

Study demonstrates sustained reduction in child mortality following educational interventions in low-resourced countries

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Mass General Brigham study authors Dr. Phoebe Yager, of Mass General for Children and Dr. Christopher Hartnick of Mass Eye and Ear (center) meet with Dr. Angel Ernesto Alvarado Rodríguez (far right), director of the Hospital Nacional de Niños Benjamín Bloom in El Salvador, to show him the manikan they use to teach a team-training simulation as part of their quality improvement curriculum and education for hospital staff members, who can then implement

these trainings into practice to lower child mortalities in the PICUs. Credit: Careways Collaborative

Pediatric intensive care units (PICUs) in low and middle-income countries see elevated mortality rates, often 10 times higher than those in high-income countries. One leading risk factor is the high incidence of unplanned intubation—a procedure that inserts a tube into the child's airway—which can lead to complications like hypoxia and ventilator-associated pneumonia. Interventions that improve clinical practices can help reduce child mortality in countries with limited resources.

In a new study [published](#) in *Frontiers of Public Health*, investigators from Mass General Brigham have demonstrated reduced mortality in intubated pediatric patients after the implementation of a low-cost quality improvement (QI) program in the largest public children's hospital in El Salvador.

Mortality rates in the PICU dropped from more than 22% to 9.5% in the year after the educational intervention was introduced. These results build on previous work by the same group that utilized educational videos translated with voiceovers in Spanish by employing AI tools, aimed at improving knowledge of local care teams and optimizing the safe care of intubated patients in the PICU.

"We believe these changes indicate a burgeoning PICU safety culture stemming from the QI framework the local clinical team had previously learned," said first author Phoebe Yager, MD, chief of the Division of Pediatric Critical Care Medicine at Mass General for Children. "They expanded their practices to include daily reviews of non-airway factors such as nutrition, and reconfigured the space to allow for better ventilation and easier access for the nurses to provide care."

After collecting pre-intervention data over an 18-month period on factors like demographics, illness severity scores and mortality, the researchers deployed QI and educational interventions including the AI-generated Spanish-language video tutorials on how to correctly intubate and monitor patients.

They also developed a Driver Map and Impact Pathway models, which were data-driven diagrams that factored in the [local environment](#) and provided customized targets for interventional strategies. The team then gathered post-intervention data over three months each for two cohorts separated by a 36-month interruption due to the COVID-19 pandemic.

Analysis of the final dataset of nearly 150 patients revealed a significant drop in PICU unexpected intubations in addition to a sustained decline in mortality. Further, the authors also observed the use of several new quality practices developed by the local PICU care team following the initial QI intervention.

"These new initiatives from the local team indicate that the observed sustained improvements in pediatric patient care are multifactorial and complex, and speak to our intervention's triggering a focus on quality improvement measures and a cascade of subsequent QI activity," said senior author Christopher Hartnick, MD, chief of the Division of Pediatric Otolaryngology at Mass Eye and Ear.

"This study serves as a model for global health care to develop quality improvement programs to allow children to go safely from home to hospital, and to home again, expanding on current programs focusing only on the operating room."

The authors believe their Driver Map and Impact Pathway models can be a paradigm used throughout global health care to identify components for effective QI interventions in low- and middle-resourced countries.

Future studies can advance this work to cultivate replicable and sustainable programs that extend to operating rooms, wards, and every facet of a child's journey from home to hospital and back home again.

More information: Phoebe Yager et al, Practical quality improvement changes for a low-resourced pediatric unit, *Frontiers in Public Health* (2024). [DOI: 10.3389/fpubh.2024.1411681](https://doi.org/10.3389/fpubh.2024.1411681).
[www.frontiersin.org/journals/p... 024.1411681/abstract](https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2024.1411681/abstract)

Provided by Mass General Brigham

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