

## CENTER FOR CHILD POLICY

A Structured Review of the Literature on Abusive Head Trauma Prevention  
 Roygardner, Palusci, & Hughes - 2019

### Tables of Articles Included

Appendix 1. Parent Education (30)		
Citation	Method	Results
Altman, R.L., Canter, J., Patrick, P.A., Daley, N., Butt, N.K., & Brand, D.A. (2011). Parent education by maternity nurses and prevention of abusive head trauma. <i>Pediatrics</i> , 128(5), e1164-72. doi: 10.1542/peds.2010-3260	Education programme delivered by nurses including a leaflet, brief video and signature page for parents. Longitudinal, non-randomized programme.	Statistically significant (p=.03) 75% reduction in AHT injuries during the first year of life (2.8 injuries per year to .7 injuries per year)
Barr, R.G., Barr, M., Fujiwara, T., Conway, J., Catherine, N., & Brant, R. (2009a). Do educational materials change knowledge and behaviour about crying and shaken baby syndrome? A randomized controlled trial. <i>Canadian Medical Association Journal</i> , 180(7), 727-33. doi: 10.1503/cmaj.081419	1279 mothers split into either experimental or control group in this Randomized Control Trial. Experimental group received materials from the Period of Purple Crying	Experimental group had statistically significantly more knowledge about crying behaviours and reported higher rates of walking away during inconsolable crying
Barr, R.G., Rivara, F.P., Barr, M., Cummings, P., Taylor, J., Lengua, L.J., & Meredith-Benitz, E. (2009b). Effectiveness of educational materials designed to change knowledge and behaviors regarding crying and shaken-baby syndrome in mothers of newborns: a randomized, controlled trial. <i>Pediatrics</i> , 123(3), 972-80.	1374 mothers in Period of PURPLE crying group, and 1364 in control group. Randomized Control Trial	Crying knowledge greater in experimental group, shaking knowledge higher in experimental group



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<p>Barr, R.G., Rajabali, F., Aragon, M., Colbourne, M., &amp; Brant, R. (2015). Education about crying in normal infants is associated with a reduction in pediatric emergency room visits for crying complaints. <i>Journal of Developmental &amp; Behavioral Pediatrics, 36</i>, 252-257.</p>	<p>A province-wide implementation of a public health programme that teaches new parents about crying. Longitudinal, non RCT</p>	<p>Before the programme, crying case visits represented 724/20,394 Emergency Room Visits. After programme implementation, the cases were reduced by 29.5% (p&lt;.001)</p>
<p>Barr, R.G., Barr, M., Rajabali, F., Humphreys, C., Pike, I., Brant, R., Hlady, J., Colbourne, M., Fujiwara, T., &amp; Singhal, A. (2018). Eight-year outcome of implementation of abusive head trauma prevention. <i>Child Abuse &amp; Neglect, 84</i>, 106-114. doi: 10.1016/j.chiabu.2018.07.004</p>	<p>A 3-dose primary, universal education programme (the Period of PURPLE Crying) was implemented through maternal and public health units and assessed by retrospective-prospective surveillance. With parents of all newborn infants born between January 2009 and December 2016 (n = 354,477), nurses discussed crying and shaking while delivering a booklet and DVD during maternity admission (dose 1). Public health nurses reinforced Talking Points by telephone and/or home visits post-discharge (dose 2) and community education was instituted annually (dose 3)</p>	<p>AHT admissions decreased for &lt; 12-month-olds from 10.6 (95% CI: 8.3-13.5) to 7.1 (95% CI: 4.8-10.5) or, for &lt; 24-month-olds, from 6.7 (95% CI: 5.4-8.3) to 4.4 (95% CI: 3.1-6.2) cases per 100,000 person-years</p>
<p>Bechtel, K., Le, K., Martin, K.D., Shah, N., Leventhal, J.M., &amp; Colson, E. (2011). Impact of an educational intervention on caregivers' beliefs about infant crying and knowledge of shaken baby syndrome. <i>Academic Pediatrics, 11</i>(6), 481-6.</p>	<p>Non-randomized comparison study examining Take 5 Safety Plan for Crying. 110 in statistical control group and 112 in treatment group</p>	<p>Treatment group more likely to take a break, to state that frustration caused shaking</p>



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<p>Bravo, M. (2014). Shaken baby syndrome: The implementation and evaluation of an education program for parents. <i>Journal of Nursing Education and Practice</i>, 4(9).</p>	<p>Dias educational programme in a pre-test, post-test design with 24 mothers</p>	<p>Statistical testing not run, however, descriptive statistics show increases in knowledge regarding SBS; knowledge, types of injuries and ways to present</p>
<p>Coster, D. (2017). Changing parents' behaviour using a psycho-educational film as a preventative measure to reduce the risk of non-accidental head injury. <i>Child Abuse Review</i>, 26(6), 465-476.</p>	<p>In 2012, a pilot of a psycho-educational film used to cope with child crying-- 40 parents were included (mostly mothers)</p>	<p>Quasi-experimental evaluation design; parents in the film group were significantly more likely to use a range of coping skills compared with comparison group</p>
<p>Deyo, G., Skybo, T., &amp; Carroll, A. (2008). Secondary analysis of the "Love Me...Never Shake Me" SBS education program. <i>Child Abuse &amp; Neglect</i>, 32(11), 1017-1025. doi: 10.1016/j.chiabu.2008.02.006.</p>	<p>Descriptive, secondary analysis of Prevent Child Abuse Ohio "Love Me, Never Leave Me" education programme.</p>	<p>Pre-test, Post-test methodology; no comparison sample, at follow up participants remembered postpartum SBS education (98%), but post-discharge did not receive education from PCP (62%). Most mothers practiced soothing techniques (79%) but few women practiced self-coping techniques (36%) or accessed community support services (9%)</p>



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<p>Dias, M.S., Smith, K., DeGuehery, K., Mazur, P., Li, V., &amp; Shaffer, M.L. (2005). Preventing abusive head trauma among infants and young children: a hospital-based, parent education program. <i>Pediatrics</i>, 115(4), e470-7.</p>	<p>8-county region of western New York State participated in a comprehensive regional program of parent education about violent infant shaking; Longitudinal non-randomized comparison study with statistical control</p>	<p>Follow-up telephone surveys 7 months later suggested that &gt;95% of parents remembered having received the information. The incidence of abusive head injuries decreased by 47%, from 41.5 cases per 100,000 live births during the 6-year control period to 22.2 cases per 100000 live births during the 5.5-year study period. No comparable decrease was seen in the Commonwealth of Pennsylvania during the years 1996-2002, which bracketed the control and study periods in western New York State</p>
<p>Dias, M.S., Rottmund, C.M., Cappos, K.M., Reed, M.E., Wang, M., Stetter, C., Shaffer, M.L., Hollenbeak, C.S., Paul, I.M., Christian, C.W., Berger, R.P., &amp; Klevens, J. (2017). Association of a postnatal parent education program for abusive head trauma with subsequent pediatric abusive head trauma hospitalization rates. <i>JAMA Pediatrics</i>, 171(3), 223-229.</p>	<p>1.18 million parents participated in a statewide universal AHT education intervention</p>	<p>During the intervention period, incidence rate ratios for AHT increased and these were not significantly different from 5 comparison states</p>



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<p>Duzinski, S.V., Guevara, L.M., Barczyk, A.N., Garcia, N.M., Cassel, J.L., &amp; Lawson, K.A. (2018). Effectiveness of a pediatric abusive head trauma prevention program among Spanish-speaking mothers. <i>Hispanic Health Care International</i>, 16(1), 5-10.</p>	<p>A retrospective review of a postintervention survey administered in the perinatal unit of a community birthing hospital. Surveys were administered to mothers of newborns by perinatal nurses as part of routine process evaluation prior to hospital discharge between May 30, 2014, and May 15, 2015; was an analysis if the PURPLE programme</p>	<p>Descriptive stats, not inferential -- A majority of participants (86.4%) answered all six knowledge questions correctly. Among participants who reported that the father or significant other was not present during the PURPLE education (44.1%), all (100%) reported intending to share the PURPLE information with their partners. The majority of participants (88.1%) intended to share the information with others who take care of their infants</p>
<p>Eismann, E.A., Pearl, E.S., Theuerling, J., Folger, A.T., Hutton, J.S., &amp; Makoroff, K. (2019). Feasibility study of the calm baby gently program: An educational baby book intervention on safe practices related to infant crying. <i>Child Abuse &amp; Neglect</i>, 89, 135-142.</p>	<p>Three paediatric practices participated between June 2016 and January 2018, including 1045 caregivers who attended their infant's 2-month well-child visit</p>	<p>Controlling for age, gender, and race, caregivers who read the book were more confident (<math>p = 0.033</math>) and had more knowledge on how to respond appropriately to infant crying (<math>p = 0.019</math>) than caregivers who had not read it</p>



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<p>Fujiwara, T., Yamada, F., Okuyama, M., Kamimaki, I., Shikoro, N., &amp; Barr, R.G. (2012). Effectiveness of educational materials designed to change knowledge and behavior about crying and shaken baby syndrome: a replication of a randomized controlled trial in Japan. <i>Child Abuse &amp; Neglect</i>, 36(9), 613-20.</p>	<p>Randomized control trial, replication of the PURPLE programme in Japan; N=201 and were placed into experimental or control group. Follow up occurred at 6 weeks and 8 weeks.</p>	<p>Scores on crying knowledge scales (out of 100) were significantly higher in the intervention than control groups (56.1 vs. 53.1; difference = 3.0, 95% confidence interval [CI]: 1.0-4.9, <math>p &lt; 0.005</math>). Percentage of sharing of advice to walk away if frustrated by crying was significantly higher in the intervention than control groups (22.4% vs. 4.1%; difference=18%, 95% CI: 7.4-29.1). Walking away during unsoothable crying was significantly higher in the intervention group than controls (0.085 vs. 0.017 events per day, rate ratio = 4.8, 95% CI: 1.1-21.2) by diary. Self-talk behaviour scale (out of 100) tended to significance in the intervention group (16.6 vs. 8.9, difference = 7.7, 95% CI: -1.0 to 16.4, <math>p &lt; 0.1</math>)</p>
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<p>Fujiwara, T. (2015). Effectiveness of public health practices against shaken baby syndrome/abusive head trauma in Japan. <i>Public Health</i>, 129(5), 475-82. doi: 10.1016/j.puhe.2015.01.018</p>	<p>Screening of a DVD (PURPLE) at a prenatal class; distribution of a public health pamphlet at a post-natal home visit. One sample pre-test, post test, n=1316</p>	<p>Crying and shaking knowledge were significantly higher among women exposed to the public health practices, with a dose-response relationship (both <math>P &lt; 0.001</math>). Further, walk-away behaviour during periods of unsoothable crying was higher among the intervention group. However, sharing information about infant crying with other caregivers was less likely among the intervention group</p>
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<p>Keenan H.T., &amp; Leventhal J.M. (2010). A case-control study to evaluate Utah's shaken baby prevention program. <i>Academic Pediatrics</i>, 10(6), 389-94. doi: 10.1016/j.acap.2010.08.005.</p>	<p>Case-control study was conducted in which 77 Utah resident mothers of children aged under 2 years who had AHT were drawn from the only paediatric level-one trauma center in Utah and the Medical Examiner's Office from 2001 to 2007. Five control mothers per case matched by birth year were identified through the state's birth certificate registry. Conditional logistic regression was used to calculate the adjusted odds of AHT given maternal exposure to the educational video. An alternate injury and alternate educational exposures were assessed to examine potential confounding</p>	<p>The educational video was associated with nonstatistically significant reductions of both AHT (odds ratio [OR] 0.7, 95% confidence interval [CI], 0.5-1.2) and the alternate injury mechanism, child injury from motor vehicle crash (OR 0.9, 95% CI, 0.6-1.4). Alternate education about car seat use (OR 0.4, 95% CI, 0.2-0.8), back to sleep (OR 0.3, 95% CI, 0.2-0.5), and setting hot water temperature (OR 0.2, 95% CI, 0.1-0.4) were associated with significant reductions in AHT. AHT occurrence was not significantly associated with the educational video but was associated with alternate postpartum education provided to mothers. These results suggest that the shaken baby prevention video is not causal at reducing AHT</p>
<p>Kelly, P., Wilson, K., Mowjood, A., Friedman, J., &amp; Reed, P. (2016). Trialling a shaken baby syndrome prevention programme in the Auckland District Health Board. <i>New Zealand Medical Journal</i>, 129(1430), 39-50.</p>	<p>Dias model adaptation in NZ, nurses talk with caregivers according to an eight-minute script and supplemental materials are also offered. N=150</p>	<p>128 (85%) remembered at least one key message, unprompted; most commonly "It's OK to walk away" (94/150, 63%). When asked, 92% had made a plan for what to do when frustrated and 63% had shared the information with others</p>



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<p>Lopes, N. R. L., Górní, S. M., Mattar, V. O., &amp; de Albuquerque Williams, L. C. (2018). Assessment of a brief intervention with parents to prevent Shaken Baby Syndrome. <i>Paidéia</i>, 28.</p>	<p>Randomized control trial, pre-test post-test, N=252, and educational video and pamphlet was given to the experimental group. Measure was the attitudes towards infant crying scale</p>	<p>Increase in participants' knowledge about consequences of shaking, caregiver's wellbeing, caregiver strategies to deal with crying, beliefs about infant care and about characteristics of infant crying were observed in the EG at posttest</p>
<p>Mirabal Rodríguez, B., Pascual Marrero, A., Díaz Ortiz, E., Ríos, J., &amp; Marrero Rivera, G. (2011). The hand project: more hugs, no shakings. <i>Boletín de la Asociación Médica de Puerto Rico</i>, 103(1), 9-13.</p>	<p>One sample pre-test, post-test with 65 Puerto Rican families and children. Parents observed an educational video and strategies to manage infant crying</p>	<p>Pre-/post-tests demonstrated increase in knowledge (<math>p &lt; 0.05</math>). Over 75% were contacted; 94% recalled learned strategies &amp; 98% reported the infants had been well. Two infants were removed from home; no incidents of head trauma were reported. Almost half (44.5%) indicated taking care of the baby was difficult; managing the baby's crying was most difficult. All reported the programme helped them</p>



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<p>Morrill, A. C., McElaney, L., Peixotto, B., VanVleet, M., &amp; Sege, R. (2015). Evaluation of All Babies Cry, a second generation universal abusive head trauma prevention program. <i>Journal of Community Psychology, 43</i>(3), 296-314.</p>	<p>Non-randomized control trial of the ABC (All Babies Cry) programme which is a media-based infant maltreatment prevention programme. Study used a mixed methods, quasi experimental evaluation design. N=423, 211 in the control group 212 in the ABC group, study was 70% fathers.</p>	<p>Intervention participants reported using a wider variety of strategies than controls to manage parental stress (2.3 vs. 2.1, <math>t = 2.7, p &lt; .01</math>). Also, at the two follow-up interviews, 61% and 60% of intervention parents who had looked at the materials reported that because of the intervention, they had done something differently to manage their stress</p>
<p>Ornstein, A.E., Fitzpatrick, E., Hatchette, J., Woolcott, C.G., &amp; Dodds, L. (2016). The impact of an educational intervention on knowledge about infant crying and abusive head trauma. <i>Paediatrics &amp; Child Health, 21</i>(2), 74-8.</p>	<p>One sample pre-test, post-test with 93 families in Nova Scotia to study effectiveness of PURPLE crying intervention</p>	<p>Knowledge about infant crying increased significantly after programme delivery (<math>P=0.001</math>). Low baseline crying knowledge was a significant predictor of increased knowledge about infant crying (<math>P \leq 0.01</math>). There was an insignificant decrease in shaking knowledge (<math>P=0.5</math>), which may have been the consequence of high baseline knowledge</p>



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<p>Palusci V.J., Zeemering W., Bliss R.C., Combs A., &amp; Stoiko M.A. (2006). "Preventing abusive Head Trauma Using a Directed Parent Education Program." <i>Sixth North American Conference on Shaken Baby Syndrome</i>. Conducted at the Pediatric Academic Societies Meeting, Atlanta, GA.</p>	<p>Poster. Goals &amp; Objectives: To provide SBS education to at least 75% of parents (6000 encounters) who give birth (over 8000) at Spectrum Health each year, to contact all hospitals in the 13 county referral region, to offer information, training and support to develop a SBS Prevention Program within their institution, to evaluate the effectiveness of the Shaken Baby Prevention Program in Kent County as evidenced by a decrease in SBS cases, to measure family and staff reactions to the programme as presented at DVCH/Spectrum Health</p>	<p>15,850 families signed forms and participated out of 24,098 births over three years. An additional 1,275 (5%) families were documented to have received the education, but chose not to participate in the research project 8,746 fathers or male caretakers were trained. 10,580 permitted follow-up calls to be made. Hospital averaged 7 admissions per year for SBS during 5 years prior to project (33.8 cases per 100,000 births). Most parents (95%) had heard about SBS before, 96% felt information was helpful and learned (94%) at least one new strategy, 96% recommended the programme for all parents</p>
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<p>Rabbitt, A.L., Bretl, D., Parker, M., Yan, K., &amp; Zhang, L. (2018). Assessment of maternal knowledge and confidence about abusive head trauma and coping with infant crying before and after infant safety education in the neonatal intensive care unit. <i>Journal of Perinatal &amp; Neonatal Nursing</i>, 32(4), 373-381.</p>	<p>Mothers received a standardized education programme about AHT and infant crying and completed a pre-education survey, post-education survey, and 4- to 5-month follow-up survey</p>	<p>Overall, there was a sustained increase in knowledge (<math>P &lt; .001</math>) and confidence (<math>P &lt; .001</math>). Mothers who received verbal education reported a higher increase in confidence (<math>P = .03</math>). Few received information from healthcare providers about crying (35%) and AHT (20%) after discharge. At follow-up survey, most felt highly confident in their ability to share information about AHT (97%) and calm their infant (95%). Most had shared the education with others (77%)</p>
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Russell B.S., Trudeau J., & Britner P.A. (2008). Intervention type matters in primary prevention of abusive head injury: event history analysis results. *Child Abuse & Neglect*, 32(10), 949-57. doi: 10.1016/j.chiabu.2008.05.002

Two hundred and sixty four adults (mean age 32 years) were recruited for participation through convenience sampling at a large Northeastern university. Participants fell into two groups – those who regularly cared for children (46%) and those who did not (54%). Methods: SBS awareness was surveyed prior to an educational intervention and at three times points (2, 6, and 12 weeks post-intervention) longitudinally. Three intervention levels were used: Two different video conditions, each with an informational brochure, and the brochure-only condition. Survey responses were combined into five factor scores. Changes in factor score over time were modeled using event history analysis to predict the conditional probability of change in awareness as a discreet event

resulting models show consistent results for three of the five factors, predicting the highest likelihood of increased awareness for a teaching video intervention, followed by a testimonial video, and the lowest probability for increased awareness for the use of an intervention using only a brochure. Negative change, or decreased awareness, was not predicted by the type of intervention materials. Demographic variables were not significant predictors of either positive or negative change. Conclusion: The results indicate that the addition of video materials, and in particular material focusing on teaching alternative behaviours, significantly increases the likelihood of positive changes in SBS awareness over interventions which use only a brochure



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<p>Russell B.S. (2010). Revisiting the measurement of Shaken Baby Syndrome Awareness. <i>Child Abuse &amp; Neglect</i>, 34(9), 671-676. doi: 10.1016/j.chiabu.2010.02.008</p>	<p>A sample of 370 adults completed the short version of the measure during 2008</p>	<p>The Shaken Baby Syndrome Awareness Assessment – short version is best used to support child abuse prevention professionals in engaging caregivers in a conversation about responding to a crying infant safely. By talking about the responses a caregiver might be willing to use in the high-stress context of an infant’s inconsolable crying bout, intervention efforts can be tailored to maximize on caregiver strengths and achieve a high degree of goodness of fit with the values held in the care environment. Increasing the goodness of fit between caregivers’ values and the steps recommended through an intervention programme supports the likelihood that the behaviour described in the programme’s service plan will be used</p>
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<p>Stolz, H. E., Brandon, D. J., Wallace, H. S., &amp; Tucker, E. A. (2017). Preventing shaken baby syndrome: Evaluation of a multiple-setting program. <i>Journal of Family Issues</i>, 38(16), 2346–2367. <a href="https://doi-org.remote.baruch.cuny.edu/10.1177/0192513X16647985">https://doi-org.remote.baruch.cuny.edu/10.1177/0192513X16647985</a></p>	<p>A process evaluation of Prevent Child Abuse Tennessee’s Shaken Baby Prevention Project. The authors utilized survey data from (a) 189 trained professionals who delivered the programme to new parents in either the hospital or home-visiting setting and (b) 5,565 new mothers who participated in the programme in one of those two settings (n = 5,416 hospital setting; n = 149 home-visiting setting)</p>	<p>Results suggest that Shaken Baby Prevention Project facilitator training was effective, and the intervention was well-received by mothers in both the home and hospital settings. Furthermore, shaken baby syndrome information should be provided in both home and hospital settings because each provided access to a different population</p>
<p>Simonnet H., Laurent-Vannier A., Yuan W., Hully M., Valimahomed S., Bourennane M., &amp; Chevignard M. (2014). Parents' behavior in response to infant crying: abusive head trauma education. <i>Child Abuse &amp; Neglect</i>, 38(12), 1914-22. doi: 10.1016/j.chiabu.2014.06.002</p>	<p>One sample, pre-test, post-test; paediatrician provides parents with a short talk about AHT and a pamphlet</p>	<p>Statistically significant improvement in knowledge for all parents, but more so for fathers over mothers using the McNemars test</p>
<p>Taşar, M. A., Bilge, Y. D., Şahin, F., Çamurdan, A., Beyazova, U., Polat, S., &amp; İlhan, M. N. (2015). Shaken baby syndrome prevention programme: A pilot study in turkey. <i>Child Abuse Review</i>, 24(2), 120–128. <a href="https://doi-org.remote.baruch.cuny.edu/10.1002/car.2326">https://doi-org.remote.baruch.cuny.edu/10.1002/car.2326</a></p>	<p>Three group, pre-test, post-test study in Turkey. Non-randomized, non-control, comparison study. N=545. A parent education-focused animated film produced by the Shaken Baby Prevention Project in Western Sydney was shown to participants</p>	<p>Levels of knowledge of shaking hazards changed from an average of <math>5.0 \pm 2.2</math> pre-intervention to <math>6.4 \pm 1.7</math> post-intervention (<math>p = 0.001</math>). There was no statistically significant difference between the groups in the pre-test score, whereas in the post-test score group one was significantly lower than the other groups (<math>p = 0.001</math>)</p>



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Trossman S. (2016). Preventing tragedies New Mexico nurses lead initiative on shaken baby syndrome. *American Nurse*, 48(4), 13.

Popular press article about an initiative – developed and driven by RNs to prevent shaken baby syndrome – is gaining momentum in New Mexico. Former intermediate care nurseries unit director, staff nurse, and nurse researcher a teamed up to create and implement an educational program for parents and guardians to prevent SBS. Now as part of routine discharge teaching, bedside nurses in the intermediate care nursery, NICU and the newborn nursery share and discuss a flyer that addresses SBS and the importance of never shaking a baby (Nurses have a script to guide them in the conversation.). Nurses use a doll that lights up to show the physical harm that occurs when a baby is shaken. Parents or guardians then watch a DVD, “When Babies Cry,” and can talk with nurses more about any concerns they may have. And if they consent, nurses follow up with parents about seven months later to determine whether they have retained the preventive message and strategies. Based on the follow-up calls Cole has performed so far, they do.

Since the programme began in 2010, there have been no incidences of SBS-related brain injuries in babies whose parents received the patient teaching from intermediate care and NICU nurses. More than 3,000 parents and guardians participated in this learning activity. And while participation is nearly 100 percent among those whose babies are in the intermediate care nursery and NICU, the rate of patient teaching on this topic in the regular mother-baby unit is less than half – most likely because of the short length of stay, according to Thornton.



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<p>Zolotor A.J., Runyan D.K., Shanahan M., Durrance C.P., Nocera M., Sullivan K., Klevens J., Murphy R., Barr M., &amp; Barr R.G. (2015). Effectiveness of a statewide abusive head trauma prevention program in North Carolina. <i>JAMA Pediatrics</i>, 169(12), 1126-31. doi: 10.1001/jamapediatrics.2015.2690</p>	<p>Changes in proportions of telephone calls for crying concerns to a nurse advice line and in AHT rates per 100 000 infants after the intervention (June 1, 2009, to September 30, 2011) in the first year of life using hospital discharge data for January 1, 2000, to December 31, 2011</p>	<p>In the 2 years after implementation of the intervention, parental telephone calls to the nurse advice line for crying declined by 20% for children younger than 3 months (rate ratio, 0.80; 95% CI, 0.73-0.87; <math>P &lt; .001</math>) and by 12% for children 3 to 12 months old (rate ratio, 0.88; 95% CI, 0.78-0.99; <math>P = .03</math>). No reduction in state-level AHT rates was observed, with mean rates of 34.01 person-years before the intervention and 36.04 person-years after the intervention. A difference-in-difference analysis from January 1, 2000, to December 31, 2011, controlling for economic indicators, indicated that the intervention did not have a statistically significant effect on AHT rates (<math>\beta</math> coefficient, -1.42; 95% CI, -13.31 to 10.45)</p>
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### Appendix 2. Community Factors and Public Education (14)

Citation	Method	Results
Beaulieu E., Rajabali F., Zheng A., & Pike I. (2019). The lifetime costs of pediatric abusive head trauma and a cost-effectiveness analysis of the Period of Purple crying program in British Columbia, Canada. <i>Child Abuse &amp; Neglect</i> , 97, 104-133.	Incidence based cost of illness analysis; quantify lifetime costs of AHT events	Investments of \$5 per newborn through the PURPLE programme resulted in \$273.52 and \$14.49/child cost avoidance
Berger R.P., Fromkin J.B., Stutz H., Makoroff K., Scribano P.V., Feldman K., Tu L.C., & Fabio A. (2011). Abusive head trauma during a time of increased unemployment: a multicenter analysis. <i>Pediatrics</i> , 128(4), 637-643. doi: 10.1542/peds.2010-2185	Clinical data were collected for AHT cases diagnosed in children younger than 5 years from January 1, 2004 until June 30, 2009, by hospital-based child protection teams within 3 geographic regions. The recession was defined as December 1, 2007 through June 30, 2009. Quarterly unemployment rates were collected for every county in which an AHT case occurred	The rate of AHT increased significantly in 3 distinct geographic regions during the 19 months of an economic recession compared with the 47 months before the recession. This finding is consistent with our understanding of the effect of stress on violence. Given the high morbidity and mortality rates for children with AHT, these results are concerning and suggest that prevention efforts might need to be increased significantly during times of economic hardship Overall knowledge of AHT was higher in women (67.9%) than in men (48.8%, $p < 0.001$ ). Female gender, having children, higher age, and level of education were predictors for the awareness of AHT. A majority of participants reported to have heard about AHT from the media
Berthold, O., Clemens, V., Witt, A., Brahler, E., Plener, PL., & Fegert, J.M. (2019). Awareness of abusive head trauma in a German population-based sample: implications for prevention. <i>Pediatric Research</i> .	A population-based representative sample of the German population aged >14 years (N = 2510) was assessed in a cross-sectional observational survey. The sample was selected in a random route approach between November 2017 and February 2018	



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Berthold, O., Witt, A., Clemens, V., Brahler, E., Plener, P., & Fegert, JM. (2019). Do we get the message through? Difficulties in the prevention of abusive head trauma. *European Journal of Pediatrics*, 178(2), 139-146.

Friedman J., Reed P., Sharplin P., & Kelly P. (2012). Primary prevention of pediatric abusive head trauma: a cost audit and cost-utility analysis. *Child Abuse & Neglect*, 36, 760-770. doi: 10.1016/j.chiabu.2012.07.008

Population-based survey of a representative population sample

A 5 year cohort of infants with abusive head trauma admitted to hospital in Auckland, New Zealand was reviewed. The authors determined the direct costs of hospital care, community rehabilitation, special education, investigation and child protection, criminal trials, punishment of offenders, and life-time care for moderate or severe disability. Analysis of the possible cost-utility of a national primary prevention programme was undertaken, using the costs established in our cohort, recent New Zealand national data on the incidence of paediatric abusive head trauma, international data on quality of life after head trauma, and published international literature on prevention programmes

Whereas the dangers are generally well known, a majority might be ambivalent towards the recommendation to leave a crying infant alone for a few minutes when the caregiver becomes too stressed or frustrated. Furthermore, a majority prefers being informed on abusive head trauma before birth

There were 52 cases of abusive head trauma in the sample. Hospital costs totaled \$NZ2,433,340, child protection \$NZ1,560,123, police investigation \$NZ1,842,237, criminal trials \$NZ3,214,020, punishment of offenders \$NZ4,411,852 and community rehabilitation \$NZ2,895,848. Projected education costs for disabled survivors were \$NZ2,452,148, and the cost of projected lifetime care was \$NZ33,624,297. Total costs were \$NZ52,433,864, averaging \$NZ1,008,344 per child. Cost-utility analysis resulted in a strongly positive economic argument for primary prevention, with expected case scenarios showing lowered net costs with improved health outcomes



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Huang M.I., O'Riordan M.A., Fitzenrider E., McDavid L., Cohen A.R., & Robinson S. (2011). Increased incidence of nonaccidental head trauma in infants associated with the economic recession. *Journal of Neurosurgery: Pediatrics*, 8(2), 171-6. doi:10.3171/2011.5.PEDS1139

The trauma database was searched for NAHT in infants 0-2 years old during nonrecession (December 2001 to November 2007) and recession (December 2007 to June 2010) periods. Incidence is reported as infants with NAHT per month summarized over time periods. Continuous variables were compared using Mann-Whitney U-tests, and proportions were compared using the Fisher exact test

In the context of an overall reduction in head trauma, the significant increase in the incidence of NAHT appears coincident with economic recession. Although the cause is likely multifactorial, a full analysis of the basis of this increase is beyond the scope of this study. This study highlights the need to protect vulnerable infants during challenging economic times



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Kelly P., Thompson J.M.D., Koh J., Ameratunga S., Jelleyman T., Percival T.M., Elder H., & Mitchell E.A. (2017). Perinatal risk and protective factors for pediatric abusive head trauma: A multicenter case-control study. *Journal of Pediatrics*, 187, 240-246.e4. doi: 10.1016/j.jpeds.2017.04.058

Multicenter, retrospective case-control study of perinatal records from 142 cases of abusive head trauma and 550 controls, matched by date and hospital of birth from 1991 to 2010. Multiple logistic regression assessed the relationship between perinatal exposures and abusive head trauma

The risk of abusive head trauma decreased with increasing maternal age (OR, 0.91 per year; 95% CI 0.85-0.97) and increasing gestational age at birth (OR 0.79 per week; 95% CI 0.69-0.91). Mothers of cases were more likely to be Ma'ori (OR 4.61; 95% CI 1.98-10.78), to be single (OR 5.10; 95% CI 1.83-14.23), have recorded social concerns (OR 4.29; 95% CI 1.32-13.91), and have missing data for antenatal care, partner status, social concerns, and substance abuse (OR 13.53; 95% CI 2.39-76.47). Case mothers were more likely not to take supplements in pregnancy (OR 3.53; 95% CI 1.30-9.54), to have membrane rupture longer than 48 hours before delivery (OR 13.01; 95% CI 2.84-59.68), and to formula feed (OR for mixed breast and formula feeding 6.06; 95% CI 2.39- 15.36) before postnatal discharge (median 3 days). Factors associated with subsequent abusive head trauma can be identified from routine perinatal records. Targeted interventions initiated perinatally could possibly prevent some cases of abusive head trauma. However, any plans for targeted prevention strategies should consider not only those with identified risk factors but also those for which data are missing



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Klevens J., Luo F., Xu L., Peterson C., & Latzman N.E. (2016). Paid family leave's effect on hospital admissions for pediatric abusive head trauma. *Injury Prevention*, 22(6), 442-445. doi: 10.1136/injuryprev-2015-041702

Klevens J., Schmidt B., Luo F., Xu L., Ports K.A., Lee R.D. (2017). Effect of the earned income tax credit on hospital admissions for pediatric abusive head trauma. *Public Health Reports*, 132(4), 505-511. doi: 10.1177/0033354917710905

Constructed panel data set which included the annual data of California and 7 comparison states. The authors used difference-in-difference analyses of publicly-available, state-level data from 1995-2011 to compare the population rate of AHT hospital admissions in California versus other US states that had no PFL policy change before and after the policy change

Difference-in-difference analyses (i.e., pre- and postdifferences in intervention vs control groups) of annual rates of states' hospital admissions attributed to abusive head trauma among children aged <2 years (i.e., using aggregate data). Conducted analyses in 14 states with, and 13 states without, an EITC from 1995 to 2013, differentiating refundable EITCs (i.e., tax filer gets money even if taxes are not owed) from nonrefundable EITCs (i.e., tax filer gets credit only for any tax owed), controlling for state rates of child poverty, unemployment, high school graduation, and percentage of non-Latino white people

Compared to seven states with no PFL policies, California's 2004 PFL showed a significant decrease of AHT admissions in both < 1 and < 2year-olds

A refundable EITC was associated with a decrease of 3.1 abusive head trauma admissions per 100 000 population in children aged <2 years after controlling for confounders (P 1/4 .08), but a non-refundable EITC was not associated with a decrease (P 1/4 .49). Tax refunds ranged from \$108 to \$1014 and \$165 to \$1648 for a single parent working full-time at minimum wage with 1 child or 2 children, respectively



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Libby A.M., Sills M.R., Thurston N.K., & Orton H.D. (2003). Costs of childhood physical abuse: comparing inflicted and unintentional traumatic brain injuries. *Pediatrics*, 2003.

Abstracts of patient records were drawn from the annual 1993–2000 Colorado state-mandated hospital discharge database maintained by the Colorado Hospital Association. The 2 dependent variables were total charges (TC) and length of stay. Our key independent variable was the nature of injury, i.e., inflicted or unintentional; other independent variables were age, severity level, death, and trauma designation of the hospital. Comparisons of variables between patients with inflicted and unintentional head trauma were performed using Student's *t* tests or 2 statistics. Ordinary least squares regression was used to estimate the marginal and total effects of inflicted injury on TC and LOS

Of the 1097 head trauma patients < 3 years old, 814 had unintentional and 283 had inflicted head trauma. Head trauma was defined using the Centers for Disease Control definition of traumatic brain injury. Patients with inflicted injuries were younger and had a higher average severity level and overall mortality rate than did patients with unintentional head trauma. The regression models showed that, controlling for age and severity, patients with inflicted head trauma stayed in the hospital 52% longer (2 days), and had a mean total bill 89% higher (\$4232 more) than did patients with unintentional head trauma



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Peterson C., Xu L., Florence C., Parks S.E., Miller T.R., Barr R.G., Barr M., & Steinbeigle R. (2014). The medical cost of abusive head trauma in the United States. *Pediatrics*, 134(1), 91-9. doi: 10.1542/peds.2014-0117

Using Truven Health MarketScan data, 2003–2011, the authors identified children 0 to 4 years old with commercial or Medicaid insurance and AHT diagnoses. The authors used exact case-control matching based on demographic and insurance characteristics such as age and health plan type to compare medical care between patients with and without AHT diagnoses. Using regression models, the authors assessed service use (i.e., average annual number of inpatient visits per patient) and inpatient, outpatient (including emergency department), drug, and total medical costs attributable to an AHT diagnosis during the 4-year period after AHT diagnosis

Assessed 1209 patients with AHT and 5895 matched controls. Approximately 48% of patients with AHT received inpatient care within 2 days of initial diagnosis, and 25% were treated in emergency departments. AHT diagnosis was associated with significantly greater medical service use and higher inpatient, outpatient, drug, and total costs for multiple years after the diagnosis. The estimated total medical cost attributable to AHT in the 4 years after diagnosis was \$47 952 (95% confidence interval [CI], \$40 219–\$55 685) per patient with AHT (2012 US dollars) and differed for commercially insured (\$38 231 [95% CI, \$29 898–\$46 564]) and Medicaid (\$56 691 [95% CI, \$4290– \$69 092]) patients



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Peterson C., Xu L., Florence C., & Parks S.E. (2015). Annual cost of U.S. hospital visits for pediatric abusive head trauma. *Child Maltreatment*, 20(3), 162-9. doi: 10.1177/1077559515583549

The primary outcome measures in this study were the total number of AHT ED visits and admissions annually, the total direct medical cost from the provider perspective of AHT ED visits and admissions annually, and the average costs per AHT ED visit and admission over the study period. Secondary end points were the proportion of AHT admissions by source (i.e., ED, another facility, etc.) and estimated associations between per-visit costs and selected patient characteristics

The survey-weighted estimated annual number of AHT treat-and-release ED visits 2006–2011 ranged from 1,009 (2010; 95% CI [824, 1,193]) to 1,223 (2007; 95% CI [963, 1,482]), with an annual average of 1,138 (95% CI [1,012, 1,264]) over the study period. The estimated number of AHT admissions ranged from 1,790 (2011; 95% CI [1,050, 2,531]) to 2,688 (2010; 95% CI [1,884, 3,492]) annually, with an annual average of 2,089 (95% CI [1,732, 2,445]) over the study period. AHT was diagnosed during a total of 6,827 (95% CI [6,072, 7,582]) ED visits and 12,533 (95% CI [10,395, 14,671]) admissions nationwide over the study period. Based on overlapping CIs, there were no significant temporal trends in ED visits, admissions, or costs over the study period



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Shanahan M., Fleming P., Nocera M., Sullivan K., Murphy R., & Zolotor A. (2014). Process evaluation of a statewide abusive head trauma prevention program. *Evaluation and Program Planning*, 47, 18-25. doi: 10.1016/j.evalprogplan.2014.07.002

Numerous methods, including telephone surveys, paper and pencil questionnaires, site visits, and programme administrative data were used to conduct the process evaluation

Results indicate that the intervention was successfully implemented in all birthing hospitals (n = 86) across the state with a high degree of fidelity. Furthermore, the majority of the hospitals reported incorporating the programme into unit procedures and employee training. More than three-fourths indicated that they plan to continue the program after the study ends. The RE-AIM framework was applied and served as a useful guide for the process evaluation of a multifaceted, multi-system, universal public health intervention



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Stewart T.C., Gilliland J., Parry N.G., & Fraser D.D. (2015). An evidence-based method for targeting an abusive head trauma prevention media campaign and its evaluation. *Journal of Trauma and Acute Care Surgery*, 79(5), 748-55.  
doi: 10.1097/TA.0000000000000828

A questionnaire on the level of importance of factors, rated on a 7-point Likert scale, was distributed to a panel of experts to determine the best advertising locations. Ranked factors were used to create weights for statistical modeling and mapping within a Geographic Information Systems to determine optimal ad locations. The media campaign was evaluated via a telephone survey of randomly selected households

The survey found locations of new families, high population density, and high percentage of lone parents to be the most important factors for selecting billboard sites. Spatial analysis revealed six areas that ranked highest in our factors. Five billboards, four media posters, and six transit shelters were selected for our advertisements. A population-based telephone survey revealed that 23% of respondents knew the campaign. Nearly half (42%) heard the radio public service announcements, and 9% saw billboards. Extending primary prevention efforts to the public helps to create a cultural change in the way inconsolable crying, the trigger for AHT, is viewed. With the use of ranked factors and Geographic Information Systems, geographic locations with high visibility and specific risk factors for AHT were identified for targeting the campaign, facilitating the likelihood that our message was reaching the population in greatest need



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### Appendix 3. Professional Education and Practice (9)

Citation	Method	Results
Coles L., & Collins L. (2009). Including fathers in preventing non-accidental head injury. <i>Journal of Community Practice</i> , 82(4), 20-3.	Qualitative study of 30 fathers, with focus groups and recorded home interviews, including a prison group	Most fathers had not learned about proper handling of babies or the dangers or consequences of shaking. Need for professional training and policy in this area was recommended
Cowley, L. E., Farewell, D. M., & Kemp, A. M. (2018). Potential impact of the validated Predicting Abusive Head Trauma (PredAHT) clinical prediction tool: A clinical vignette study. <i>Child Abuse &amp; Neglect</i> , 86, 184-196.	Clinicians estimated the probability of AHT and indicated their CP actions in six clinical vignettes. One vignette described a child with AHT, another described a child with non-AHT, and four represented "gray" cases, where the diagnosis was uncertain. Clinicians calculated the PredAHT score and reported whether this altered their estimate/actions. The 'think-aloud' method was used to capture the reasoning behind their responses	PredAHT significantly influenced clinicians' probability estimates in all vignettes ( $p < 0.001$ ), although the impact on individual clinicians varied. However, the influence of PredAHT on clinicians' CP actions was limited; after using PredAHT, 9/29 clinicians changed their CP actions in only 11/174 instances. Clinicians' AHT probability estimates and CP actions varied somewhat both before and after PredAHT. Qualitative data suggested that PredAHT may increase clinicians' confidence in their decisions when considered alongside other associated clinical, historical and social factors



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Fraser J.A., Flemington T., Doan T.N.D., Hoang M.T.V., Doan T.L.B.,r & Ha M.T. (2017). Prevention and recognition of abusive head trauma: training for healthcare professionals in Vietnam. *Acta Paediatrica*, 106(10), 1608-1616. doi: 10.1111/apa.13977

One hundred and sixteen healthcare professionals (paediatric medical and nursing staff) completed a clinical training programme and participated in its evaluation. A pre-post-test and follow-up design was used to evaluate the outcomes. Questionnaires were used to collect data prior to training, at six weeks and at six months. Generalised linear modelling was used to examine changes in diagnostic skills and knowledge of the consequences of shaken baby syndrome (SBS) (a form of abusive head trauma), its prevention and treatment

At baseline, awareness and knowledge reflected no former abusive head trauma training. Following the intervention, participants had an increased awareness of shaken baby syndrome and the potential consequences of shaking infants and had acquired techniques to inform parents how to manage the crying infant. The intervention was effective in raising awareness of shaken baby syndrome and its consequences amongst the participating healthcare professionals in Vietnam. Training can improve detection and prevention of abusive head trauma, and the intervention has the potential to be adapted for similar settings internationally



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Fujiwara, T. (2015). Effectiveness of public health practices against shaken baby syndrome/abusive head trauma in Japan. *Public Health*, 129(5), 475-82. doi: 10.1016/j.puhe.2015.01.018

This study investigated the impact of public health practices to prevent SBS/AHT in Japan through the use of educational materials. Cross-sectional study. The intervention was comprised of two parts: (1) the screening of an educational DVD at a prenatal class; and (2) the distribution of a public health pamphlet at a postnatal home visit. Expectant parents watched a DVD (The Period of PURPLE Crying) about the features of infant crying and recommended behaviours (walking away if frustrated in the event of unsoothable crying, sharing information on crying with other caregivers) at a preterm parenting class held at eight months' gestation. A postnatal home-visit service was implemented in which a maternity nurse distributed a pamphlet to explain information about infant crying. Before the four month health check-up, a self-administered questionnaire was distributed to assess exposure to these publichealthpractices and outcome variables (i.e. infant crying knowledge, walk away and information-sharing

Crying and shaking knowledge were significantly higher among women exposed to the public health practices, with a dose-response relationship (both  $P < 0.001$ ). Further, walk-away behaviour during periods of unsoothable crying was higher among the intervention group. However, sharing information about infant crying with other caregivers was less likely among the intervention group. The impact of educational materials in public health practice on knowledge of crying and shaking, and walk-away behaviour in Japan had a dose-response relationship; however, an increase in sharing information with other caregivers was not observed



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behaviours), and responses were collected at the four-month health check-up (n = 1316). The impacts of these interventions on outcome variables were analysed by comparing those exposed to both interventions, either intervention and neither intervention after adjusting for covariates



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Goulet C., Frappier J.Y., Fortin S., Déziel L., Lampron A., & Boulanger M. (2009). Development and evaluation of a shaken baby syndrome prevention program. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 38(1), 7-21. doi: 10.1111/j.1552-6909.2008.00301.x

To evaluate parents' and nurses' opinions regarding the adequacy of an educational programme on shaken baby syndrome: the Perinatal Shaken Baby Syndrome Prevention Program (PSBSPP).  
Design: Qualitative and quantitative assessments in the form of interviews and questionnaires administered in French  
Setting: Two birthing institutions in Montréal, QC, Canada: a university hospital and a regional center

Two hundred and sixty-three parents (73.8% mothers, 26.2% fathers) received the intervention after the birth of their child, and 69 nurses administered it. Both parents and nurses supported this initiative. Most parents appreciated the usefulness of the information. Nurses believed the programme was adequate, and their training to deliver the programme was satisfactory. All participants reported that the program was highly relevant, especially for new parents. Conclusion: The Perinatal Shaken Baby Syndrome Prevention Program achieves the goals of (a) increasing parents' knowledge about infant crying, anger, and shaken baby syndrome and (b) helping parents identify coping strategies. The relevance of introducing the PSBSPP in all birthing institutions is supported. Future studies should focus on vulnerable and culturally diverse populations, and longitudinal follow-up could help determine if the PSBSPP reduces the incidence of shaken baby syndrome



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Letson, M. M., Cooper, J. N., Deans, K. J., Scribano, P. V., Makoroff, K. L., Feldman, K. W., & Berger, R. P. (2016). Prior opportunities to identify abuse in children with abusive head trauma. *Child Abuse & Neglect, 60*, 36–45. <https://doi-org.remote.baruch.cuny.edu/10.1016/j.chiabu.2016.09.001>

Infants with minor abusive injuries are at risk for more serious abusive injury, including abusive head trauma (AHT). Our study objective was to determine if children with AHT had prior opportunities to detect abuse and to describe the opportunities. All AHT cases from 7/1/2009 to 12/31/2011 at four tertiary care children's hospitals were included. A prior opportunity was defined as prior evaluation by either a medical or child protective services (CPS) professional when the symptoms and/or referral could be consistent with abuse but the diagnosis was not made and/or an alternate explanation was given and accepted

Two hundred-thirty-two children with AHT were identified; median age (IQR) was 5.40 (3.30, 14.60) months. Ten percent (22/232) died. Of the 232 patients diagnosed with AHT, 31% (n = 73) had a total of 120 prior opportunities. Fifty-nine children (25%) had at least one prior opportunity to identify abuse in a medical setting, representing 98 prior opportunities. An additional 14 (6%) children had 22 prior opportunities through previous CPS involvement. There were no differences between those with and without a prior opportunity based on age, gender, race, insurance, mortality, or institution. Children with prior opportunities in a medical setting were more likely to have chronic subdural haemorrhage (48 vs. 17%,  $p < 0.01$ ) and healing fractures (31 vs. 19%,  $p = 0.05$ ). The most common prior opportunities included vomiting 31.6% (38/120), prior CPS contact 20% (24/120), and bruising 11.7% (14/120). Improvements in earlier recognition of AHT and subsequent intervention might prevent additional injuries and reduce mortality



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Nocera M., Shanahan M., Murphy R.A., Sullivan K.M., Barr M., Price J., & Zolotor A. (2016). A statewide nurse training program for a hospital based infant abusive head trauma prevention program. *Nurse Education in Practice*, 16(1), e1-6.  
doi: 10.1016/j.nepr.2015.07.013

In preparation for statewide adoption of a hospital-based universal education programme, nursing staff at 85 hospitals and 1 birthing center in North Carolina received standardized training. This article describes the training programme and reports findings from the process, outcome and impact evaluations of this training. Evaluation strategies were designed to query nurse satisfaction with training and course content; determine if training conveyed new information and assess if nurses applied lessons from the training sessions to deliver the programme as designed

Evaluations were received from 4358 attendees. Information was obtained about training type, participants' perceptions of newness and usefulness of information and how the programme compared to other education materials. Programme fidelity data were collected using telephone surveys about compliance to delivery of teaching points and teaching behaviours. Results demonstrate high levels of satisfaction and perceptions of programme utility as well as adherence to programme model. These findings support the feasibility of implementing a universal patient education programmes with strong uptake utilizing large scale systematic training programmes



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Rideout L. (2016). Nurses' perceptions of barriers and facilitators affecting the Shaken Baby Syndrome Education Initiative: An exploratory study of a Massachusetts public policy. *Journal of Trauma Nursing*, 23(3), 125-37. doi: 10.1097/JTN.0000000000000206

The objective of this study was to assess nurses' perceptions of barriers to and facilitators of implementation of the shaken baby syndrome (SBS)/abusive head trauma (AHT) public policy. A legislative Act providing for the prevention of SBS/AHT was passed in Massachusetts in November 2006. A stipulation of this Act was the provision of a program to educate parents/guardians of newborns about SBS/AHT prevention. A quantitative, cross-sectional research design with a qualitative component was used for this study. Nurses in 13 Massachusetts birthing hospitals were surveyed using a Web-based questionnaire

Hospital nurses' responses (N = 922; 155 responded) revealed barriers to and facilitators of SBS/AHT guideline implementation. The disadvantage of Web-based surveys as they relate to the challenges of enlisting cooperation and a lack of direct access to the nurses may have attributed to the low response rate (17%) for this study. The outcomes of logistic regression analyses and themes from the qualitative analysis revealed a lack of SBS/AHT brochures and an inability to provide SBS/AHT education for non-English-speaking parents/guardians as barriers to SBS/AHT education. An atmosphere of supportive leadership facilitated implementation of the SBS/AHT education guidelines by nurses. It is imperative that nurse leadership support be sustained so that nurses have SBS/AHT education resources, an understanding of the SBS/AHT education guidelines, and feedback about the impact of their SBS/AHT education interventions



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Stewart T.C., Polgar D., Gilliland J., Tanner D.A., Girotti M.J., Parry N., & Fraser D.D. (2011). Shaken baby syndrome and a triple-dose strategy for its prevention. *Journal of Trauma and Acute Care Surgery*, 71(6), 1801-7. doi: 10.1097/TA.0b013e31823c484a

Multi-armed programme was implemented with the aim to reduce the incidence of SBS. The objectives of this study were to describe the epidemiology of SBS, the triple-dose prevention programme, and its evaluation. Methods: Descriptive and spatial epidemiologic profiles of SBS cases treated at Children's Hospital, London Health Sciences Centre, from 1991 to 2010 were created. Dose 1 (in-hospital education): pre-post impact evaluation of registered nurse training, with a questionnaire developed to assess parents' satisfaction with the programme. Dose 2 (public health home visits): process evaluation of additional education given to new parents. Dose 3 (media campaign): a questionnaire developed to rate the importance of factors on a 7-point Likert scale. These factors were used to create weights for statistical modeling and mapping within a geographic information system to target prevention ads

Forty-three percent of severe infant injuries were intentional. A total of 54 SBS cases were identified. The mean age was 6.7 months (standard deviation, 10.9 months), with 61% of infant males. The mean Injury Severity Score was 26.3 (standard deviation, 5.5) with a 19% mortality rate. Registered nurses learned new information on crying patterns and SBS, with a 47% increase in knowledge post-training ( $p < 0.001$ ). Over 10,000 parents were educated in-hospital, a 93% education compliance rate. Nearly all parents (93%) rated the programme as useful, citing "what to do when the crying becomes frustrating" as the most important message. Only 6% of families needed to be educated during home visits. Locations of families with a new baby, high population density, and percentage of lone parents were found to be the most important factors for selecting media sites. The spatial analysis revealed six areas needed to be targeted for ad locations

