

# Participatory One Health Disease Detection (PODD): A Novel Approach for Community-Based Reporting of Emerging Infectious Diseases

Lertrak Srikitjakarn<sup>1</sup>, Surasing Wisarurat<sup>2</sup>, Somporn Pornwisetsirikul<sup>3</sup>, Karoon Chanachai<sup>4</sup>, Patipat Susumpao<sup>5</sup>, Polawat Phetra<sup>5</sup>,  
Terdsak Yano<sup>4</sup>, Jennifer Olsen<sup>6</sup>, Mark Smolinski<sup>6</sup>

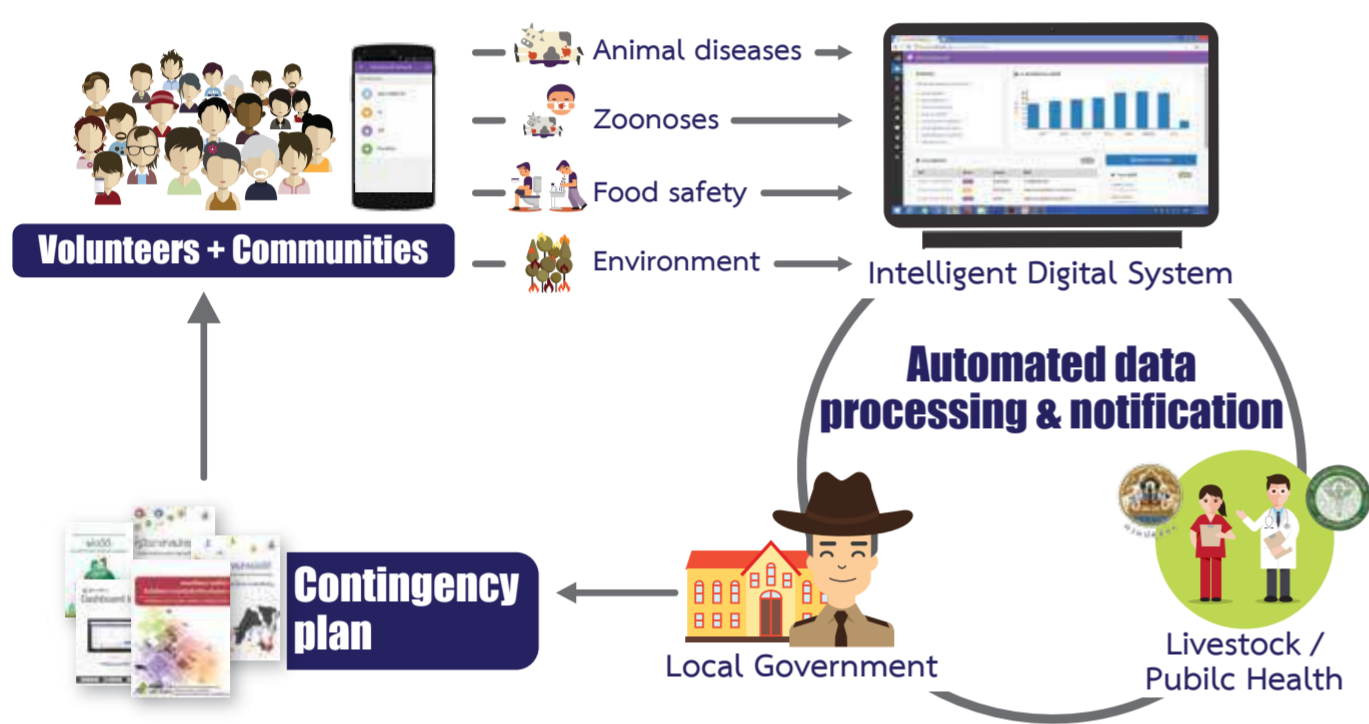
<sup>1</sup>Faculty of Veterinary Medicine, Chiang Mai University, <sup>2</sup>Public Health Expert, <sup>3</sup>Bung Kan Provincial Livestock Office,  
<sup>4</sup>Department of Livestock Development, <sup>5</sup>Opendream Co., Ltd., <sup>6</sup>Skoll Foundation



## Introduction & Objectives

Early detection of emerging infectious diseases can act as the rate-limiting step that prevents a localized outbreak from becoming a regional epidemic or global pandemic. Public engagement plays a critical role in the detection of human and animal diseases and addresses surveillance priorities laid out by the Global Health Security Agenda and International Health Regulations. The Participatory One Health Disease Detection (PODD) project is designed for early outbreak detection and control using an open source digital platform.

## Methods



The community-owned, event-based surveillance system collects data from trained volunteers and delivers automated outbreak notification to local villages and relevant authorities. With the PODD system, volunteers use a mobile application to report suspected outbreaks and other health threats, which is complemented by a protocol for coordinating fast evaluation and response.

## Acceptability & Effectiveness

The PODD program has grown to over 4,600 volunteers over two years. Within the first few months, volunteers reported more animal disease events than had been reported in the whole of Chiang Mai in the previous year. Within 16 months, 1,340 abnormal events were reported. Among those, 36 incidents of dangerous zoonotic potential were verified.

### Performance of the PODD surveillance system on abnormal high mortality in backyard chickens

**Table 1.** Time to detect outbreaks (from first case to index case)

Time (days)	No. of outbreaks	Percent (%)	Cumulative frequency (%)
1-3	5	45.5	45.5
4-6	2	18.2	63.6
7-9	2	18.2	81.8
10-12	1	9.1	90.9
13+	1	9.1	100

**Table 2.** Time which LGs starts to implement control measures after receiving reports

Time (days)	No. of outbreaks	Percent (%)	Cumulative frequency (%)
Within ½ day	6	54.5	54.5
1	4	36.4	90.9
2	1	9.1	100

**Table 3.** Time needed for bringing outbreaks under control (from first case to end of last case)

Time (weeks)	No. of outbreaks	Percent (%)	Cumulative frequency (%)
1-2	3	30	30
3-4	6	60	90
5-6	0	0	-
7-8	1	10	100

**Table 4.** Role and success of LGs on outbreaks control

- Outbreak was contained within a village 8/11 episodes (72.7%)
- Outbreak spread to neighboring villages (4,5 villages) 3/11 episodes (27.3%)
- Success was result mainly from LG's action 11/11 episodes (100%)
- The district authority closely cooperated since outbreak begin 3/11 episodes (27.3%)
- District and provincial authorities closely monitored the situation 11/11 episodes (100%)
- No human diseases found

## Sustainability and expected Outcome



Confirmation of PODD Social Impact ASEAN ICT AWARD granted by DE Minister Dr. Pichet Durongkaveroj CSR - Bronze, Siem Reap 2017

Data submitted to PODD may soon be used to produce a simulated epidemic curve and predict disease scenarios. The early detection of one case of foot-and-mouth disease prevented nearly \$4 million in economic losses. PODD volunteers are also using the system to report other hazards, including fraudulent medication sales, landslides, flash floods, smoke and forest fire. In July 2016, Chiang Mai University transferred ownership of PODD to the Chiang Mai government, with plans to expand to Chiang Rai and Khon Kaen provinces. Authorized local government personnel are trained in the operation of the PODD "dashboard", which allows them to monitor the performance of volunteers and inform relevant parties at the community level about responses to outbreaks and other situations.

### Activities of Subdistrict One Health Operational Centers in the 67 pilot subdistricts in Chiang Mai Province since October 2016

Activity	Number of subdistricts	Percent
Announce/Establish One Health Operational Centers	67	100
Conduct One Health Operational Center meetings	55	82
Include Center in the Subdistrict Development Plan	63	94
Receive reports abnormal events	40	59.70
Respond to abnormal events (n =40)	34	85
Monitor activities using Dashboard	53	79.10
Monitor activities of volunteers	57	85
A minimum of 2 PODD volunteers per village	56	83.60
Conduct PODD volunteer meetings	52	77.60