# Clean Frontline: Improving hospital surface hygiene in Cambodia

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**Host:** UNC Healthcare Facilities Community of Practice

## TL;DR

A pragmatic, low-cost **TeachClean / WHO–adapted training + supportive supervision** package was rolled out as a stepped‑wedge trial across **13 referral hospitals in Cambodia**. Monthly microbiological sampling from May 2022–Mar 2023 showed a measurable improvement in surface cleanliness. Surface-level metrics improved substantially in some analyses (~30–40% better), while the hospital‑level average effect was modest (~5% increase). The package is affordable at approximately USD 5,000 per hospital and effectively equips and empowers cleaners. However, it faces consistent barriers: too few staff hours, inadequate supervision, weak leadership prioritization, and shortages of basic supplies, including cloths, buckets, and hand hygiene bottles.

## What was done (short method snapshot)

* **Design:** Stepped‑wedge cluster randomized trial — all 13 hospitals received the intervention; the timing of rollout was randomized. Thirty surface swab samples per hospital per month; two months baseline with continuous monthly sampling May 2022–March 2023.
* **Intervention:** TeachClean (adapted by WHO) training-of-trainers model — 52 local Cleaning Champions trained; champions trained peers at facility level; ~271 people trained at facilities (51 of them dedicated cleaners in the targeted wards). The package emphasizes visual aids, demonstrations, adult learning and realistic schedules.
* **Microbiology & outcome:** Dip-slide sampling with pathogen-specific side (Staphylococcus aureus was assayed). “Clean” was defined as under ~2.5 colony‑forming units/cm².
* **Sample size:** ~3,900 samples collected; 3,822 included in final analysis.

## Key results (what actually changed)

* **Effect:** Study team reported a statistically positive effect overall. Surface‑level analyses suggested a **~30–40% improvement** in microbiological cleanliness after training in some metrics, while aggregated hospital‑level averages showed a **modest ≈5% improvement** pre vs post (these figures reflect different ways of aggregating the same data — surface‑sample vs hospital average).
* **Cost:** Implementation costs were low — roughly **USD 5,000 per hospital** for training and minimal supplies.
* **Qualitative:** Cleaners reported improved knowledge, confidence, and role recognition. Sustaining change was difficult due to practical constraints: staff shortages, limited paid hours, high staff turnover, poor leadership/managerial prioritization, and shortages of basic supplies like cloths.

## What mattered most (practical takeaways)

* **Training works.** The package is effective, inexpensive and scalable as an entry point. It substantially improves cleaner knowledge, technique and some surface‑level microbiology.
* **Local adaptation & realism are critical.** Realistic cleaning schedules (given actual staff hours), simple visual aids and low‑literacy teaching methods made the difference.
* **Supplies > sophistication.** Access to essential, cheap supplies (cloths, buckets, basic PPE, personal hand‑rub bottles) is often the main bottleneck. Prioritizing access to those supplies is more important than pursuing complex technology.
* **Supervision & leadership make or break sustainability.** The impacts of training fade without continued supportive supervision and explicit managerial prioritization and budgeting.
* **Measurement is time-intensive but necessary.** Results from microbiological sampling are variable and seasonal — you need large sample sizes and time‑trend data to detect effects.

## Recommendations — for ministries, hospital managers, funders, implementers

1. **Integrate TeachClean content into national IPC guidance** and formal training curricula — Cambodia is already moving in this direction.
2. **Budget for ongoing supportive supervision** (not just a one‑off training). Supervisors are the multiplier.
3. **Fund the basics:** provide sufficient reusable cloths (or affordable disposable options), buckets, simple PPE and hand‑rub bottles to cleaners as part of routine budgets.
4. **Set realistic cleaning schedules** with facility staff — prioritize patient‑zone, high‑touch surfaces when staffing is limited.
5. **Plan for measurement & learning:** use monthly microbiological sampling during rollout to monitor, but expect variability — complement with process indicators (fluorescent gel checks, observations, knowledge tests).
6. **Do a costed scale‑up analysis** before national rollout so ministries understand recurrent costs (supervision, supplies, replacement cloths).

## Practical tools & resources

* Clean Frontline trial registration & materials: <https://clinicaltrials.gov/study/NCT05540886?locStr=Cambodia&country=Cambodia&page=2&rank=17>
* WaterAid policy/learning brief (Clean Frontline summary & recommendations): <https://washmatters.wateraid.org/publications/breaking-infection-chain-supporting-essential-work-cleaners-cambodia-healthcare-facilities>
* WHO environmental cleaning training package (TEACH CLEAN / WHO adaptation): <https://iris.who.int/handle/10665/379551>

## Caveats & unanswered questions

* The trial measured microbiological cleanliness (a plausible intermediate outcome), not healthcare‑associated infections (HAIs); detecting HAIs reliably requires blood culture systems and better clinical surveillance than most participating hospitals currently have.
* Results varied substantially from month to month and by hospital — plan for sufficient sample sizes and time to see trends.

**Credits & contacts:** Presented by Giorgia Gon (LSHTM) on behalf of the Clean Frontline team; hosted by UNC (emcee Ryan Cronk; Zoom coordination by Darcy Anderson and Liam Powell).