EVALUATING THE BENEFITS AND COSTS OF REMOTE TEMPERATURE MONITORING: EVIDENCE FROM MOZAMBIQUE


Background

Current protocol for using thermometers twice-a-day to monitor and record vaccine refrigerator temperatures often fails to detect and ensure proper reporting of excursions above or below the recommended 2°C to 8°C range for vaccine storage.

Hypothesis

By using short-message service (SMS) technology to alert health facility staff about temperature excursions and escalate unresolved issues to supervisors, the remote temperature monitoring (RTM) device, ColdTrace, can help facility staff to promptly address problems and better protect vaccine potency.

Results

All temperate data presented in this results have been collected by a RTM device placed in each health facility, including at facilities in Groups 2 and 3.

Key outcomes

**63%-88% Reduction in Cold and Freezing Duration**

RTM reduced cold and freezing alarm duration by 63%-88% compared to 30DTR and stem thermometers

Facilities in Group 1 (RTM + SMS) achieved an average uptime of 86%, while those in Group 2 (30DTR) and those in Group 3 (stem thermometers) achieved average uptimes of 79% and 62% respectively.

Facilities in Group 1 (RTM + SMS) had 50% fewer cold excursions than those in Group 2 (30DTR) and 62% fewer than those in Group 3 (stem thermometers)(p<0.02).

The RTM in Group 1 reduced total duration of cold alarms by 75% compared to Group 2 (30DTR) and by 82% compared to Group 3 (stem thermometers) (p<0.02).

The RTM in Group 1 reduced total duration of freezing alarms by 63% compared to Group 2 (30DTR) and by 88% compared to Group 3 (stem thermometers) (Group 3 only p<0.05).

**Conclusion**

Lower freezing duration was observed in Group 1 health facilities, this could be because health facility staff and supervisors in Group 1 were informed about temperature excursions through SMS and escalated alerts in real-time and therefore had the opportunity to take prompt actions and inform technicians when needed.

**Evaluation design**

Using a randomized control trial design, health facilities were randomized into three groups controlling for the age of the refrigerators and distance of the facility from the provincial Ministry of Health (MOH).

- **Group 1** included 29 health facilities using RTM + SMS alerts (Staff trained on ColdTrace usage).
- **Group 2** included 28 health facilities using 30-day temperature recorders (30DTRs) with visual alerts; staff trained on usage.
- **Group 3** included 26 health facilities with stem thermometers (this is the status quo with twice-a-day temperature readings).

To inform comparisons, continuous temperature and power data were collected and transmitted remotely from all participating health facilities using RTM devices. We also calculated the total cost of ownership (TOC) for the RTM ColdTrace device and collected qualitative data through informal interviews with health facility and MOH staff.

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