



PODD Case Study For CMU

Stopping Pandemics at the Source

September 2017



Highlights

- In July 2014, Chiang Mai University (CMU) received a \$2 million USD (69,080,000 THB), two-year grant from the Skoll Global Threats Fund (SGTF) to create the **Participatory One Health Disease Detection (PODD)** project—a first-of-its-kind community-owned pandemic surveillance and response system.
- The goal of PODD is to enable **early detection of animal-borne disease outbreaks** and prevent them from becoming pandemics. The grant funded the development and launch of a **Thai-built mobile app** that local volunteers use to report suspected outbreaks and other dangerous events, as well as the development of a protocol for coordinating fast evaluation and response among local government officials, veterinarians, and public health experts.
- The PODD program had **300 trained local volunteers** at launch, growing to more than **4,600** volunteers two years later.
- Within the first few months, volunteers reported more animal disease events in those districts using PODD than had been reported in the whole province of Chiang Mai in the previous year. Within 16 months, **1,340 abnormal events were reported**. Among those, a total of 36 incidents of dangerous diseases were verified.
- The early detection of one case of foot-and-mouth disease, stopped before it could spread, **saved \$4 million USD (138,120,000 THB)**.
- PODD volunteers also use the system to report a range of other hazards, from fraudulent medication sales to **landslides and flash floods**.
- The provinces of **Chiang Rai** and **Khon Kean** signed on as PODD participants for the summer of 2017, with CMU supporting the training and transfer of the tool.
- **Private-sector funding, with government support, could expand the project to additional provinces—even regionally—to amplify pandemic prevention.**

About CMU

Founded in 1964, Chiang Mai University was the first institution of higher education in Northern Thailand and the first provincial university in the kingdom. CMU today thrives as a public institute of learning excellence and a hub of research and innovation, with a highly collaborative approach to exploring new solutions across borders and disciplines.

The school's Faculty of Veterinary Medicine is a member of the USAID collaboration on One Health and is internationally respected for its interdisciplinary, multi-sectoral approach to health issues. CMU is also home to an international dual degree program for a Masters in Public Health—One Health, conducted in partnership with the University of Minnesota.

The Idea

In 2008, a research team from the faculty of veterinary medicine at CMU published a paper with troubling findings. Four years earlier, Thailand and Vietnam had been at the epicenter of an avian flu outbreak that killed more than 50 people, sickened hundreds more, and resulted in an economic loss of roughly \$1.7 billion USD¹ (58,701,000, 000 THB).

The team had studied the outbreak, the local response, and the country's current state of preparedness. Their conclusion: preventing a pandemic would require both the ability to detect an outbreak early and a coordinated plan for stopping its spread. And Thailand, like many countries, had neither.

Filling these gaps proved a daunting task. Almost half of Thai citizens rely on backyard animal production for their livelihood, meaning many millions of animals live outside the formal agricultural system. The researchers found that very few of these farmers knew about avian flu or other diseases capable of hopping from animals to humans.

1 Srikitjakarn et al, 2008, Research Abstract on Participatory Surveillance Model, Thailand Research Fund.



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Despite recent concerns, many were still consuming or selling chickens, cows, and other animals that died of unknown causes. Those who buried the carcasses weren't taking measures to protect themselves. In the rare event that farmers reported an illness or outbreak to the local government, they seldom got a response—in part because governments had no budget, bandwidth, or strategy for disease control.

The paper's lead author was Dr. Lertrak Srikitjakarn, former dean of CMU's veterinary medicine program. Srikitjakarn believed that Thailand needed a new kind of disease detection system, one that made spotting and reporting sick animals—and responding to outbreaks—routine and easy. One that encouraged and empowered local citizens and local governments to play a leading role in these critical tasks.

“One Health” Disease Surveillance

The system that Srikitjakarn envisioned was the embodiment of “One Health,” an approach to addressing global and local health challenges that acknowledges the deep interconnectedness of humans, animals, and the ecosystems they share. Chiang Mai Province had a longstanding interest in this approach, already boasting a One Health committee established by gubernatorial decree. After Srikitjakarn's paper was published, the Chiang Mai government started convening conversations about the idea. Meanwhile, Srikitjakarn began looking for outside funding to help jumpstart the project.

In 2013, Srikitjakarn met with leaders of the Skoll Global Threats Fund

(SGTF), an initiative started by eBay founder Jeff Skoll. As part of its ending pandemics initiative, SGTF helps to advance community-owned disease surveillance solutions to find, verify, and contain potential disease outbreaks faster. Southeast Asia has long been a hotspot for emerging and reemerging zoonotic disease outbreaks, so SGTF was eager to help Srikitjakarn bring his project to fruition, especially since it would be the first such project to embrace the principles of One Health at the community level.

The Design

In March 2014, a multidisciplinary team of over 40 experts, most of them Thai, participated in a SGTF-hosted epidemiology hackathon, or Epihack™, to explore what this system might look like. These experts included:

- Veterinarians, physicians, and environmental health specialists
- Technologists
- Economists
- Engineers
- Local government representatives

Out of the event came numerous prototypes that were then further refined into a system design.

Four months later, CMU was awarded a two-year, \$2 million USD (69,080,000 THB) grant from SGTF to create and operationalize that system, now dubbed the Participatory One Health Disease Detection project, or PODD, which in Thai means “look closely and you will see.”

Over the next six months, PODD team members crafted both a project strategy and the infrastructure to support it. They would pilot the

project in 75 of the 210 sub-districts within Chiang Mai, each of which had both a high density of livestock and, critically, a local government willing to participate.

Powered by the People

PODD team members ran focus group discussions with local government officials so they could express their ideas and suggest system improvements. These discussions surfaced a high level of interest, strong commitment, and a good understanding of the types and level of support they would give to the PODD project, which would be critical to ensuring rapid response.

Meanwhile, each of the 75 sub-districts was asked to select four community members to serve as PODD volunteer reporters responsible for reporting incidents. Intriguingly, some chosen volunteers were either housewives or car mechanics—two groups of individuals highly plugged in to local gossip. Each volunteer received training on animal health, clinical signs of illness, and disease prevention and control practices. Each also received a mobile phone, along with technical training on PODD's disease reporting system.





The reporting system itself was designed to be simple and intuitive. Volunteers would report potential animal disease outbreaks or environmental hazards through the PODD app loaded onto their phone. They could take a photo of the animal or hazard or select one from a photo gallery. GPS would tag the photo location, or volunteers could choose from a predefined list. Then the app would walk the volunteers through a series of short questions that captured what they were seeing. To ensure constant engagement, volunteers had to report in every day, regardless of whether they had an event to report.

All volunteer reports were fielded by the PODD Epicenter, a central hub at Chiang Mai University staffed by analysts and researchers, many of them veterinarians. If a report was concerning, an analyst would call the volunteer to ask clarifying questions, then, if needed, send a team to investigate and collect specimens. If something significant was found, the case would shift to “suspected outbreak” status, and email alerts would be automatically sent to the volunteer, the village headman, local government officials, public health officers, and the district livestock office.

These authorities would then stage a coordinated response—ranging from quarantine and vaccination to eliminating animals, disinfecting the area, and communicating the risk publicly. During the response, all stakeholders would receive real-time updates to avoid gaps in information and awareness. Stakeholders could always review incoming reports or pull up a dynamic situations map that showed all active cases, offering a systems view of the PODD case landscape.

Early Impact & Learning

In January 2015, the PODD pilot went live. Despite some initial concerns, the project took off:

- Within the first few months, volunteers reported more animal disease events in those districts using PODD than had been reported in the whole province of Chang Mai in the previous year.
- In the first 10 days, there were 190 reports of animal bites, sick animals, or outbreaks.
- Within 16 months, 1,340 abnormal events were reported, 77% of which proved accurate. Among those events, a total of 36 incidents of dangerous zoonotic diseases were detected, investigated, and verified. Twenty-six were “chicken pest”—the villager’s term describing sudden, abnormal high mortality in chickens, which can also be indicative of avian flu.

There were also four incidents of foot-and-mouth disease (FMD), a devastating illness of pigs and cattle. “It’s one of the most terrible diseases from an economic and trade standpoint,” said Jennifer Olsen, who oversees SGTF’s participation in the project. “One farmer had a few cases of foot-and-mouth disease (FMD) in his cattle herd. If that had moved to neighboring farm, it would have changed the course of local Thai economics pretty significantly.”

Within the piloting period between January 2015 and July 2016, almost 30% of the 29 FMD outbreaks might have gone undetected or suffered delays in reporting if PODD was not



Built to Share

The PODD app, database, and infrastructure were built by Opendream, a Bangkok-based technology company with prior experience in building health communication software. Opendream modified and improved the system regularly after PODD’s launch. The PODD team also held multiple meetings to assess progress, discuss potential system changes, and further educate volunteers on recognizing the signs of outbreaks.

One condition of the grant required Opendream to use open-source code for the PODD project so that others could easily adapt the system. An independent technology firm’s external audit validated that the tool and its related documentation were capable of being adapted for similar use cases in other countries.

The PODD app was simple enough that 89% of volunteers could use it agilely after basic training, even though half had never owned a mobile phone. On average, users required less than 3 minutes to submit a report.



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functioning in the area. In villages where incidents and outbreaks occurred, the PODD team canvassed the area, helping to educate villagers on the importance of early detection and reporting. Charuk Singhapreecha, a CMU economist embedded with this team, talked to farmers about the economic impact of disease outbreaks. “I tell them how an outbreak can affect not just their income but their neighbors’ income,” Singhapreecha explained, adding that farmers were often surprised by this news.

He also talked to local government officials. “They have to spend a lot to control a disease, so before they would wait until it had spread,” he said. “Now they know it’s better to stop at the beginning stage, or else nobody can help.” Singhapreecha also regularly analyzed the value of PODD reporting from a wider trade and tourism standpoint. His analysis showed that the early detection of one FMD case, stopped before it could spread, saved \$4 million **(138,120,000 THB)**.

Ready to Respond

These assessments are just part of what is helping to shift local culture around disease awareness and action in Chiang Mai. Another key factor? Help now comes much faster with the PODD system. Most PODD volunteers point to this as the biggest reason why the project is proving so successful. “I can just take a photo and get a very rapid response,” said one volunteer who lives in a remote mountain village. Another said that farmers are more willing to report problems because they trust that their local government will respond.

For their part, governments are now far more equipped to help. As the PODD coordinator for one district put it: “People in local government now can solve these problems by themselves, which makes them care more about these issues.”

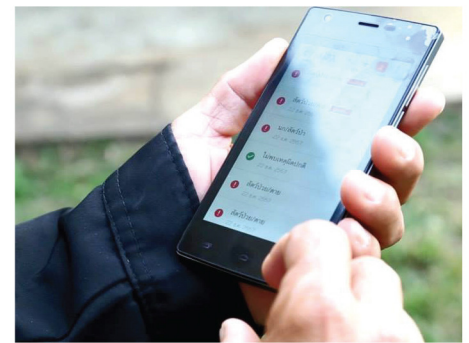
Community engagement has also increased significantly. “Villagers talk about these problems more than ever before,” said one PODD volunteer. “They have more contact between people in the community in their area,” reported another. “It has brought the community together.”

This heightened engagement has taken other forms as well. Some communities are building designated quarantine areas, while others have asked to learn how to do vaccinations themselves. Some local governments have even put their own money into the program, primarily to fund additional volunteers. Multiple local leaders have said that if PODD funding went away, they would find the money to continue the project in their district.

Villagers and local governments have even expanded the kinds of information reported on through the PODD app. PODD volunteers are now reporting on natural disasters like flash floods and landslides, fraudulent medication sales, and food safety issues, particularly the reuse of cooking oil—a known carcinogen affecting many people in the region.

Looking Ahead

PODD has steadily gained momentum since its launch. Early in 2016, more than 4,000 public health volunteers asked to be added to the PODD volunteer roster, bringing





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the total number of registered volunteers in Chiang Mai Province to 4,615. Two additional provinces, Chiang Rai and Khon Kaen, signed on to participate in PODD for the summer of 2017, with CMU serving as the administrator.

However, July 2016 marked the end of Chiang Mai University's original SGTF grant for PODD. The program currently lacks the resources needed to scale up and realize its full potential.

The Chiang Mai provincial government committed \$117,000 USD (4M baht) in support for 2017, with the same amount planned for 2018. The national government, while supportive of PODD, has not indicated extending any financial backing to help expand the program.

Private funding, in partnership with local governments, has the power to advance the pandemic-halting benefits of PODD to not only more provinces throughout Thailand, but to neighboring countries as well.

To this end, Chiang Mai University is seeking visionary partners to make investments that will, among other goals:

- Expand the PODD surveillance system countrywide, establishing Chiang Mai as a model “super province” and a focal point for expansion
- Develop community contingency plans, especially for livestock diseases in backyard production systems, which could be a source of pandemics
- Establish customized PODD system delivery methods for relevant partners
- Explore cost-effective staffing models on par with the graduate students working for CMU
- Demonstrate the value of PODD to help ensure its sustainability

PODD is an unquestionable success story for CMU and the people of Chiang Mai Province. Dr. Lertrak Srikitjakarn is excited by how far the program has come in just a few short years, but he is even more excited about the future possibilities. “This model is delivering exactly the types of results we hoped it would,” said Srikitjakarn. “If we can take PODD beyond Chiang Mai, we can help revolutionize the way we save lives and preserve economies.”



Timeline

March 2014 — Chiang Mai Epihack™

August 2014 — Two-year grant to Chiang Mai University begins

December 2014 — Stakeholder trainings begin

January 2015 — PODD launches

July 2016 — Grant from SGTF ends

September 2016 — PODD honored with national Good Practices award from the Department of Disease Control, Ministry of Public Health

May 2017 — Chiang Rai province joins PODD

June 2017 — Chiang Mai University appoints PODD Advisory Board

July 2017 — Khon Khan Province joins PODD

To learn more about PODD, please contact animalhealth.cmu@gmail.com