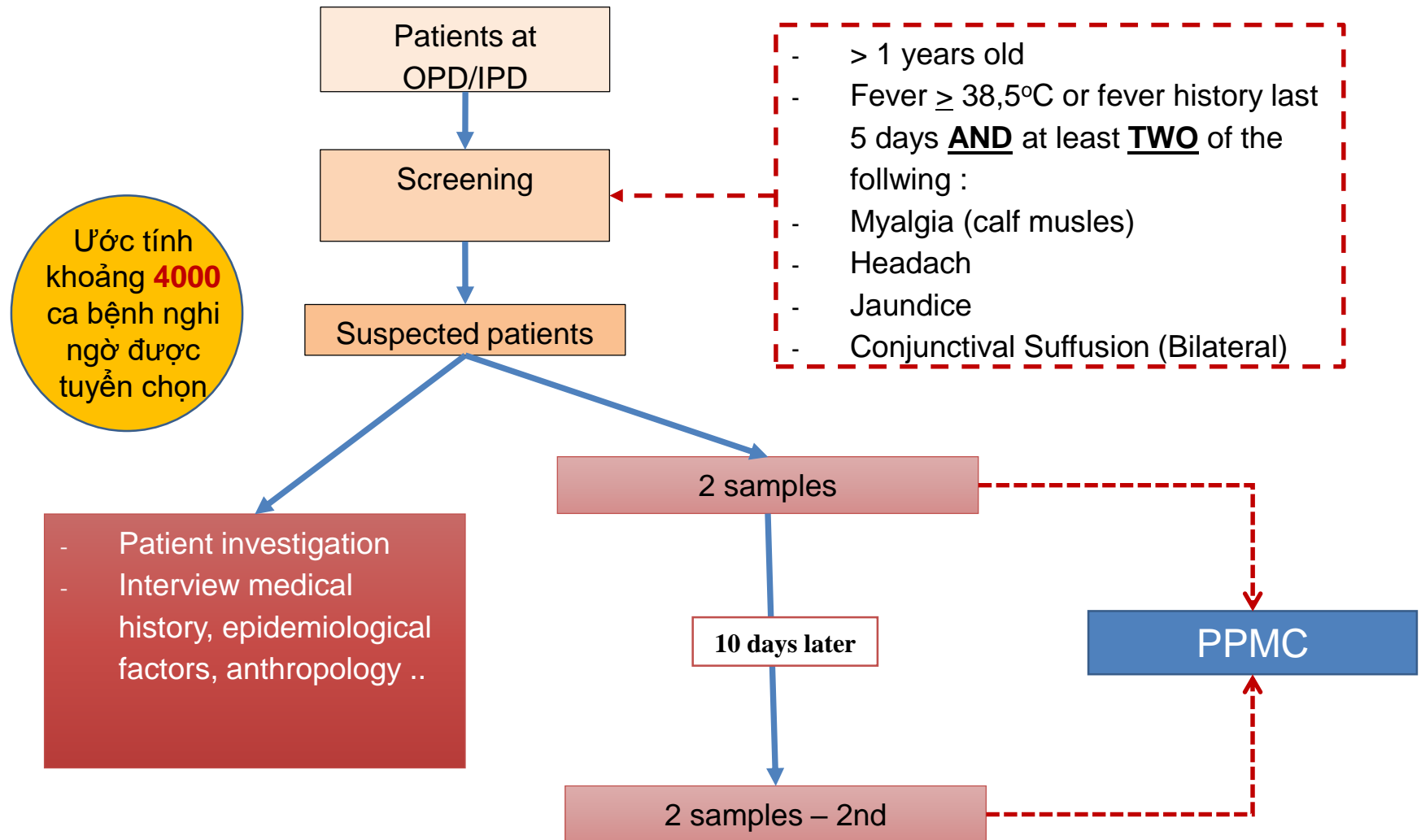


1  
year

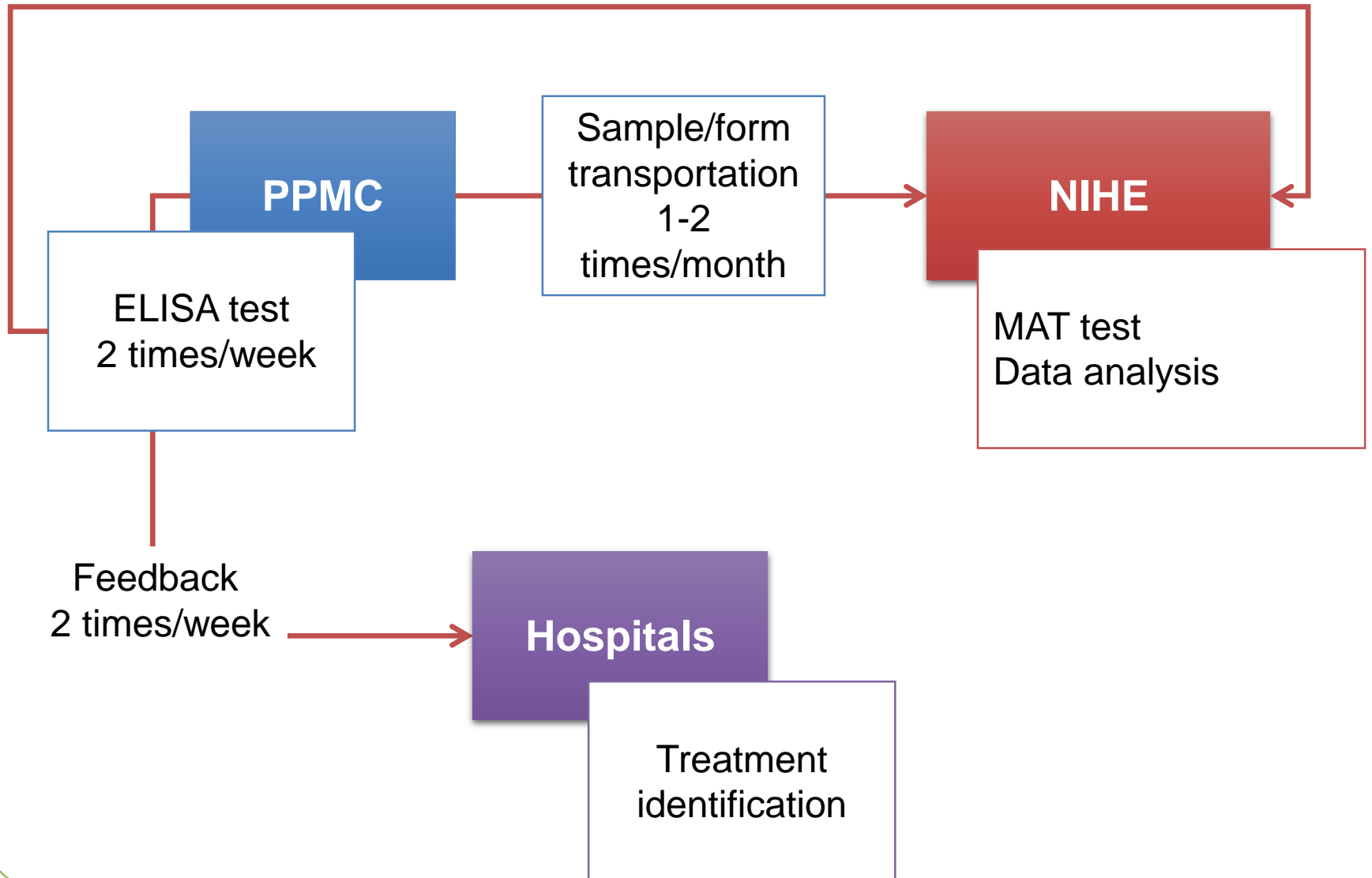
District and provincial hospitals



# 1. Hospital-based surveillance



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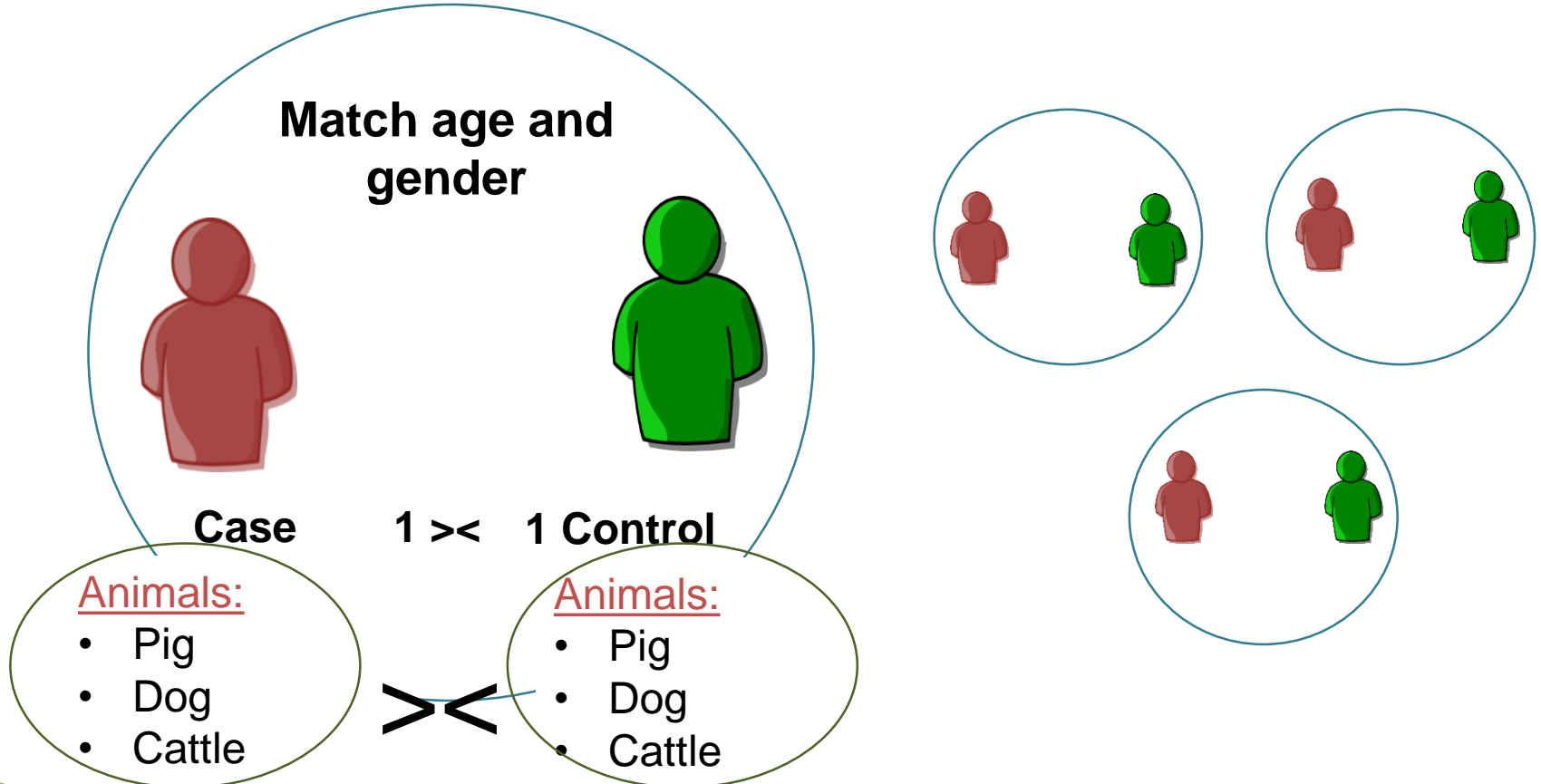
## 2. Case - control

**Case:** Hospital cases and confirmed Leptospirosis

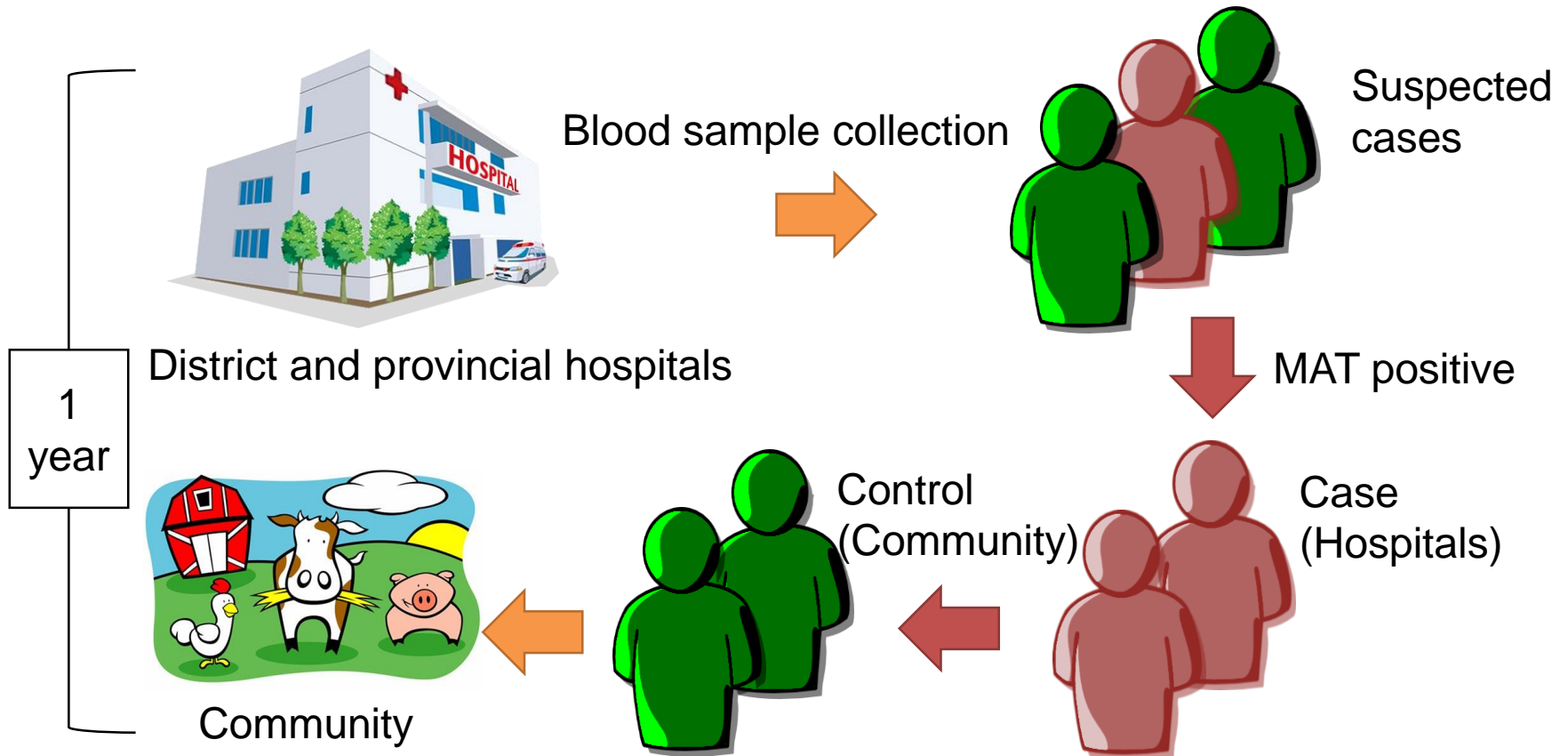
**Sample size** estimated: 600

**Control:** Match age and gender to cases, and select at community

**Sample size** estimated: 600

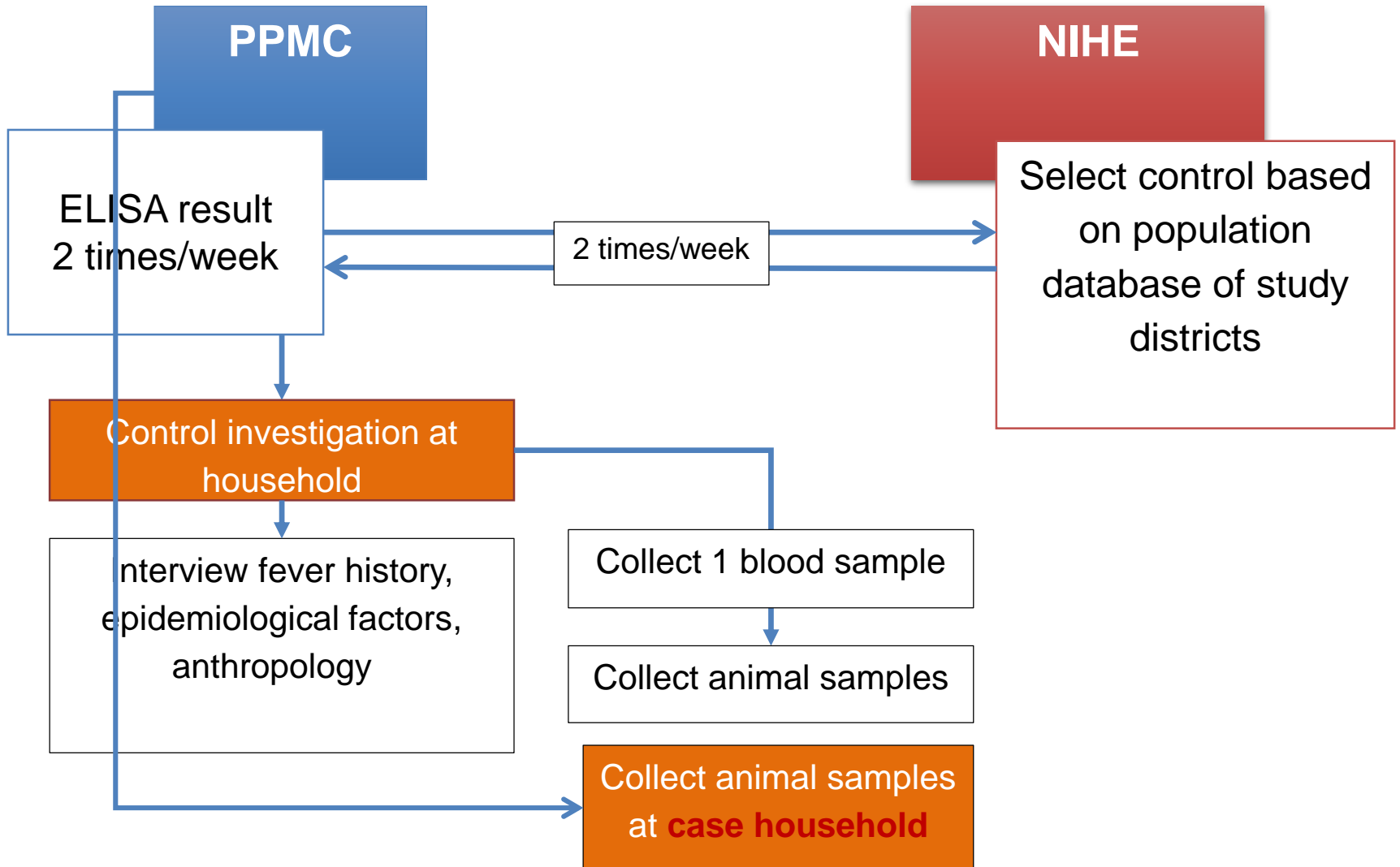


## 2. Case - Control



- Collect animal samples at households of cases and controls
- Collect data on behaviors, risk factors, knowledge of *Leptospira*
- Dataset of climate, weather, environment

## 2. Case - Control



## 2. Case - Control

Blood samples from confirmed case

Blood samples from contact animals

Blood samples from controls



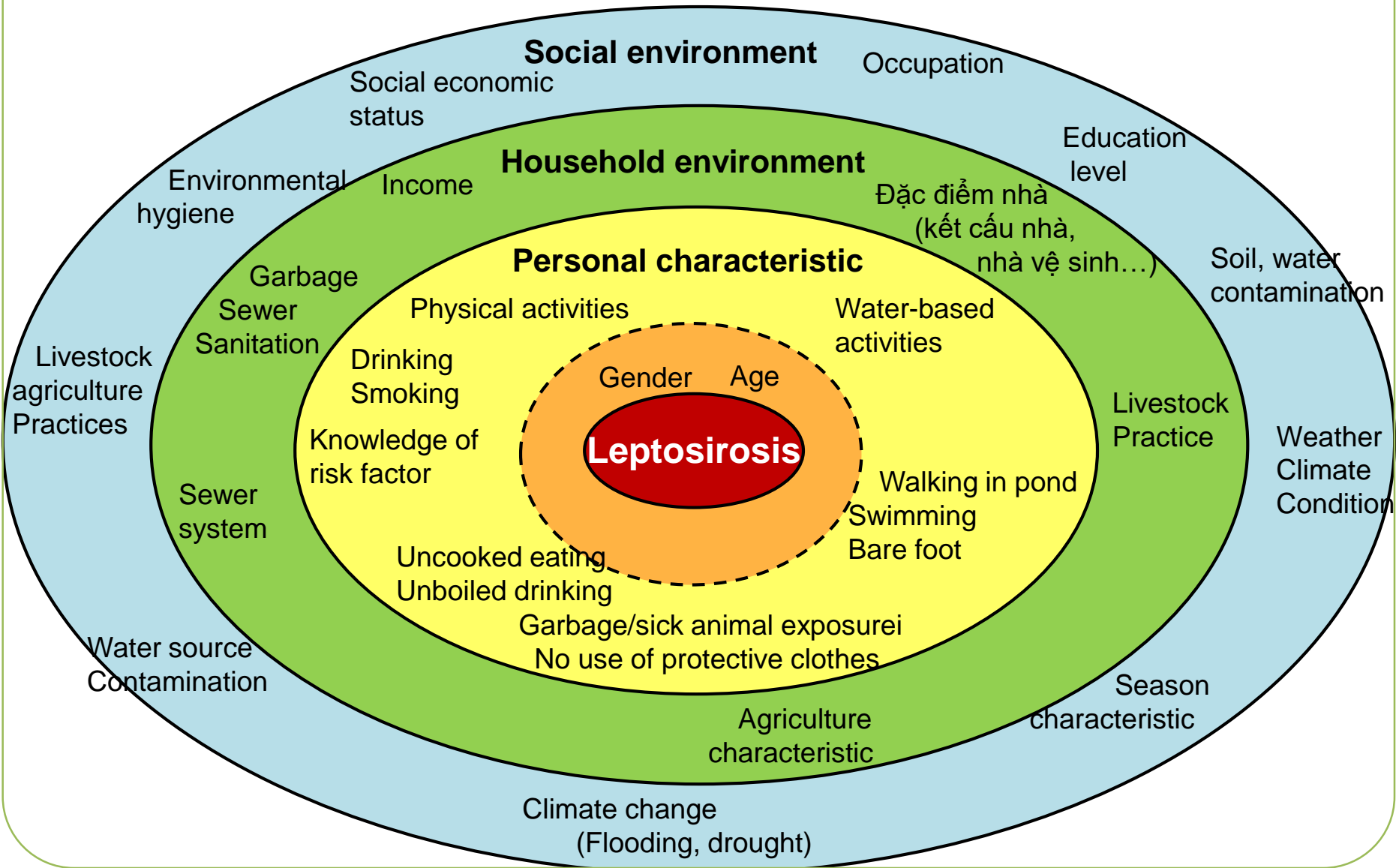
**ELISA /MAT**

NIHE



**Defying Serogroup**

## 2. Case - Control: Risk factors



### 3. Improve capacity of involved institutions in lab testing and diagnosis and management of Leptospirosis

#### Participating institutions

- Leptospirosis lab at NIHE
- Lab at PPMC of 3 provinces
- Hospitals of 3 provinces



**Time:** 9/2018 – 10/2018



### 3. Improve capacity of involved institutions in lab testing and diagnosis and management of Leptospirosis

#### ▪ NIHE:

- High techniques for *Leptospira* detection such as sequencing
- Developing reference lab at NIHE in collaboration with international institutes

#### ▪ PPMC:

- Techniques for *Leptospira* detection like ELISA, MAT
- Practice with project samples các mẫu bệnh phẩm thu thập được từ dự án.

#### ▪ Hospital:

- Diagnosis guidelines for Leptospirosis



## 4. Strengthen collaboration among human, animal health and environment sectors

### Subjects

Time: 9/2018 – 12/2021



## 4. Strengthen collaboration among human, animal health and environment sectors

### Activities

- Partnership Workshops/meetings to share/update of projects
- Working group meetings and with partners working on One health

# EXPECTED OUTPUTS

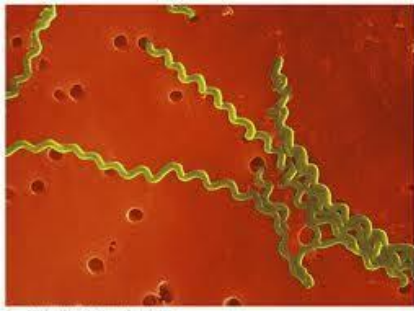
# 1. Incidence of Leptospira

- Crude rate
- Incidence rate
- Incidence by age/gender
- Incidence by relevant anthropology factors



# 1. Incidence of Leptospira

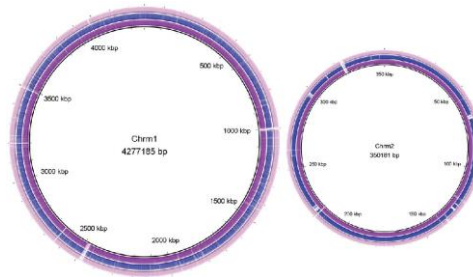
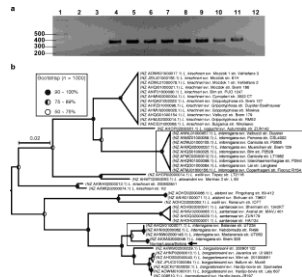
- Recommendations related to prevalence of Leptospirosis at study districts/provinces.
- Contribution to evidence-based policy development for Leptospirosis in community.



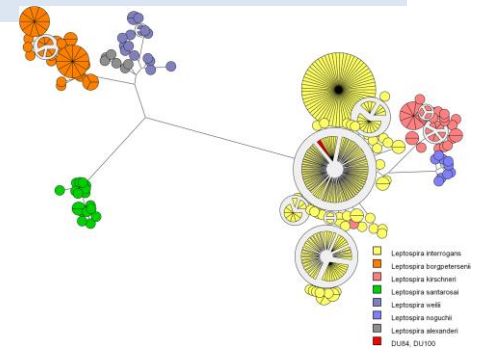
## 2. Defining serogroups circulation in human and animal in Vietnam

### Serogroups circulation in human and animal by :

- Animal types
- Geographic areas
- Weather/climate characteristic
- Districts/provinces
- Anthropological group



LV331  
■ Hn (animal)  
■ Hn (human)  
■ Hn (water)  
LSJ  
■ Hn (animal)  
■ Hn (human)  
■ Hn (water)  
LS4  
■ Hn (animal)  
■ Hn (human)  
■ Hn (water)



## 2. Defining serogroups circulation in human and animal in Vietnam

- Providing database of *Leptospira* serogroup circulation in both human and animal at different areas
- Recommendation of improving *Leptospira* surveillance.
- Strengthen collaboration of *Leptospira* surveillance in both human and animal



### 3. Identifying risk factors

Recommendations of key risk factors in study sites

Recommendations of agricultural and livestock practices in different climate areas

Recommendations in development of Leptospirosis prevention

Short term/long term outcomes

## 4. Improve capacity of involved institutions in lab testing and diagnosis and management of Leptospirosis

### Lab capacity improvement in detecting *Leptospira*

Technical training courses organized in 3 provinces

100% provincial labs practice with studied samples

### Improvement of Leptospirosis management at hospitals

Guidelines for management of *Leptospirosis* at hospitals

Training and routine supervision in hospitals

### Hospital-based surveillance

Training 5 – 10 supervisors per site

Regular updated supervision data and used for decision orientation

## 5. Strengthen collaboration among human, animal health and environment sectors

- Commitment in prevention of Leptospirosis in both human and animals
- Updated data of Leptospirosis shared among relevant parties
- Surveillance system of Leptospirosis in human and animal

# Timelines

08 - 09/2018



**Kick-off meeting  
Training in data  
collection**

10/2018



**Implementation in the  
field**

- Data collection
- Sample collection and testing
- Monitoring and supervision

09/2019



**Analysis and report  
writing**

- Data analysis, dissemination
- Recommendation for surveillance model
- Thiết kế các mô hình giám sát liên quan

Thank you for your  
attention

