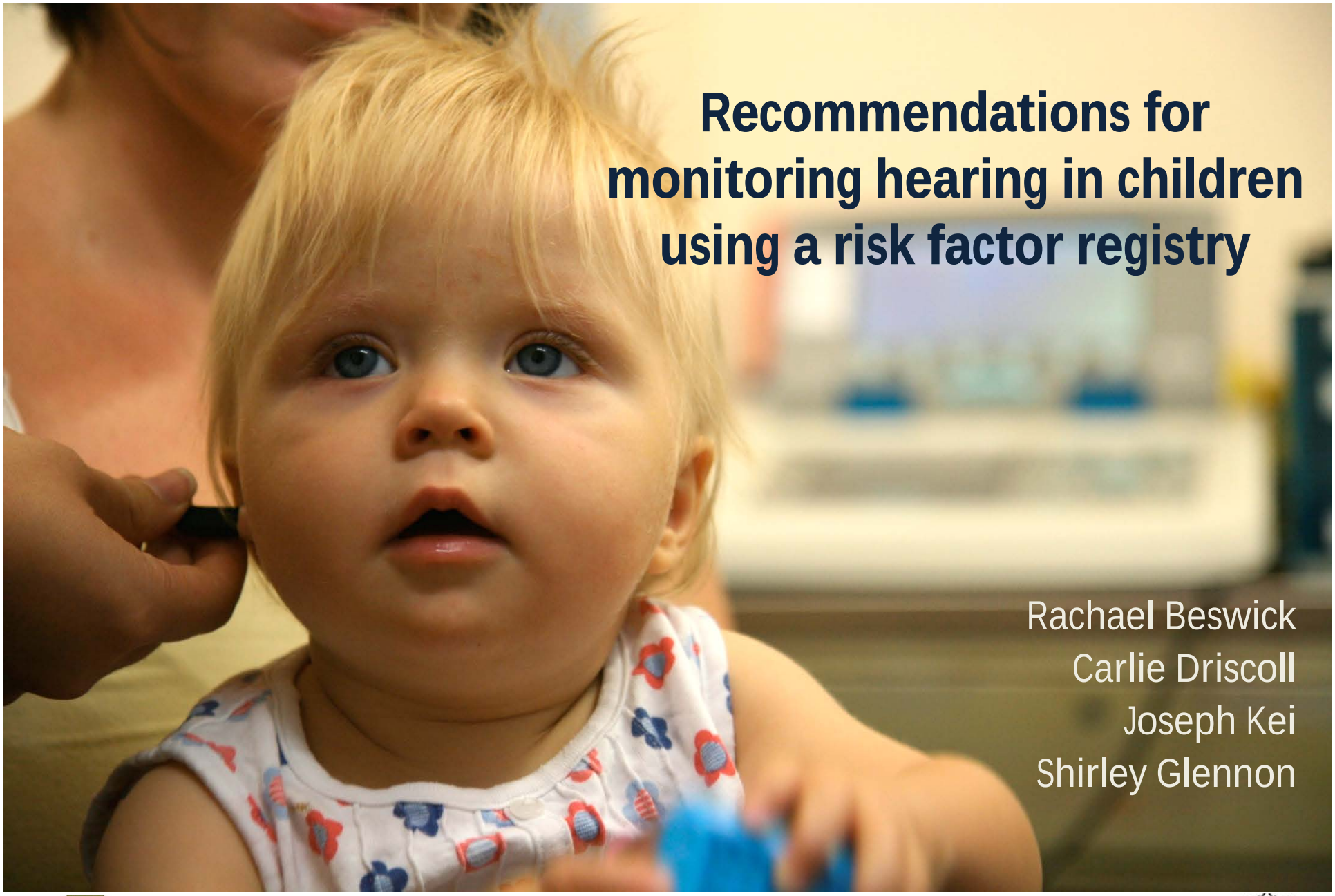


Recommendations for monitoring hearing in children using a risk factor registry

Rachael Beswick
Carlie Driscoll
Joseph Kei
Shirley Glennon

7th Australasian Newborn Hearing Screening Conference 2012

The University Of Queensland
AUSTRALIA

Queensland Government

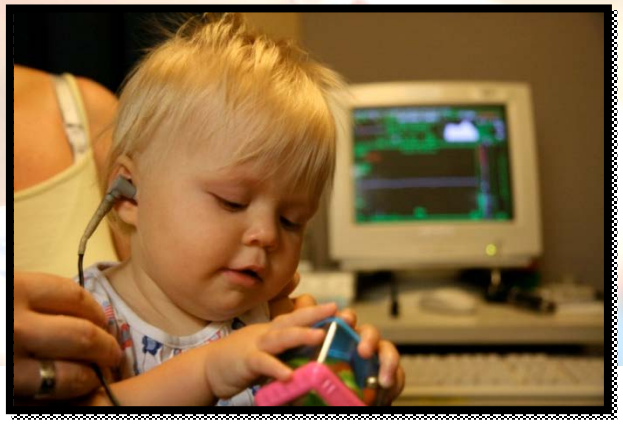
Background

- To provide recommendations for risk factor registries incorporated within targeted surveillance programs

Beswick, R., Driscoll, C., & Kei, J. (2012). Monitoring for postnatal hearing loss using risk factors: A systematic literature review. Ear & Hearing, 33, 745-756.

Beswick, R., Driscoll, C., Kei, J., & Glennon, S. (2012). Targeted surveillance for postnatal hearing loss: A program evaluation. International Journal of Pediatric Otolaryngology, 78, 1046-1056.

Beswick, R., Driscoll, C., Kei, J., Khan, A., & Glennon, S. (2013). Which risk factors predict postnatal hearing loss in children? Journal of the American Academy of Audiology, 24(3), 205-213.



Queensland's risk factor registry

- **Family history of permanent childhood hearing loss** (mother/father/siblings of baby only excluding grommets/ear infections/trauma)
- **Syndromes** associated with hearing loss (e.g., Down Syndrome, FAS)
- **Prolonged ventilation** = 5 days (IPPV/CPAP)
- **Bacterial meningitis** (confirmed/suspected)
- **Low birth weight** =1500 grams
- **Severe asphyxia** at birth (convulsions/HIE/PPHN)
- **Craniofacial anomalies**, e.g., cleft palate (excluding cleft lip & skin tags)
- **Hyperbilirubinemia** levels =450µmol/l (Term) or =340µmol/l (preterm)
- **Proven/suspected congenital infection** of the baby (Toxoplasmosis, Rubella, CMV, Herpes, Syphilis)
- **Professional concern**

Grade	Recommendation	Description
A	**Monitor**	Collective evidence generally offers strong support for monitoring. e.g., existence of cohort studies indicating cases of postnatal hearing loss in children with the risk factor in isolation + a positive yield + positive relationship/significant Chi-squared correlation + OR>1
B	**Potentially Monitor**	Overall findings are mixed; however, some or most indicate support for monitoring as per grading A
C	**Lack of Evidence**	Collective evidence is lacking. e.g., no literature evidence or case studies only; +/- presence of complicating risk factors; and/or logistic regression not completed. Alternatively, overall findings may be highly mixed/inconclusive.
D	**Potentially Don't Monitor**	Overall findings are mixed; however, some or most indicate support for not monitoring as per grading E
E	**Don't Monitor**	Collective evidence generally offers strong support for not monitoring. e.g., existence of cohort studies indicating no/limited cases of postnatal hearing loss and complicating risk factors present + nil yield + negative relationship/insignificant Chi-squared correlation + OR=1

Family History

SLR

- **Limited evidence**
- Three studies were identified that repor… …nd postnatal hearing loss (Robertson et al… …et al., 2006)
- Difficult to establish the n… …s (i) children with a hearing loss o… …e children who developed a pos… …re than one risk factor

QLD

- **S… …ng**
- … 46.4% (26/56) children with a postnatal hearing loss
- …lysis revealed a positive correlation between family history …al hearing loss [? 2(1) = 16.9, p<0.001]
- … regression analysis revealed that children with family history as a risk factor were twice more likely to develop a postnatal hearing loss than those without family history (OR: 1.92; 95% CI: 1.04-3.56)

MONITOR

Syndromes

SLR

- **Limited evidence**
- Only one child with Branchio-oto-[illegible]ed in the literature who passed [illegible] with a postnatal hearing loss ([illegible]
- This child also had [illegible]and ear pits

QLD

- **Su[illegible]ally monitoring**
- [illegible] in 19.6% (11/56) of children with a postnatal
- [illegible]or analysis revealed a positive correlation between [illegible]ome and postnatal hearing loss [? 2(1) = 32.2, p<0.001]
- Logistic regression could not be completed due to issues of multicollinarity with craniofacial anomalies

POTENTIALLY MONITOR

Prolonged Ventilation

SLR

- **Evidence not definitive** due to other compli…
- Other risk factors include asphyxia, far… …tal diaphragmatic hernia (Masumoto et… …iger et al., 1984)
- For children who had re… …of children developed a postn… …1998, Fligor et al., 2005)

QLD

- **Su… …ally monitoring**
- …was present in 19.6% (11/56) of children with a … loss
- …or analysis revealed a positive correlation between …ged ventilation and postnatal hearing loss [? 2(1) = 6.0, p=0.014]
- Logistic regression could not be completed due to issues of multicollinarity with low birth weight

POTENTIALLY MONITOR

Bacterial Meningitis

SLR

- **Limited evidence** as a substantial number
  excluded due to the exclusion criteria
- Two studies included (Thiringer et a
- Difficult to establish natu
  children with a heari
  other risk factor

QLD

- Li
  referred for bacterial meningitis who passed
  developed a postnatal hearing loss
- hildren in QLD have developed a hearing loss
  quent to bacterial meningitis during childhood. However, these children are excluded from analysis of a targeted surveillance program as they were identified due to medical referral

POTENTIALLY DON'T MONITOR

Low Birth Weight

SLR

- **Some evidence**
- One high quality cohort study (Salam
- 6/224 children (2.7%) develop
- All 6 children had other

QLD

- **Su** **onitoring**
- 56) of children with a postnatal hearing loss
- ysis revealed a significant negative relationship and postnatal hearing loss
- egression analysis revealed that children with LBW as a risk were one-tenth more likely to develop a postnatal hearing loss than those with normal birth weight (OR: 0.14; 95% CI: 0.05-0.39)

DON'T MONITOR

Severe Asphyxia

SLR

- **Some evidence**
- One high quality cohort study
- 4/40 children (10%) dev ing loss

QLD

- In esent in 16.1% (9/56) of children al hearing loss
- actor analysis revealed no significant relation between severe asphyxia and postnatal hearing loss

LACK OF EVIDENCE

Craniofacial Anomalies

SLR

- **Limited evidence**
- Weichbold et al., 2006
  - 2/23 children (8.7%) with a postnatal
    anomalies
- Roth et al., 2008
  - 1/637 children (0.2%
    postnatal heari
    tags and c
    ear pits developed a
    ded that children with skin
    hearing monitored

QLD

- Su
- ng
- esent in 17.9% (10/56) of children with a
- alysis revealed a positive correlation between
  anomalies and postnatal hearing loss [? 2(1) = 5.4, p=0.020]
- egression analysis revealed that children with craniofacial
  malies as a risk factor were more than two times more likely to develop a postnatal hearing loss than those without craniofacial anomalies (OR: 2.61; 95% CI: 1.19-5.70)

MONITOR

Hyperbilirubinemia

SLR

- **Limited evidence**
- One case report only was identi
- This child had other contri ing family history

QLD

- Li
- ia present in 3.6% (2/56) of children tal hearing loss
- factor analysis revealed no significant tionship between hyperbilirubinemia and postnatal hearing loss

POTENTIALLY DON'T MONITOR

Congenital Infection (TORCH)

SLR

- **Evidence for CMV and toxoplasmosis only**
- CMV
  - 1.3%-5.6% (asymptomatic) and 5.7 [illegible] children developed a postnatal hearin[illegible] et al., 2007)
- Toxoplasmosis
  - No evidence ass[illegible]tnatal hearing loss (Brown et al., 2009)

LACK OF EVIDENCE

QLD

- Li[illegible]
  - [illegible]n present in 3.6% (2/56) of children [illegible]al hearing loss
  - [illegible]actor analysis revealed no significant [illegible]tionship between congenital infection and postnatal hearing loss

Professional Concern

SLR

- **Not explicitly reported in the literatu**
- May incorporate factors such a ge, ototoxic therapy, and GA
- Complex cases so diff the hearing loss

QLD

- N developed a postnatal hearing loss onal concern
- factor analysis revealed no significant relation between professional concern and postnatal hearing loss

POTENTIALLY DON'T MONITOR

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