WHO position paper: Reducing pain at the time of vaccination – September 2015

Abstracts of references provided in the position paper

Kennedy A, et al. Vaccine Attitudes, Concerns, and Information Sources Reported by Parents of Young Children: Results From the 2009 HealthStyles Survey. Pediatrics. 2011;127:S92C9.

OBJECTIVE: To describe the vaccine-related attitudes, concerns, and information sources of US parents of young children. **METHODS:** We calculated weighted proportions and 95% confidence intervals for vaccine-related attitudes, concerns, and information sources of parents with at least 1 child aged 6 years or younger who participated in the 2009 HealthStyles survey. **RESULTS:** The overall response rate for the survey was 65% (4556 of 7004); 475 respondents were parents or guardians ("parents") of at least 1 child aged 6 years or younger. Among those respondents, nearly all (93.4%) reported that their youngest child had or would receive all recommended vaccines. The majority of parents reported believing that vaccines were important to children's health (79.8%) and that they were either confident or very confident in vaccine safety (79.0%). The vaccine-related concern listed most often by parents was a child's pain from the shots given in 1 visit (44.2%), followed by a child getting too many vaccines at 1 doctor's visit (34.2%). When asked to list their most important sources of information on vaccines, the most common response was a child's doctor or nurse (81.7%). **CONCLUSIONS:** To maintain and improve on the success of childhood vaccines in preventing disease, a holistic approach is needed to address parents' concerns in an ongoing manner. Listening and responding in ways and with resources that address specific questions and concerns could help parents make more informed vaccination decisions.

Taddio A, Ilersich AL, Ipp M, et al. Physical interventions and injection techniques for reducing injection pain during routine childhood immunizations: Systematic review of randomized controlled trials and quasi-randomized controlled trials. *Clin Ther.* 2009;31 Suppl 2:S48–76.

Background: Vaccine injections are the most common reason for iatrogenic pain in childhood. With the steadily increasing number of recommended vaccinations, there has been a concomitant increase in concern regarding the adequacy of pain management. Physical interventions and injection techniques that minimize pain during vaccine injection offer an advantage over other techniques because they can be easily incorporated into clinical practice without added cost or time. Their effectiveness, however, has not previously been studied using a systematic approach.
Objective: The purpose of this review was to determine the effectiveness of physical interventions and injection techniques for reducing pain during vaccine injection in children.
Methods: MEDLINE, EMBASE, CINAHL, and the Cochrane Central Register of Controlled Trials databases were searched to identify randomized controlled trials (RCTs) and quasi-RCTs that determined the effect of physical interventions and injection techniques on pain during injection of vaccines in children 0 to 18 years of age, using validated child self-reported pain or assessments of child distress or pain made by others (parent, nurse, physician, observer). We sought to determine the effects of: (1) different formulations of the same vaccine; (2) position of the child during injection; (3) intramuscular versus subcutaneous injection; (4) cooling of the skin at the injection site with ice before injection; (5) stroking the skin or applying pressure close to the injection site before and during injection; (6) order of vaccine injection when 2 vaccines were administered sequentially; (7) simultaneous versus sequential injection of 2 vaccines; (8) vaccine temperature; (9) aspiration before injection; (10) anatomic location of injection; (11) aspects of the needle (gauge, length, angle of insertion, speed of injection); and (12) combinations of these interventions. All meta-analyses were performed using a fixed-effects model.
Results: Nineteen RCTs involving 2814 infants and children (0–18 years of age) were included in the systematic review. One study included children ≥16 years and adults (n = 150). Interventions with positive findings are summarized here. In 2 trials that used child self-reports of pain during administration of measles-mumps-rubella vaccine (total, 680 children with complete data), the Priorix

vaccine caused less pain than the M-M-R_{II}vaccine (standardized mean difference [SMD], −0.66; 95% CI, −0.81 to −0.50; $P < 0.001$). In 3 trials (404 children), the number needed to treat (NNT) with Priorix to prevent 1 child from crying was 3.2 (95% CI, 2.6–4.2). In 4 trials (281 infants and children), sitting children up or having parents hold infants appeared to cause less pain than the supine position, but the difference was not statistically significant; however, significant heterogeneity was found among the studies, and a qualitative approach was used for data analysis. A benefit was observed for 3 of the 4 studies; the SMD ranged from −0.4 to −0.8 ($P < 0.05$ for all analyses). The negative findings observed for the remaining study may have been the result of methodologic heterogeneity. Stroking the skin close to the injection site before and during injection reduced pain in 1 trial (66 children; SMD, −0.53;$P = 0.03$). One study (120 children) found that when diphtheria-polio-tetanus-acellular pertussis-*Haemophilus influenzae* type b (DPTaP-Hib; Pentacel) and pneumococcus (Prevnar) were injected sequentially during the same office visit, observer- and parent-reported pain scores were lower when DPTaP-Hib was injected first (SMD, −0.40 and −0.57, respectively; $P \leq 0.03$). In 1 study (113 infants) comparing rapid intramuscular injection without aspiration and slow intramuscular injection with aspiration, the rapid injection without aspiration was associated with less pain (SMD, −0.62 to −0.97 for parent, nurse, physician, and observer behavioral pain ratings; all, $P < 0.05$). The NNT to prevent 1 infant from crying was 2.5 (95% CI, 1.8–4.3).
Conclusions: Pain during immunization can be decreased by: (1) injecting the least painful formulation of a vaccine; (2) having the child sit up (or holding an infant); (3) stroking the skin or applying pressure close to the injection site before and during injection; (4) injecting the least painful vaccine first when 2 vaccines are being administered sequentially during a single office visit; and (5) performing a rapid intramuscular injection without aspiration.

Taddio A, et al. Survey of the prevalence of immunization non-compliance due to needle fears in children and adults. Vaccine. 2012 Jul 6;30(32):4807C12.

Needle fears are a documented barrier to immunization in children and adults. There is a paucity of data, however, regarding the prevalence of needle fears and their impact on immunization compliance. In this cross-sectional survey, a convenience sample of parents ($n = 883$) and children ($n = 1024$) attending a public museum in Toronto, Canada answered questions about needle fears and non-compliance with immunization due to needle fear. Altogether, 24% of parents and 63% of children reported a fear of needles. Needle fear was the primary reason for immunization non-compliance for 7% and 8% of parents and children, respectively. Interventions aimed at improving education about, and access to, analgesic interventions during immunization injections performed in childhood are recommended in order to prevent the development of needle fears and vaccine non-compliance.

Taddio A, McMurtry M, Shah V, et al. Reducing pain during vaccine injections: clinical practice guideline. CMAJ 2015; Aug 24 [Epub ahead of print]. DOI:10.1503/cmaj.150391

Pain at the time of vaccine injection is a common concern and contributes to vaccine hesitancy across the lifespan. Evidence-based and feasible interventions are available to mitigate pain and are part of good vaccination clinical practice. This guideline includes recommendations for pain mitigation based on five domains of pain management interventions (procedural, physical, pharmacologic, psychological and process): the “5P” approach.

Turner N. Introduction and Session Overview [Internet]. Geneva: SAGE Technical Consultation Group on Reducing Pain and Distress at the Time of Vaccination; 2015. Presentation at SAGE Meeting, 2015 Apr 14-16. Cited 2015 May 21]. Available from: http://www.who.int/immunization/sage/meetings/2015/april/presentations_background_docs/en/index1.html; accessed August 2015.
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WHO. Report to SAGE on reducing pain and distress at the time of vaccination [Internet]. Geneva: SAGE Technical Consultation Group on Reducing Pain and Distress at the Time of Vaccination; 2015 [updated 2015 Mar 31; cited 2015 May 19]. Available from: http://www.who.int/immunization/sage/meetings/2015/april/1_SAGE_latest_pain_guidelines_March_24_Final.pdf?ua=1; accessed August 2015.
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