PROJECT OPTIMIZE: ALBANIA

Remote temperature monitoring for vaccine quality

Proper monitoring of temperatures is crucial to ensuring the quality of vaccines. As vaccine efficacy can be affected by exposure to excessive heat and cold, it is important that vaccines are correctly transported and stored from the point of manufacture to the point of use. Temperature monitoring, usually conducted by health workers, helps ensure the quality with which vaccines are handled, detects malfunctioning equipment and prevents temperature fluctuations that can negatively impact vaccine potency and safety. In Albania, 30-day temperature recording devices, such as Berlinger's Fridge-tag®, are used in most health centers where vaccines are stored. However, health workers cannot respond to an alarm during nonworking hours, and without supervisors' assistance, they cannot always take the appropriate remedial actions.

Project Optimize designed and implemented a study in Albania to evaluate the potential benefits of remotely connected monitoring devices. Optimize was a five-year partnership between WHO and PATH to identify ways in which supply chains can be optimized to meet the demands of an increasingly large and costly portfolio of vaccines. The project tested an SMS-based system to monitor and log temperature conditions in peripheral cold chain equipment. The aim was to assess whether these remote alarm systems facilitate better vaccine and cold chain management than non-connected temperature loggers.

Implementation date: March 2010

About Project Optimize: Albania

In collaboration with the National Immunization Program (NIP) and Berlinger, Optimize installed an SMS-based system that monitors and logs temperature conditions in peripheral cold chain equipment. In Albania's Shkoder District, 24 health centers storing vaccines were equipped with remote temperature monitoring devices that included sensors, monitors and SMS gateways. When an alarm is activated due to exceeded temperature limits, an SMS text message is immediately sent to a central server that logs the issue and sends a notification to health workers and supervisors in charge of the storage location. Once the problem is addressed, its status is reset on the central server.

To analyze temperature curves for the working status of refrigeration equipment, mobile phones were also used to transmit frequent temperature measurements. The FoneAstra system was used for this process and installed at six sites. Temperature probes were placed inside equipment and the mobile phone and accessory mounted externally, which sampled and aggregated data from the temperature sensors every few minutes. Detailed temperature logs are periodically sent to the central server via SMS, which also stores alarm notification data. All data can be easily viewed using a standard web browser.

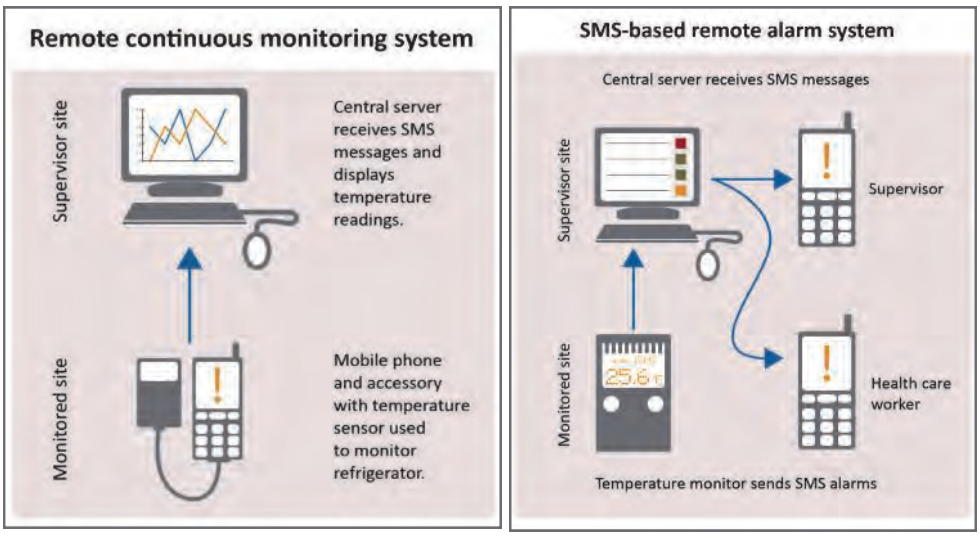
Evaluation and Results

Over a 10-month period, 136 alarm incidents were detected, including 22 low- and 114 high-temperature alarms. The system also demonstrated certain managerial benefits. For example, supervisors phoned health workers or storekeepers in 41% of incidents to confirm detection of the problem and assisted in taking appropriate follow-up measures in 15% of these.

In focus group discussions, nurses and supervisors reported that the technology was beneficial for their work. However, while the study highlighted some qualitative benefits of the technology, it did not find any situation in which remote monitoring saved a vaccine from freezing or excessive temperature exposure. Therefore, a case for positive cost-benefits could not be made.

Lessons Learned

- The study increased awareness of the importance of temperature monitoring, improved collaboration between vaccinators and supervisors to resolve alarm events and cold chain problems, and served to improve the entire cold chain system in Shkoder district
- There was a sense that this technology provided a "best-in-class" level of quality control.



- Since the study was designed to establish the potential benefits of the concept, there was no attempt to produce the devices at low cost, thereby making scalability and sustainability unknown. At USD$1,000 per monitoring device, the Fridge-tag®–based system is unaffordable for limited-resource locations. However, a prior FoneAstra project suggests costs may drop to about $100 per device.
- Ongoing communication costs of almost $1,500 each year may also present a barrier to project adoption.

Conclusion

The adoption of non-connected recording devices has demonstrated willingness to invest in temperature monitoring equipment to safeguard expensive vaccines. The prospects for adoption of remote monitoring systems will likely be driven by their costs. The experience in Albania suggests it may become a niche product, mostly suitable for places where high vaccine stock values are at stake or for remote storage points with unreliable storage conditions.

The demonstration was a partial success. Further research is needed to quantify potential benefits, such as the number of vaccines saved, and to produce lower-cost devices.

Geographic Coverage: Albania

Implementation Partners: Ministry of Health, Albania | Institute of Public Health, Albania | Health Insurance Institute, Albania | PATH | Shkoder Directorate of Public Health, Shkoder, Albania | Albania Country Office, World Health Organization

Funder: The Bill & Melinda Gates Foundation

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2. Temperature monitoring for vaccine quality. Optimize Fact Sheet. World Health Organization, PATH. July 2012.