

New clinical practice guideline for pain management during routine childhood vaccination — What pharmacists need to know

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Introduction

Advances in vaccine science have led to a continuous increase in the number of vaccines developed to combat infectious diseases in children. Commensurate with the increase in vaccine availability, however, has been an increase in the burden of pain associated with vaccine administration. At present, Canadian children undergo about 2 dozen vaccine injections by the time they reach school-age. Unmitigated pain from vaccine injections can lead to long-term harms, including pre-procedural anxiety and fear at future procedures, increases in pain sensitivity and the development of needle fears. It is estimated that about ¼ of the adult population has a fear of needles, with the majority of these fears developing in childhood. Needle fears can lead to nonadherence with preventive health care measures, such as vaccination. About 10%–15% of adults avoid vaccination simply because of needle fears.

An evidence-based clinical practice guideline was recently published in the *Canadian Medical Association Journal* that addresses pain management during vaccine injections in children.¹ The guideline was developed by the Help ELiminate Pain in KIDS (HELPin-KIDS) Team (www.sickkids.ca/Learning/SpotlightOnLearning/profiles-in-learning/help-eliminate-pain-in-kids/index.html), a national interdisciplinary team of scientists, clinicians, educators and policy-makers led by Dr. Anna Taddio, associate professor in the Leslie Dan Faculty of Pharmacy at the University of Toronto. The guideline is intended to help health care providers, as well as parents, reduce the pain and distress associated with vaccine injections in children. As pharmacists are commonly consulted by parents about how to mitigate vaccine injection pain, and more recently, have become certified to administer vaccine injections in some provinces, this guideline is directly applicable to pharmacy practice.

Guideline summary

The evidence base for the clinical practice guideline included 71 primary research studies (with more than 8000 children) and a range of pharmacological, physical and psychological pain-relieving strategies. The guideline offers practice recommendations that fall into 4 categories: 1) infants, 2) pharmacotherapy, 3) injection process

and 4) psychological interventions. A brief summary of the recommendations are provided below.

1) Strategies for infants

- Encourage breastfeeding mothers to breastfeed their infants during vaccination. An adequate latch should be established prior to vaccine injection.
- Among infants up to 12 months of age who cannot be breastfed during vaccination, administer a sweet-tasting solution (e.g., sugar water).

2) Pharmacotherapy

- Encourage parents to use topical anesthetics.

3) Injection process

- If more than one commercial brand of a vaccine is available and the brands are interchangeable, inject the least painful brand.
- Do not place children in a supine position during vaccination.
- Have children sit upright or be held by a parent.
- Administer intramuscular vaccines using a rapid injection technique without aspiration.
- When administering multiple vaccines to children sequentially, inject the most painful vaccine last.
- Among children aged ≥ 4 years, offer to rub or stroke the skin near the injection site with moderate intensity before and during vaccination.

4) Psychological interventions

- Use clinician-led distraction techniques.

Examples of age appropriate distraction techniques:

- Infants: bubbles, toys, singing.
- Toddlers: bubbles, toys, pop-up books, songs.
- School-aged children: toys, stories, videos, books, joking, music.
- Adolescents: games, videos, books, joking, music.
- Use child-led distraction among children aged ≥ 3 years.
- Use parent-led distraction or coaching to reduce pain-related distress.

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- Have children aged ≥ 3 years engage in slow, deep breathing or blowing.
- Among children aged ≥ 3 years, use combined psychological interventions.
- Do not tell children that “it won’t hurt,” as this type of simple suggestion, when used alone, has been shown to be ineffective in reducing pain at the time of injection. It may also promote distrust of health care providers.

No pain-relieving strategy reliably eliminates the pain of vaccine injections and using a combination of pain-relieving strategies improves pain relief. Judgment regarding the suitability and feasibility of individual strategies, however, is required, when considering the strategies to employ for individual children.

In order to facilitate implementation of the guideline, educational materials and tools, including a fact sheet for parents, a fact sheet for health care providers and a website and video for parents and health care providers, have been developed. All resources are available online, free of charge.¹ In addition, clinical considerations related to the use of pharmacological interventions (i.e., sweet-tasting solutions, topical anesthetics and oral analgesics), which may be of particular interest to pharmacists, are further elaborated on below.

Sweet-tasting solutions

Oral sweet-tasting solutions such as sugar (sucrose) water may be prepared immediately prior to vaccine injection by mixing 1 packet of sugar (or a sugar cube) with 10 mL (2 teaspoonfuls) of water in a medicine cup. A commercially available product has recently been licensed for sale in Canada (Tootsweet, Natus), however, it is not widely available. The sugar water is administered in the infant’s mouth using an oral syringe, pacifier or medicine cup immediately before the procedure. One dose can be used for multiple vaccine injections, since the duration of action is about 10 minutes. Sugar water is only indicated for the management of pain and not for general comfort.

Topical anesthetics

There are 3 commercially available products: lidocaine-prilocaine 5% cream/patch (EMLA), tetracaine 4% gel (Ametop) and liposomal lidocaine 4% cream (Maxilene). For all, the dose is 1 gram. However, the application time ranges from 20 minutes to 60 minutes, depending on the product. The long application time necessitates that their use is planned ahead of time (i.e., they can be applied at home, or upon arrival at the vaccine appointment if there is a sufficient time lag between arrival and vaccine injection). Topical anesthetics are available as creams, gels or patches impregnated with the drug. The creams and gels are covered by an occlusive dressing (that is usually included in the packaging) to prevent them from being accidentally wiped off or ingested. The patch is applied to the skin like a band aid.

It is important for parents to apply topical anesthetics in the correct anatomical sites, as the site for vaccine injections varies according to child age. The anterolateral aspect of the thigh is used in

infants <12 months and the upper arm (i.e., deltoid area) is used in infants >12 months. If multiple injections are to be given, then both limbs are used. Thus, parents should apply 2 doses, 1 on each limb.

Topical anesthetics frequently cause transient local skin reactions (about 1/3 to 1/2 of patients may have a reddening or whitening of the skin). Occasionally, there is itching or edema. These reactions are not harmful. If the severity of local skin reactions increases over time with subsequent applications, it may be a sign of an allergic reaction that should be investigated. Systemic toxicity is rare and generally only occurs after either administration of excessive doses or excessive application times.

Oral analgesics

Oral analgesics such as acetaminophen and ibuprofen, although commonly used to mitigate pain from vaccine injections, have not been evaluated for this purpose and are therefore not recommended. In addition, the long-standing practice of administering acetaminophen and/or ibuprofen prophylactically to prevent local and systemic adverse events following immunization (AEFI), including delayed pain, has recently been questioned because of new scientific data showing a potential for interference with the immunogenicity of some common childhood vaccines.² At present, these medications are only indicated for the treatment of AEFI after they occur.

Overall summary

It is hoped that this guideline will facilitate improvements in pain management practices in children undergoing vaccine injections and reduce the long-term consequences of untreated pain, including needle fears and health care avoidance behaviours. The guideline has been officially endorsed by the Canadian Pharmacists Association, the Canadian Paediatric Society, the Canadian Center for Vaccinology, as well as numerous other organizations across Canada. We encourage pharmacists to recommend and use these simple evidence-based pain management strategies in their practice to improve the quality of care given to children and their families during vaccine injections. Additional information can be obtained from the guideline manuscript and accompanying tools.¹ ■

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