IMPRESS EVIDENCE BRIEF 2

Improving care for small and sick newborns

Evidence from a randomised trial of a hospital management intervention in Malawi

OCTOBER 2025

While Malawi has made impressive progress in newborn survival, a large number of babies admitted to hospital continue to die from preventable causes. Now that most births happen in health facilities, there is an urgent need to improve hospital care for small and sick newborns. This remains, however, a challenge. Even when staff and equipment are available, poor clinical care often persists, possibly due to organisational failings linked to weak management.

The IMPRESS project tested whether structured support for hospital managers and clinical staff could strengthen management practices and, in turn, improve newborn survival. A year-long randomised controlled trial (RCT) in 30 hospitals assessed the effect of the intervention on neonatal mortality and quality of care.

KEY FINDINGS

- Neonatal mortality was 2.0 percentage points lower in intervention hospitals than in controls (equivalent to a 14.9% relative reduction). This point estimate is clinically meaningful.
- However, there is considerable uncertainty in the estimate of effect: a risk difference ranging from a 4.2 percentage points decrease (a substantial reduction in mortality) to a 0.1 percentage point increase (a small increase in mortality) is also reasonably compatible with the data.
- There was no evidence of differences in the effect of the intervention on neonatal mortality across subgroups of patients.
- There was no measurable effect of the intervention on any of the 14 clinical practice indicators.
- These clinical results should be considered alongside findings showing the intervention successfully strengthened hospital management practices.

Background

Newborns are among the most vulnerable users of the health system, with an estimated 2.3 million neonatal deaths each year. Many of these deaths are preventable with higher-quality hospital care. As part of the World Health Organization and UNICEF's Every Newborn Action Plan, a package of interventions for small and sick newborns has been developed to reduce neonatal mortality.

Malawi has made impressive progress in newborn survival, with nearly all deliveries now in health facilities. The focus has therefore shifted to improving the quality of care for small and sick newborns in hospitals. Evidence shows that health technologies, medical training and clinical audits can improve quality of care. Yet in practice, babies often miss out on life-saving interventions because of organisational failings rooted in weak management. Examples include poorly configured patient pathways, staff shortages at critical times, or delays in the delivery of medical supplies.

Improving management practices – so that hospitals effectively manage and motivate staff, use data to guide decisions, and have in place systems to support quality improvement – offers a promising way forward. Practices in areas such as effective human resource management, performance monitoring, and target setting have been shown to be associated with better patient outcomes; however, whether this relationship is causal remains unclear.

The IMPRESS project, working with the Ministry of Health, NEST360 and hospitals across Malawi, co-designed a structured management support package and evaluated it through a one-year RCT in 30 district hospitals. This brief presents the findings on the effect of the intervention on clinical outcomes for small and sick newborns.

Intervention

IMPRESS provided structured, on-site support to hospital managers. Trained technical assistants (TAs), working in pairs, visited intervention hospitals for one week each month over a year – a total of 12 visits. The intervention was delivered in two phases.

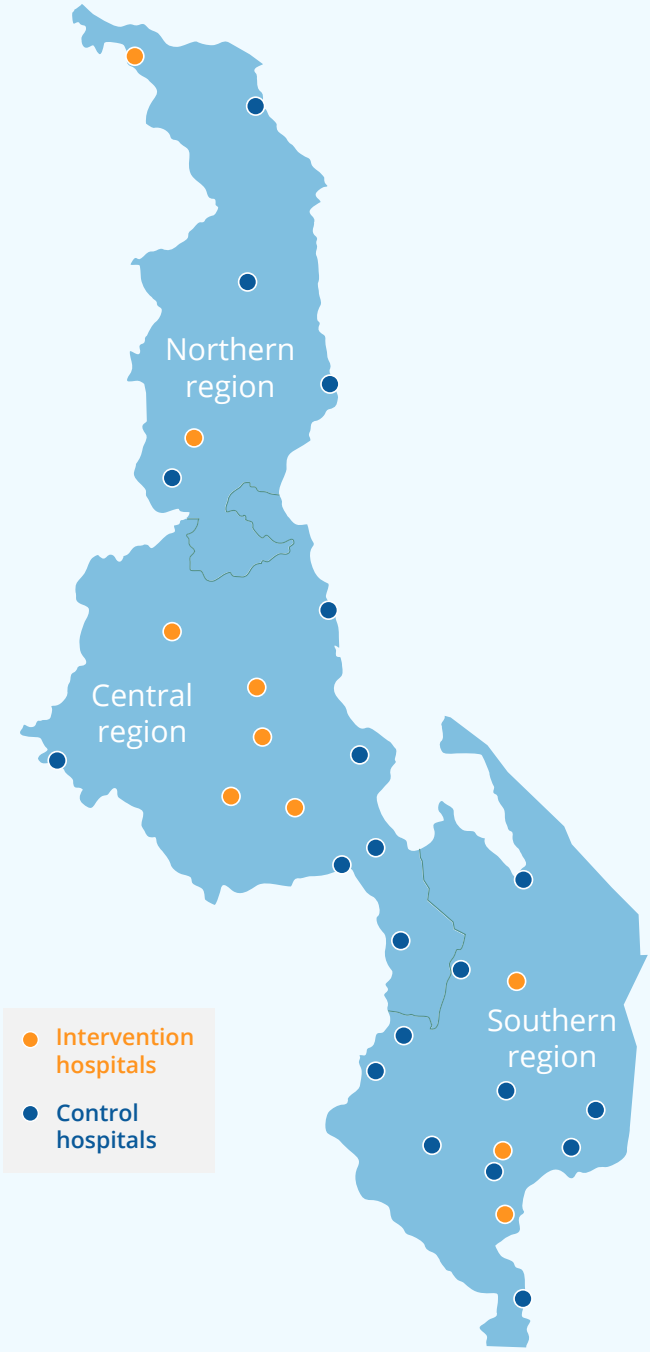
- **Diagnostic phase** (first 2 months):
  TAs supported hospital teams to conduct a situation analysis, develop a management implementation plan, and identify an 'IMPRESS hospital champion'.
- **Implementation phase** (10 months):
  TAs provided ongoing support to hospitals to adopt management practices consistent with standards and guidelines set by the Ministry of Health. Key activities are shown in Figure 1.

Figure 1: Activities undertaken by Technical Assistants

Rigorous Evaluation

The IMPRESS study was designed as a cluster RCT, chosen because RCTs provide the strongest design for assessing causal effects of the intervention on outcomes (trial registration: ISRCTN14770806). The trial involved 30 district hospitals across all regions in Malawi (Figure 2) with ten hospitals receiving the intervention and 20 serving as controls. Before the trial began, all study hospitals received the NEST360 package of lifesaving newborn care technologies and training for health professionals and biomedical engineers.

Figure 2: Location of intervention and control hospitals in Malawi



Participants

The trial involved all newborns admitted alive to the neonatal unit of the study hospitals. These patients comprised both babies born in the same hospital as the neonatal unit (inborn admission) and babies born elsewhere before being transferred to the study hospital neonatal unit (outborn admission). Babies with a birthweight of 1000g or less were excluded.

Randomisation

Hospitals were assigned to intervention or control in a ratio of 1:2. This was done using stratified randomisation: hospitals were ranked by baseline neonatal mortality, split into ten groups, and in each group one hospital was randomly allocated to intervention while the other two served as controls. Informed consent was obtained from all participating hospitals.

Data

Data on mortality and clinical practices of all babies admitted to the neonatal unit of the study hospitals were captured prospectively through the neonatal inpatient dataset – a high-quality routine information system implemented by the Ministry of Health with support from NEST360. Through a data-sharing agreement with the Ministry of Health, IMPRESS was given access to de-identified individual patient data to conduct the evaluation.

Outcomes

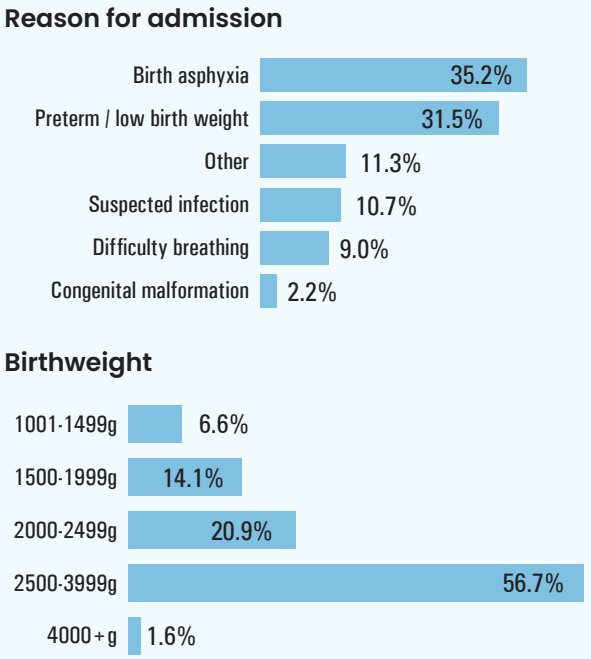
The primary outcome was all-cause in-hospital mortality among patients admitted to the neonatal unit. The secondary outcomes were 14 clinical practices measuring quality of care, based on WHO guidelines and adapted to the Malawian context using Care of Infant and Newborn (COIN) guidelines (see Figure 6 for the full list of clinical practices). All neonates should receive some practices, while others are specific to certain conditions, such as antibiotics for suspected sepsis.

The effect of the intervention on outcomes was assessed over the six months from 1 April to 30 September 2024 (covering the last three months of implementation and the three months following the end of the intervention).

Characteristics of study population

The analysis included 17,911 neonatal admissions in the 30 study hospitals, ranging from 60 to 2,668 per hospital. Their characteristics are shown in Figure 3.

Figure 3: Characteristics of neonatal admissions



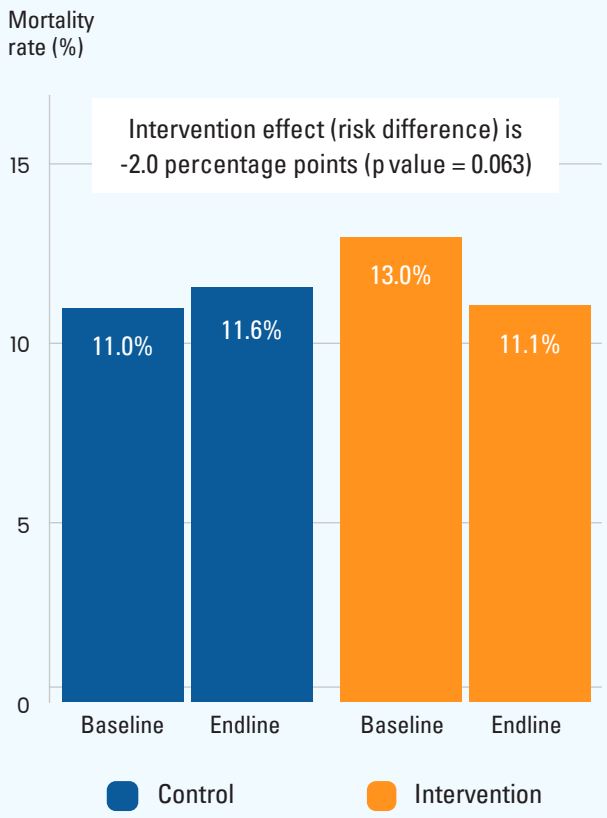
Evaluation findings

The intervention had a non-significant reduction in neonatal mortality

Figure 4 shows the neonatal mortality rate before and after the intervention started in the intervention and control hospitals. There was a notable decrease in neonatal mortality over time in intervention hospitals, alongside a small increase in control hospitals. The trial analysis found that neonatal mortality was 2.0 percentage points lower (14.9% relative reduction) in intervention than control hospitals (Figure 4). This size of effect is clinically meaningful.

However, there is wide uncertainty in the estimate of the intervention's effect. The true effect could credibly range from a reduction of 4.2 percentage points to a small increase of 0.1 percentage points. In other words, the data are compatible with both a large reduction in neonatal mortality and with a very small increase.

Figure 4: Effect on neonatal mortality



No evidence of differences in the effect on neonatal mortality across subgroups of patients

Analyses of the effect of the IMPRESS intervention on different subgroups of patients were planned before the start of the trial. There were no measurable differences in the effect of the intervention by birthweight, sex, and location of birth.

Figure 5 shows that there was a significant reduction in neonatal mortality for some groups of babies (those weighing less than 2,500 grams, female babies, and babies born in the same hospital as the neonatal unit where they were admitted). However, due to the possibility of chance findings, these effect estimates should be interpreted with caution.

No evidence that the IMPRESS intervention improved any of the clinical practices measured

There was no evidence that the IMPRESS intervention improved any of the 14 clinical practices measured in the evaluation (Figure 6). Some practices – such as pulse oximetry, temperature and blood sugar checks, breastfeeding support and antibiotic use for suspected sepsis – were already carried out almost universally, leaving little scope for further improvement. Others, particularly laboratory-based practices such as blood cultures, were rarely performed for reasons beyond the control of the intervention. Where differences were observed between intervention and control hospitals, they were small and not statistically significant.

Figure 5: Effect of intervention on neonatal mortality for different groups of babies

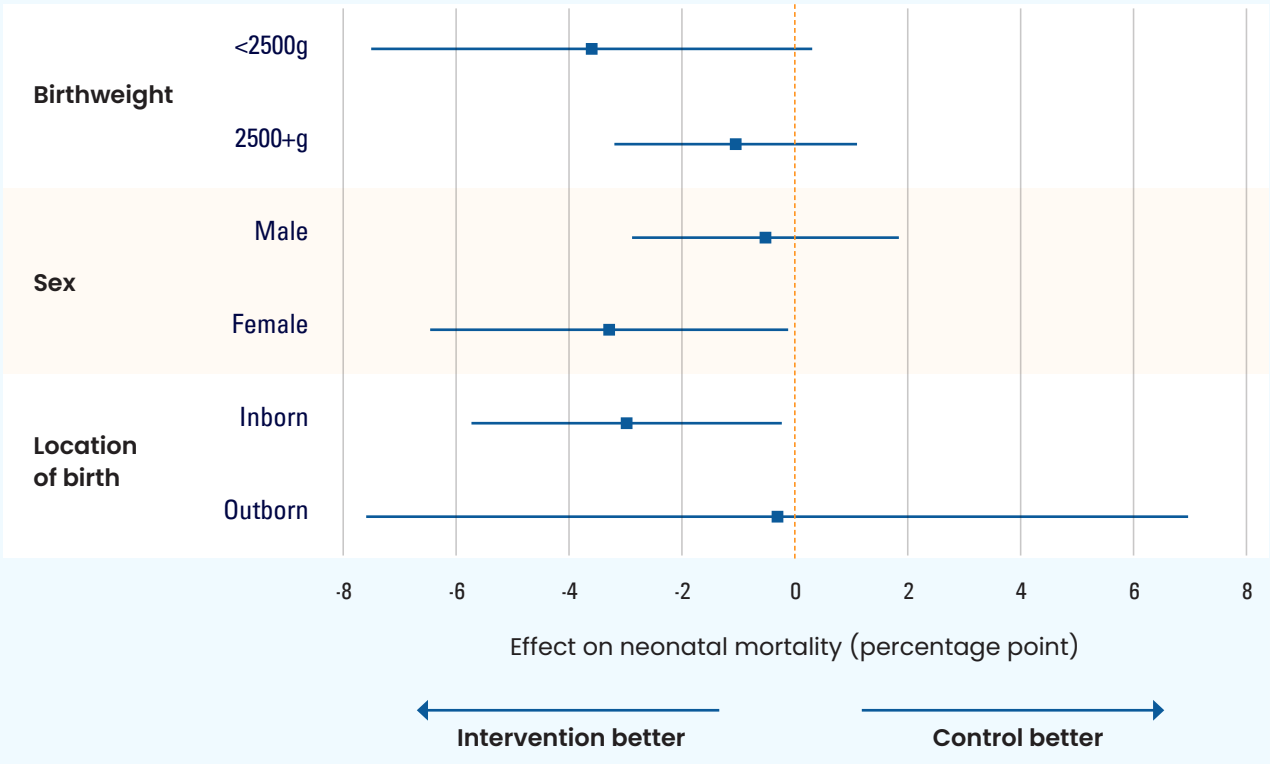
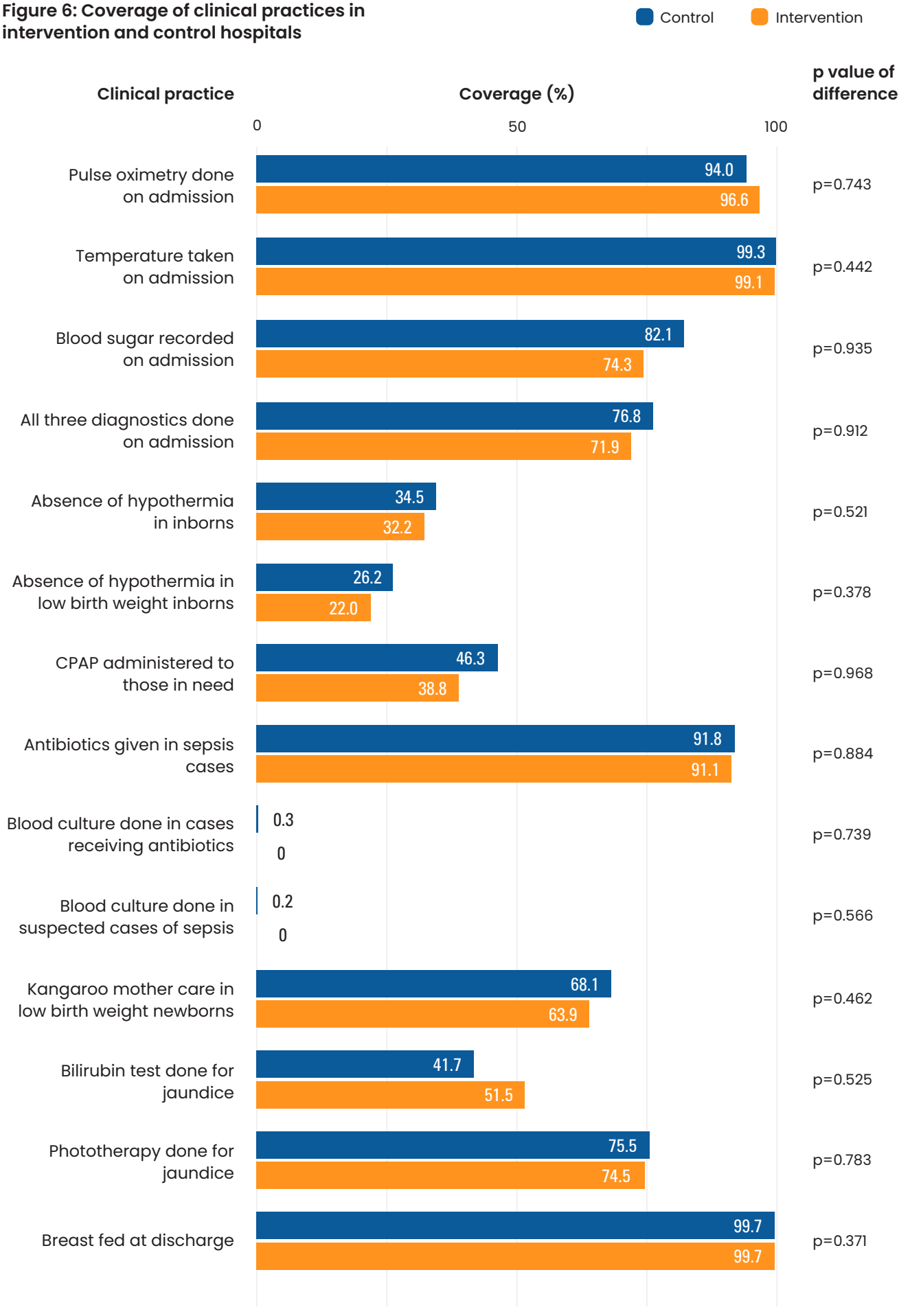


Figure 6: Coverage of clinical practices in intervention and control hospitals



Interpreting the results

The trial could not conclusively demonstrate that the IMPRESS intervention reduced neonatal mortality due to wide uncertainty in the estimate of effect. Mortality was lower in intervention hospitals but it is possible the true effect ranges from a large reduction to a small increase in mortality. Evidence of a reduction in mortality should be interpreted as suggestive rather than conclusive.

For policymakers, three points are important to consider. First, the IMPRESS intervention substantially improved adoption of hospital management practices (see Evidence Brief #1). These improvements were observed across a wide range of recommended management practices and represent an important achievement. Some may consider these gains as sufficient to justify the intervention, while others may want clearer evidence of direct health benefits.

Second, the absence of a change in clinical practices raises questions. How could the intervention have reduced mortality without improving clinical practices? The clinical practice indicators may not have captured improvements in the quality of certain clinical actions, such as the timeliness of care or technical quality. In addition, the IMPRESS intervention may have reduced mortality through other pathways that the evaluation was unable to measure. Qualitative evidence on how and under what circumstances the intervention worked will help to address some of these questions (see Evidence Brief #4).

Third, evidence on the cost-effectiveness of the intervention will provide valuable information. Together with the findings on the feasibility and acceptability of the intervention (see Evidence Brief #1), this will provide a fuller picture to inform future decisions about government implementation and scale-up of this hospital management support intervention.

Conclusion

The IMPRESS intervention may have reduced neonatal mortality, but the evidence is uncertain rather than conclusive. No measurable improvements were observed in clinical practice indicators.

The results on mortality and clinical practices should be considered alongside the findings showing a large effect of the IMPRESS intervention on management practices. Qualitative evidence will be important to understand how and under what circumstances the intervention may have influenced (or failed to influence) outcomes.

About this brief

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