

# A collaborative quality improvement intervention was effective for promoting use of surfactant therapy in preterm infants

Horbar JD, Carpenter JH, Buzas J, *et al*. Collaborative quality improvement to promote evidence based surfactant for preterm infants: a cluster randomised trial. *BMJ* 2004;**329**:1004.

**Q** Is a multifaceted quality improvement intervention based on 4 key habits (change, evidence-based practice, systems thinking, and collaborative learning) effective for promoting use of surfactant therapy in preterm infants?

## METHODS

	<b>Design:</b> cluster randomised controlled trial.
	<b>Allocation:</b> concealed.
	<b>Blinding:</b> unclear.
	<b>Follow up period:</b> until discharge from hospital.
	<b>Setting:</b> 114 neonatal intensive care units (NICUs) in North America.
	<b>Patients:</b> 6182 preterm infants (23–29 wks gestation, birth weights 401–1500 g) who did not have major birth defects.
	<b>Intervention:</b> 57 NICUs were allocated to a multifaceted, collaborative, quality improvement intervention involving audit and feedback, an interactive training workshop based on 4 key habits (change, evidence-based practice, systems thinking, and collaborative learning) and ongoing faculty support (intervention NICUs, 3332 patients). 57 NICUs were allocated to receive centre specific confidential routine reports (control NICUs, 2850 patients).
	<b>Outcomes:</b> proportion of infants receiving a first dose of surfactant in the delivery room, proportion of infants receiving a first dose of surfactant >2 hours after birth, median time from birth to first dose of surfactant, mortality before hospital discharge, and pneumothorax.
	<b>Patient follow up:</b> 98% (mean gestational age 27 wks, mean birth weight 933 g, 46% girls; intention to treat analysis). All 114 NICUs were included in follow up analyses.

## MAIN RESULTS

More infants in the intervention NICUs received surfactant therapy in the delivery room, and fewer received a first dose of surfactant

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therapy >2 h after birth (table). The groups did not differ for mortality before hospital discharge or pneumothorax (table). Infants in intervention NICUs received first surfactant therapy sooner after birth than those in control NICUs (median 21 v 78 min, adjusted hazard ratio 1.57, 95% CI 1.42 to 2.07).

## CONCLUSION

A multifaceted, collaborative, quality improvement intervention based on 4 key habits was effective for promoting use of evidence-based surfactant therapy in preterm infants.

## Commentary

Early surfactant therapy for infants with very low birth weight represents best practice and is well supported in the literature.<sup>1 2</sup> However, a gap still exists between evidence and practice in the proportion of infants treated with surfactant in the delivery room.<sup>3</sup> The study by Horbar *et al* used a multifaceted intervention model, which included a 3 day workshop and used several teaching strategies. Such a workshop would be costly to offer; however, one should also consider the costs associated with failure to apply quality research findings in clinical situations.

2 types of outcomes were of interest: process of care and infant morbidity and mortality. The authors made a distinction between outcomes for individuals and outcomes for practitioners and hospitals. Findings showed that infants in intervention NICUs were more likely to be treated with surfactant earlier, but the overall effect on morbidity and mortality was not significant. Although the numbers of NICUs and infants were large enough to show a difference in practice patterns, they were probably not large enough to show a difference in infant outcomes (ie, mortality and pneumothorax). Also, the intervention and control groups were not similar in race, and only 114 of 178 eligible NICUs entered the study. Both factors may reduce the generalisability of the findings. Beyond the clinical findings related to surfactant use, this study details a promising intervention to change the practice of healthcare professionals. The findings are directly useful for neonatal nurses but may also merit scrutiny by educators, quality assurance managers, hospital administrators, physicians, economists, and researchers.

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1 Stevens TP, Blennow M, Soll RF. *Cochrane Database Syst Rev* 2004;(3):CD003063.

2 Soll RF, Morley CJ. *Cochrane Database Syst Rev* 2001;(2):CD000510.

3 Horbar JD, Carpenter JH, Buzas J, *et al*. *Pediatrics* 2004;**113**:1593–602.

Quality improvement intervention for promoting surfactant therapy in neonatal intensive care units (intervention) v no intervention (control) in preterm infants\*

Outcomes	Intervention	Control	RBI (95% CI)	NNT (CI)
Surfactant given in delivery room	55%	18%	200% (176 to 228)	3 (3 to 3)
			<b>RRR (CI)</b>	<b>NNT (CI)</b>
First dose of surfactant >2 h after birth	9%	25%	62% (57 to 67)	7 (6 to 8)
Mortality before hospital discharge	17.8%	18.2%	2% (-9 to 12)	Not significant
Pneumothorax	6.6%	7.4%	11% (-7 to 26)	Not significant

\*Abbreviations defined in glossary; RBI, RRR, NNT, and CI calculated from data in article.



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