Five-Year Follow-up of Harms and Benefits of Behavioral Infant Sleep Intervention: Randomized Trial
Anna M.H. Price, Melissa Wake, Obioha C. Ukoumunne and Harriet Hiscock
Pediatrics; originally published online September 10, 2012;
DOI: 10.1542/peds.2011-3467

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://pediatrics.aappublications.org/content/early/2012/09/04/peds.2011-3467
Five-Year Follow-up of Harms and Benefits of Behavioral Infant Sleep Intervention: Randomized Trial

AUTHORS: Anna M.H. Price, BA(Hons), PhD,a,b Melissa Wake, MB BS, FRACP, MD, Grad Dip Epi,a,b,c Obioha C. Ukoumunne, PhD,d and Harriet Hiscock, MB BS, FRACP, MD, Grad Dip Epi,a,b,c

> Centre for Community Child Health, The Royal Children's Hospital, Parkville, Victoria, Australia; 4Murdoch Childrens Research Institute, Parkville, Victoria, Australia; 5Department of Paediatrics, The University of Melbourne, Parkville, Victoria, Australia; and 4PenCLAHRC, Peninsula College of Medicine and Dentistry, University of Exeter, Exeter, United Kingdom

ABBRVIATIONS
- aOR—adjusted odds ratio
- SDQ—Strengths and Difficulties Questionnaire


WHAT THIS STUDY ADDS: Behavioral sleep techniques did not cause long-lasting harms or benefits to child, child-parent, or maternal outcomes. Parents and health professionals can feel comfortable about using these techniques to reduce the population burden of infant sleep problems and maternal depression.

BACKGROUND AND OBJECTIVES: Randomized trials have demonstrated the short- to medium-term effectiveness of behavioral infant sleep interventions. However, concerns persist that they may harm children’s emotional development and subsequent mental health. This study aimed to determine long-term harms and/or benefits of an infant behavioral sleep program at age 8 years on (1) child, (2) child-parent, and (3) maternal outcomes.

METHODS: Three hundred twenty-six children (173 intervention) with parent-reported sleep problems at age 7 months were selected from a population sample of 692 infants recruited from well-child centers. The study was a 5-year follow-up of a population-based cluster-randomized trial. Allocation was concealed and researchers (but not parents) were blinded to group allocation. Behavioral techniques were delivered over 1 to 3 individual nurse consultations at infant age 8 to 10 months, versus usual care. The main outcomes measured were (1) child mental health, sleep, psychosocial functioning, stress regulation; (2) child-parent relationship; and (3) parent depression, anxiety, and stress scores.

RESULTS: Two hundred twenty-five families (89%) participated. There was no evidence of differences between intervention and control families for any outcome, including (1) children’s emotional (P = .8) and conduct behavior scores (P = .6), sleep problems (9% vs 7%, P = .2), sleep habits score (P = .4), parent- (P = .7) and child-reported (P = .8) psychosocial functioning, chronic stress (29% vs 22%, P = .4), (2) child-parent closeness (P = .1) and conflict (P = .4), global relationship (P = .9), disinhibited attachment (P = .3); and (3) parent depression, anxiety, and stress scores (P = .9) or authoritative parenting (63% vs 59%, P = .5).

CONCLUSIONS: Behavioral sleep techniques have no marked long-lasting effects (positive or negative). Parents and health professionals can confidently use these techniques to reduce the short- to medium-term burden of infant sleep problems and maternal depression. Pediatrics 2012;130:643–651

(Continued on last page)
Infant sleep problems are prevalent, reported by up to 45% of mothers in the second 6 months of life, and double the risk of maternal depression symptoms. As a common driver of health care use during infancy, they are also costly for families and health systems. Fortunately, they are often readily treatable. From 6 months of age, extinction-derived behavioral techniques like “controlled comforting” (see D1 in Guide for Fig 1) help infants learn to self-settle and sleep independently.

Mindell et al’s 2006 systematic review of behavioral interventions for child sleep problems found that 49 of 52 programs led to clinically significant reductions in bedtime resistance and night waking 3 to 6 months later. Secondary benefits included better parent sleep, mental health, and child-parent relationships. No studies, including the longest follow-up to date (3 years’ postintervention), have reported detrimental effects. The American Academy of Sleep Medicine subsequently classified behavioral techniques as “standard” practice for managing infant sleep problems, and a recent expert working party convened by the Australian Research Alliance for Children and Youth concluded that behavioral approaches are safe, at least in the short term.

Despite strong evidence of the short- and medium-term benefit and cost-effectiveness of behavioral sleep techniques, unproved concerns about their potential for lasting benefit and cost-effectiveness are limiting their uptake and provoking vigorous debate. For example, a 2011 review by Blunden et al notes that behavioral techniques could prevent parents from responding consistently and sensitively to their child, thereby leading to long-term adverse impacts on child-parent bonding, child stress regulation, mental health, and emotional development. These concerns originated with pure extinction (“crying-it-out”), which is not usually recommended nowadays because of the distress it causes parents and infants. However, the concerns have extended to extinction derivatives like controlled comforting and “camping out,” which are recommended for best practice.

In response to Blunden et al, Sadeh et al countered that there is no evidence that behavioral techniques cause harm. Researchers from these opposing perspectives are calling for a rigorous longitudinal study of the long-term effects of behavioral sleep interventions to resolve this controversy.

Interestingly, this debate is largely framed around possible harms rather than the potential for lasting benefits. In the absence of long-term follow-up studies, it is entirely possible that benefits to maternal mental health may extend beyond the medium-term already demonstrated. Furthermore, teaching parents to regulate their children’s sleep behavior is a form of limit setting that, combined with parental warmth, constitutes the optimal, authoritative, parenting style for child outcomes.

In 2003–2005, Hiscock and colleagues conducted the Infant Sleep Study. Designed to improve Australian infants’ sleep problems at 8 to 10 months of age, it was a large, community-based, secondary-prevention randomized trial of a behavioral intervention comprising positive bedtime routines and teaching either controlled comforting...
or adult fading (also known as camping out), should parents choose to use them. In comparison with controls, intervention parents reported fewer sleep problems at infant age 10 months (56% [intervention] vs 68% [control]; adjusted odds ratio [aOR] 0.6 [95% confidence interval 0.4–0.9]) and 12 months (39% vs 55%; aOR 0.5 [0.3–0.8]), with a sustained reduction in maternal depression at 2 years (15% vs 26%; aOR 0.4 [0.2–0.9]).

To determine long-term harms and/or benefits of this infant behavioral sleep intervention, we now report our 2009 follow-up at age 6 years. We hypothesized that there would be no evidence of intervention versus control group differences in: (1) child emotional and conduct behavior (primary outcomes), sleep, psychosocial health-related quality of life, and diurnal cortisol as a marker of stress; (2) child-parent relationship, disinhibited attachment; or (3) maternal mental health or parenting styles.

**METHODS**

**Design and Setting**

The Kids Sleep Study is the 5-year follow-up of the Infant Sleep Study, a randomized controlled trial (International Standard Randomized Controlled Trial Number 48752250) for which we have previously reported methods for outcomes at ages 12^1^ and 24^2^ months. In brief, the Infant Sleep Study aimed to recruit all mothers with children born in June to July 2003 who attended their nurse well-child check at ages 1 and 8 months, with mean duration for the first and subsequent visits of 25 and 19 minutes, respectively. Control families received usual care, which meant they were free to attend the scheduled 8-month visit and ask for sleep advice; control nurses, however, were not trained to deliver specific sleep management techniques.

**Follow-up Patients and Procedures**

From April to October 2009, we contacted all families. Of the original 328 Infant Sleep Study children, 328 were eligible at age 6, whereas 2 met our prespecified exclusion criteria of intellectual disability or developmental delay (Fig 2). Parents who returned written informed consent were mailed a questionnaire and phoned to arrange a 40- to 60-minute home-based assessment as close as practicable to the child’s sixth birthday, during which the trained researchers (1) administered the Pediatric Quality of Life Inventory^15^ to the child and (2) showed families how to collect salivary cortisol (see Table 1).

Families selected a nonschool day (weekend or holiday) to collect 2 cortisol samples: (1) 30 to 40 minutes after waking to avoid the postawakening rise, because its meaning in relation to the diurnal cortisol profile or psychosocial stress is unclear;^16^ and (2) before lunch. We based our collection protocol on the standardized procedures provided by the pathology laboratories responsible for testing samples. Children avoided brushing teeth, eating or drinking for 30 minutes before collection, then thoroughly rinsed their mouth with water 3 times, chewed a piece of Wrigley’s sugarfree gum, EXTRA peppermint, and collected 4 mL of saliva in a plain tube. Families recorded children’s waking and saliva collection times. Families stored samples at room temperature before mailing them back within 1 to 2 weeks of collection, when we froze them at −18°C. Cortisol levels were measured by 2 local laboratories owing to an unexpected company merger (by using the Roche Modular and Avida Centaur systems, respectively). Interassay coefficients of variation fell below 5.3%.
(n = 113 samples) and 15% (n = 54) for
the 2 laboratories, respectively. No
saliva-based intraassay reliabilities
were available. The proportion of in-
tervention samples analyzed by each
lab was similar (55% vs 46%, respec-
tively).

### Measures

Table 1 shows details of the outcome
measures. For all variables but corti-
sol, we selected potential confounding
variables a priori based on existing
research.18 Throughout childhood,
child gender, temperament, maternal
depression, and socioeconomic status
(maternal education and Socioeco-

### Sample Size and Analyses

The original Infant Sleep Study was
powered to detect a difference of 20%
between the proportions of mothers
reporting infant sleep problems at each
of the 10- and 12-month follow-ups with
80% power at the 5% level of signifi-
cance, with an assumed cluster size
of 11 and intracluster correlation co-
efficient of 0.02.3 For the Kids Sleep
Study follow-up (not considered at the
original sample size calculation), we
anticipated retaining at least 75% of the
2-year-old participants (99 of 132 con-
trol and 110 of 146 intervention families,
total n = 209). A sample size of 99 per
group would give the study 80% power
to detect a difference of 0.4 SD units (ie,
effect size) between groups at the 5%
level of significance. We did not allow
for intracluster correlation, because we

---

**FIGURE 2**

Participant flow for the original Infant Sleep Study to 6-year-old outcomes. All clusters were trained (so 0 “did not receive intervention”), but not all individuals received the intervention. †Take-up of the intervention was voluntary. One hundred families reported receiving the intervention. *All lost to follow-up because of failure to return questionnaires. †Did not return the 10- or 12-month follow-up questionnaire (were not sent 2-year questionnaire). ¶Did not return 2-year follow-up questionnaire. MCH, maternal and child health.
expected any cluster effects to fade over the 5 years since the intervention.

We compared trial arms by fitting random effects linear regression models estimated by using maximum likelihood for quantitative outcomes, and marginal logistic regression models by using generalized estimating equations, assuming an exchangeable correlation structure with information sandwich ("robust") estimates of SE for binary outcomes. Both methods allow for correlation between outcomes of participants from the same cluster. We conducted analyses unadjusted and adjusted for the potential confounders, with the exception of analyses of (1) SDQ binary outcomes, which was not adjusted for maternal education, and (2) child “moderate/severe” sleep problem, which was not adjusted for child gender, maternal depression, or education, because there were potentially too few subjects with clinically high SDQ scores or a sleep problem to obtain stable estimates from models with all potential confounders included as predictors. The omitted variables were not strongly related to the respective binary outcomes.

All retained participants were analyzed in the groups to which they were randomized, applying the intention-to-treat principle. Confidence intervals from analyses of quantitative outcomes were validated by using the bootstrap method. IntrACLuster (intra-maternal and child health unit) correlation coefficients from adjusted analyses are reported according to the CONSORT recommendations for cluster-randomized trials. All data files were analyzed by using Intercooled Stata, version 11.1 for Windows (StataCorp, College Station, TX).

Both the original trial (23067B) and 6-year-old follow-up (28137F) were approved by the Human Research Ethics Committee of The Royal Children’s Hospital, Melbourne.

**RESULTS**

At age 6 years, 225 of 326 children (69%) participated (see Fig 2, participant...
flow. Of these, 193 (86%) participated in the home visit and 177 (79%) agreed to collect cortisol. Of the latter, 167 (94%) provided at least 1 cortisol sample and 149 (84%) provided the 2 cortisol samples and the collection time data required to categorize the diurnal profile as “abnormal” versus “normal.” We were unable to contact 49 of 326 families (15%), and 52 of 326 (16%) families declined for reasons including “too busy” (n = 26), “not interested” (n = 6), “personal reasons” (n = 6), “child illness” (n = 1), or no reason (n = 13).

Table 2 shows the sample characteristics. In the control arm, children of mothers who completed a university degree were overrepresented, and children from disadvantaged backgrounds were underrepresented among those retained versus lost to follow-up; children of families who spoke a language other than English at home were underrepresented in both arms. Follow-up occurred at a mean age of 6.0 years (SD 1.9 months). Of the retained families, those who did and did not collect at least 1 cortisol sample had similar baseline characteristics (data available from authors on request), with the exception that those who did were less likely to speak a language other than English at home (13% vs 26%).

There was little evidence of unadjusted or adjusted differences between trial arms on the child, child-parent, and maternal outcomes (Table 3). Mean scores were almost identical between groups for the parent-reported child emotional, conduct behavior; and total mental health difficulties; Child Sleep Habits Questionnaire; psychosocial health-related quality of life; the child-parent relationship measures; and maternal mental health. The proportions of children with mental health problems, “moderate/severe” sleep problems, and authoritative parenting were also similar between trial arms. Consistent with these findings, the mean scores for children’s self-reported health-related quality of life and the proportions of children classified with chronic stress according to the objective physiologic cortisol measure were similar between intervention and control groups, providing little evidence that the early intervention harmed or benefited the intervention group with respect to child, child-parent, or maternal outcomes at 6 years.

**DISCUSSION**

There was no evidence that a population-based targeted intervention that effectively reduced parent-reported sleep problems and maternal depression during infancy had long-lasting harmful or beneficial effects on child, child-parent, or maternal outcomes by 6 years of age. Thus, this trial indicates that behavioral techniques are safe to use in the long-term to at least 5 years postintervention.

The study had several strengths. This 5-year follow-up of a rigorously conducted randomized trial (the gold standard for assessing causality) may represent the only opportunity to provide objective evidence investigating any lasting harms or benefits of behavioral infant sleep interventions. This is because, with their known short- and medium-term effectiveness, it is unlikely that new trials with true non-intervention controls and 5-year follow-up could now be ethically

<table>
<thead>
<tr>
<th>TABLE 2 Baseline Characteristics According to Follow-up Status (ie, Retained or Lost to Kids Sleep Study) at Age 6 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline Characteristics (4 mo)</strong></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Retained (n = 225)</strong></td>
</tr>
<tr>
<td><strong>Child</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Age (months), mean (SD)</td>
</tr>
<tr>
<td>Difficult temperament</td>
</tr>
<tr>
<td><strong>Mother</strong></td>
</tr>
<tr>
<td>Age (years), mean (SD)</td>
</tr>
<tr>
<td>Depression (EPDS), mean (SD)</td>
</tr>
<tr>
<td>Depression (EPDS) &gt;9</td>
</tr>
<tr>
<td>Education status</td>
</tr>
<tr>
<td>Did not complete high school</td>
</tr>
<tr>
<td>Completed high school</td>
</tr>
<tr>
<td>University degree</td>
</tr>
<tr>
<td><strong>Family</strong></td>
</tr>
<tr>
<td>Index of Social Disadvantage</td>
</tr>
<tr>
<td>High disadvantage</td>
</tr>
<tr>
<td>Medium disadvantage</td>
</tr>
<tr>
<td>Low disadvantage</td>
</tr>
<tr>
<td>Language other than English</td>
</tr>
</tbody>
</table>

All values are percentages, except where otherwise stated. EPDS, Edinburgh Postnatal Depression Scale, where EPDS >9 is the community cut point for depression; SEIFA, Socioeconomic Indexes for Areas, 2002 Australian census data for socioeconomic status by postal code.
conducted. Where possible, we used well-validated, reliable outcome measures\(^\text{15,27–31}\) collected from multiple sources, including parent report, child report, and objective physiologic biomarkers. Although details of the 30% (290/982) of families originally excluded from the population sample were unknown, the enrolled participants covered a broad socioeconomic range and were similar to Australian and US normative data for maternal well-being and child temperament characteristics,\(^\text{52}\) meaning that our findings should generalize to English-speaking families.

The study also had some limitations. Because 31% (101/326) of the original sample was lost to follow-up at age 6 years, the lower and upper bounds of the 95% confidence intervals did not rule out smaller long-term harms or benefits of the intervention that could be meaningful in public health research.\(^\text{7}\)

Nonetheless, the precision of the confidence intervals make clinically meaningful group differences unlikely. Loss to follow-up can also introduce internal biases and reduce generalizability. Regarding bias, the retained intervention and control participants were fairly balanced (Table 2); however, as more non–English-speaking and disadvantaged families were lost to follow-up, our findings may be less generalizable to these participant groups. Finally, no validation studies of the categorical cortisol variable were available, but our own exploratory analyses within the combined cohort showed that abnormal cortisol was associated with poorer child and maternal well-being suggests that it was indeed functioning as a stress biomarker (A.P., M.W., H.H., unpublished data).

![Table 3 Results of Regression Analyses Comparing the 2 Trial Arms on Child, Child-Parent, and Maternal Outcomes at Age 6 Years](image-url)

### Conduct Parenting Score

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Intervention (I)</th>
<th>Control (C)</th>
<th>Unadjusted Statistics</th>
<th>Adjusted Statistics</th>
<th>ICC (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDQ Total score</td>
<td>122 8.5 (5.7)</td>
<td>103 8.1 (6.0)</td>
<td>0.4 (0.5)</td>
<td>-1.0 to 1.9</td>
<td>0.0</td>
</tr>
<tr>
<td>SDQ Total problems, %</td>
<td>122 11.5</td>
<td>103 10.5</td>
<td>0.7</td>
<td>0.6</td>
<td>0.3 to 1.2</td>
</tr>
<tr>
<td>SDQ Emotion score</td>
<td>122 18.2 (2.0)</td>
<td>103 18.2 (2.0)</td>
<td>0.0</td>
<td>0.04</td>
<td>-0.6 to 0.5</td>
</tr>
<tr>
<td>SDQ Conduct behavior score</td>
<td>122 12.3 (1.8)</td>
<td>103 12.3 (1.8)</td>
<td>0.7</td>
<td>0.5</td>
<td>0.3 to 1.0</td>
</tr>
<tr>
<td>SDQ Conduct behavior problems, %</td>
<td>122 22.1</td>
<td>103 23.3</td>
<td>0.9</td>
<td>0.9</td>
<td>0.5 to 1.8</td>
</tr>
<tr>
<td>Sleep problem, %</td>
<td>122 9.0</td>
<td>102 6.9</td>
<td>1.6</td>
<td>1.6</td>
<td>0.8 to 3.1</td>
</tr>
<tr>
<td>CSHQ Total</td>
<td>115 42.2 (6.1)</td>
<td>97 42.7 (8.1)</td>
<td>-0.5</td>
<td>-0.8</td>
<td>-2.7 to 1.1</td>
</tr>
<tr>
<td>PedsQL Psychosocial, parent-proxy</td>
<td>122 78.9 (12.0)</td>
<td>103 78.3 (13.9)</td>
<td>0.7</td>
<td>0.5</td>
<td>-2.7 to 3.8</td>
</tr>
<tr>
<td>PedsQL Psychosocial, child-self</td>
<td>98 68.1 (15.3)</td>
<td>88 68.6 (16.8)</td>
<td>0.4</td>
<td>0.6</td>
<td>-3.8 to 5.0</td>
</tr>
<tr>
<td>&quot;Abnormal&quot; cortisol, %</td>
<td>80 28.8</td>
<td>60 21.7</td>
<td>1.4</td>
<td>1.4</td>
<td>0.6 to 3.3</td>
</tr>
</tbody>
</table>

**ARTICLE**

---

**Summary**

The study also had some limitations. Because 31% (101/326) of the original sample was lost to follow-up at age 6 years, the lower and upper bounds of the 95% confidence intervals did not rule out smaller long-term harms or benefits of the intervention that could be meaningful in public health research. Nonetheless, the precision of the confidence intervals make clinically meaningful group differences unlikely. Loss to follow-up can also introduce internal biases and reduce generalizability. Regarding bias, the retained intervention and control participants were fairly balanced (Table 2); however, as more non–English-speaking and disadvantaged families were lost to follow-up, our findings may be less generalizable to these participant groups. Finally, no validation studies of the categorical cortisol variable were available, but our own exploratory analyses within the combined cohort showed that abnormal cortisol was associated with poorer child and maternal well-being suggests that it was indeed functioning as a stress biomarker (A.P., M.W., H.H., unpublished data).

Our findings were entirely consistent with the longest follow-up study before the Kids Sleep Study\(^*\)\(^\text{20}\) which reported no differences between intervention and control arms on child internalizing and externalizing problems, sleep, or maternal mental health at age 3 to 4 years (3 years postintervention). Thus, these new data, when interpreted with shorter follow-up data from >50 intervention studies (including 9 randomized controlled trials), suggest that behavioral sleep interventions have short- to medium-term benefits that fade beyond 2 to 3 years’ postintervention.
In the context of potential harm, it is unknown whether there are subgroups of infants (eg, those who have previously been maltreated, experienced early trauma, or are anxious children) for whom the techniques are unsuitable in the short- or long-term.\(^{12}\) If supported by empirical investigation, there could be a case for using more gradual interventions such as adult fading instead of the more intensive graduated extinction (controlled comforting) to manage infant sleep. Along with trials like ours demonstrating that sleep problems can be effectively treated in older infants, recent efficacy trials for children younger than 6 months suggest that parent education programs that teach parents about normal infant sleep and the use of positive bedtime routines could effectively prevent later sleep problems.\(^{4,6}\)

Our findings highlight the importance of access for parents to effective sleep management strategies and training for the health professionals in such settings. Currently, the information available to parents about the effects of behavioral sleep strategies is inconsistent and out of date. For example, peak bodies including the Australian Infant Mental Health Association and the Australian Breastfeeding Association, which work to influence policy and practice but argue against the use of behavioral techniques like controlled comforting, have not updated position statements since the mid-2000s. Thus, there is a pressing need to deliver evidence-based information to parents and health care providers, which could be achieved, in part, by updating position statements, policy documents, and training curricula to reflect our current findings that behavioral sleep techniques are both effective in the short- and medium-term and safe to use in the long-term.

**CONCLUSIONS**

The intervention achieved all of its original aims (better infant sleep and lower maternal depression and health care costs in the short- to medium-term). The 6-year-old findings indicate that there were no marked long-term (at least to 5 years’ postintervention) harms or benefits. We therefore conclude that parents can feel confident using, and health professionals can feel confident offering, behavioral techniques such as controlled comforting and camping out for managing infant sleep.

**ACKNOWLEDGMENTS**

We thank all the parents and children who took part in the Infant and Kids Sleep Studies; the Maternal and Child Health nurses from the cities of Bayside, Darebin, Hobson’s Bay, Manningham, Monash, and the Shire of Yarra Ranges who helped recruit and deliver the intervention in the Infant Sleep Study; and Lisa Quinn and Emily Roberts for their help with recruitment and data collection.

**REFERENCES**


36. Varni JW, Seid M, Kurtin PS. PedsQL 4.0: reliability and validity of the Pediatric Quality of Life Inventory version 4.0. Medical Care. 2001;39(8):800–812

(Continued from first page)

FINANCIAL DISCLOSURE: All authors had financial support from the Foundation for Children for the submitted work (see Funding, below); no financial relationships with any organizations that might have an interest in the submitted work in the previous 3 years; no other relationships or activities that could appear to have influenced the submitted work.

FUNDING: The Infant Sleep Study was funded by the Australian National Health & Medical Research Council (NHMRC) Project grant 237120 and the Pratt Foundation, and the follow-up Kids Sleep Study by the Foundation for Children (Project grant 180 2009) and the Victorian Government’s Operational Infrastructure Support Program. The authors’ work was independent of the funders (the funding source had no involvement). Dr Price was supported by a Melbourne Research Foundation, and the follow-up Kids Sleep Study by the Foundation for Children (Project grant 180 2009) and the Victorian Government’s Operational Infrastructure Support Program. The authors had all had financial support from the NHMRC. The Foundation for Children (The University of Melbourne) and the Murdoch Childrens Research Institute (MCR). Dr Wake was supported by NHMRC Population Health Career Development Awards 284556 and 546405, and Dr Hiscock’s postdoctoral position was supported by NHMRC Population Health Capacity Building grant 458314 and Career Development Award 607551. The MCR administered the grants and provided infrastructural support to its staff but played no role in the conduct or analysis of the trial.
Five-Year Follow-up of Harms and Benefits of Behavioral Infant Sleep Intervention: Randomized Trial

Anna M.H. Price, Melissa Wake, Obioha C. Ukoumunne and Harriet Hiscock

*Pediatrics*; originally published online September 10, 2012;
DOI: 10.1542/peds.2011-3467

Updated Information & Services
including high resolution figures, can be found at:
http://pediatrics.aappublications.org/content/early/2012/09/04/peds.2011-3467

Permissions & Licensing
Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
http://pediatrics.aappublications.org/site/misc/Permissions.xhtml

Reprints
Information about ordering reprints can be found online:
http://pediatrics.aappublications.org/site/misc/reprints.xhtml