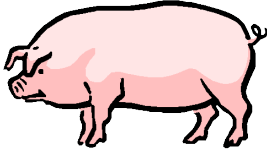*OFFLU swine influenza virus meeting*
27 – 28 March 2017
FAO Headquarters, Rome, Italy

Tung Nguyen
Department of Animal Health, Vietnam

Influenza Surveillance in Viet Nam 2017

Human			Poultry	Pig	Wildlife
Hospital SARI/ILI	Hospital EBS	PREDICT Human Illness Monitoring	DAH/FAO Influenza Surveillance	DAH/FAO Influenza Surveillance	PREDICT Wildlife Surveillance

Coordinated Surveillance "LISN" will add
More capacity, more sharing, more knowlege, more analysis
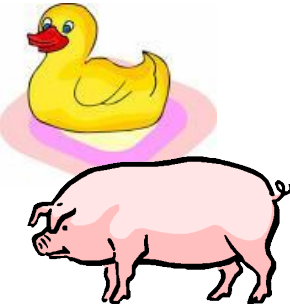
- More influenza virus characterization
- Test existing specimens for other viruses
- Strengthen capacity for surveillance and laboratory diagnostics
- Share outputs across sectors for situation analysis and risk assessment

Coordinated Surveillance for Influenza and Potential Pandemic Pathogens (LISN = Longitudinal influenza surveillance network)

Objectives:

1. Alignment of the surveillance localities, sampling time and laboratory testing algorithm.

2. Monitor and characterize influenza viruses and other potential pandemic pathogens.

3. Regular information sharing and risk assessment using the aligned surveillance results.

Stakeholders

	Central	Regional	Provincial
	GDPM	NIHE (NIC, Epi) Pasteur I (NIC, Epi)	PDH PPPMC Hospital
	DAH NCVD	RAHO2 (Epi, Lab) RAHO6 (Epi, Lab) RAHO7 (Epi, Lab)	DARD Sub-DAH
		NIHE (Predict) Pasteur I (Predict) RAHO2 (Predict) RAHO6 (Predict)	

Influenza Surveillance in Humans

Objectives	Surveillance Strategy in Viet Nam

Identify unusual events	- **Event-based surveillance**
	   - Reporting from healthcare facilities, labs, communities
	   - Media monitoring

Monitor national influenza activity/trends & inform national influenza control policy	- **Indicator-based surveillance**
	   - Nationally notifiable diseases
	   - Sentinel surveillance (ILI and SARI*)

Contribute to global influenza control (pandemic monitoring & vaccine determination)	- **Characterization of viruses**

*ILI= influenza-like illness; SARI = Severe acute respiratory infections

Sentinel Surveillance

ILI Surveillance

- From 2006 - 2015, US-CDC supported establishment of the system
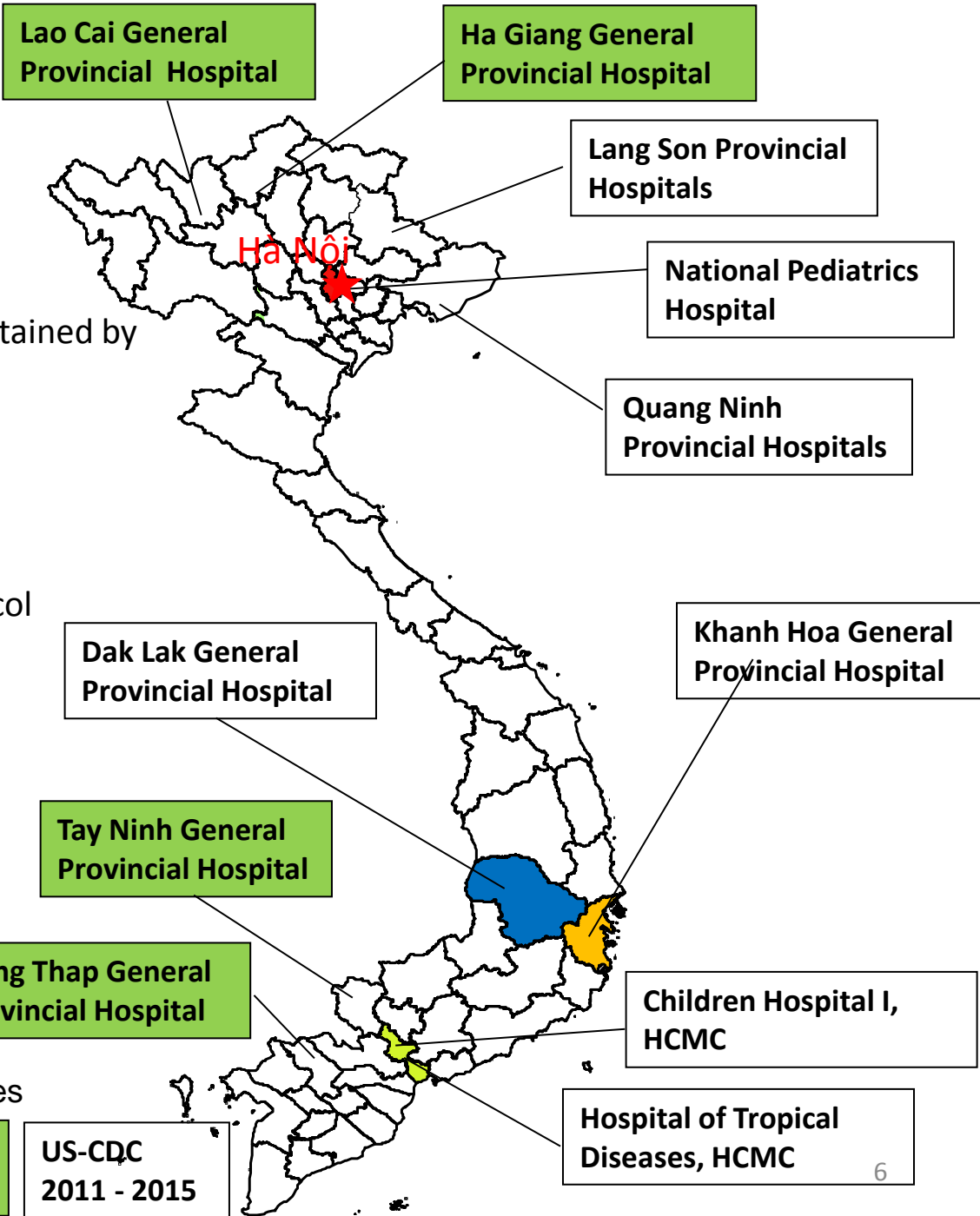- Since 2016, sentinel surveillance is maintained by government funds

SARI surveillance

- Began in 2011
- January 2016: new "harmonized" protocol
  - At least 10 sites
  - Coordinated by MOH,
  - Supported by CDC and WHO
  - Test for
    – Influenza A (subtypes of H1pdm09, H3, H5 and H7) and influenza B
    – Respiratory syncytial virus (RSV);
    – Human metapneumovirus (HMPV);
    – Parainfluenza virus (PIV) 1, 2, 3;
    – Adenovirus (AdV);
    – Rhinovirus (RV)

Lao Cai General Provincial Hospital

Ha Giang General Provincial Hospital

Lang Son Provincial Hospitals

Hà Nội

National Pediatrics Hospital

Quang Ninh Provincial Hospitals

Dak Lak General Provincial Hospital

Khanh Hoa General Provincial Hospital

Tay Ninh General Provincial Hospital

Dong Thap General Provincial Hospital

Children Hospital I, HCMC

Supported sites

Hospital of Tropical Diseases, HCMC

WHO/USAID 2014 - 2015

US-CDC 2011 - 2015

6

Avian Influenza Surveillance 2017

Objectives

1. **Early detection of H7N9** viruses in poultry and LBMs in high-risk areas for rapid response;

2. **To understand the epidemiology and the evolution of HPAI H5** viruses in poultry to inform prevention and control strategies, including vaccine selection; and to evaluate the performance of H5Nx control programme

3. **To understand the gene pool and the evolution of influenza A** viruses in poultry and pigs for early warning of emergence of pandemic influenza A

|		
(orange)	**Baseline** All the year round	(light blue)
(red)	**Enhanced** High season	(dark blue)
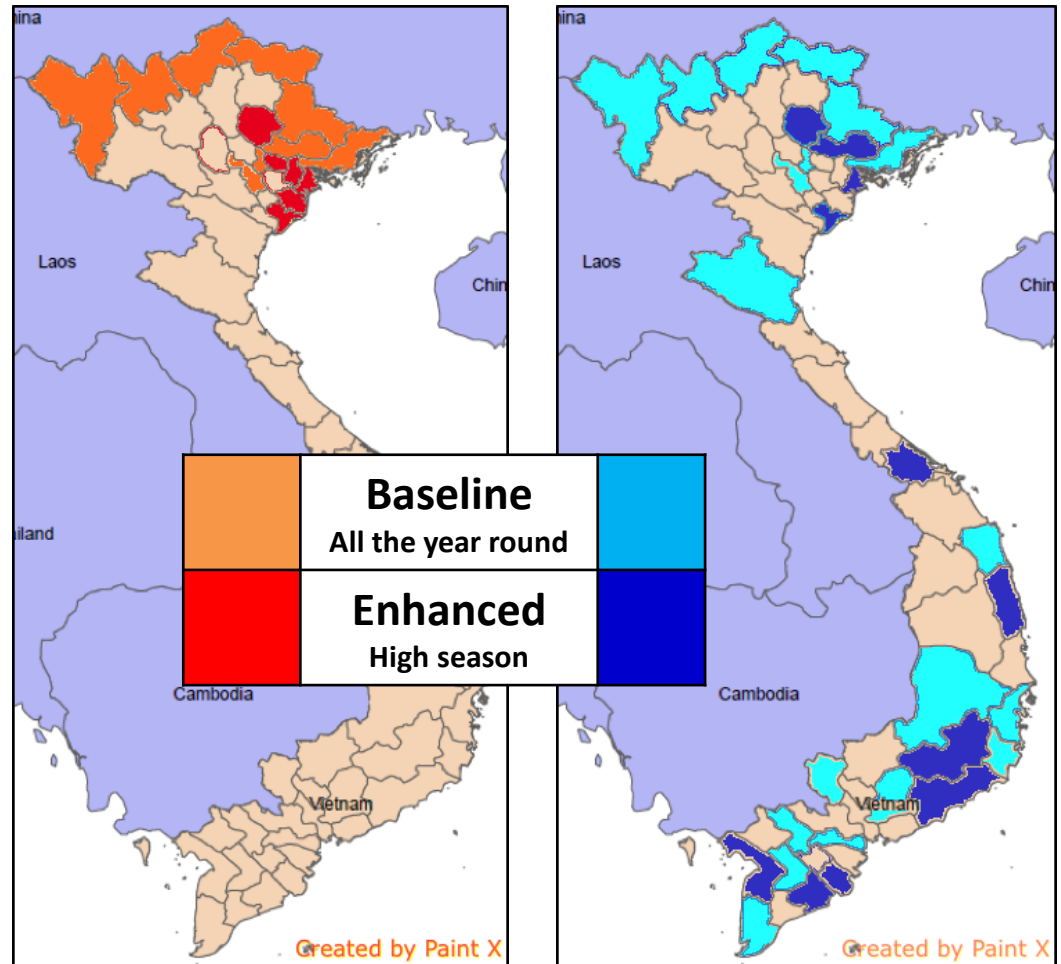
Detection (H7N9)   **Monitoring (H5)**

Swine influenza surveillance

- Surveillance of influenza A virus was initiated in 2013 in order to understand better on;
  - gene pool of influenza A virus in pig population
  - risk factors for virus transmission, circulation, and evolution across sectors based on production systems and value chains

- Risk-based surveillance targeted at high risk population i.e. large commercial breeding/fattening farms with low farm biosecurity

Sampling Design

- Province:
  - High density of pig population
  - 2012 – 2013; 12 provinces
  - 2014 – 2015; 19 provinces
- Farm:
  - Large scale and low biosecurity
  - Breeding: 100-200 sows
  - Fattening: >1000 pigs
- Animals and samples:
  - 5-8 & 9-12 weeks old:
  - 30 nasal swabs/farm from each age group
  - Swabs from 60 animals/farm
  - Sera from 10 piglets/farm (+5 sows in breeding farms)
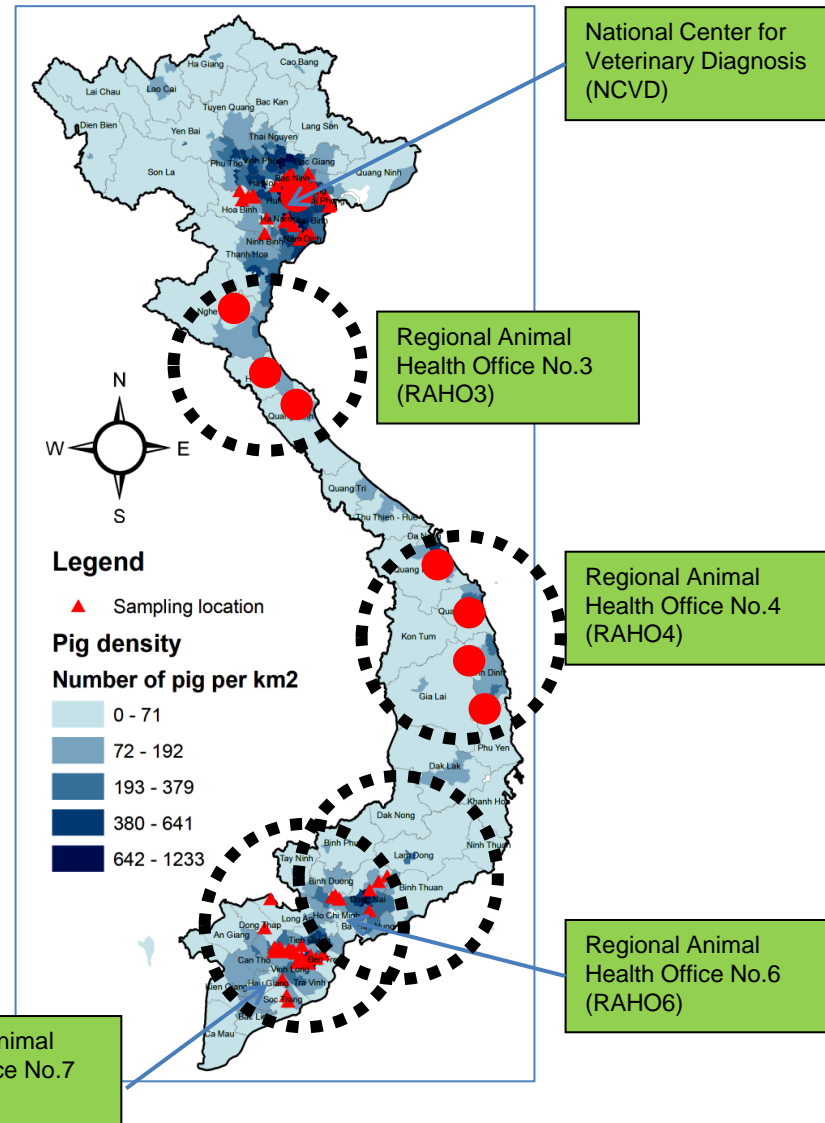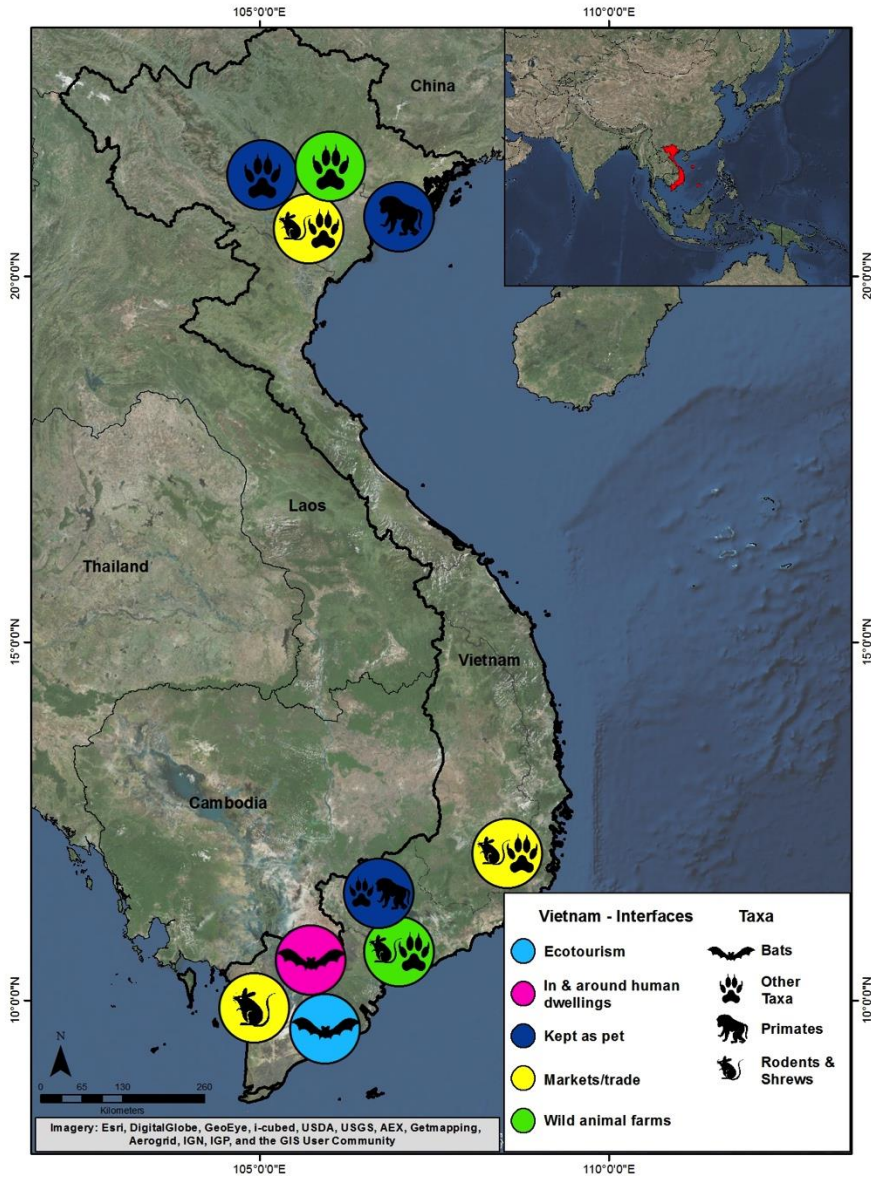
Flu A Viruses in Human, Pig, and Poultry in Viet Nam (Publicly available sequences in July 2016)
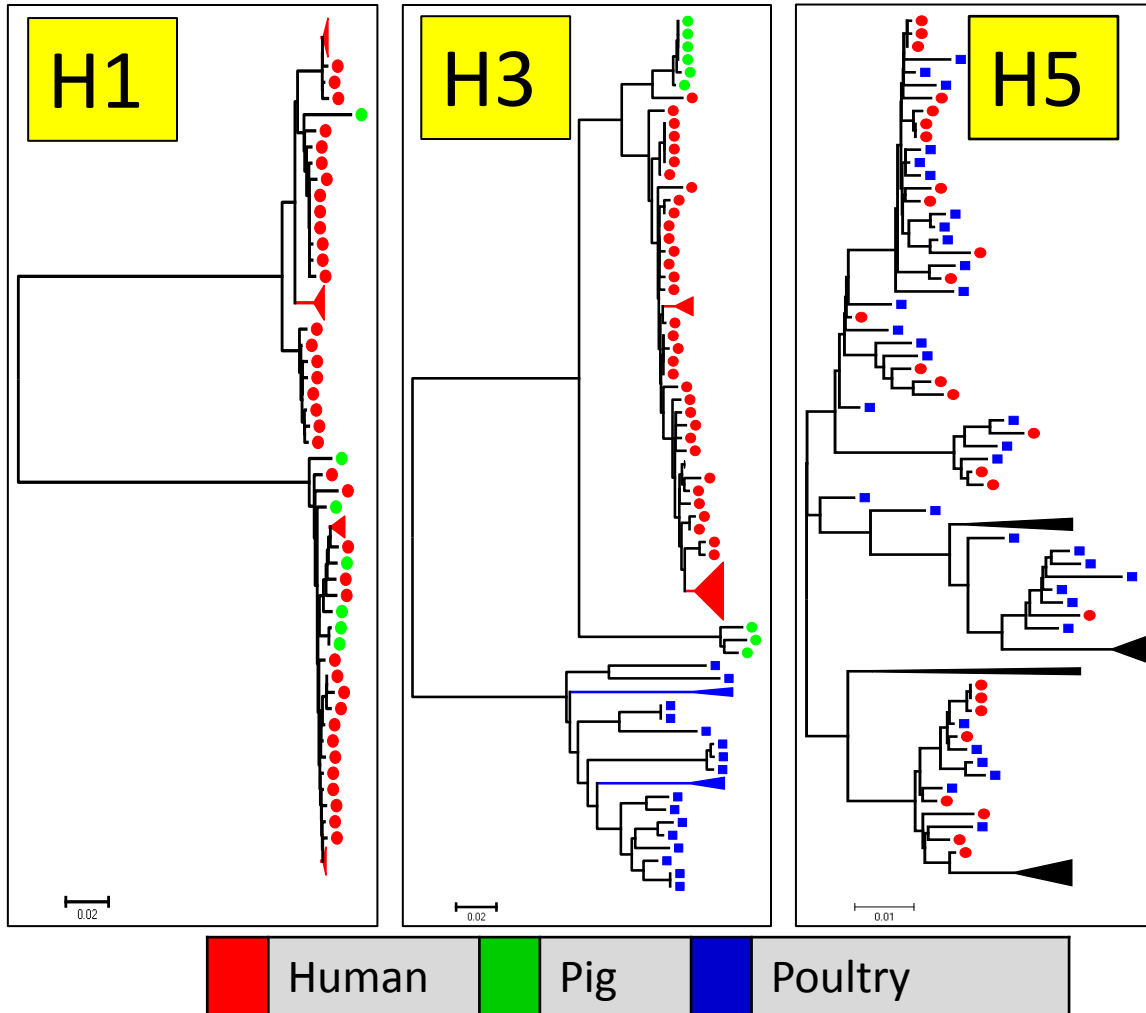
Sub-type	No of HA gene sequence available In public database (Genebank+GISAID)		
	Poultry	Pig	Human
H1	0	5+	250+
H3	20+	5+	400+
H5	500+	0	50+
H7	3	0	0
H9	0	0	0

Human   Pig   Poultry

Wildlife Surveillance in Viet Nam

- Surveillance targeting "high-risk" interfaces for disease transmission between wildlife and humans

- Screening for viral pathogens of pandemic potential

- Building local capacity for surveillance & laboratory diagnostics

Specimens and Viral Testing

- Viral Families (n=12; 4 in all countries)
  - Corona, Hanta, Arena, Alpha, Paramyxo, Flavi, Rhabdo, Influenza, Seadorna, Picorna, Filo, Reo (Retro) viruses
- Specimen type
  - Oropharyngeal swab/saliva
  - Rectal swab/feces
  - Urine, blood
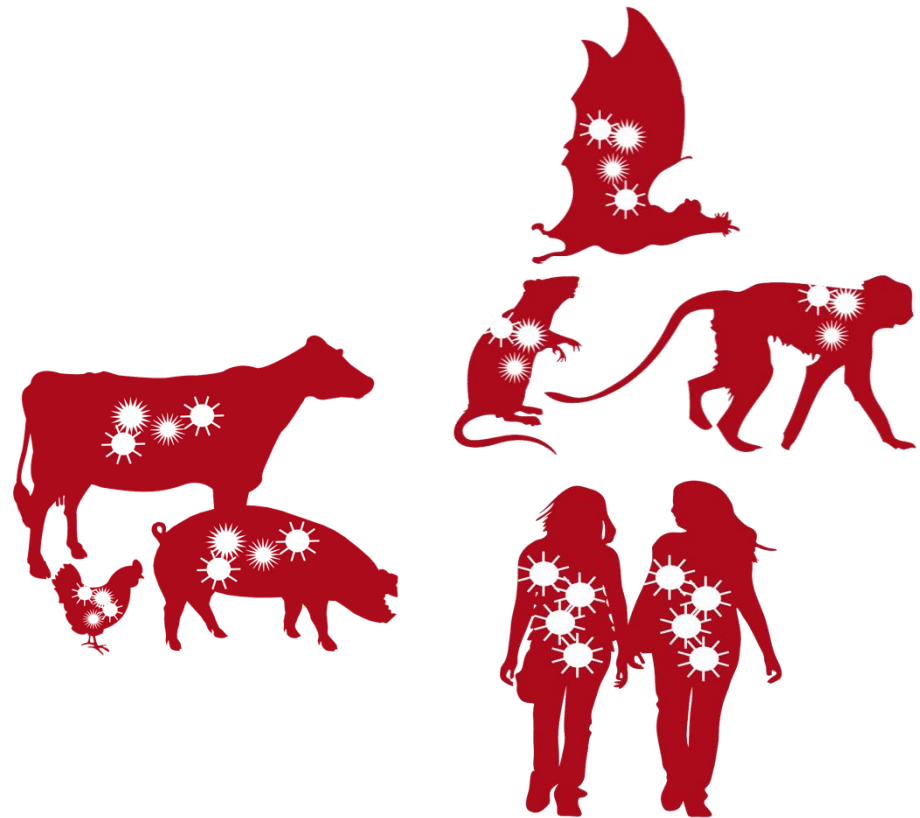
* All taxa:
  * Same sample type
  * Same suit of viral families

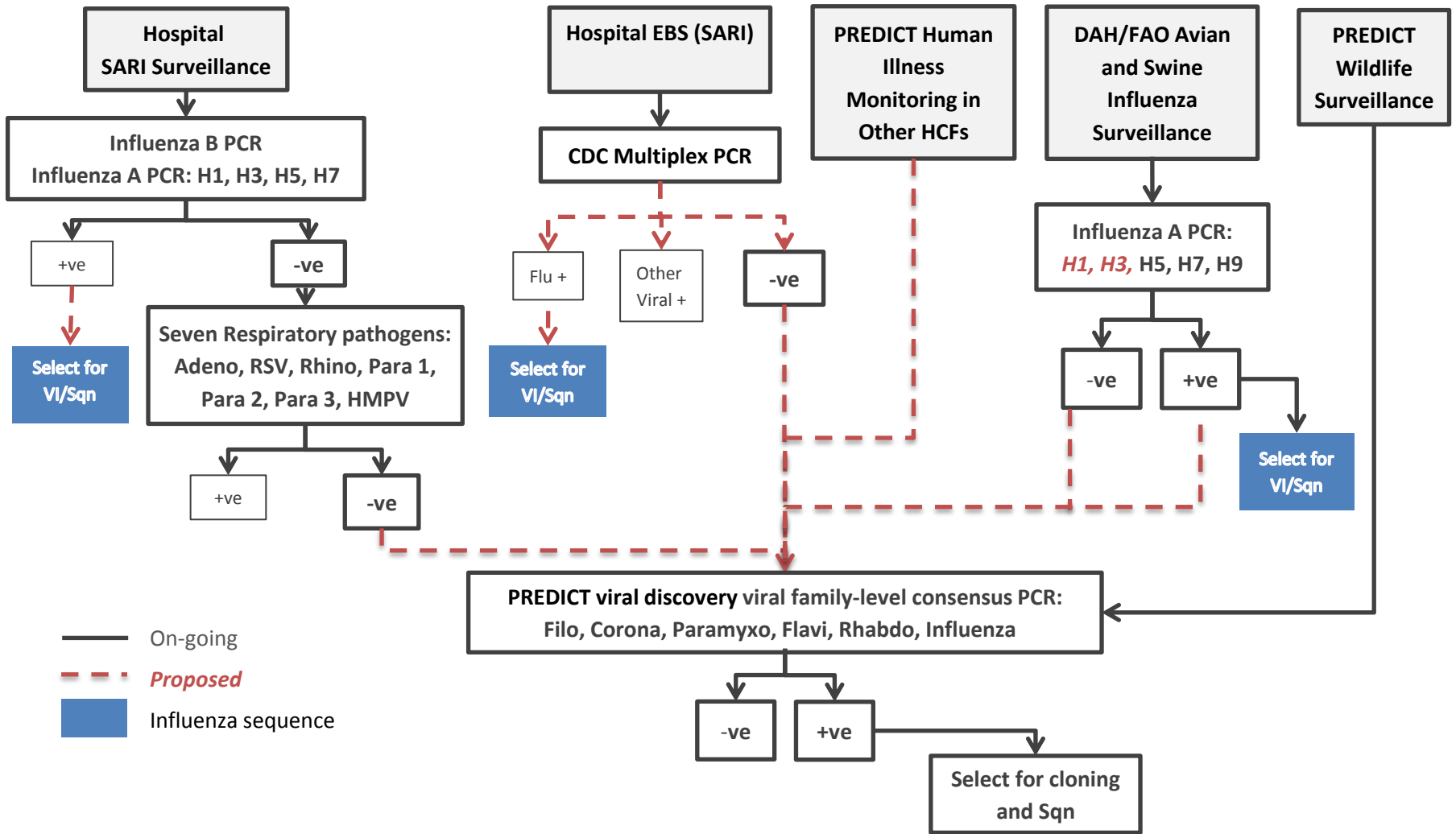# Wildlife Trade in Viet Nam

- Source Country
- Consumer Country
- Transit Country

Coordinated Surveillance for Influenza and Potential Pandemic Pathogens

Hospital SARI Surveillance

Influenza B PCR
Influenza A PCR: H1, H3, H5, H7

+ve → **Select for VI/Sqn**

-ve → **Seven Respiratory pathogens: Adeno, RSV, Rhino, Para 1, Para 2, Para 3, HMPV**

+ve

-ve

Hospital EBS (SARI)

CDC Multiplex PCR

Flu + → **Select for VI/Sqn**

Other Viral +

-ve

PREDICT Human Illness Monitoring in Other HCFs

DAH/FAO Avian and Swine Influenza Surveillance

Influenza A PCR: *H1, H3,* H5, H7, H9

-ve

+ve → **Select for VI/Sqn**

PREDICT Wildlife Surveillance

PREDICT viral discovery viral family-level consensus PCR:
Filo, Corona, Paramyxo, Flavi, Rhabdo, Influenza

-ve

+ve → **Select for cloning and Sqn**

Legend:
- On-going (solid line)
- *Proposed* (red dashed line)
- Influenza sequence (blue box)

Provincial Level (PPMC, Sub-DAH)	Regional Level (NIHE, PI-HCM, RAHO2,6,7)	National Level (GDPM, DAH, CITES)
• Quarterly coordination meeting between PPMC and S-DAH to review progress and trouble shoot	• Six monthly meeting to review virological and epidemiological data	• Annual meeting to review risk assessment results and identify potential intervention

"I don't know where to go, can't do it alone…"

- Pandemic detection and prevention
  - Longitudinal influenza evolution
  - Pathogen discovery
- Strengthened capacity
  - Laboratories e.g. sequencing
  - Risk assessment
  - Routine information sharing (4-way linking, circular 16)
- Data / Information
  - Epidemiological linked samples / data
  - Viruses characteristics
  - Situational analysis and joint risk assessment