Sudden Unexpected Death in Infancy. SUDI: Comparison of neonatal and post-neonatal deaths Queensland Australia

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Background
- The rate of SUDI including Sudden Infant Death Syndrome (SIDS) has plateaued in Queensland and Australia. Following initial rate reductions after safe sleeping campaigns in the 1990s. 
- International comparisons are hampered by definitional differences. SIDS rates have decreased. SUDIs classified as “undetermined” or “accidental suffocation” have increased. There are between-country differences as to whether neonates are included and, if so, whether from birth or 1 week of age.
- The peak age for SUDI occurs soon after the transition from neonatal to post-neonatal age. Neonates are reported as an increasing proportion of SUDI following the safe sleeping campaigns; this has largely been related to the fall in the SUDI rate in the post-neonatal age group 1. Reports from the UK and USA that the median age of SUDI has fallen, led us to compare deaths at different infant age groups.
- The Triple Risk Model posits a “critical developmental period” for SIDS. We focussed on infant sleeping circumstances, and considered SUDI cases with regard to infant development stages (head control, crying, rolling) and mother/carer interventions in response, as these relate to infant age.

Aims
- Review SUDI to identify trends and relate these to milestones in development including sleep, peak crying (at 6-8 weeks), and rolling prone to supine (at approximately 6 months).
- Determine if there are different opportunities for prevention at different infant developmental ages.

Methods
- QPQC conducted a retrospective multi-record review of all post-neonatal SUDI deaths in Queensland in 2013. Included in this review was a subgroup of neonates identified by ICD-10 code as having died suddenly and unexpectedly after discharge from birth hospital.
- The San Diego classification was used to define cause of death as “explained”, SIDS or UID (Unexplained Sudden Infant Death).
- This work was supported by a funding grant from the Clinical Excellence Division. The documents were obtained in accordance with legislation supporting this notification.
- The project was approved by the Children’s Health Queensland-Health Ethics Committee.

Results 1 Screening infant deaths for SUDI
- 99 infant deaths were identified: 90 post-neonatal infant deaths and 9 neonatal deaths. The deaths were categorized as either SUDI or non-SUDI. 51 deaths met the definition of SUDI.
- Cases were stratified by age as neonatal (0-27 days age at death), early post-neonatal (28-66 days), mid-post-neonatal (2-6 months) and late post-neonatal (6-12 months).
- 2 SUDI case documents were not released by the Coroner (1 neonatal, 1 early post-neonatal).

Results 2 SUDI analysis n=47 Sleep details
- 39 (83%) SUDI occurred in infant sleep: 31 might sleep, 8 day sleep, 5 not asleep, 3 uncertain if asleep.
- 16 shared with a smoker.

Results 3 SUDI occurred during infant sleep or in the sleep environment
- 19 (49%) shared a sleep surface: 2 neonate, 8 early post neonate, 8 mid, 1 late, 16 shared with a smoker.

Infant position – how placed to sleep (or held) and how found

<table>
<thead>
<tr>
<th>Infant position</th>
<th>How placed to sleep (or held) and how found</th>
</tr>
</thead>
<tbody>
<tr>
<td>prone</td>
<td>7 place</td>
</tr>
<tr>
<td>supine</td>
<td>6 neonate or early, 7 mid post-neonate, 1 late post-neonate, 1 found supine</td>
</tr>
<tr>
<td>side</td>
<td>8 with pillows / soft bedding</td>
</tr>
<tr>
<td>propped</td>
<td>9 in arms</td>
</tr>
<tr>
<td>unknown</td>
<td>3 unpropped, 3 found unpropped,</td>
</tr>
<tr>
<td>snuggled</td>
<td>3</td>
</tr>
<tr>
<td>asleep</td>
<td>16</td>
</tr>
<tr>
<td>not asleep</td>
<td>1</td>
</tr>
</tbody>
</table>

Conclusions
- All SUDI occurred in the setting of an unsafe sleep environment. Many occurred in unsafe adult sleep surfaces, shared with carers with high rates of smoking and substance abuse. Infants died in unsafe cots, informal sleep surfaces, or in an asleep-mother’s arms either sleeping or feeding.
- Sleep practices for neonate SUDI were safer; more placed and found supine, fewer sharing a sleep surface. Sleep practices for early post-neonate SUDI were most unsafe; almost all shared unsafe sleep surfaces. Sleep practices for mid post-neonate SUDI were unsafe with recurring themes of prone placement and shared unsafe sleep surfaces. Although older infants in this group have good head control and some may learn to roll easily most will be suddenly and unexpectedly after discharge from birth hospital.
- The critical developmental period of the Triple Risk Model presents a paradox; an infant of post-neonatal age is biologically more robust than a neonate, yet the SUDI / SIDS rate in neonates is low. Infant development after the first few weeks (crying more, sleeping and self-setting less), and perhaps carer fatigue, are likely to influence carers to seek new strategies to enhance infant settling and feeding, such as inadvertently sharing unsafe sleep surfaces, thus moving away from safer sleep practices used in the first few weeks of life.
- Risk minimization approaches to bed sharing acknowledge that the practice is widespread and culturally valued. These may provide parents with strategies to keep their infant safe as they make decisions about infant feeding and sleep during early infant development.

Acknowledgements
- QPQC acknowledges that the death of an infant is a tragic loss for family and community. Our connection that further deaths may be avoidable by addressing modifiable risk factors, is the motivation for this work.
- Our other acknowledgements include the work of the volunteer expert panel, the cooperation of data custodians including the Queensland Health Statistics Unit, Forensic and Scientific Services, and the Hospital Clinical Excellence Division.

References

Key Message
Unsafe sleep factors were universal and multiple.

Key Message
Consider risk minimization approaches to bed sharing.