

# Best Practice for Prevention of Vaccination Common Problems With Antipyretic/Analgesic Medications

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## ABSTRACT

Nurse practitioners are on the front lines providing parental education regarding vaccines. Some reasons for vaccine hesitancy include the potential common mild problems of vaccine administration, such as pain and/or elevated temperature. According to research, prophylactic administration of an antipyretic/analgesic medication, such as acetaminophen, reduces common mild problems related to vaccines when administered before or at the time of vaccination. Additionally, the evidence that prophylactic administration of antipyretic/analgesic medication decreases antibody response to vaccinations is insufficient at this time. However, this research has led to some confusion on best practice guidelines. This review of the literature resulted in recommendations that nurse practitioners should reassure parents that an antipyretic/analgesic medication will not reduce the immune response and can be administered to prevent or reduce common mild problems of vaccinations, which may then reduce vaccine hesitancy among parents.

**Keywords:** antipyretic, analgesic, immunization, prophylactic, vaccine

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In 2014, 91% of American children under age 6 received a well-child examination.<sup>1</sup> The Advisory Committee on Immunization Practices<sup>2</sup> and the American Academy of Pediatrics<sup>3</sup> recommend the administration of vaccinations during most routine well-child examinations. According to the Centers for Disease Control and Prevention, the majority of childhood vaccinations are administered during the first 18 months of life.<sup>4</sup> However, sometimes infants and young children experience common mild problems from vaccines such as elevated temperature, tenderness, and/or swelling at the injection site.<sup>5</sup>

Parents play an integral part in their child's health care; thus, it is vital that nurse practitioners (NPs) use

motivational interviewing to understand parental concerns regarding vaccine administration.<sup>6</sup> Although there are many reasons for parental vaccine hesitancy, mild common problems related to vaccines are often sighted as a reason to exempt or delay vaccine administration.<sup>5,7</sup> If sighted as a concern, NPs oftentimes recommend the administration of an antipyretic/analgesic medication to infants and young children before or at the time of routine vaccinations.<sup>8</sup> However, this practice is sometimes surrounded by controversy.<sup>5</sup> Although it is well-known that antipyretic/analgesic medications, such as acetaminophen, can be safely administered for mild common problems related to vaccinations, 1 study suggests this practice may negatively affect the child's ability to produce an effective immune response to vaccines.<sup>9</sup> Conversely, other studies find antipyretic/analgesic medications effectively treat mild common problems associated with vaccines, such as elevated

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temperature and discomfort, and do not negatively affect the immune response.<sup>10</sup>

As health care providers, NPs should provide evidence-based education to parents regarding the potential benefits and risks of antipyretic/analgesic medication and vaccination. However, there are few studies that have investigated the immune response and antipyretic/analgesic medication administration, and the findings in these studies are inconsistent.<sup>9-11</sup> The research regarding the use of antipyretic/analgesic medications to treat mild common problems related to vaccines is outdated. Therefore, the purposes of this article are to 1) review the literature regarding the prophylactic use of antipyretic/analgesic medications before or at the time of vaccination administration, 2) make a clinical recommendation for the NP regarding best practice, and 3) call for more research to resolve the question regarding antibody response and antipyretic/analgesic treatment for mild common problems associated with vaccines.

## METHODS

CINAHL, MEDLINE, and the Cochrane Library were searched to identify articles examining prophylactic antipyretic/analgesic medication use for vaccination administration. Additionally, select websites were reviewed, including the Centers for Disease Control and Prevention and the US Department of Health and Human Services websites. Search terms included acetaminophen, ibuprofen, paracetamol, antipyretic, prophylactic, immunization, vaccine, fever, febrile, adverse side effects or reactions, pain, swelling, irritability, fussiness, and antibody. Only randomized controlled trials (RCTs) published in the English language were included for review. Articles were included if published since 1987, which was the year of the first published RCT on this topic. Because the focus of this literature review was on antipyretic/analgesic medication use in infants and children before, at the time of, or after vaccination administration, articles regarding antipyretic/analgesic medication use for adolescent and adult vaccinations were excluded.

## RESULTS

Thirteen articles met the inclusion criteria. Although all 13 studies included research regarding the effect of

antipyretic/analgesic medications on vaccine-related mild common problems, some researchers evaluated the effect of antipyretic/analgesic medications on the patient's ability to produce a healthy antibody response after vaccination.

The type of antipyretic/analgesic medication differed from study to study. Although acetaminophen and ibuprofen are available in the United States, ibuprofen is only approved for use in children 6 months and older. This is significant because many vaccines are given before 6 months of age. Additionally, paracetamol, although not available in the US, was 1 of the antipyretic/analgesics used in some of the studies. Furthermore, the type of vaccine administered and the number of vaccines in the series varied from study to study.

Three main outcomes were measured in the 13 studies, namely, the effect of antipyretic/analgesic medications on local vaccine reactions, systemic vaccine reactions, and antibody response. Nine studies focused on the antipyretic/analgesic medication effect on local vaccine reactions, specifically vaccine site redness, swelling, and pain.<sup>9,12-19</sup> Eleven studies evaluated the effect of antipyretic/analgesic medications on systemic vaccine reactions, such as elevated temperature, fussiness, and sleep duration.<sup>9,10,12-15,17-21</sup> Researchers also measured the effect of antipyretic/analgesic medications on antibody response in 3 studies.<sup>9-11</sup>

### Local Vaccine Reactions

**Redness and Swelling.** Eight RCTs addressed the relationship between redness and swelling at the vaccination site and antipyretic/analgesic medication administration.<sup>9,13-19</sup> In 6 RCTs, researchers found a decrease in redness and swelling at the vaccination site when antipyretic/analgesic medication was administered before or at the time of vaccination although the findings were not always statistically significant.<sup>9,13-15,17,18</sup> Rose et al<sup>18</sup> found the reduction of redness and swelling with prophylactic antipyretic/analgesic medication varied depending on the type of vaccine being administered and the number of doses in the vaccine series. A reduction of redness and swelling was observed in all doses of the series for both the pneumococcal conjugate vaccine, 7-valent (PCV-7), and the combination vaccine, diphtheria, tetanus,

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