

# The Development of a Pediatric Medication Administration Guideline for Preprocedure Nurse Callers

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**Purpose:** This article describes the authors' development of a pediatric medication administration guideline for use by preprocedure nurse callers. Preprocedure refers to procedures done with general anesthesia such as surgery, endoscopy, or magnetic resonance imaging.

**Design:** This article describes a process improvement project.

**Methods:** The literature was searched using Cumulative Index to Nursing and Allied Health Literature, MEDLINE, Google Scholar, and Google. No existing peer-reviewed pediatric preprocedure medication administration guidelines were found. A guideline with instructions for commonly prescribed pediatric medications was developed.

**Findings:** Use of the guideline improves patient safety by providing clear medication administration instructions, while increasing the efficiency and autonomy of our nurse callers. Surveys of the nurse callers demonstrated that the guideline was clear, caregivers were receptive to receiving instructions from nurse callers, and use of the guideline decreased the number of calls made to other providers.

**Conclusions:** The use of a medication administration guideline improves patient safety, nurse efficiency, and nurse autonomy.

**Keywords:** pediatric, preprocedure, medication administration guideline, preprocedure nurse callers, preoperative.

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**THIS ARTICLE DESCRIBES** the development of a pediatric preprocedure medication administration guideline for preprocedure nurse callers (described as callers throughout this article). Callers are registered nurses with varying years of experience in the pediatric preoperative (preop) and postanesthesia care unit (PACU) areas. In addition to their time placing preprocedure calls, all continue to work in the preop and PACU areas.

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Caregivers of children scheduled for surgery or a procedure with general anesthesia, such as endoscopy or magnetic resonance imaging, need preop medication administration instructions for their children who take daily medications. In general, it is advantageous for children to continue taking their essential medications on the day of surgery or procedure prescribed for conditions, such as asthma, infection, seizures, and gastroesophageal reflux<sup>1,2</sup> (unpublished data, Martin L and Haberkern C, "Medications before anesthesia or surgery," 2016). However, some essential medications should not be given on the day of surgery or procedure because of concerns about side effects or interactions with anesthetic agents such as angiotensin-converting enzyme inhibitors and diuretics<sup>3-5</sup> (unpublished data, Martin L and Haberkern C, "Medications before anesthesia or surgery," 2016).

The lack of a standard pediatric preprocedure medication administration guideline at the authors' institution contributed to unclear communication with patient caregivers and increased time for the callers. This article will:

- Describe the authors' development of a medication administration guideline for the callers.
- Describe the educational process provided to the callers before guideline implementation.
- Describe the results of the callers' evaluation of the guideline at 3 and 12 months postguideline implementation.
- Describe some of the challenges experienced with guideline implementation.
- Provide access to and use to the authors' guideline ([Appendix](#)).

## Background

In the past at the authors' institution, callers contacted caregivers 2 days before the day of surgery or procedure to give hospital arrival times and pre-anesthesia fasting instructions. Callers did not provide instructions for medication administration; citing they felt this was outside the scope of their practice, and they lacked comfort and familiarity with many of the prescribed medications. As a result, all medication administration questions were directed to a nurse practitioner (NP) in the preanesthesia clinic or to the in-charge anesthesiologist in the operating room (OR). This often resulted in multiple phone calls, delays, and extra time for both the callers and the caregivers, and it increased the potential for inconsistent or inappropriate medication administration instructions. There was concern that the administration of inappropriate preop medication(s) could pose a patient safety risk. Another concern was that there could be delays or cancellations of a surgery or procedure if inappropriate medications were administered, resulting in subsequent financial loss and inconvenience to both the patient, caregiver, and institution.<sup>6</sup> It was determined that if the callers had a medication guideline, they would have the ability to provide consistent medication administration instructions and answer most medication administration questions in a single phone call while working within the scope of their practice and training.

Registered nurses provide education, counseling and health promotion, coordinate care, and administer medications, along with numerous other patient-focused interventions. Two of the essential conditions conducive to safe medication administration include the nurses' right to have access to drug information and their right to have policies or guidelines on safe medication administration.<sup>7</sup>

Clinical practice guidelines are developed to synthesize scientific evidence on medical conditions, procedures, or therapies to inform health care policy and delivery.<sup>8</sup> The principle benefits of clinical guidelines are to improve the quality and consistency of care received by the patient. They are also important tools for embedding clinical evidence into practice.<sup>9</sup>

## Literature Search

As an effort to provide the callers with the information they needed to complete their preprocedure calls as safely and efficiently as possible, a search of the literature (from 1996 to November 2017) was done looking for existing peer-reviewed pediatric preprocedure medication administration guidelines. Searches included Cumulative Index to Nursing and Allied Health Literature, MEDLINE, Google Scholar, and Google. Search terms included medication administration, pre-operative, pediatric, before surgery, medication instructions, pre-surgery, children, preoperative care, preadmission, and medication reconciliation. The literature results were limited, and articles were primarily focused on adults. In addition, many of the articles focused on medication reconciliation and the identification of the patient's current medication list at the time of their preop admission. Although searching Google resulted in a number of informal guidelines from various pediatric hospitals, none of these guidelines were peer reviewed.

## Purpose

There was a need to develop a peer-reviewed medication administration guideline. The purpose in developing the guideline was to improve patient care and safety by providing consistent presurgery or procedure medication administration instructions for caregivers. We also presumed that use of a guideline would increase the efficiency of

the callers by reducing the number of calls placed to other providers such as the preanesthesia clinic NPs and the charge anesthesiologist.

The authors' institution is a busy 371-bed pediatric teaching hospital in the Pacific Northwest. Nurse callers are part of the institution's perioperative services. These services include 14 OR suites; preop rooms; a PACU; a procedure room; gastroenterology, cardiac catheterization, and interventional radiology suites; and a preanesthesia clinic. Care is provided for newborns to adults in the following areas: cardiovascular, neurosurgery, robotics, plastic surgery, ophthalmology, otolaryngology, urology, general surgery, gastroenterology, gynecology, dental, oral surgery, orthopaedics including complex spine care, solid organ transplant, dermatology, and orthopaedics—oncology. Patient volumes average 11,300 annually.

### **Process**

An initial planning meeting to discuss guideline development was held with the institution's key nursing and anesthesia stakeholders. These stakeholders included the lead caller, two preanesthesia clinic NPs, and the PACU clinical nurse specialist. Of note, pharmacy stakeholders did not participate in the initial planning meeting, but they were actively involved and played an important role during guideline review and approval.

One preanesthesia clinic NP and the lead caller went on to develop the guideline. A limited informal guideline developed by two of the institution's anesthesiologists (unpublished data, Martin L and Haberkern C, "Medications before anesthesia or surgery," 2016) was used as a starting point, along with the day-to-day clinical practice experience of the preanesthesia clinic NPs. Every effort was made to identify and include the most commonly prescribed outpatient pediatric medications.

At the authors' institution, the preanesthesia clinic NPs see the most medically complex patients several weeks to days before a surgery or a procedure. These patients account for about 20% of the institution's total preop patient volume. During the preanesthesia clinic visit, the NPs review the patients' daily medications and provide their

caregivers with written preop medication administration instructions. These instructions are documented on the clinic visit summary. The clinic visit summary becomes a permanent part of the patient's electronic health record. The callers review the clinic visit summary instructions with the caregiver during their call, 2 days before surgery/procedure. The remaining 80% of preop patients not seen in the preanesthesia clinic receive all their medication administration instructions from the callers.

### **Guideline Design**

The guideline consists of three tables (Appendix). Appendix Table 1 in the guideline includes medications that should not be given on the day of surgery. Appendix Table 2 in the guideline includes medications that require review with a provider (preanesthesia clinic NP, in-charge anesthesiologist, surgeon, or the prescriber) before administration decisions are made. Appendix Table 3 in the guideline (Figure 1) includes medications that may be given at least 2 hours before the start of the surgery with a small sip of water or 5 to 10 mL flush of water if the child has a feeding tube. Each table includes the body system associated with the medication, drug classification, drug name, and any special administration instructions. In addition to information found in the literature<sup>1-5</sup> (unpublished data, Martin L and Haberkern C, "Medications before anesthesia or surgery," 2016), our institution's online medication formulary was used as a reference.

### **Guideline Approval**

Once a draft of the guideline was completed, two of the institution's anesthesiologists and a preanesthesia clinic NP reviewed it for corrections and additions. After their review, the guideline was sent to the institution's Pharmacy and Therapeutics Committee. The primary function of the Pharmacy and Therapeutics Committee is to centralize organizational decisions about medication use. The committee serves in an evaluative, educational, and advisory capacity to medical staff and organizational administration.

Recommendations from the committee included the following: placing the table of medications that should *not* be given first on the guideline, adding the disclaimer that the medication tables were

**Table 3 - The following medications *may* be given on the day of surgery at least 2 hours before the start time with a small sip of water or 5-10 ml water flush if given by NG or G-tube.**

Any questions about medication administration should be referred to the PASS Clinic NPs (7-2728), the surgeon, and/or the prescribing care provider.  
\*Note that the following table is not all inclusive.

| Body System    | Drug Classification                    | Examples of commonly prescribed medications – generic (Trade)<br>*Note that this list is <u>not</u> all inclusive | Special Instructions   |
|----------------|--|---|--|
| Cardiovascular | Angiotensin receptor blocker           | losartan (Cozaar)   |  |
|                | Anti-arrhythmic agent, cardioglycoside | digoxin (Lanoxin)   |  |
|                | Beta-adrenergic blocker                | atenolol (Tenormin)<br>metoprolol (Lopressor, Dutoprol)<br>propranolol (Inderal)                                  | Encourage caregiver to administer on the day of surgery.                               |
|                | Calcium channel blocker                | amlodipine (Norvasc)  |  |
|                | Endothelin receptor antagonist         | bosentan (Tracleer)   |  |
|                | Phosphodiesterase – 5 inhibitor        | sildenafil (Revatio, Viagra)  |  |
| Pulmonary      | Bronchodilator                         | albuterol (Proventil, Ventolin, ProAir)   | Instruct caregiver to administer usual dosage the night before and morning of surgery. |
|                | Long acting beta agonist               | fomoterol (Foradil)<br>salmeterol (Serevent)  |  |

Figure 1. Example from medication administration guideline. First page, Table 3, medications that may be given on the day of surgery. NG, nasogastric feeding tube; G-tube, gastrostomy feeding tube; PASS, preanesthesia surgical services. See Appendix for complete guideline with all tables. This figure is available in color online at [www.jopan.org](http://www.jopan.org).

not all inclusive and, listing both trade and generic drug names throughout the tables. The aforementioned recommendations were incorporated into the final guideline. Final guideline approval was obtained from a variety of institution representatives, including nursing, pharmacy, anesthesia, and surgery.

### **Guideline Implementation**

Early discussion to create awareness and interest about the new guideline occurred during staff meetings and informally on a one-to-one basis with the authors. The authors were identified as the guideline's primary resource(s) or champion(s) to help encourage adoption of the guideline.<sup>9</sup> Advanced education to the callers about the guideline's purpose, format, and use was provided by the authors at an in-person group meeting 1 month before guideline implementation. Introductory information and copies of the guideline were electronically mailed to all the nurse callers

before the group meeting for their review. The guideline's goals of improved patient safety, nurse efficiency, and nurse autonomy were highlighted in this electronic mail.

During the group meeting, the guideline was reviewed, and the nurse callers were able to ask questions and express concerns. Concern was expressed that not all medications were included in the guideline. The authors acknowledged that from a practical standpoint, it was not possible for the guideline to include every medication, and the callers were advised to focus on the drug classification (such as antibiotics and diuretics) when they encountered medications not found on the guideline. Use of the institution's online medication formulary was suggested to help identify drug classifications, interactions, and potential side effects. The callers were asked to keep a running list of frequently encountered medications not included in the guideline so that they could be added in the future. In

addition, the guideline authors, preanesthesia clinic NPs, and in-charge anesthesiologist were identified as resources for additional questions once the guideline was implemented. The resources' contact information was included on each page of the guideline. The guideline subsequently became part of the institution's OR policies. Staff not present at the group meeting received one-on-one training from the authors, and newly hired staff received guideline training during their orientation.<sup>10</sup>

**Nurse Caller Documentation**

The institution's callers place 50 to 60 preprocedure caregiver calls each day. Keeping that in mind, every effort was made to streamline the

documentation of medication administration instructions. Calls are documented on each patient's electronic health record on a special preprocedure call form (Figure 2). A hyperlink to the medication administration guideline is incorporated within the call form so it can be easily and quickly accessed by the callers. The guideline can also be searched electronically by medication name. Paper copies of the guideline were also posted in the callers' office area.

Caregivers were instructed to give all appropriate medications at least 2 hours before the start of surgery with a small sip of water. Caregivers of children with nasogastric or gastric feeding tubes were advised to give the medication in the tube followed by a 5 to 10 mL flush of water. Callers were

The screenshot shows a web-based form titled "Pre-Procedure Instructions" for a patient named "Segoe UI". The form is organized into several sections:

- Procedure Details:** Shows the patient name "Segoe UI" and a dropdown menu set to "9".
- Legal Guardian:** Radio buttons for "Parent", "Self", and "Other".
- Name of Informed Legal Representative Contacted & Relation to Patient:** A text input field.
- Representative Phone #:** A text input field.
- Informed Responsible Adult Escort Required for Discharge:** Radio buttons for "Yes", "Admit", and "Other".
- Recent Illness/Exposure:** Radio buttons for "Yes" and "No".
- If yes, explain:** A text input field.
- PASS Clinic Appointment:** Radio buttons for "Yes" and "No".
- Medication Instructions:** Radio buttons for "N/A", "Per RN", "Per PASS", and "Per Clinic".
- NPO/Med Recommendations:** A text input field with a "Ref" link.
- Check-In Time Given:** A dropdown menu.
- Instructed NPO Solids, Milk, Formula, and Fortified Breast Milk:** A dropdown menu.
- Instructed NPO Breast Milk:** A dropdown menu.
- Instructed NPO Clear Liquids:** A dropdown menu.
- Infectious Disease Exposure Within the Past 30 Days:** Checkboxes for "None", "Pertussis", "Chicken pox", and "Measles".
- Immunizations Current:** Radio buttons for "Yes", "No", and "Unknown".
- Hazardous Drug Precautions:** Radio buttons for "Yes" and "No".
- Hazardous Drug Name:** A text input field with a "Ref" link.

Outpatient Pre-op Medication Administration Guidelines for RN callers. © 2018 Seattle Children's All Rights Reserved

Figure 2. Callers' documentation form. PASS Clinic, Preanesthesia Surgical Services Clinic; per PASS, per the PASS Clinic nurse practitioner; per RN, per nurse caller; NPO, nothing by mouth. This figure is available in color online at [www.jopan.org](http://www.jopan.org).

to document any medication instructions given to the caregiver, such as “caregiver advised to hold captopril (Capoten)” and “give levetiracetam (Kepra) the morning of the procedure.”

### Guideline Evaluation

A confidential online survey requiring yes/no binary responses was sent to all the nurse callers 3 months after guideline implementation ( $N = 27$ ). Nurse callers were asked the following: (1) did they feel the guideline was clear and easy to follow, (2) did they feel caregivers were receptive to receiving medication administration instructions from the nurse callers rather than the anesthesia clinic NPs or other providers, (3) did they feel they were making fewer additional phone calls to other providers for instructions or clarification, and (4) did they feel they had enough training to use the guideline effectively?

The nurse callers' responses ( $n = 18$ ) were analyzed using descriptive statistics (Table 1, survey 1 results). The results showed the following:

- The guideline was clear and easy to follow (94%).
- Caregivers were receptive to receiving medication administration instructions by the callers (94%).
- Use of the guideline improved the callers' efficiency and autonomy based on the finding that they were making fewer calls to other

providers for instructions and clarification (57%).

- A small number felt they did not have adequate training (11%).

To respond to the respondents who felt they needed more training, the guideline authors provided an additional hour-long open question and answer period for all interested callers.

An identical follow-up confidential survey was sent to the callers 12 months after the guideline was implemented ( $n = 15$ ) (Table 1, survey 2 results). The callers' responses were analyzed using descriptive statistics. Based on the results of survey 2:

- The guideline was clear and easy to follow (93%).
- Respondents felt caregivers were receptive to receiving medication administration instructions by the callers (100%).
- Use of the guideline improved the callers' efficiency and autonomy based on the finding that they were making fewer calls to other providers for instructions and clarification (87%).
- A small number of callers felt they did not have adequate training (13%).

Noted areas of improvement between survey 1 and survey 2 results include the following: 100% of the callers felt caregivers were receptive to receiving medication administration instructions

**Table 1. Callers Confidential Survey Results**

|                                 | Survey 1                   |           | Survey 2                   |          |
|---------------------------------|----------------------------|-----------|----------------------------|----------|
|                                 | frequency of responses (%) |           | frequency of responses (%) |          |
| Total surveys sent              | 27                         |           | 25                         |          |
| Returned surveys                | 18 (67%)                   |           | 15 (60%)                   |          |
| Questions                       | Responses                  |           |                            |          |
|                                 | Yes                        | No        | Yes                        | No       |
| Guideline is clear              | 17 (94%)                   | 1 (6%)    | 14 (93%)                   | 1 (7%)   |
| Caregivers receptive to callers | 17 (94%)                   | 1 (6%)    | 15 (100%)                  | 0        |
| Decreased caller phone calls    | 10 (56.5%)                 | 8 (44.5%) | 13 (87%)                   | 2 (13%)  |
| Additional training is needed   | 2 (11%)                    | 16 (88%)  | 2 (13%)                    | 13 (87%) |

Note: Surveys required yes/no binary responses. Survey 1 sent 3 months postguideline implementation. Survey 2 sent 12 months postguideline implementation. Total surveys sent for survey 2 were less than survey 1 because of callers leaving/changing positions.

by the callers, and an increase from 56% to 87% of the callers felt they making fewer additional calls to other providers for medication questions.

## Discussion

The preprocedure medication administration guideline provides clear, easy to follow, and safe medication administration information for callers. Use of the medication guideline results in fewer calls to other providers, therefore improving callers' efficiency and autonomy. Caregivers are very receptive to receiving medication administration instructions from callers instead of being directed to other providers such as preanesthesia clinic NPs or in-charge anesthesiologist. Although most callers in both surveys felt the guideline was clear and easy to follow, anecdotally, callers expressed frustration to the authors that the guideline did not include all medications. These frustrations did seem to decrease over time. A plausible explanation for this decrease is that with time, the callers became familiar with the guideline and more comfortable providing medication instructions. An additional reminder to focus on the drug class rather than a specific medication when making administration decisions may have also helped improve the callers' comfort. Posting a running list of medications not included in the guideline along with any administration instructions provided by a preanesthesia clinic NP or an anesthesiologist also helped when callers were making subsequent calls for the same medication. This also highlighted the importance of regular guideline updates with the addition of new medications and administration instructions as they became available.

Several challenges have been identified related to guideline use. The first involves the medically complex patient who is taking multiple medications. Placing calls to those caregivers requires extra time and patience by the callers. Understandably, this can be especially frustrating when the caller has a long list of calls to make.

The second identified challenge involves patients taking daily doses of medications that can potentially increase bleeding such as aspirin and nonsteroidal anti-inflammatory drugs. The guideline recommends that the caller consult with the sur-

geon or the prescribing care provider. Typically, these medications are stopped 7 days before surgery or procedure (excluding radiologic procedures where no bleeding is expected to occur). Unfortunately, the callers found that a number of patients had not been told to stop or had forgotten to stop their aspirin or nonsteroidal anti-inflammatory drugs, and they were still taking the medication when they placed their call 2 days before surgery or procedure. This discovery resulted in extra calls and caller delays spent contacting the surgeon to determine if the medication could be continued or if surgery or procedure needed to be canceled until the medication could be stopped for 7 days. Ideally, instructions regarding these medications should be given by the surgical team at the preop clinic appointment and documented in the patient's clinic visit summary.

The third challenge identified involves documentation of the medication administration instructions given to the caregiver by the caller. Although ideally as brief as possible, considerable caller time is required to document the information, particularly if the patient is taking a number of medications. However, this is essential information that must be documented in the patient's electronic medical record and is the policy for most institutions, including the authors. Documentation also is an important safeguard for the callers in case of errors or if questions develop after the call has been placed.

The fourth challenge identified involves keeping the guideline current and up to date. Ideally, the guideline should be reviewed and updated on a regular basis. Currently, the institution's lead caller completes this task by periodically requesting that the posted list of medications not presently included in the guideline are added to the guideline. This request is reviewed and approved by the institution's Pharmacy and Therapeutics Committee and then is added to the guideline.

The authors' institution continues to look at ways to address the aforementioned challenges. For example, audits will be conducted of completed preprocedure call forms to identify issues with documentation of medication administration instructions. Also in process is identification of how administration instructions for medications

that can potentially increase bleeding are identified well in advance of the preop call.

## Conclusions

In conclusion, this article describes the development of a preprocedure medication administration guideline for callers. Prior peer-reviewed literature about pediatric preprocedure medication administration has been very limited and primarily focused on adults. The authors' hope is that sharing the guideline and the development process along with the successes and challenges will be helpful

for other institutions developing their own medication administration guidelines.

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## Appendix

Complete medication administration guideline is contained in the appendix found at <https://doi.org/10.1016/j.jopan.2018.06.102>.

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