Objective Feedback Improves Resuscitation Training and Practice

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Challenge

- Of the 10M newborns that need help taking their first breath each year, Interscapular Hypoxic Events (formerly asphyxia) accounts an estimated 0.8 M deaths, and 1.0M reported stillbirths. Many more suffer permanent neurologic damage. 1,2,3
- Despite proven effectiveness, one in five of the best trained health workers fail to perform resuscitation effectively and, those that do, experience a rapid deterioration in resuscitation proficiency.4
- Every 30 second delay in establishing effective ventilation from birth increases the risk of death by 16%.5
- A significant fraction of these deaths could be prevented with timely and effective ventilation.
- Fortunately, there are successful programs that disseminate training and distribute equipment to healthcare workers.

Fig 1. Helping Babies Breathe training session

Fig 2. 4th Generation training device being used with a Laerdal Neonatal BVM and training manikin.

Healthcare providers need an objective way to learn, practice and maintain the skills and confidence to administer positive pressure ventilation (PPV).

Device Description

The AIR device is a low-cost add-on, compatible with Bag Valve Mask (BVM) and two-piece resuscitation equipment. The AIR device:

1. Monitors ventilation and provides instant, objective feedback on:
   - Effective face-mask seal (absence of significant leak)
   - Patent airway
   - Slow, gentle chest rise
   - Correct ventilation rate
2. Gives healthcare workers objective feedback so they can build, practice, and maintain their skills and confidence.
3. Logs resuscitation data for quality improvement and program monitoring and evaluation.

Fig 3. RCT Efficacy trial schema

RCT Trial Description

Birth attendants were recruited to voluntarily participate, including a mix of midwives, nurses, respiratory therapists, pediatricians, and neonatologists.

Fig 4. Randomized Controlled Trial (RCT) to measure the effectiveness of routine feedback. Trial sites in Boston, MA and Uganda.

RCT Results

Effective ventilation defined as slow, gentle, and complete chest rise at a rate of 30-60 breaths per minute.

During the RCT, we observed that the AIR device empowered trainees to engage in peer-to-peer teaching and learning. The AIR device could help create sustainable behaviour change and support line-dose, high-frequency resuscitation practice.

References


Fig 5.

Clinical: Neonatal – Pediatric – Adult

Commercial: EMT, ambulance, police, military, fire fighters

Veterinary medicine

Next steps

1. Follow-up with longitudinal sites
2. Commercialization and transition to scale
   - Final product design
   - Regulatory approval
   - Expanded product roadmap