

# PROJECT 27/28


An Enquiry into  
quality of care  
and its effect on  
the survival of babies  
born at 27–28 weeks

EXECUTIVE SUMMARY





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**PROJECT 27/28** is the final report of a 2-year project spanning the period 1998–2000. The aim was to identify patterns of practice or service provision that might contribute to the deaths of premature babies at 27–28 weeks gestation, and from these to make recommendations for future practice. The approach included a series of panel enquiries coupled with collection of epidemiological information in order to produce as complete as possible a picture of this highly important topic.

A key aim of the project was to provide national survival figures of babies born at 27–28 weeks gestation. In total, 3522 liveborn babies at this gestation were notified and of these 88% were alive at day 28. This figure was considerably higher than anticipated.

Enquiries were held on 366 deaths and a random sample of 395 babies who survived. Panel enquiries addressed a series of issues concerning care of the mother and baby before delivery and of the baby in the first week of life. The results were used as the basis for a series of recommendations for improvements in practice.

## ■ FETAL WELL-BEING – ASSESSMENT PRIOR TO LABOUR

Deficiencies in the assessment of fetal well-being were **more frequent** in babies who died (26%) than in babies who survived (18%). There is substantial scope for improvement in the assessment of fetal well-being for anticipated preterm deliveries, although separating out the effects of underlying pathology of the pregnancy from that of clinical care was problematic.

The role of specific technologies, in particular Doppler ultrasound of the umbilical artery, should be better defined.

## KEY RECOMMENDATIONS

- National guidelines specifying the indications for referral to specialist fetomaternal assessment are needed.
- Any planned delivery earlier than 28 weeks gestation requires review as early as possible, by staff with expertise in the interpretation of fetal well-being tests.
- Women in this group should be seen within 24 hours of admission by a consultant obstetrician, and their plan of care reviewed.

## ■ ANTENATAL MANAGEMENT OF PRETERM DELIVERY

The antenatal management of anticipated preterm delivery includes administration of steroids to promote maturation of the fetal lung, treatment of infection and administration of drugs (tocolytics) to inhibit uterine contractions. Mothers of babies who died were **less likely** to receive corticosteroids, and efforts to ensure that these drugs were administered were considered inadequate in at least 16% of these maternities as compared to 11% in the mothers of babies that survived. Failure or delay of treatment of infection (chorioamnionitis) was an area of concern, though there was no evidence that this was related to the

overall mortality. In established labour tocolytics were used in 30% of mothers of babies who died and 41% of mothers of babies who survived. Failures or inappropriate use of tocolytics, however, were **equally** distributed between the mothers whose babies died and those whose babies survived.

#### KEY RECOMMENDATIONS

- Units should ensure that, at booking and during antenatal care, there is a system for clearly flagging mothers who are at risk of preterm delivery. These mothers should have an appropriate level of consultant care.
- All health professionals who may come into contact with a woman in threatened premature labour need to be aware of the benefits of antenatal administration of corticosteroids and of the difficulties in the diagnosis of premature labour.

#### INTRAPARTUM CARE

Labour and delivery at 27–28 weeks gestation is a high-risk situation. Most babies (67%) were delivered by caesarean section and two-thirds of these were emergency operations. Difficulty in the conduct of the delivery was identified for 15% of the babies who died and 10% of the babies who survived. This difference was significant, and was due to difficulties at caesarean section rather than at vaginal delivery. Panels expressed concerns about the quality of intrapartum care in a fifth of pregnancies and unsatisfactory provision of anaesthesia or analgesia in a tenth of cases. These failures were **equally** distributed between the mothers whose babies died and those whose babies survived.

Nearly half of the emergencies were attended by a consultant obstetrician. Compared with earlier surveys, this suggests an improvement in availability of senior staff for emergency care. There is still a shortfall, however, and in 1 in 12 deliveries concerns were expressed about lack of consultant involvement.

#### KEY RECOMMENDATIONS

- At national level the need for high-risk delivery suite teams needs to be defined; this includes the training requirements for obstetricians, midwives and anaesthetists.
- All staff should be trained and be aware of the local arrangements for simultaneous obstetric and neonatal emergencies.

#### NEONATAL RESUSCITATION

The neonatal management of the preterm baby involves immediate resuscitation, followed by a variety of measures to maintain the major organ systems. Overall, most basic resuscitation requirements for premature babies were achieved, though in 45% of deliveries there were significant concerns about the timely attendance of skilled staff at delivery. These concerns were noted **equally** in babies who died and those who survived, but the validity of this conclusion was limited by poor documentation. Problems with intubation skills were particularly highlighted and were more frequent in babies who died (14%) than in those who survived (9%).

#### KEY RECOMMENDATIONS

- Staff responsible for the immediate care of a baby born at 28 weeks gestation or less should be accredited in neonatal life support. At least one should be trained in tracheal intubation.
- All maternity units should have at least one professional available at all times who is trained in resuscitation and stabilisation of a preterm baby.
- Units should have guidelines concerning the circumstances in which senior or consultant neonatal staff should attend preterm deliveries.

### ■ EARLY THERMAL CARE

Most babies admitted to the neonatal unit from the labour ward had a temperature below the recommended standard of 36°C. Hypothermia on admission to the neonatal unit and deficient early thermal care was observed **more frequently** in babies who died. The main concerns were allowing the temperature to fall unnecessarily, lack of monitoring and problems arising from the transfer process. The time taken to normalise the temperature was highly variable, reflecting the fact that the optimum warming technique is not established. Incorporating simple measures to avoid hypothermia may significantly improve outcomes for preterm babies.

#### KEY RECOMMENDATIONS

- All labour ward and neonatal staff should be trained in the thermal care of infants at resuscitation.
- All transfers of preterm infants to the neonatal unit should take place in a warmed transport incubator.
- Continuous recording of temperature is necessary for infants requiring intensive care.

### ■ SURFACTANT THERAPY

Prevention of respiratory distress syndrome by surfactant therapy was overall of good standard. Most intubated babies (96%) received surfactant, but delays in administration were a frequent concern, especially in the babies who died. If a policy of administering surfactant to all babies within 1 hour of birth were implemented, an additional 12% of babies at this gestation would receive surfactant, and 1 in 3 babies would receive it substantially earlier. This might afford a small but definite improvement in survival rates.

#### KEY RECOMMENDATIONS

- National guidance is needed on the timing and gestation at which prophylactic surfactant should be administered, and the indications for repeat doses.
- Any failure or delay to administer surfactant to infants of 27–28 weeks gestation should be reviewed locally.

### ■ VENTILATORY SUPPORT

Ventilatory care was the subject of more panel comments than any other neonatal aspect of the Enquiry. The main issues related to poor management plans and failure to respond to blood gas analysis. **More deficiencies** were identified in the babies who died (50%) than in the babies who survived (34%). Even after allowing for the severity of illness of the baby shortly after birth, this difference was still significant.

#### KEY RECOMMENDATIONS

- All staff involved in the provision of respiratory support for a baby born at 27–28 weeks gestation should have received training in airway management and ventilatory support. This should include all modes and types of ventilation and interpretation of blood gas analysis.
- Units routinely managing preterm babies born at 27–28 weeks gestation should have guidelines for all modes and types of ventilation used in the unit.
- These units should have guidelines for the ventilation strategy including indications for artificial ventilation, the policy to be applied for infants on nasal CPAP and monitoring procedures.

### CARDIOVASCULAR SUPPORT

Some deficiency of cardiovascular support was noted in 34% of babies who died and in 20% of babies who survived. This difference was significant even after allowing for the severity of illness of the baby shortly after birth. The most frequent concern was the delay or failure to use inotropes.

#### KEY RECOMMENDATIONS

- Inotropes should be administered to infants who remain hypotensive after cautious volume expansion (not more than 20 ml/kg) and in the absence of specific hypovolaemic conditions causing hypotension (e.g. haemorrhage).
- Units should have guidelines for monitoring of cardiovascular status, the use of volume expansion and the use of inotropes.

### MANAGEMENT OF INFECTION

Despite some deficiencies in screening and treatment of infection (most notably delay in administering antibiotics), there was a good overall standard in this area. Deficiencies did not seem to be associated with the death of the babies, but were nevertheless frequent enough to deserve attention. The concerns included delays in administration of antibiotics in the first few days of life and failures to screen for sepsis at later stages.

### PATHOLOGY

Postmortem examination was discussed with the family in at least 75% of babies who died, and was carried out in 36% of the babies who died. For those cases in which information was available, 77% of the postmortem examinations had been performed by a specialist perinatal pathologist. It was particularly notable that unsatisfactory postmortem examination and reports were more likely with non-specialist pathologists.

#### KEY RECOMMENDATIONS

- Perinatal pathology services should be more strategically organised and accessible to all Trusts.
- A specialist perinatal pathologist should perform all postmortem examinations on preterm infants, where resources allow.
- The mother's general practitioner or primary health care team should be informed promptly of the death of a baby and certainly within 24 hours.

### ORGANISATION OF CARE

The Enquiry highlighted a number of organisational aspects of neonatal care. In recent years there have been major changes in the delivery of services. Yet, despite strong national recommendations in 1996, organisational deficiencies were still frequent in 1998–2000. Most premature babies (90%) were born in units that could provide appropriate neonatal care, but the transfer system supporting this lacks clear standards, was frequently poorly implemented and at times could have been unsafe for both mother and baby. The formation of managed clinical networks might reduce the frustrations of health professionals and parents and yield further improvements in outcomes for premature babies.

#### KEY RECOMMENDATIONS

- The Department of Health and the Welsh Assembly Government should support the establishment of managed clinical networks (i.e. networks of hospitals with neonatal units of differing nature, working in partnership to deliver care for newborn babies with agreed patterns of referral, shared protocols and shared commissioning).

- National standards should be established for in-utero and ex-utero transfers; these should detail indications, personnel (and training), equipment, monitoring, documentation and clinical governance.
- Staff involved in transferring a mother or baby between hospitals should have received training in transfer arrangements.
- Units should ensure that there is early and close neonatal consultant supervision of care during the first 24 hours of a baby born at 27–28 weeks gestation.

## ■ COMMUNICATION

Communication may be the least tangible aspect of care but, from the point of view of the parent it is one of the most important to manage correctly. Failures were **more frequently** noted in the care of babies who died and their mothers. Before delivery neonatal staff were **less likely** to see mothers of babies who died (42% not seen) than mothers of babies who survived (30% not seen). There was no communication between maternity and neonatal staff in 10% of the cases in which the baby died, compared to 6% when the baby survived.

## KEY RECOMMENDATIONS

- Formal communication should take place at least daily between the obstetric, midwifery and neonatal units.
- There should be early communication between the obstetric and neonatal staff to establish the ability of the unit to accept the admission and to agree the optimum timing for delivery.

- The neonatal team should make every effort to speak to the mother to prepare her for the delivery and the care immediately afterwards.
- All mothers should have the opportunity to discuss the care of their baby with a consultant neonatologist within 24 hours of delivery.
- Parents of infants receiving intensive care should be kept informed of progress.

## ■ RECORD-KEEPING

Record-keeping has been a concern raised in every CESDI Report. The poor recording of detail and plans of care was particularly noted in the neonatal nursing and neonatal medical notes. This hampered several areas of the Enquiry, particularly the assessment of personnel present at resuscitation. There is still an urgent need for standardisation in recording key areas of clinical care, particularly delivery and transfer arrangements.

## KEY RECOMMENDATIONS

- Documentation recording the birth and any resuscitation should be standardised nationally. Information should include personnel present, timing of events and actions taken, as well as equipment.
- Documentation recording the process and rationale of in-utero and ex-utero transfers should be standardised nationally. Information should include reason for transfer, number of units contacted and time between decision to transfer and the transfer taking place.
- Clinicians should conclude each patient contact with an explicit statement of their plan of care.

## ■ CONCLUSIONS

The care of premature babies has advanced significantly in the last decade. Survival rates have improved substantially, as the unexpectedly high survival rate of 88% found by Project 27/28 confirmed. Could this be further improved? The Enquiry findings conclude that it almost certainly could. Most of the babies who died did so early on, a quarter of deaths occurring within the first 24 hours and just under three-quarters within the first week of life. The babies who died were notably sicker at birth, suggesting that significant differences must exist antenatally. Despite this there were remarkably few maternal factors – either in background, past obstetric history or arising as a complication during pregnancy – to help identify mothers whose babies subsequently died. However, there was a significantly greater frequency of suboptimal antenatal care in the mothers of the babies who died. Improvements here may well improve the condition of the baby at birth and subsequent outcomes.

Units must provide sufficient skilled staff trained in the care of premature babies. Specialist skills, kept updated, are essential for the care of these babies. Although resuscitation standards at birth were generally achieved, there were frequent concerns about the

proficiency of resuscitation: difficulties in intubation were notable. Most of these babies required ventilation, and the degree of poor technique noted in this area implies inexperience of the neonatal team. Early and close neonatal consultant supervision of the care for these babies is crucial. Less technical areas such as thermal care were also highlighted for improvement.

Continuity of the local health professional care team is frequently not feasible. Deciding if, when and where to transfer the mother and the baby is integral to their care. Good communication between health professionals and with parents is paramount. The Enquiry identified this area for particular attention.

Most babies born at 27–28 weeks gestation were delivered in a hospital with neonatal intensive care facilities, but nearly 1 in 10 was not. One in four mothers required transfer before delivery, and a tenth of babies were transferred between hospital units in the first week of life. These arrangements are both ad-hoc and precarious. Neonatal intensive care resources should be used more effectively. There is a pressing need for national standards to be introduced to ensure appropriate referral and transfer arrangements, safe for both mother and baby.

## CESDI and CEMACH

The Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI) was established in 1992 to improve understanding of how the risks of death in late fetal life and infancy, from 20 weeks of pregnancy to one year after birth, might be reduced. It aims to identify patterns of practice or service provision that may be related to these deaths and from these make recommendations to improve future practice.

Approximately 10,000 deaths between 20 weeks of life and one year after birth in England, Wales and Northern Ireland are reported to CESDI annually via its own reporting form. Enquiries are held on a subset according to the programme of work.

Multidisciplinary Panels held at regional level conduct the Enquiry. The Panel assessors are independent of the case and the relevant hospital and are provided with the anonymised medical record.

CESDI was initially managed by the Department of Health up to 1996 when the Maternal and Child Health Research Consortium (MCHRC) assumed this responsibility. The Consortium comprises representatives from the Royal College of Obstetricians & Gynaecologists, Royal College of Paediatrics & Child Health, Royal College of Pathology and the Royal College of Midwives.

In 1999 CESDI with three other National Enquiries came under the umbrella of the National Institute for Clinical Excellence (NICE). A review of the Enquiries recommended that CESDI should join with the Confidential Enquiry into Maternal Deaths to form a new organisation, the Confidential Enquiry into Maternal and Child Health (CEMACH). This has a wider brief which will include children up to the age of 16 years. This change commences in April 2003.

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### **Obtaining the full report:**

The full text of this publication is available on the Internet.  
You can find it at: <http://www.cemach.org.uk>

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