

Purpose: This guideline is intended to be used to reduce and manage pain and anxiety for patients that need non-emergent needlestick procedures. Some interventions show more effectiveness for certain procedures than others, and those will be listed in the evidence and summary tables. Almost all interventions show increased effectiveness when used in combination with other interventions. All caregivers provide care that requires needlesticks, including but not limited to, physicians, advanced practice practitioners (APP), nurses, patient care technicians (PCTs), Certified Child Life Specialists (CCLS), and phlebotomists. While some interventions below are limited by an individual's training, licensure, or scope of practice, it is the expectation and standard that each clinician involved in the needlestick procedure will advocate for pain reducing interventions for each patient for each needlestick and consult other team members if more interventions are needed.

We pledge to do our part to develop, teach, implement, and advocate for practices that will provide More Comfort and Less Pain to every patient, every visit, every procedure.

Definition:

Needlestick Procedures include: venipuncture for intravenous access, venipuncture for phlebotomy, injections (intramuscular, subcutaneous, intradermal), finger stick blood collection, port-a-cath access, lumbar puncture, heel lancet, arterial punctures, sutures, and other procedures with needles.

Guideline Inclusion Criteria: Patients presenting to Dell Children's Medical Center and Dell Children's North for care, including Emergency Department, inpatient, day surgery, pre-anesthesia testing, lab draw station, outpatient visits that require a needlestick procedure.

Many of these interventions are evidence-based to reduce pain and fear for other procedures such as wound care, dressing changes and others, but are outside the scope of this guideline.

Guideline Exclusion Criteria: Hemodynamically unstable patients that require emergent life-saving treatment.

Consults/Referrals: Certified Child Life Specialists evaluation should be offered to every patient that is needing a procedure to be completed. Other consults that should be considered for patients based on assessment and previous procedural experiences are music or art therapists.

Escalation Criteria: Some patients will present for care with a history of needle fear or traumatic experiences that will require interventions above and beyond this guideline. The team should discuss all procedures with caregivers and patients to develop a plan, and if it is determined that the interventions in this guideline are not expected to reduce pain and fear to facilitate the successful completion of the procedure, the provider should consider other options, such as change or delay in procedure, or consult with sedation services.

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Justification: Needle Pain Affects All Ages

Needlestick procedures are inherent in medical care for the administration of medications, vaccines or collecting lab samples, and almost all patients that need medical care, either preventative or emergent, will be subjected to some form of needle stick procedure. The American Academy of Pediatrics (AAP)¹⁰, Association of Child Life Professionals (ACLP)⁴⁹, American Society of Pain Management Nursing (ASPMN)⁴⁵, Centers for Disease Control (CDC)⁴⁸, and American Nurses Association (ANA)⁵² have guidelines and/or practice recommendations to highlight the importance of clinicians from these disciplines recognizing the crucial role they play in anticipating, preventing, reducing, and managing pain for all ages of patients, which includes pain caused by needles and medical procedures.

- The American Nurses Association (ANA) states that nurses have an “ethical responsibility to relieve pain and the suffering it causes,”⁵² and that clinicians have a professional, ethical, and legal obligation to improve knowledge and skills to be able to anticipate, minimize, and treat pain for procedures to minimize adverse and untoward events.⁴¹
- The American Society of Pain Management Nursing (ASPMN) states “all patients undergoing painful procedures have the right to safe and effective pain management throughout the phase of care and that their interprofessional health care team ensures such ethical obligation is fulfilled with a framework of patients preferences.”⁴⁵
- The American Academy of Pediatrics (AAP) recommends that every health care facility caring for neonates should have a plan to reduce the number of painful procedures performed, and have procedures in place for pain assessment and management with pharmacologic and nonpharmacologic therapies.¹⁰
- Association of Child Life Professionals (ACLP) practice statement says that during the course of preparation for a procedure, it is essential that potential stressors are anticipated and fears addressed. Most children prepared for medical procedures experience significantly lowered levels of fear and anxiety, and this preparation promotes long-term coping and adjustment to future medical interventions.⁴⁹

It is estimated that about 10% of the population avoids needle procedures because of a fear of needles and that up to 25% of adults have a fear of needles, most of which developed during childhood.³⁸ Avoiding needle stick procedures can be detrimental to health, as many medical diagnoses require lab draws, most vaccines are injections, and some daily medications are administered via needles. Vaccines are administered frequently from infancy through childhood, and adults continue to need vaccines and boosters as well. Not only can negative experiences with needle pain develop into needle fear that can cause people to avoid medical care, but parents or caregivers who have fears of needles may hesitate to have their children vaccinated.³⁹ There is also evidence that this distress affects the caregiver and the vaccine administrator negatively, as well.³⁸ With the COVID 19 pandemic and urgent need to vaccinate large numbers of the population of all ages, the need to reduce pain and fear for needles has become even more pressing.

While needle pain and fear is shown to be a challenge for the population at large, special attention should be paid to neonates, infants, and children. Great strides have been made in understanding the pain experience of children in the last 30 years, and it has been found that pain sensation is functional as early as 25 weeks’ gestation, and pain experienced in infancy and childhood can have short and long term effects. Inadequate analgesia for procedures in young children may diminish the effect of adequate analgesia in subsequent procedures.⁷¹ Specifically for neonates, especially preterm infants, repeated pain experiences can have both short and long term ramifications, such as physiologic instability, altered brain development, and abnormal neurodevelopment, somatosensory, and

stress response systems, which can persist into childhood.¹⁰ While vaccinations are the primary preventative needlestick procedure that affects children, those seeking care in a clinic or hospital will most likely need many different types of seemingly “minor” needlestick procedures as well, including venipuncture for lab studies, finger sticks for glucose testing, heel lancets for newborn screening and testing, lumbar punctures for testing or treatment, and port-a-cath access for patients that need frequent lab draws, infusions, or therapies. Adequate pain management is essential, as exposure to pain in premature infants has shown to result in high self-reported pain by school age children during venipuncture, and can lead to poor cognition and motor function. It is also shown that pain in early life heightens risk for developing anxiety, chronic pain, and depressive disorders in adulthood.⁷²

The interventions examined in this guideline include interventions that are evidence-based, easy to administer or perform, and provide a variety of options both for clinicians to use, depending on the situation of the needlestick, and the patient/caregiver to choose from, based on past experience and expert knowledge of their child.

Procedural Preparation

The primary objective of preparation for procedural events is to reduce the fear and anxiety of the patient and their caregivers. Patient and parent participation in preparation has been shown to reduce negative psychological outcomes and increase development of appropriate coping strategies, etc.⁽³³⁾ The key elements of procedural preparation include assessment of the patient's and family's previous experiences, interdisciplinary collaboration, provision of developmentally appropriate information, actively involving parents, patient participation and encouragement of emotional expression, and formation of a trusting relationship with a healthcare professional.⁽³³⁾

Key elements:

- **Assessment of previous experiences**
 - Questions need to be asked about children's previous experience with procedures:
 - What comfort measures were used previously?
 - Which strategies were effective?
 - What were the child's emotional and physical reactions to the procedural stimuli?
 - What were the caregiver's reactions to the procedure?
 - Other aspects of assessment include:
 - Has the child had severe stress reactions to other procedural or non-procedural events?
 - Has the child experienced severe levels of pain?
 - Is the child separated from parents or caregivers?
 - Has the child had previous traumatic experiences?
- **Interdisciplinary collaboration**
 - Appropriate consults should be made to interdisciplinary members, including a consultation to a Certified Child Life Specialist (CCLS) to provide developmentally appropriate preparation, emotional expression, and creation of a coping plan. If a CCLS is unavailable, these roles should be assumed by another team member, such as the nurse.
 - Additional consults may be needed to other disciplines, such as music therapists or art therapists, based on the child's individual needs.
 - Role division should be completed prior to the start of the procedure to determine who will be involved in the procedure, who will be performing which task (completing procedure, assisting with positioning, providing distraction, etc.), and who will provide the One Voice.
- **Provision of developmentally appropriate information**
 - Clear and accurate messaging
 - Should be as specific as possible to include both what will happen during the upcoming medical procedure, as well as why it will happen.
 - Include sensations: sights, sounds, smells, and feelings
 - Coping techniques should be offered (such as visual and auditory distraction, tactile stimulation, counting and singing, and verbal interaction)
- **Parental/Caregiver involvement**

- Parents require preparation prior to the procedure.
- Parents need to be encouraged to stay and be given active roles to take (positioning for comfort, soothing, hand holding, distraction, etc.). Exceptions can be made for caregivers who have procedural fear or show high levels of distress themselves.
- **Patient involvement and encouragement of emotional expression**
 - During preparation, potential stressors should be anticipated and misconceptions and fears should be addressed.
 - Pay attention to nonverbal communication.
 - Findings indicated that children who asked questions and expressed concerns were less distressed and spent significantly less time seeking information during the procedure.
- **Formation of a trusting relationship with a healthcare professional**
 - Through preparation, teaching of coping techniques, and encouragement of emotional expression, the CCLS is poised to establish a supportive and trusting relationship with the child.
 - Key strategies for building rapport included asking the child questions about topics such as age, grade in school, pets, or the number of siblings.
 - Children and families who received any form of preparation and supportive care (defined as the nurse making a special effort to establish a trusting and supportive relationship with child and parent) expressed significantly greater satisfaction with their hospital experience when compared with children and families in other groups.

Allowing kids and families to decide *how they want* to cope gives them a sense of control and calm which helps to reduce procedure pain and anxiety.

Pain Prevention and Management Interventions

Topical Lidocaine

Topical anesthetics should be considered with every patient undergoing a needle stick procedure. They have been shown to reduce pain and anxiety with IV starts in children⁵³ and were shown to be the only consistent analgesia within an additive pain intervention regimen during vaccinations in infants.¹⁹ There is also evidence they improve insertion pain for lumbar puncture⁵⁴ over placebo, and should be considered as part of the pain management bundle for that procedure. In a comparison between injected buffered lidocaine and topical anesthetics in children, there was no significant difference in pain and anxiety reduction or nursing satisfaction and success with the procedure, suggesting the advantage of a cream application over an additional subcutaneous injection.⁵⁵ However, a similar study in adults did suggest superior analgesia with injected lidocaine, highlighting a potential role for injected lidocaine in specific cases, such as a particularly difficult or prolonged IV cannulation. Despite the common misconception, topical lidocaine has not shown to constrict veins or negatively affect success rate of IV cannulation or venipunctures in children.^(56, 57, 58)

The two most common topical anesthetics currently available are 4% liposomal lidocaine (LMX4, ELA-Max) and a mixture of 2.5% lidocaine and 2.5% prilocaine (EMLA: eutectic mixture of local anesthetics), with the latter being the most studied of the two. The two creams have been shown to be equally effective when used appropriately, with the difference between the two relating to application time and time to full efficacy. EMLA must have an occlusive dressing in place to facilitate better penetration on intact skin, whereas LMX 4 doesn't need the occlusive dressing, but the general recommendation is to cover applied cream with an occlusive dressing such as Tegaderm to prevent unintentional removal. ELA-Max (LMX4) is a liposomal lidocaine, and liposomes have been used to enhance the effects of medications by increasing the rate of drug absorption, therefore LMX4 does not require the use of an occlusive dressing.⁴³ In a study comparing LMX4 and EMLA, the study found "comparable venipuncture pain relief effects" between the two products, and the shorter time of a 30 minute application time needed for LMX4 is preferable to the longer time needed for EMLA to numb the skin.⁴³ **See [Addendum 1](#) for comparisons of Topical Anesthetics.**

Contraindications to topical anesthetics are mostly regarding allergy to the medication itself or contact irritation from the cream. There is a theoretical risk of methemoglobinemia in infants, specifically pre-term infants and those less than 3 months of age, for lidocaine-prilocaine creams, but not with liposomal lidocaine.⁵⁶ This risk of methemoglobinemia from EMLA was thought to be limited to the first 3 months of life, correlating with low levels of activity of the enzyme nicotinamide adenine dinucleotide cytochrome b5 reductase, which increases to normal with age. Prilocaine and its metabolites, 4 hydroxy-2-methylaniline and 2 methylaniline (o-toluidine), have been implicated as the methemoglobin stressors in EMLA cream. ELA-Max, however, does not contain prilocaine and therefore would not be expected to increase the risk of methemoglobinemia in infants younger than 3 months.⁴³

Interestingly, a recent meta-analysis added to this discussion by demonstrating a non-superiority of topical anesthetics to direct breastfeeding or sucrose in this age group for venipuncture, highlighting the importance of those methods of analgesia for infants.⁵⁴ Topical anesthetics have also not been shown to be effective in heel lances, an additional procedure where breastfeeding or sucrose would have an advantage.⁵⁴

Ages and Dose	<p>Less than 37 weeks: 0.5 gram per application, 2 application per day 37 weeks - 3 Months: 1 gram per application, 2 applications per day Greater than 3 months: 2.5 grams per application, 4 applications per day</p> <p>***Topical LMX 4, "ELA-Max" comes in 5 Gram tubes.</p>
Indications	<p>To provide safe use of local anesthetic for needle procedures: venipuncture (PIV start or blood draws), intramuscular injections, subcutaneous injections, lumbar puncture, port-a-cath access, arterial punctures.</p> <p>See Addendum 1</p>
Contraindications	<p>Allergy to lidocaine Not shown to be effective for pain management with heel lances</p>
How To	<ol style="list-style-type: none"> 1. Wash hands. 2. Make sure the intended site for the application of topical lidocaine cream has intact skin. 3. Do not clean the skin with alcohol or acetone prior to application of topical lidocaine cream. 4. Apply a pea sized amount of topical lidocaine cream to the intended site. 5. Gently rub the topical lidocaine cream into the skin over the intended site for 30-60 seconds. <ol style="list-style-type: none"> a. ***For venipuncture, it is preferred to place on 2 application sites at one time in the event that the first attempt is unsuccessful. The second site could be used immediately after cream is removed. b. May apply to multiple sites, if needed for immunizations, based on dosing frequency of patient age. 6. Apply a thick layer of the lidocaine cream (based on dosing for age of patient: 0.5 gram, 1 gram or 2.5 grams) from the tube to the intended site. 7. For small children and infants, a transparent dressing should be placed over the cream to prevent the child from ingesting or removing the cream. 8. Allow a minimum of 30 minutes after the application of the topical lidocaine cream before proceeding with the needle procedure 9. Remove the transparent dressing and wipe off the cream with a 2x2 gauze pad after. <ol style="list-style-type: none"> a. Gently stretch the Tegaderm dressing straight out and parallel to skin. This will release the adhesion of the dressing to the skin and reduce pain during removal. Applying adhesive remover also will reduce pain. 10. Proceed with the preparation of the site for the needle procedure.

Oral Sucrose

According to The American Academy of Pediatrics (AAP) policy statement (2016), oral sucrose and/or glucose solutions can be effective in neonates undergoing mild to moderately painful procedures, either alone or in combination with other pain relief strategies. A meta-analysis of 57 studies including >4730 infants with gestational ages ranging from 25 to 44 weeks concluded that sucrose is safe and effective for reducing procedural pain from a single event.¹⁰

- Desjardins et al. (2016) conducted an RCT to determine if the administration of sucrose decreased pain during needle placement in children 28 days to 3 months of age. Pain scores using the FLACC did not differ between groups, yet there was a significant difference in crying times.¹²
- In a systematic review, Hatfield et al. (2011) sought to evaluate the efficacy and safety of oral sucrose as a procedural intervention for mild to moderate procedural pain in infants. The investigators concluded that sucrose is an effective, convenient, safe, and immediate-acting analgesic for reducing crying time, and significantly decreasing the biobehavioral pain response following painful procedures in infants.¹⁴
- Sethi and Nayak (2015) evaluated the use of a 24% sucrose solution used 2 minutes before venipuncture in 30 neonates (28–34 weeks and 35–40 weeks). The neonates first venipuncture was conducted using standard care and served as the control group. The same infants served also as the experimental group and received the 24% sucrose solution before the second venipuncture. The control group was observed to have greater pain (22 or 73.4%).¹⁵
- Biran et al. (2011) conducted a randomized, controlled double-blind prospective study and found that the combination of sucrose and EMLA cream revealed a higher analgesic effect than sucrose alone during venipuncture in preterm infants.¹¹
- Oral sucrose can also safely be used in conjunction with other non pharmacological measures, such as nonnutritive sucking and positioning.^{60, 61, 62}
- The AAP policy statement (2016) reveals maximum reductions in physiologic and behavioral pain indicators have been noted when sucrose was administered about 2 minutes before a painful stimulus, and the effects lasted about 4 minutes. An additive analgesic effect has been noted when sucrose is used in conjunction with other nonpharmacologic measures, such as non-nutritive sucking and swaddling.¹⁰
- Oral sucrose has been extensively studied for this purpose, yet many gaps in knowledge remain, including appropriate dosing, mechanism of action, soothing versus analgesic effects, and long-term consequences.¹⁰

Non-Nutritive Sucking

Non-nutritive sucking is an infant's natural response to stress. Generally, the use of a pacifier, gloved finger, or hand to mouth is used to promote sucking. In a review of 63 studies for non-pharmacological interventions to reduce pain for procedures in pre-term, neonates and infants, the evidence suggested that non-nutritive sucking has an effect on all age groups. The studies looked at pain reactivity, which is the infant's response in the first 30 seconds after the procedure and, immediate pain regulation which is the pain response by the infant after 30 seconds.⁵² While there was insufficient evidence to draw firm conclusions, these is evidence to suggest that this simpler intervention can be beneficial in reducing pain.

For preterm infants, the pooled results from this review suggest that there is evidence that sucking is not efficacious in reducing pain reactivity, but is effective for immediate pain regulation in preterm infants. **For neonates**, the results suggest that sucking is effective for pain reactivity and immediate pain regulation, but this is based on very low quality evidence. **For older infants**, evidence suggests that non-nutritive sucking is effective for the immediate regulation of pain, but this is based on low quality evidence.⁵²

Ages	Birth to 6 months
Indications	<p>Minor procedures:</p> <ul style="list-style-type: none"> • Heelsticks • Suctioning • Arterial punctures • Dressing changes • Nasogastric or orogastric (NG, OG) tube insertion • Venipuncture (IV insertion or blood draws) • Injections • Adhesive tape removal • Eye examinations • Urinary catheterization <p>Sucrose is not suitable for lengthy or significantly painful procedures. It is only suitable for decreasing short-term pain during minor procedures.</p>
Contraindications	See Oral Sucrose Solution – Managing Infant Procedural Pain – Neonatal Patients
How To	<p>It is important to administer the sweet solution directly onto the tongue.</p> <ul style="list-style-type: none"> • Evaluate need and check for sucrose expiration date • Give approximately one quarter of the total amount 2 minutes before starting the procedure • Dip pacifier in sucrose solution and offer to infant prior to, during, and after the procedure • Incrementally give the rest of the solution throughout the procedure, as needed <p>Oral sucrose is more effective if given with a pacifier, as this promotes Non-Nutritive Sucking (NNS), which contributes to calming. Analgesic effects peak at 2 minutes and last for 3-5 minutes.</p>
PolicyStat	Oral Sucrose Solution – Managing Infant Procedural Pain – Neonatal Patients

Breastfeeding

Breastfeeding combines holding, sweet taste, and sucking, and is one of the best ways to reduce pain in babies. There are several potential mechanisms by which breast milk or breastfeeding may produce an analgesic effect: presence of mother/comforting person, physical skin-to-skin contact, diversion of attention, and sweetness of the breast milk. Direct breastfeed or use expressed breast milk starting two minutes prior to the procedure. Breastfeeding or breast

milk should be used to alleviate pain in neonates experiencing a single painful procedure, rather than positioning or no intervention at all.⁵⁹

Factors that may explain the effect of breastfeeding on the infant undergoing a painful procedure are listed below.

- Suckling focuses attention on the mouth by stimulating oropharyngeal tactile mechanoreceptors, so attention to external stimuli is reduced.³⁷
- The close interaction between neonate and mother may have an effect similar to that of skin-to-skin contact, and is thought to contribute to the release of the stress-reducing hormone oxytocin.³⁷

Ages	All patients being breastfed
Indications	Needlestick procedures. Use in combination with other infant strategies like swaddling, skin to skin/kangaroo care.
Contraindications	NPO
How To	<ol style="list-style-type: none"> 1. Undress the baby to free the leg(s) or arm(s) where the needle will be given before starting to breastfeed. 2. Parents should start to breastfeed 2 minutes before the needlestick. Be sure there is a good latch. Then, parents should continue breastfeeding during and after the needlestick.

Mechanical Vibration (Buzzy® Bee™)

Buzzy® Bee is a battery operated device that vibrates and can be used with cooling ice pack “wings” that can be used for immediate-acting pain relief. Buzzy® uses natural “gate control” pain relief by confusing the body’s own nerves, thereby dulling or eliminating sharp pain. The theoretical basis explaining the action of the device are the Gate Control Theory and the diffuse noxious inhibitory control theory, which both involve modulation of the transmission of pain. Therefore, it is theorized that the simultaneous use of vibration and cold would provide optimal pain management.



- One study found that the intervention group that used Buzzy® during an IV insertion reported significantly less pain on the Wong-Baker FACES pain scale than the control group.¹
- A meta analysis of 7 studies found self report pain and anxiety were reduced when Buzzy® was used during procedures.²

- Better pain reduction is achieved when Buzzy® is used in combination with other pain reduction measures. A randomized controlled trial by found that using Buzzy® combined with the child watching cartoons for distraction provided better pain reduction than Buzzy® alone.³
- For term or term-corrected neonates, mechanical vibration using a device similar to Buzzy® Bee has shown to reduce pain, is safe, and causes no adverse effects. Babies in this study were swaddled with one leg exposed, heel warmer applied for 3-5 minutes, and two minutes prior to the procedure, the baby was given oral sucrose 24%. The vibration device was applied to the mid/lateral calf for 30 seconds prior to the heel stick to assess patient condition and response. If the baby showed adverse reaction, the device was removed, but if the baby tolerated the device was held in place during the collection of a heel stick capillary sample.⁴⁴

Ages	35 weeks Postmenstrual Age and older
Indications	Needle procedures: injections, venipuncture, heel stick, finger sticks
Contraindications	<p>“Ice Wings” should not be used on:</p> <ul style="list-style-type: none"> • Patients with Reynaud’s Disease or Sickle Cell • Patients less than 18 months old
How To	<ol style="list-style-type: none"> 1. Obtain Buzzy® and cold pack (if not contraindicated) and necessary equipment for needlestick procedure 2. Check Buzzy® batteries are functioning. 3. Insert cold pack into Buzzy®, if applicable. Alternatively, the patient may hold the cold pack to control its placement if they feel it is too cold in Buzzy®. 4. Apply a tourniquet if applicable. 5. Locate site of procedure - venipuncture, injection, or finger/heel stick site. For site specific information refer to Addendum 2 6. Place Buzzy® with/without cold pack as indicated in Addendum 2. 7. Turn Buzzy® on to activate vibration and leave in place for 30 to 60 seconds prior to the procedure. 8. Place wider end of Buzzy® closest to where the painful site will be: <ol style="list-style-type: none"> a. When used for injections, clean the site, and while site is drying, move Buzzy® with or without cold pack proximal (about 1 inch above or along dermatome line as identified in Addendum 2) to the site. b. When used for venipuncture, clean the site, and while site is drying, move Buzzy® with/ or without cold pack 3-5 cm proximal to the site. 9. Leave Buzzy® with/without cold pack in place throughout the procedure. 10. Provide patient support throughout the procedure. 11. Remove Buzzy® and cold pack once the procedure is completed. 12. Document in electronic health record (EHR) use of Buzzy® with/without cold pack for needlestick procedure.

Shot Blocker®

The ShotBlocker®, a non-pharmacological single patient use device, is a novel application of the Gate Theory of Pain Management. The device is placed directly on the skin before implementing an injection, and has been shown to be effective for IM injections and subcutaneous injections. It uses a number of blunt contact points to saturate the sensory signals around an injection site, distracting the patients from the pain signals of the needle poke. The contact points of this device do not puncture the skin. Theoretically, pressure contact points provide a stimulus to modulate and reduce the perceived pain from the injection. It can be used quickly with no prep time needed. ShotBlocker® was shown to reduce pain for vaccines in term neonates⁶⁴, and also helped reduce pain and increase satisfaction in adults receiving IM injections.⁶⁶ One study found that local vibration was more effective at reducing pain than with the shot blocker.⁶⁵ However, another study showed that in pediatric patients with diabetes, the lowest fear and anxiety was with the shotblocker group, compared to Buzzy® and the control group, and also reported lower pain for injections with shot blocker compared to Buzzy®.⁶⁷ While this shows that more research still needs to be done, evaluating each patient and their needs will help the clinician make the decision as to which intervention is best.



Ages	35 weeks Postmenstrual Age and older
Indications	Injections: Intramuscular, subcutaneous, intradermal
Contraindications	It requires no advance preparation or wait time and has no known side effects.
How To	<ol style="list-style-type: none"> 1. Select the injection site and prep the skin as usual. 2. Hold ShotBlocker® so that the blunt contact points touch the skin at the injection site. 3. Press ShotBlocker® firmly against the skin. DO NOT MOVE OR REMOVE SHOTBLOCKER® UNTIL THE INJECTION HAS BEEN COMPLETED. 4. Immediately administer the injection in the usual manner through or near the central opening of ShotBlocker®. 5. For subcutaneous injections, angle the needle as needed to give the injection. IF MORE THAN 20 SECONDS ELAPSE BETWEEN THE PLACEMENT OF SHOTBLOCKER® AND THE INJECTION, COMPLETELY REMOVE SHOTBLOCKER FROM THE SKIN. REPEAT THE PROCESS BEGINNING WITH STEP 2. 6. After you have completed the injection and withdrawn the needle, remove and clean ShotBlocker® with soap and water. 7. Single patient use: give to patient if in outpatient, or place in medication drawer with patient label to be used on next injection.

Vapocoolant

Vapocoolant sprays, such as [Gebauer’s Pain Ease Spray](#) or Num Sterile Numbing Spray, are an effective pain relief and prevention tool. They work by releasing a liquid spray that rapidly evaporates from the skin surface, resulting in a drop in skin temperature that causes a temporary interruption of sensation. The resulting effect is a rapid onset of temporary anesthesia of the skin.

As shown through multiple studies, vapocoolant sprays have various applications in the healthcare setting to help prevent and reduce procedural pain. In comparison to placebo sprays, vapocoolant results in markedly decreased pain associated with peripheral IV insertions, peripheral lab draws, subcutaneous and intramuscular injections, arterial line insertions and lab draws, spinal injections, and dermatological procedures. In one study where vapocoolant spray is compared to injected lidocaine for peripheral IV starts, the vapocoolant spray was associated with greater cannulation success (83.6% vs 67.3%, P=0.005), less time to administer (median 9.0 vs 84.5 s, P<0.001), and more staff convenience (median 5 vs 4, P<0.001).

See [Addendum 1](#) for topical numbing comparisons

Ages	Children age 4 or greater
Indications	<ul style="list-style-type: none"> -Gebauer’s Pain Ease Medium Stream Sprays are vapocoolants (skin refrigerants) intended for topical application to skin, intact mucous membranes (oral cavity, nasal passageways, and the lips) and minor open wounds. -Pain Ease controls pain associated with injections (venipuncture, IV starts, cosmetic procedures) and minor surgical procedures (such as lancing boils, incisions, drainage of small abscesses, and sutures). -Num Sterile Spray is a sterile single use product. It can be used immediately prior to blood culture collection or port access.
Contraindications	<ul style="list-style-type: none"> ● Do not use Pain Ease spray prior to collection of peripheral stick blood cultures or prior to port-a-cath access. ● Do not spray in the eyes. ● Do not use this product on persons with poor circulation or insensitve skin. ● Do not use it on large areas of damaged skin, puncture wounds, animal bites or serious wounds. ● Apply only to intact mucous membranes. ● Do not use on genital mucous membranes. <p>Pain Ease is contraindicated in individuals with a history of hypersensitivity to 1,1,1,3,3-Pentafluoropropane and 1,1,1,2-Tetrafluoroethane.</p>
How To	<ul style="list-style-type: none"> ● When used to produce local freezing of tissues, adjacent skin areas should be protected by an application of petroleum. ● The freezing and thawing process may be painful, and freezing may lower resistance to infection and delay healing.

	<ul style="list-style-type: none"> ● Over application of the product might cause frostbite and/or alter skin pigmentation. ● If skin irritation develops, discontinue use. ● Medium Stream (vs mist spray) is preferred for venipuncture for patient comfort and satisfaction. <p>Steps: (more detailed steps in PolicyStat)</p> <ol style="list-style-type: none"> 1. Hold the can upright, 3 to 7 inches (8 to 18 cm) from the procedure site, about a can's length away. 2. Spray steadily 4 to 10 seconds or until the skin begins turning white, whichever comes first. Do not spray longer than 10 seconds. 3. After spraying the site, immediately perform the procedure. The anesthetic effect lasts about one minute. Reapply if necessary.
PolicyStat	Cold/Numbing Spray for Needle Sticks (PainEase/Cold Spray and nüm) - DCMC

Comfort Positioning

Comfort positioning is a powerful approach that empowers the caregiver to help their child feel safe and secure during medical procedures. This approach encourages the caregiver to play an active role in ensuring the emotional safety of the child. Providing the opportunity for the caregiver to comfort the child in an embrace during a procedure instead of a potentially more stress-inducing position can help the child feel more calm. Some comfort positions are better suited to certain ages, and different procedures require different kinds of comfort holds. (See [Comfort Position Options](#) for suggestions). Most of the comfort positions help by keeping the child from laying their back. Being on their back can make children feel vulnerable and anxious. An upright position reduces anxiety and fear and helps a child see what is happening around them, including distractions. The comfort position helps the child stay still and allows the medical procedure to be completed in a safe manner.

The benefits of comfort positioning include: reduced patient fear and distress⁵⁶, improved patient cooperation, and improved patient satisfaction scores.⁶⁸ Children who are able to sit up during medical procedures show significantly less distress than children who are positioned supine.⁶⁹

Common staff concerns about using comfort positioning include worrying that the procedure will not be successful or will take more time to complete. Research has shown no change in the number of procedure attempts and no increase in the time needed to complete the procedure when using comfort positioning.²⁸ Positioning in an upright seated position is typically recommended for children 6 months and older. For younger infants, see [newborn positioning strategies](#).

Ages	All ages
Indications	For painful /distressing procedures and tests
Contraindications	Medical or physical limitations that would compromise the safety of the child or caregiver.
How To	<p>Suggested Age: 6-12 months:</p> <ul style="list-style-type: none"> ● Back to chest or chest to chest, cuddled and warm with caregiver holding whenever possible <p>Suggested Age: 1-5 years:</p> <ul style="list-style-type: none"> ● Back to chest ● Chest to chest ● Side-sitting position on caregivers lap with legs in between legs. <p>Suggested Age: 6-12 years</p> <ul style="list-style-type: none"> ● Side by side with caregiver next to child in bed or chair ● Back to chest <p>Suggested Age: 13+</p> <ul style="list-style-type: none"> ● Sitting in a comfortable position in chair or bed ● Caregiver at bedside depending on patient preference

Comfort Position Options

Link to DCMC Comfort Positioning Video
[Comfort Positioning for Medical Procedures \(video\)](#)



Newborn and Infant-Focused Physical Strategies

Swaddling

Swaddling with positioning has shown variable effectiveness in reducing pain or stress behaviors. Swaddling is most suitable for infants 0-3 months of age. This technique promotes self-calming. For procedural comfort, it is best when used in conjunction with pacifier or non-nutritive sucking and/or oral sucrose. When used in conjunction with oral sucrose, swaddling has shown an additive analgesic effect.¹⁰



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Kangaroo Care/Skin-to-Skin Care

Kangaroo care, or skin to skin care, refers to an infant lying on the bare skin of their caregiver, upright at a 40-60 degree angle and covered by the parent's shirt/gown, with an additional blanket as required. It appears to be effective and safe for single painful procedures with or without oral sucrose in preterm and term infants.^{10, 63}

Facilitated Tucking

Facilitated tucking refers to holding a neonate's body so that the limbs are in close proximity to the trunk in a flexed position.^{10,70} The neonate is held side-lying in a flexed position, and this technique involves touch and positioning, as well as promotes a sense of control for the neonate. Facilitated tucking has been shown to be an effective comfort measure for infants born preterm. Specifically, lower mean HRs and shorter crying times were observed after painful procedures.⁷⁰

Distraction Techniques

Distraction is a simple and effective technique that directs children's attention away from noxious stimuli.⁷³ Distraction has been shown to be effective at reducing pain and anxiety for procedures. Distraction can be divided into two groups: passive and active distraction. Passive distraction requires the assistance of the medical staff or caregivers, whereas active distraction methods are done by the patient themselves.⁵¹

Distraction can be used before, during and after the procedure to assist in recovery from stressful stimulation. When planning distraction interventions, a patient's age, developmental level, cognition, and communication skills should be considered.⁵¹ There are a number of studies that demonstrate the value of distraction to mitigate pain and distress during procedures. Distraction interventions for neonates and infants should be mostly passive, and are usually visual or auditory, such as mirrors, pictures, or music. Young children and preschoolers typically respond well to active techniques, such as blowing bubbles or playing games, as well as passive distraction interventions, such as diversional conversation, singing songs, and reading books. Allow the patient to participate in decision-making when possible.

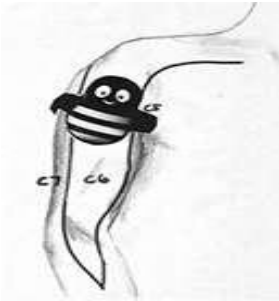


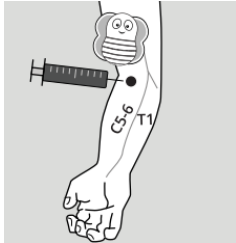
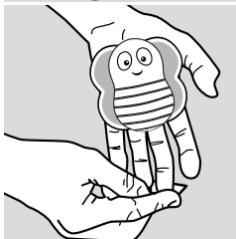
Ages	All ages
Indications	Distractions have to be age appropriate
Contraindications	-Patient is sedated, neonates -Patients that do not wish to be distracted- patients that want to be aware of what is going on
Distractions	<p>Distractions helping children cope with procedural pain include:</p> <ul style="list-style-type: none"> • blowing bubbles (Fanurik et al 2000; Rusy & Weisman 2000; Lambert 1999), • movies (Fanurik et al 2000), • books (Fanurik et al 2000; Lambert 1999), • party blowers (Manne et al 1994; Blount et al 1992; Manne et al 1990), • novel toys (Colaizzo & Tesler 1994; Ellis & Spanos 1994), • illusion kaleidoscope (Canbulat et al 2014; Tufekci et al 2009; Carlson et al 2000; Rusy & Weisman 2000; Kleiber & Harper 1999; Lambert 1999; Vessey et al 1994), • video games (Rusy & Weisman 2000),

Addendum 1: Topical Anesthetics Comparison Table

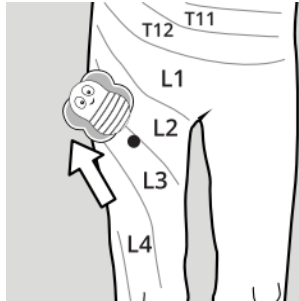
	Amide Anesthetics		Ester Anesthetics	Pentafluoropropane Tetrafluoroethane
Active Ingredient	Liposomal lidocaine 4% (LMX 4, ELA-MAX)	Lidocaine 2.5% - prilocaine 2.5% (EMLA)	Amethocaine 4% / Tetracaine (Ametop)	Vapocoolant spray (Pain Ease or Num Sterile)
Onset	30 min	60 min (increased dermal analgesia with up to 2 h of occlusion)	30 min	Immediate
Max application time	-Max 90 min for less than 3 months -Max 2 hours for greater than 3 months (Max application area 100 cm ² in <10 kg)	Max 4 h in children Max 1 h in ≤3 months (Max application area of 10 cm ²)	Studied up to 60 min (Max dose 50 mg)	Spray 10 s or until blanching
Duration of efficacy after removal	60 min	Up to 1–2 h (efficacy increases up to 15–60 min after removal)	4 h	45–60 s
Advantages	-Rapid action Occlusion not required -No cross-sensitivity with Ametop -Does not cause vasoconstriction	No cross-sensitivity with Ametop	-Rapid action -Superior to EMLA -No cross-sensitivity with lidocaine	Immediate
Side Effects	Methemoglobinemia (rare)	-Vasoconstriction -Methemoglobinemia (increased if <1-year-old) -Hypersensitivity (rare)	Hypersensitivity	Burning sensation/ Frostbite
Contraindications	-Allergy, <2 years of age, application on mucosae or an open wound or in eyes -Use cautiously with heart block or severe hepatic disorder	-Allergy, application on mucosae or an open wound or in eyes, methemoglobinemia, G6PD. -Use cautiously with heart block or severe hepatic disorder	Allergy (including PABA and sulfonamides), application on mucosae or an open wound or in eyes	-Num to be used prior to STERILE procedures (port access) or blood culture collection -Hypersensitivity, <3 years of age, application on mucosae or an open wound

Addendum 2: Optimal Buzzy® Placement

- When injecting, Buzzy® should go directly on the intended needle site, then be moved proximally during the procedure.
- Buzzy®'s motor is at the larger rounded tail end away from the switch, so the bigger rounded end should be closer to the shot, and Buzzy®'s "head" should be closer to the actual head or spine. Leave the ice pack in place for this whole process if tolerated: ice adds about 60% of the pain relief.
- Images and instructions from PainCareLabs [50](#)

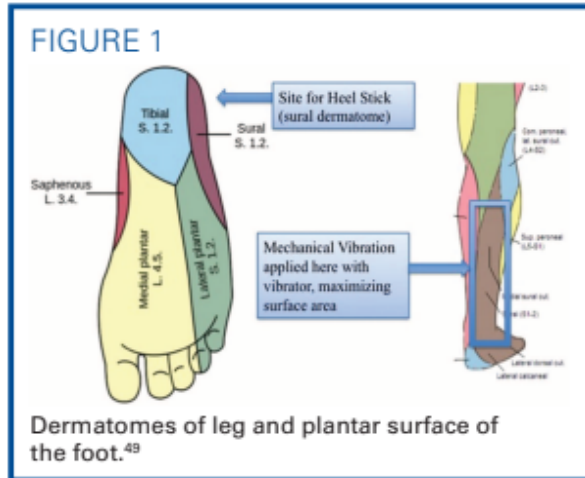
Location	Instructions
<p>Arm Placement- Vaccines/Injections</p> 	<ul style="list-style-type: none"> • Place Buzzy® right over the injection area for IM injection, then move toward the shoulder and leave in place during the injection. • For subcutaneous injections in the deltoid, move Buzzy® posterior and lateral for about 15 seconds, then reposition slightly proximal during the injection.
<p>Arm/hand/finger placement- Phlebotomy</p>    	<ul style="list-style-type: none"> • To place "proximally" for IVs and during the actual painful procedure (splinter removal, cleaning a wound, injection, IV, etc.) means Buzzy® needs to go "between the brain and the pain" to be effective. In other words, Buzzy® should be placed along the path of the nerve to best interrupt the pain signals' journey from your skin to the brain. • The nerves travel in territories called "dermatomes". The first and second pictures show Buzzy® optimally placed to decrease pain in the C6 dermatome.

Leg Placement

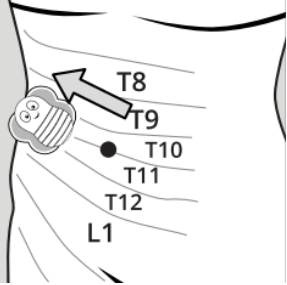
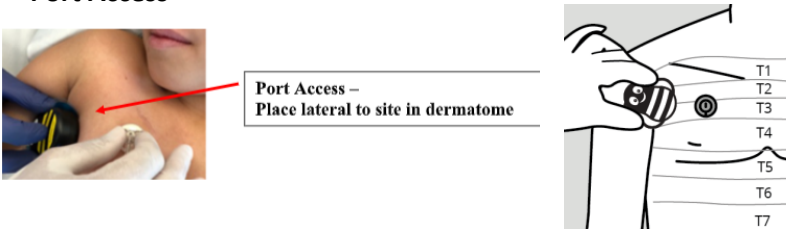




- This shows where Buzzy® would go for an injection on the mid-thigh, for injecting medications such as Rocephin, Humira, or Enbrel.
- First, place Buzzy® directly on the intended site to desensitize the area. Leave in place up to 60 seconds as it is a more muscular area, then move toward the brain/spine a few centimeters up and lateral.
- Keep Buzzy® vibrating in place while the shot is given.

Foot Placement for heel lance⁴⁴



1. Approximately 30 seconds before the heel stick, the vibrator should be applied over the mid/lateral calf, just below the knee, in accordance with the sural dermatome (see Figures 1) for a 30-second “test” vibration.
2. During this period, the infant should be observed carefully for any adverse responses. If the infant has any apnea, bradycardia, or desaturation, the vibrator should be immediately removed, and reaction documented. Similarly, if the infant demonstrates sustained heart rate elevation 20% above baseline or persistent crying, the mechanical vibration should be immediately removed and not reapplied.
3. If there are no adverse responses observed during the 30-second trial, the vibration should be continued throughout the duration of the heel lance procedure, and stopped immediately before the application of the adhesive bandage.

<p>Abdominal Placement</p> 	<p>This diagram shows positioning of Buzzy® for a procedure on the line between T10 and T11. Imagine the nerves coming out from the spine and wrapping horizontally around the stomach and chest. This Buzzy® is in great position for a poke between the belly button and Buzzy®'s bottom. The skin on the stomach is thinner than the back or upper arm, so Buzzy® may only need to be in place 15-30 seconds before moving and doing the procedure.</p>
<p>Port Access</p>  <p>Port Access – Place lateral to site in dermatome</p>	<ul style="list-style-type: none"> Place Buzzy® as pictured laterally to port access site. Ensure that another medical team member is holding Buzzy® away from the sterile site, and ensuring Buzzy® does not enter the sterile field or touch the cleaned skin.  Buzzy® for Port Access https://youtu.be/-KXD9K3WeE0
<p>Gluteal Placement</p> 	<p>For gluteal injections, the nerve pathways are very tilted and fairly narrow. Buzzy® XL may be better for this, as it is slightly larger and covers more area. For a gluteal injection in the upper outer quadrant of the buttock, after desensitizing the area 60-90 seconds, Buzzy® should be angled and slightly closer to the spine.</p>

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