PODD – A community owned One Health surveillance system to stop outbreaks, avert pandemics, and minimize disaster
Good Practice Award in disease surveillance granted by Department of Disease Control (Bangkok, 2016)
Confirmation of PODD Social Impact
ASEAN ICT AWARD granted by DE Minister Dr.Pichet Durongkaveroj
(CSR - Bronze, Siem Reap 2017)
BACKGROUND

Community Owned One Health Surveillance & Respond System

- Pandemic prevention
- Strengthening existing systems
- One-health approach
- Community owned
- Local volunteer reporters

Participatory One–health Disease Detection
THE IDEA

• Without fast detection and timely effective outbreak response, epidemic & pandemic could not be prevented.

• The existing current “top down” systems both animal and public health have never been fast and effective enough.

• To achieve that goal, we have to empower and work with community.
PODD 1.0 - Objective

To establish and strengthen community participatory outbreaks/abnormal events report and rapid response systems using smart phone and one health approach
Supporting outbreak response and building LGs capacity to contain outbreaks in backyard production systems
PODD surveillance system

• Objectives
  • Early detection of disease outbreaks / abnormal events
  • Engaging community for prompt response to contain the outbreaks esp. in backyard animal production
  • Prioritized immediate benefit to community rather than collecting data for national future use.

• Characteristic
  • Syndromic enhanced passive surveillance
  • Village volunteer reporters covering whole Tambon(subdistrict) area
  • Community leaders support surveillance networks
  • Community owned surveillance data, systems including rapid response
  • Public accessible and reporting
One health approach

- Multisectoral actors
- Community participation
- Transdisciplinary
- Systems thinking
- Outbreaks / abnormal events report on:
  - Epizootic diseases (animal & economic health)
  - Zoonoses and human epidemic diseases
  - Food safety problems
  - Environmental alarming
Environmental health surveillance

- Water quality monitoring
- Invasion of alien species
- Abnormal low price of meat
- Bush meat selling / consumption
- Burning & smoke problem
PODD: 3 KEY ELEMENTS

The Digital System

PODD volunteers

Local government (One Health Operational Center)
THE PODD functional SYSTEM

1. Volunteers + Communities

2. Automated data processing & notification
   - Livestock/Public Health
   - Local Government

3. Contingency Plans

- Animal diseases
- Human diseases
- Food safety
- Environment
Surveillance is not only asking for reports, but effective response, too........
Real time responsive notification with just in time learning materials through digital tool

PODD Pathway for Animal Bite

1. Suggest patient on rabies awareness
2. 10 days animal surveillance
   - Animal alive: report on Day 5 & 10
   - Animal died: report immediately

Reporter

Animal Bite Event

PODD App.

Case

SMS Alert

Epicenter

LGs & Local Authorities

District & Provincial PH & AH Units

Follow Up (+ Rabies control if suspected)

Finish

Warning message for rabies surveillance
Train & Strengthen volunteers reporter status in their villages.
Alert stakeholders in red, yellow, and green area to contain suspected outbreaks following the community contingency plan
Result:

6 kinds of positive report.

N=437

(January 2015 – February 2017)
1. Animal bite (Rabies Surveillance)

- Dogs: 83%
- Cats: 13%
- Others: 4%

2. Epidemic Disease in Humans

- Influenza: 4%
- Dengue Fever: 90%
- Leptospirosis
  - Hand Foot: 1%
  - Mouth: 5%
2. Food Safety

- Poor Hygienic Condition: 13%
- Food Poisoning: 37%
- Low Quality Food: 25%
- Food Contamination: 25%

3. Consumer Protection

- Unregistered Drug: 67%
- Unregistered Cosmetic: 11%
- Low Standard Food: 11%
- Used Oil: 11%
Success:

Epidemic Disease in Human and Animal

- Epidemic in Animal Suspected Outbreak = 60
- Abnormal Sick/Dead = 207
- Sick/Dead Report = 1,060
- Total Report = 2,058
Supporting component

• In addition to original 74 PODD engaged LGs, more than 20 new LGs now use PODD systems and begin reporting abnormal events and outbreaks to the systems.

• More than 70% of volunteer reporters are actively engaged with PODD activities.

• 34% of LGs showed high promising, 46% medium performance in usage of PODD systems.
Technophobia ?

Volunteers agilely use app

Volunteers can not use app

89%

11%
Average time for app usage

2.4 minute
Some findings in human health issues
2 persons with high fever and subcutaneous hemorrhages were reported
A PODD volunteer reported Hand, Foot, Mouth in a day care children center, activated LGs to control the outbreak
Consumer protection – selling of unregistered herbal medicine
Research team visited fowl plague outbreak area right after reporting start.
PODD & local government stopped black leg spreading, averting continual farmers’ huge loss.
Automated POOD Monthly Surveillance Report

Report of disease surveillance and suspected disease events dangerous to health under the PODD system in Sub-district, District, 2017

<table>
<thead>
<tr>
<th>Sub-district</th>
<th>Total number of volunteers</th>
<th>Number of active Volunteers</th>
<th>Total number of reports</th>
<th>Number of abnormal events reported</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number of reports on human health</td>
<td>Number of reports on animal health</td>
<td>Number of reports on the environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hemorrhagic fever</td>
<td>Foot chilvers</td>
<td>Environmental problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Influenza</td>
<td>Foot and mouth disease</td>
<td>Natural disasters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foot and mouth disease</td>
<td>Foot and mouth disease</td>
<td>Forest fires</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rabies</td>
<td>Blackleg disease</td>
<td>Locations/activities creating a health risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Food poisoning</td>
<td>Food poisoning</td>
<td>FRIS (Porcine Reproductive and Respiratory Syndrome)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unusual food</td>
<td>Unusual food</td>
<td>Hog chilvers (Swine fever)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consumer protection</td>
<td>Consumer protection</td>
<td></td>
</tr>
</tbody>
</table>

Examples of successful control of abnormal events in Chiang Mai Province

- **Foot chilvers**
  - 21 Aug 17: Received report of 32 local deaths, 50 downed birds, 100 birds, 40 eggs, 20 purple dots, 50 eggs, 200 eggs, 50 dead, 100 birds, 200 eggs, 50 eggs, 200 ego
Report of suspicious Foot and Mouth Disease in pig and cattle, January 2015 - July 2016

Number of reports

- by PODD (n=61)
- by DLD (n=29)
Figure 12 report of suspicious rabies in dog and cat in Chiangmai by PODD project and animal health office (DLD), January 2015 – July 2016
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)

<table>
<thead>
<tr>
<th>Time (days)</th>
<th>No. of outbreaks</th>
<th>Percent (%)</th>
<th>Cumulative frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>5</td>
<td>45.5</td>
<td>45.5</td>
</tr>
<tr>
<td>4-6</td>
<td>2</td>
<td>18.2</td>
<td>63.6</td>
</tr>
<tr>
<td>7-9</td>
<td>2</td>
<td>18.2</td>
<td>81.8</td>
</tr>
<tr>
<td>10-12</td>
<td>1</td>
<td>9.1</td>
<td>90.9</td>
</tr>
<tr>
<td>+13</td>
<td>1</td>
<td>9.1</td>
<td>100</td>
</tr>
</tbody>
</table>
### Table 2. Time which LGs starts to implement control measures after receiving reports

<table>
<thead>
<tr>
<th>Time (days)</th>
<th>No. of outbreaks</th>
<th>Percent (%)</th>
<th>Cumulative frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within ½ day</td>
<td>6</td>
<td>54.5</td>
<td>54.5</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>36.4</td>
<td>90.9</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>9.1</td>
<td>100</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Time (weeks)</th>
<th>No. of outbreaks</th>
<th>Percent (%)</th>
<th>Cumulative frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>3</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>3-4</td>
<td>6</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>5-6</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>7-8</td>
<td>1</td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 4. Role and success of LGs on outbreaks control

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outbreak was contained within a village</td>
<td>8/11 episodes (72.7%)</td>
</tr>
<tr>
<td>Outbreak spread to neighboring villages (4, 5 villages)</td>
<td>3/11 episodes (27.3%)</td>
</tr>
<tr>
<td>Success was result mainly from LG’s action</td>
<td>11/11 episodes (100%)</td>
</tr>
<tr>
<td>The district authority closely cooperated since outbreak begin</td>
<td>3/11 episodes (27.3%)</td>
</tr>
<tr>
<td>District and provincial authorities closely monitored the situation</td>
<td>11/11 episodes (100%)</td>
</tr>
<tr>
<td>No human diseases found</td>
<td></td>
</tr>
</tbody>
</table>
ACKNOWLEDGEMENTS
Thank You