EXECUTIVE SUMMARY

Enhancing Infection Control, Efficiency, and Clinical Accuracy: The Case for Disposable Thermometers

Abstract

Healthcare-associated infections (HAIs) remain a significant burden across healthcare settings. Reusable thermometers have been shown to act as vectors for cross-contamination, despite disinfection protocols. Disposable thermometers provide a safe, efficient, and accurate alternative. This white paper evaluates their impact on infection prevention, economic performance, and clinical accuracy based on current literature and post-market clinical findings.

1. Introduction

Thermometers are among the most frequently used non-critical medical devices. Yet, studies show that improper disinfection of reusable thermometers can significantly contribute to HAI transmission, with associated clinical and economic consequences. This paper supports the adoption of disposable thermometers by synthesizing evidence on three fronts: infection control, cost-efficiency, and diagnostic accuracy.

2. Infection Control: Minimizing Cross-Contamination Risk

Reusable thermometers have been implicated in multiple pathogen transmission events due to insufficient or inconsistent disinfection:

- In a three-hospital study, 8% of electronic thermometer handles were found contaminated with pathogenic organisms, including Clostridioides difficile and MRSA (John et al., 2018).
- A Candida auris outbreak in a UK ICU was directly linked to the use of reusable axillary probes. Patients monitored with such probes had a significantly increased risk of colonization (OR 6.8; 95% CI, 2.96–15.63) (Eyre et al., 2018).
- In a Nigerian teaching hospital, 62.1% of reusable thermometers were contaminated with resistant organisms including Staphylococcus aureus and Pseudomonas aeruginosa (Uneke & Ijeoma, 2011).

Disposable thermometers have demonstrated effectiveness in virtually eliminating this risk. Their single-use nature removes the need for disinfection between uses and thus mitigates the risk of operator error.

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3. Economic Value: Cost Reduction and Workflow Efficiency

The use of disposable thermometers supports healthcare efficiency by eliminating cleaning-related labor, reducing accessory supply costs, and minimizing HAI-related expenditures.

Chart A: Comparative Operational Costs

Cost Category	Reusable Thermometers	Disposable Thermometers
Equipment & Maintenance	High (initial & repair costs)	Low (bulk per-use cost)
Disinfection Supplies	Required	None
Nursing Time per Use	3–4 minutes	<1 minute
HAI-Associated Costs (per 1000 pts)	$25,000–$45,000	Minimal (infection risk abated)

Adapted from John et al. (2018).

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4. Clinical Accuracy: Core Site Reliability

Disposable thermometers that employ oral or axillary sites have demonstrated high correlation with core body temperature. Notable findings include:

- A post-market clinical follow-up of the TraxIt® thermometer involving 402 subjects showed a mean deviation of −0.09°C compared to the Omron digital reference, with 95% of readings within ±0.9°C (Medical Indicators, 2025).
- Tempa.DOT thermometers yielded 75.2% of readings within ±0.4°C of the pulmonary artery catheter reference, outperforming tympanic devices (Farnell et al., 2005).
- A separate study comparing Tempa.DOT to mercury thermometers found a mean difference of 0.04°C overall, with 100% sensitivity and >95% specificity for detecting fever in children (Van den Bruel et al., 2005).
- NCITs (forehead infrared devices) showed wide accuracy variability, with up to 88% of readings outside the manufacturers' stated range (Sullivan et al., 2021).

Chart B: Accuracy and Agreement with Core Temperature

Device Type	Mean Deviation (°C)	Percent Within ±0.4°C
Disposable Oral/Axillary	0.08–0.2	>75%
Tympanic	0.6–1.2	~51%
NCIT (Forehead)	0.5–1.7	~30–50%

5. Conclusion

Infection control priorities, staffing constraints, and clinical outcome demands underscore the need for reliable, efficient tools. Disposable thermometers provide a compelling solution—delivering superior hygiene, optimized workflows, and dependable diagnostic accuracy.

Their implementation aligns with evidence-based infection prevention strategies and health system goals of value-based care. Transitioning from reusable thermometry to disposable solutions is not only a prudent clinical choice but a strategic operational investment.

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