

The Comfort Promise

Eliminating (or easing) pain and anxiety caused by needle procedure for children in pediatric healthcare settings

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The logo for Children's Minnesota, featuring a blue star above the word "Children's" in a serif font, with "MINNESOTA" in a blue sans-serif font below it.

The logo for UCSF Benioff Children's Hospitals, featuring a row of five stylized human figures in orange, red, purple, blue, and green above the text "UCSF Benioff Children's Hospitals" in a bold sans-serif font, with "Stad Center for Pediatric Pain, Palliative & Integrative Medicine" in a smaller sans-serif font below it.

The Comfort Promise

Module 2:

Current Evidence. The Why. The What. The How

January 2025

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Why Change?

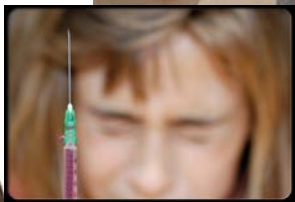
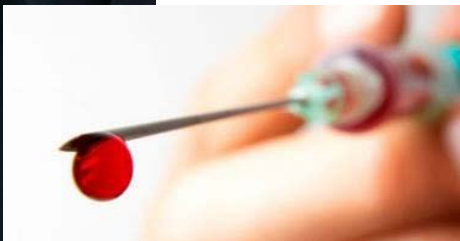
(We have always been doing it like this!)





What are children most afraid of when coming to a clinic or hospital ?

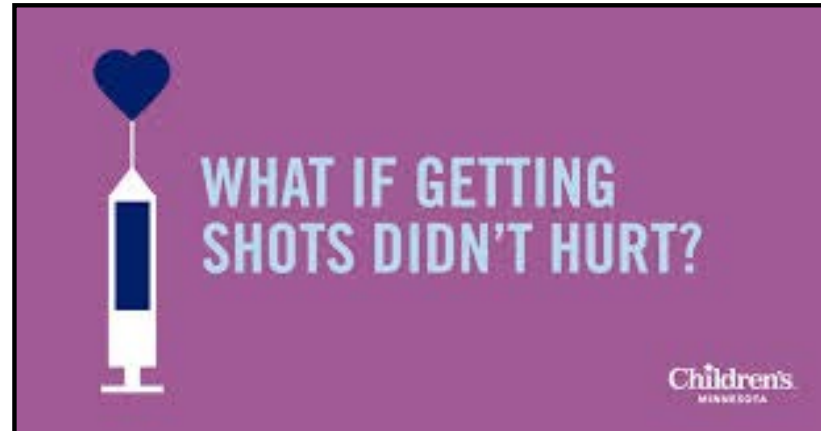
Friedrichsdorf S, Eull D, Weidner C: *Children Are Actually Afraid of Needle Pokes. And their Parents, too.* Journal of Things We Already Knew. 2016;(1)1:1-518





Poorly treated
pain =
**Preventable
Harm**

"Redningskvinder" Channel Tv3 - [Http://www.tv3.dk/redningskvinder](http://www.tv3.dk/redningskvinder). (Episode 7, Season 4.) 2014



- **WHY**
- **WHAT**
- **HOW**

Needle Pain: A Call for Action

- **Needle procedures (incl. vaccine injections) performed in childhood are substantial source of distress**
 - By age 2: 14-20 vaccine injections in US
 - Children get behind in vaccination schedule
- **Injection-induced anxiety and pain most frequent adverse effect following immunization**
- **Over 90% of young children exhibit severe distress during immunization**

Taddio A, Chambers CT, Halperin SA, Ipp M, Lockett D, Rieder MJ, et al. Inadequate pain management during routine childhood immunizations: the nerve of it. Clin Ther 2009;31:S152-67.

Jacobson RM, Swan A, Adegbenro A, Ludington SL, Wollan PC, Poland GA, Vaccine Research Group. Making vaccines more acceptable—methods to prevent and minimize pain and other common adverse events associated with vaccines. Vaccine 2001;19:2418-27.



Challenges reported by 883 parents during childhood immunizations

Challenges	Frequency (%)
Crying	752 (85)
Screaming	338 (38)
Flailing	288 (33)
Having to use restraint to carry out procedure	206 (23)
Running away	173 (20)
Kicking	136 (15)
Light headedness	37 (4)
Threatening	31 (4)
Shortness of breath	33 (4)
Soil self	15 (2)
Fainting	14 (2)

- Taddio A, Ipp M, Thivakaran S, Jamal A, Parikh C, Smart S, Sovran J, Stephens D, Katz J. Survey of the prevalence of immunization non-compliance due to needle fears in children and adults. Vaccine 2012;30(32):4807-4812.

Babies don't remember pain...?

Boys do remember unrelieved circumcision pain months later

Pain ratings at 4-6 months routine vaccination higher for circumcised versus uncircumcised boys:

- Circumcised infants showed stronger pain response to subsequent routine vaccination than uncircumcised infants; preoperative treatment with **EMLA attenuated pain response**

Taddio A, Katz J, Ilersich AL, Koren G.
Effect of neonatal circumcision on pain response during subsequent routine vaccination. Lancet. 1997;349(9052):599-603.

- Neonatal circumcision may affect pain response several months after the event.

Taddio A, Goldbach M, Ipp M, Stevens B, Koren G. Effect of neonatal circumcision on pain responses during vaccination in boys. Lancet. 1995;345(8945):291-2.



Pain in the Neonate: Why bother?

- **Neonates admitted to NICU: 10 painful procedures/day; 79 % performed without any type of analgesia** Carbajal, R., Rousset, A., Danan, C., Coquery, S., Nolent, P., Ducrocq, S., et al. Epidemiology and treatment of painful procedures in neonates in intensive care units. The Journal of the American Medical Association 2008; 157, 1058-64.
- **11.4 painful procedures/day; use of analgesics was only 36.6%.** Roothoof DW, Simons SH, Anand KJ, Tibboel D, van Dijk M. Eight years later, are we still hurting newborn infants? Neonatology. 2014;105(3):218-226.
- **Poorly managed pain has serious short- & long term consequences:** Each painful event causes immediate physiological and behavioral instability Holsti L, Grunau RE, Oberlander TF, Whitfield MF. Specific Newborn Individualized Developmental Care and Assessment Program movements are associated with acute pain in preterm infants in the neonatal intensive care unit. Pediatrics. 2004 Jul; 114(1):65-72.
- **Significant relationship between physiological markers of neonatal pain and oxidative stress** Slater L, Asmerom Y, Boskovic DS, Bahjri K, Plank MS, Angeles KR, et al. Procedural pain and oxidative stress in premature neonates. The journal of pain 2012 Jun; 13(6):590-7.

- **Infants with prior surgery have higher analgesic requirements and lowered pain thresholds** Peters JW, Schouw R, Anand KJ, van Dijk M, Duivenvoorden HJ, Tibboel D. Does neonatal surgery lead to increased pain sensitivity in later childhood? Pain. 2005; 114(3):444-54.
- **Repetitive procedural pain in preterm infants associated with reduced early body growth and head circumference - after accounting for multiple medical confounders** Vinal J, S. P. Miller, et al. (2012). Neonatal pain in relation to postnatal growth in infants born very preterm. Pain 153(7): 1374-1381.



Procedural Pain in the Neonate

- Critically ill infant may experience >480 painful procedures during NICU stay Barker DP (1995)

Exposure to invasive procedures in neonatal intensive care unit admissions. Arch Dis Child Fetal Neonatal Ed 72:F47-8; Johnston CC (1997) A cross-sectional survey of pain and pharmacological analgesia in Canadian neonatal intensive care units. Clin J Pain 13:308-12

- Exposure to severe pain on NICU, without adequate treatment, has negative long-term consequences

- ↑ morbidity (hypoxia, coagulopathy, respiratory incoordination, increased intracranial pressure)
- ↑ risk of IVH

- ↑ mortality Anand KJS (1999) Analgesia and sedation in preterm neonates who require ventilatory support: results from the NOPAIN trial. Neonatal Outcome and Prolonged Analgesia in Neonates. Arch Pediatr Adolesc Med 153:331-8

- Combined procedural pain interventions (sucrose, massage, music, nonnutritive sucking, and gentle human touch) during neonatal intensive care improves sleep = correlated with improved cognitive neurodevelopment development at 2 years Gao H, Li M, Gao

H, Xu G, Wang D, Lv H. Effect of combined procedural pain interventions during neonatal intensive care on sleep, cognitive development, and internalizing behavior: a follow-up analysis of a randomized controlled trial. Pain. 2023;164(8):1793-800.



Fear of needles...

- **Estimates show that as many as 2 in 3 children and 1 in 4 adults have a strong fear of needles, according to the U.S. Centers for Disease Control and Prevention.**

DHDD newsletter - December 2021. National Center on Birth Defects and Developmental Disabilities (Center for Disease Control and Prevention). Division of Human Development and Disability. <https://stacks.cdc.gov/view/cdc/113742>



Countering Vaccine Hesitancy

Kathryn M. Edwards, Jesse M. Hackell, THE COMMITTEE ON INFECTIOUS DISEASES, THE COMMITTEE ON PRACTICE AND AMBULATORY MEDICINE

- **Pain is a common reason for vaccine hesitancy**
- **44% of parents reported concern over pain associated with receiving multiple injections during a single visit**
Kennedy A, Basket M, Sheedy K. Vaccine attitudes, concerns, and information sources reported by parents of young children: results from the 2009 HealthStyles survey. Pediatrics. 2011;127(suppl 1):S92-S99. PMID:21502253]
- **Some parents are concerned primarily about the pain associated with immunizations.**
- Strategies to reduce pain include administering vaccines quickly without aspirating, holding the child upright, administering the most painful vaccine last, and providing tactile stimulation.

- "Breastfeeding, feeding sweet-tasting solutions, and topical anesthetics are other tools that can be used before vaccine administration to decrease pain.



<http://pediatrics.aappublications.org/content/early/2016/08/25/peds.2016-2146>

Needle Fear = Immunization non-compliance

- **Needle fear was primary reason for immunization non-compliance** for 949 parents and their 1024 children,

respectively Taddio A, Ipp M, Thivakaran S, Jamal A, Parikh C, Smart S, Sovran J, Stephens D, Katz J. Survey of the prevalence of immunization non-compliance due to needle fears in children and adults. *Vaccine* 2012;30(32):4807-4812.

- 205 parents (24%) and 636 children (63%) reported having a fear of needles.
- rate of needle fear was higher for children's self-report (64%) compared to parental report (51%), ($p < 0.001$)
- Self-reported immunization non-compliance due to needle fear in 58 (7%) of parents and 79 (8%) of children
- Half of parents reported they would pay to reduce immunization pain in their children (28% said pain treatment/medication should be included as part of immunization process; not as extra parental expense)

- Parents reported a 30% increase in willingness to be vaccinated themselves and a 40% increase in willingness to vaccinate their children if vaccination was administered in a non-painful manner.



Pediatric Cancer Mortality Increased in Low-Medium Income Countries (LMIC) due to Needle Pain & Anxiety



- **USA: Between 83% (1 year of age) to 87% (15-19 years of age) of children with cancer are alive 5 years after diagnosis,** compared with about 62% in the mid-1970s

Ries LAG SM, Gurney JG, Linet M, Tamra T, Young JL, Bunin GR (eds.). Cancer Incidence and Survival among Children and Adolescents: United States SEER Program 1975-1995, National Cancer Institute, SEER Program, Bethesda, MD: NIH; 1999; Howlander N NA, Krapcho M, et al. SEER cancer statistics review, 1975-2014, National Cancer Institute. https://seer.cancer.gov/csr/1975_2014. Published 2017. Accessed 11/10/2023, 2023; National Cancer Institute. Cancer in Children and Adolescents. <https://www.cancer.gov/types/childhood-cancers/child-adolescent-cancers-fact-sheet#:~:text=However%2C%20despite%20the%20overall%20decrease,further%20reduce%20childhood%20cancer%20mortality>. Published 2023. Accessed 11/10/23, 2023.

- **Almost 90% of children with malignancies live in LMICs where most will die of their disease.**

GBD 2017 Childhood Cancer Collaborators. The global burden of childhood and adolescent cancer in 2017: an analysis of the Global Burden of Disease Study 2017. Lancet Oncol 2019; 20(9): 1211-1225; Rodriguez-Galindo C, Friedrich P, Alcasabas P, et al. Toward the cure of all children with cancer through collaborative efforts: pediatric oncology as a global challenge. J Clin Oncol 2015; 33: 3065-73.; Steliarova-Foucher E, Colombet M, Ries LAG, Moreno F, Dolya A, Bray F, Hesselting P, Shin HY, Stiller CA; ICCC-3 contributors. International incidence of childhood cancer, 2001-10: a population-based registry study. Lancet Oncol. 2017 Jun; 18(6):719-731.; Howard SC, Metzger ML, Wilimas JA, Quintana Y, Pui CH, Robison LL, Ribeiro RC. Childhood cancer epidemiology in low-income countries. Cancer. 2008 Feb 1; 112(3):461-72.

- **Many health systems in LMICs do not have capacity for central venous lines (CVLs) resulting in children with cancer requiring dozens to even hundreds of needle pokes during their treatment course**
- **In LMIC many children stop their cancer therapy, because they are afraid of needles**

McNeil MJ, Garcia Quintero X, Gonzalez M, Zheng Y, Ugaz Olivares C, Morales R, et al. Preventing and Treating Pain and Anxiety during Needle-Based Procedures in Children with Cancer in Low- and Middle-Income Countries. Cancers (Basel). 2024;16(5).

Kids becoming adults...

- **Negative experiences with injections lead to development of needle fears in children carried into adulthood; contribute to health care avoidance behaviors, including immunization non-compliance**

Wright S, Yelland M, Heathcote K, Shu-Kay N. Fear of needles: nature and prevalence in general practice. *Aust Fam Physician* 2009;38:172–6.

- **Up to 26% of adults refused vaccination because of fear of injections**

Hofmann F, Ferracin C, Marsh G, Dumas R. Influenza vaccination of healthcare workers: a literature review of attitudes and beliefs. *Infection* 2006;34:142–7.

- Outbreaks of vaccine-preventable diseases documented to begin in individuals that refused immunization Omer SB, Salmon DA, Orenstein WA, deHart P, Halsey N. Vaccine refusal, mandatory immunization, and the risks of vaccine-preventable diseases. *N Engl J Med* 2009;360:1981–8.

- ...or, due to reduced herd immunity, among infants too young to be immunized Diekema DS. Improving childhood vaccination rates. *N Engl J Med* 2012;366:391–3.

- **Managing injection pain improves vaccination compliance** Taddio A, Lord A, Hogan ME, Kikuta A, Yiu A, Darra E, et al. A randomized controlled trial of analgesia during vaccination in adults. *Vaccine* 2010;28:5365–9



Procedural pain: A Call for Action

- **Memory** of previous painful experience **has great influence on pain experience during subsequent procedures** Versloot J, Veerkamp JS, Hoogstraten J: Children's self-reported pain at the dentist. Pain 2008. 137:389-94

- **Inadequate analgesia** for initial procedures in children 8 years or younger **diminishes effect of adequate analgesia in subsequent procedures** Weisman SJ, Bernstein B, Schechter NL: Consequences of inadequate analgesia during painful procedures in children. Arch Pediatr Adolesc Med 1998. 152:147-9

- **Higher frequency of vaso-occlusive episodes** in children with sickle-cell disease associated with **greater procedural pain** Schlenz AM, McClellan CB, Mark TR, McKelvy AD, Puffer E, Roberts CW, et al. Sensitization to acute procedural pain in pediatric sickle cell disease: modulation by painful vaso-occlusive episodes, age, and endothelin-1. J Pain 2012 Jul;13(7):656-65.



Under Treatment of Pediatric Pain

- **Pain in hospitalized children is common, under-recognized and under-treated**

USA: Friedrichsdorf SJ, Postier AC, Eull D, Foster L, Weidner C, Campbell F: Pain outcomes in a US children's hospital: a prospective cross-sectional survey. *Hospital Pediatrics* 2015; 5(1):18-26

Kozlowski LJ, Kost-Byerly S, Colantuoni E, et al. Pain prevalence, intensity, assessment and management in a hospitalized pediatric population. *Pain Manag Nurs*. 2014;15(1): 22-35

De Souza E, Parvathinathan G, Anderson TA. Pain Prevalence and Treatment in Hospitalized Children and Adolescents at a US Tertiary Pediatric Hospital. *Clin Pediatr (Phila)*. Jun 2024;63(6):805-814.

Denmark: Walther-Larsen S, Pedersen MT, Friis SM, Aagaard GB, Romsing J, Jeppesen EM, et al. Pain prevalence in hospitalized children: a prospective cross-sectional survey in four Danish university hospitals. *Acta Anaesthesiol Scand*. 2017;61(3):328-37

Great Britain: Twycross A, Collis S. How well is acute pain in children managed? A snapshot in one English hospital. *Pain Manag Nurs*. 2013;14(4):e204-15.

Canada: Taylor EM, et al. Pain in hospitalized children: A prospective cross-sectional survey of pain prevalence, intensity, assessment and management in a Canadian pediatric teaching hospital. *Pain Res Manage* 2008 13;1:25-32.

Senger A, Bryce R, McMahon C, Baerg K. Cross-sectional study of pediatric pain prevalence, assessment, and treatment at a Canadian tertiary hospital. *Can J Pain*. 2021;5(1):172-82

South Africa: Velazquez Cardona C, Rajah C, Mzoneli YN, et al. An audit of paediatric pain prevalence, intensity, and treatment at a South African tertiary hospital. *Pain Rep*. 2019;4(6):e789.

- **Parents expect pain to be relieved**

Forgeron PA, Finley GA, Arnaout M. Pediatric pain prevalence and parents' attitudes at a cancer hospital in Jordan. *J Pain Symptom Manage*. 2006; 31(5):440-8.

- **Assumption: everything possible is done**

Anand: *Lancet* 1987; 1(8527):243-8

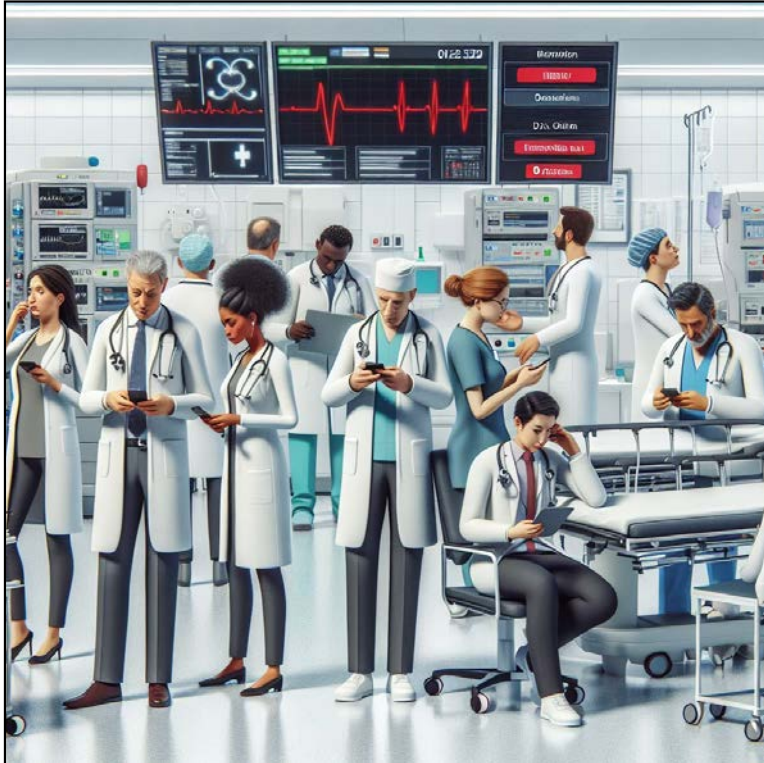
- **Parents' greatest distress: failing to protect their child from pain**

Tiedeman, M. (1997). Anxiety responses of parents during and after the hospitalisation of their 5 - to -11 year old children. *Journal of Pediatric Nursing*, 12(2), 110-119. Melnyk BM. Intervention studies involving parents of hospitalized young children: an analysis of the past and future recommendations. *J Pediatr Nurs*. 2000 Feb;15(1):4-13.

- **Priorities of parents of hospitalized children "Taking care of pain" rated as second highest priority (1st: getting right diagnosis)**

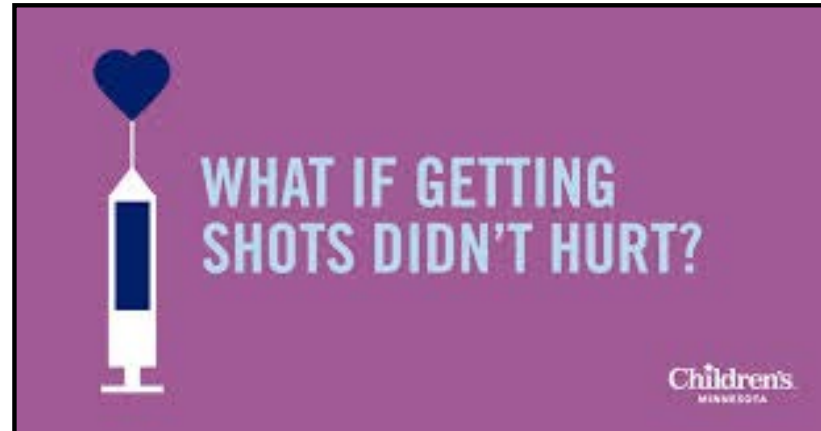
Ammentorp J, Mainz J, Sabroe S. Parents' priorities and satisfaction with acute pediatric care. *Arch Pediatr Adolesc Med* 2005;159:127-131.





Pain and Anxiety caused by needle procedures is the number one concern of children in healthcare settings.

How many resources does your institution allocate to address this “Number One” concern?



- WHY
- **WHAT**
- HOW

What is the Evidence?

What should we offer to every child. Every time. Everywhere.



Comfort Promise 1.0 versus 2.0

Children's COMFORT PROMISE

*We will do everything possible
to prevent and treat pain.*

For needle procedures, that means:

Numb the skin

4% lidocaine cream

- No age restrictions, including infants
- 30 minutes for effect, shorter with warm packs
- Can stay on for two hours, works for one hour after removed

J-tips

- When there is no time to wait
- Children must be older than two years

Sucrose or breastfeeding (0-12 months)

Sucrose

- 2 minutes before, lasts 4 minutes
- May repeat as needed
- Just a few drops on pacifier or inside cheek
- It is the detection of sweet, not amount that triggers the effect

Breast feeding

- Start 2-5 minutes before procedure
- Continue during procedure

Comfort positioning

- Swaddling for infants 0-6 months
- Upright is best for children older than 6 months
- Parent or caregiver holding or close by

Distraction

- Age appropriate
- Per-patient preference

Available in room carts:

bubbles, pin wheels,
stress balls, "Find it" sheets

Available in tool kits:

spinners, game books by age,
rattles, "Find it" tube

The original "Comfort Promise" roll-out (2013-2020) listed 4 simple steps to reduce or eliminate needle pain

- Topical anesthesia
- Sucrose or breast feeding
- Comfort positioning
- Distraction

Comfort Promise 1.0 versus 2.0

Since 2021 the “**Comfort Promise**” lists **6 simple steps to reduce or eliminate needle pain (5 in each age group)**

All age groups:

- Topical anesthesia (numbing cream)
- Comfort positioning
- Distraction
- Choices
- plus Infants only: Sucrose or breast feeding
- plus Children only: Praise & Memory-shaping



Children's
COMFORT
PROMISE

*We will do everything possible
to prevent and treat pain.*



Click this Link to watch Comfort Promise Intro: <https://vimeo.com/105979936>



Numbing cream

Makes needle procedures less painful



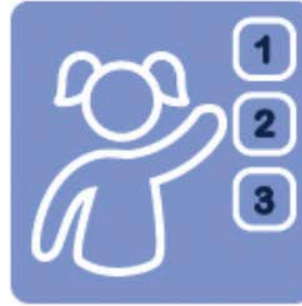
Comfort positions

Helps children feel calm and secure



Distractions

Puts the focus on an entertaining activity



Choices

Provides the patient with some sense of control



Breastfeeding or sugar water

Soothes and reduces babies' pain



Memory-shaping

Frames the experience in a positive way

Comfort Tool Kit

**Plan the
“Before”,
“During”,
“After”**



Numbing cream

Makes needle procedures less painful



Comfort positions

Helps children feel calm and secure



Distractions

Puts the focus on an entertaining activity



Choices

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Memory-shaping

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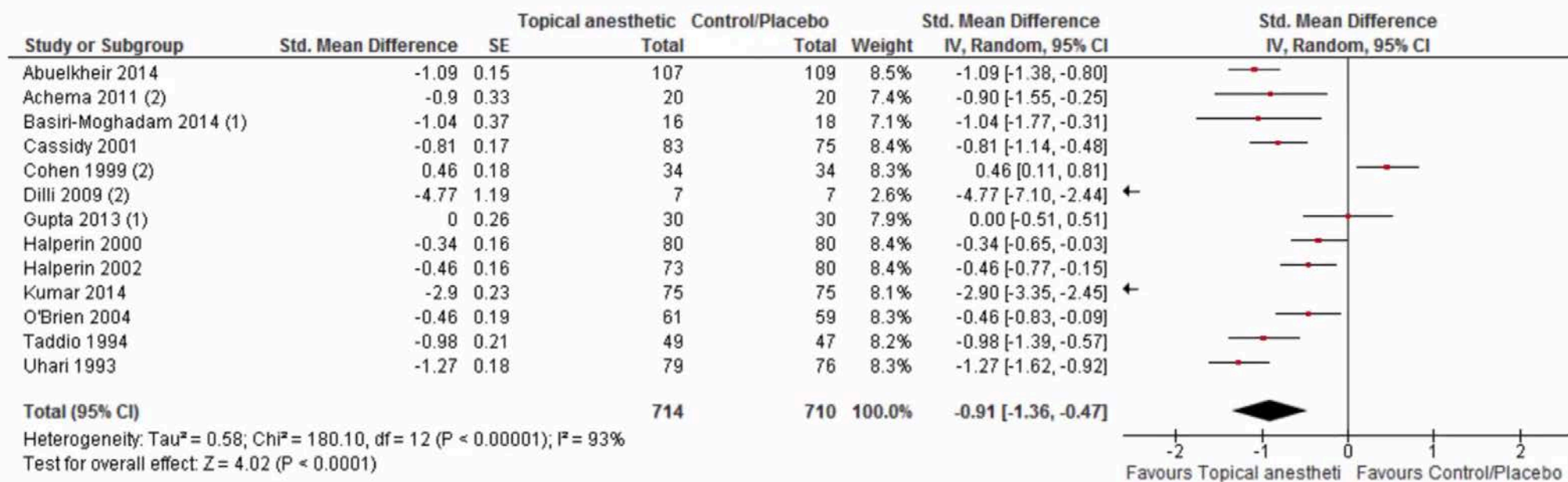
Comfort Tool Kit

Topical Local Anesthetics

- To reduce pain at time of injection, encourage parents to use **topical anesthetics** during vaccination of children (*grade A recommendation, based on level I evidence*). Taddio A, Appleton M, Bortolussi R, Chambers C, Dubey V, Halperin S, et al. Reducing the pain of childhood vaccination: an evidence-based clinical practice guideline. CMAJ : Canadian Medical Association journal 2010 Dec 14;182(18):E843-55.
- **Topical anesthetics considered safe for children of all ages.** However, administration of excessive doses and/or prolonged application times can lead to serious adverse effects, including irregular heartbeat, seizures and difficulty breathing
www.hc-sc.gc.ca/dhp-mps/medeff/advisories-avis/public/_2009/empla_ametop_pc-cp-eng.php
- **Use numbing prior to all needle sticks** - incl. for term infants (36 weeks and older)
- **4% lidocaine**
 - Apply 30 minutes prior to needle procedure
 - Cover with plastic wrap or tape to avoid getting in mouth or eyes
 - Wipe off prior to injection, prep skin per protocol
 - Can safely be left in place for 2 hours
 - Effect lasts for at least 1 hour after it is removed
 - Warm pack may be applied to speed up numbing process

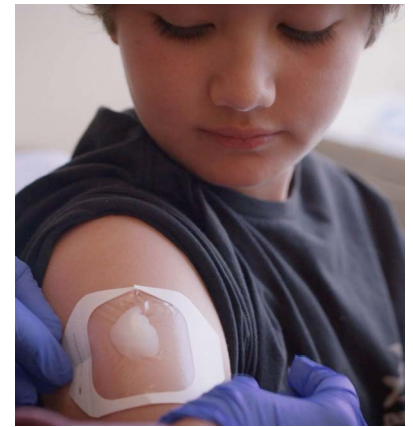
Effectiveness of Topical Anesthetics (Meta-Analysis)

Distress Acute



Can Numbing Cream be Substituted?

- **“Since staff resistance against use of topical anesthesia might initially be high, can you offer the “Comfort Promise” without numbing cream?”** [a.k.a. “Cheap & Easy” as oppose to “what is right for the patient”]
 - **Short Answer: NO**
 - **Long Answer: Other than J-tip - Still NO**



Can Numbing Cream be Substituted?

- **Only liposomal lidocaine provided consistent analgesia within an additive pain intervention regimen during vaccinations in infants.** Taddio A, Pillai Riddell R, Ipp M, Moss S, Baker S, Tolkin J, Malini D, Feerasta S, Govan P, Fletcher E, Wong H, McNair C, Mithal P, Stephens D. Relative effectiveness of additive pain interventions during vaccination in infants. CMAJ 2016.
- Among 1,226 children in Latin-America, the majority of children now describe their intervention as **“pain free”** using the Comfort Promise: **topical anesthesia the most effective modality of the bundle (odds ratio 9)**, followed by age-appropriate distraction and praise & reward doubling the **likelihood of pain control**, respectively. García-Quintero X, Enriquez-Chavez C, Gomez POC, Arrieta J, Friedrichsdorf SJ, Friedrich P, et al. Advancing Pediatric Pain Management: Global Comfort Promise Successes in Latin America. . 6th Maruzza International Congress on Paediatric Palliative Care Oral Abstract Presentation Session Rome, Italy. Oct 16-18, 2024

Can Numbing Cream be Substituted?

- Some single studies -usually industry-sponsored - show efficacy compared to NO TREATMENT (not compared to numbing cream), however
- **Vapocoolant spray**
 - Moderate-quality evidence indicates that use of a vapocoolant immediately before intravenous cannulation **reduces pain** during the procedure **by only 1.1 on a 0-10 scale** Griffith RJ, Jordan V, Herd D, Reed PW, Dalziel SR. Vapocoolants (cold spray) for pain treatment during intravenous cannulation. Cochrane Database Syst Rev. 2016;4(4):CD009484.
 - Metaanalysis [12 studies, 1266 patients (509 children, 757 adults)] **Vapocoolants ineffective in children** and adults when compared to placebo, and **effective in adults only when compared to no treatment.** Hogan ME, Smart S, Shah V, Taddio A. A systematic review of vapocoolants for reducing pain from venipuncture and venous cannulation in children and adults. J Emerg Med. 2014;47(6):736-49.
 - Metaanalysis (25 studies involving 3,143 participants) **Vapocoolant spray ineffective in children.** Wang L, Fang L, Zhou Y, Fang X, Liu J, Qu G (2023) Efficacy and safety of vapocoolant spray for vascular puncture in children and adults: A systematic review and meta-analysis. PLoS ONE 18(2): e0279463. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0279463>

Can Numbing Cream be Substituted?

- **Buzzy device**
- **Pain and anxiety relief using the Buzzy device is not as effective as EMLA cream in children requiring venipuncture.** Haidar NA, Al Amri MH, Sendad NG, Toaimah FHS. Efficacy of Buzzy Device Versus EMLA Cream for Reducing Pain During Needle-Related Procedures in Children: A Randomized Controlled Trial. *Pediatr Emerg Care*. Mar 1 2024;40(3):180-186.
- **Insufficient evidence** for or against use of **shot-blockers, Buzzy-Bees, skin-cooling techniques** Shah V, Taddio A, Rieder MJ, Team HE. Effectiveness and tolerability of pharmacologic and combined interventions for reducing injection pain during routine childhood immunizations: systematic review and meta-analyses. *Clin Ther*. 2009;31 Suppl 2:S104-51. (vapocoolants spray cause pain/discomfort in children) etc. to reduce pain at time of injection.
- **These tools may be considered in ADDITION to topical anesthetics - NOT INSTEAD of numbing cream!**

EMLA versus Lidocaine 4 % (LMX)

- EMLA Cream (lidocaine 2.5% and prilocaine 2.5%) vs Ela-Max LMX 4% Lidocaine Topical Anesthetic Cream ⁽¹⁾

Koh JL, Harrison D, Myers R, Dembinski R, Turner H, McGraw T: A randomized, double-blind comparison study of EMLA and ELA-Max for topical anesthesia in children undergoing intravenous insertion. Paediatr Anaesth 2004. 14(12):977-82; (2) Eichenfield LF, Funk A, Fallon-Friedlander S, Cunningham BB: A clinical study to evaluate the efficacy of ELA-Max (4% liposomal lidocaine) as compared with eutectic mixture of local anesthetics cream for pain reduction of venipuncture in children. Pediatrics 2002. 109(6):1093-9

- 4% Lidocaine: 30 minutes application as effective as 60 minutes
- EMLA application for preventing pain during IV insertion in Children

- ELA-Max caused significantly ($P = 0.04$) less blanching than EMLA, however there was no difference in the anesthesiologists' rating of the difficulty of the i.v. placement between the groups ($P = 0.73$)

- **Analgesia duration:**

- EMLA 1-2 hours vs. LMX 1 hour

- **Skin time:**

- EMLA 4 hours vs. LMX 2 hours

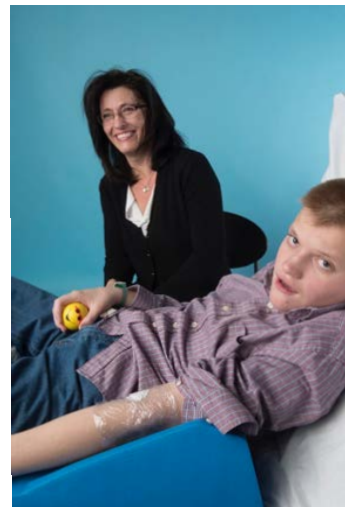


4% Lidocaine

over-the-counter
works in 30 minutes
lasts about an hour

Success of venipuncture or venous cannulation in children

- 388 children (255 with EMLA, 133 without). Procedures were successful at first attempt in: Schreiber S, Ronfani L, Chiaffoni GP, et al. Does EMLA cream application interfere with the success of venipuncture or venous cannulation? A prospective multicenter observational study. Eur J Pediatr. Feb 2013;172(2):265-268.
- 86% percent of in the EMLA group
- 76.7 % in the no EMLA group
- (n=958) use of J-tip did not affect first-attempt success for IV placement in 1-6 year old children. Lunoe MM, Drendel AL, Brousseau DC. The use of the needle-free jet injection system with buffered lidocaine device does not change intravenous placement success in children in the emergency department. Acad Emerg Med. 2015;22(4):447-451.



Sick Kids, Toronto

EMLA and Neonates

- If choice available - 4% lidocaine somewhat safer in infants than EMLA
- In neonates, EMLA reduces behavioral pain response to venipuncture but not heel lance

Taddio A, Ohlsson A, Einarson TR, Stevens B, Koren G: A systematic review of lidocaine-prilocaine cream (EMLA) in the treatment of acute pain in neonates. *Pediatrics* 1998. 101(2):E1

- Single EMLA use not associated with methemoglobinemia Taddio A, Ohlsson A, Einarson TR, Stevens B, Koren G: A systematic review of lidocaine-prilocaine cream (EMLA) in the treatment of acute pain in neonates. *Pediatrics* 1998. 101(2):E1

- Effective for neonates > 34 weeks gestation for lumbar puncture Kaur G, Gupta P, Kumar A: A randomized trial of eutectic mixture of local anesthetics during lumbar puncture in newborns. *Arch Pediatr Adolesc Med* 2003, 157(11):1065-70



Application of Cream



- If removal of transparent adhesive uncomfortable, use adhesive remover spray
- or alternatively...



Application of Cream



J-Tip (Lidocaine)

J-tip: single-use, disposable, carbon-dioxide-powered, needle-less lidocaine injector

- J-Tip jet injection of 1% buffered lidocaine provided greater anesthesia than a 30-minute application of ELA-Max according to patient self-assessment of pain for children aged 8 to 15 years undergoing PIV catheter

insertion Spanos S, Booth R, Koenig H, Sikes K, Gracely E, Kim IK. Jet Injection of 1% buffered lidocaine versus topical ELA-Max for anesthesia before peripheral intravenous catheterization in children: a randomized controlled trial. *Pediatr Emerg Care*. Aug 2008;24(8):511-5. doi:10.1097/PEC.0b013e31816a8d5b

- Use of the J-Tip for children aged 1 to 6 years reduced venipuncture pain compared with vapocoolant spray or sham treatment.

Lunoe MM, Drendel AL, Levas MN, Weisman SJ, Dasgupta M, Hoffmann RG, et al. A Randomized Clinical Trial of Jet-Injected Lidocaine to Reduce Venipuncture Pain for Young Children. *Ann Emerg Med*. 2015;66(5):466-474.



LET Gel

Lidocaine 4% - **E**pinephrine 0.18% - **T**etracaine 0.5%
**On open wounds prior to sutures or painful interventions at
least 30 minutes prior**



MYTH versus REALITY



- **Numbing cream causes vasoconstriction**
 - Incorrect. If blanching, apply warm pack
- **Numbing cream doesn't work as analgesic**
 - Incorrect. Be aware of nocebo-effect; i.e. staff falsely claiming “it doesn't work”
- **We don't have the time to wait 30 (-60) minutes**
 - Incorrect. You may need to change to process - but it actually saved time in healthcare institution, which implemented the Comfort Promise Friedrichsdorf SJ,

Eull D, Weidner C, Postier A. A hospital-wide initiative to eliminate or reduce needle pain in children using lean methodology. Pain Rep. 2018;3(Suppl 1):e671.

WHO Guideline



- **WHO guidelines (2015) state that the lack of analgesic provision for vaccination pain is inexcusable.**

Organization WH. Reducing pain at the time of vaccination:WHO position paper, September 2015-Recommendations.Vaccine. 2016;34(32):3629-30.
<https://www.who.int/publications/i/item/who-wer9039>



Numbing cream

Makes needle procedures less painful



Comfort positions

Helps children feel calm and secure



Distractions

Puts the focus on an entertaining activity



Choices

Provides the patient with some sense of control



Breastfeeding or sugar water

Soothes and reduces babies' pain



Memory-shaping

Frames the experience in a positive way

Comfort Tool Kit





Sucrose for Infants 0-12 months

Sucrose

- Reduces pain and cry during painful procedure, such as venipuncture

Stevens B, Yamada J, Ohlsson A, Haliburton S, Shorkey A. Sucrose for analgesia in newborn infants undergoing painful procedures. Cochrane Database Syst Rev. 2016;7:CD001069.

Sucrose (*Does not affect NPO status or Lab Values*)

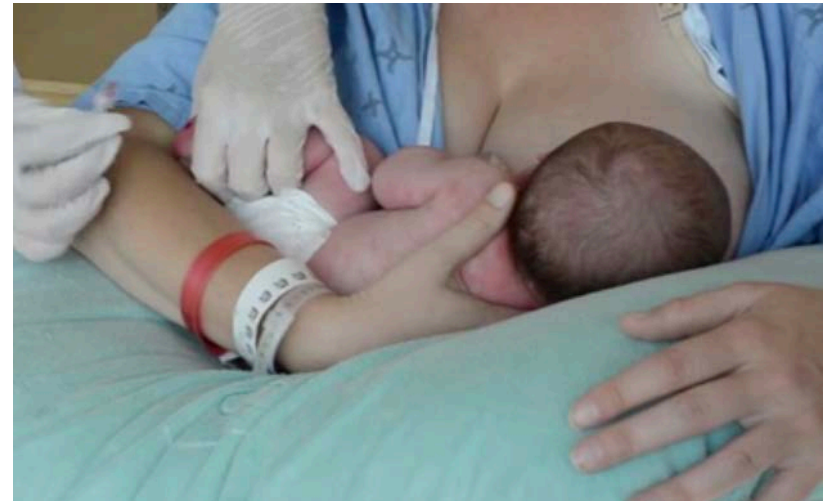
- Give solution 2 minutes prior to procedure (on pacifier, parents' finger, side of cheek)
- Just drops are needed (taste triggers the effect)
- Effect lasts for 4 minutes
- Re-administer as needed during and after the procedure
- Role of endogenous opioids - naloxone blunts effect
 - Effective dose (24%): Just a drop (0.1 ml) Stevens B, Yamada J, Campbell-Yeo M, Gibbins S, Harrison D, Dionne K, et al. The minimally effective dose of sucrose for procedural pain relief in neonates: a randomized controlled trial. BMC pediatrics. 2018;18(1):85.
 - Administration 2 minutes prior to mild - moderately painful procedure
 - Duration ~ 4 min
- Evidence for 0-12 months, may offer beyond



Breastfeeding for Infants 0-12 months

Breastfeeding

- Start 2-5 minutes before the procedure
- Continue throughout
- Evidence for 0-12 months, may offer beyond
- Effective in term infants (superior to sweetening agents - likely due to skin-to-skin?) (1) Shah PS, Herbozo C, Aliwalas LL, Shah VS. Breastfeeding or breast milk for procedural pain in neonates. Cochrane Database Syst Rev. 2012;12:CD004950. (2) Gray L, Miller LVW, Philipp BL, Blass EM. Breastfeeding is analgesic in healthy newborns. Pediatrics. 2002 Apr;109(4):590-3. (3) Weissman A, Aranovitch M, Blazer S, Zimmer EZ. Heel-lancing in newborns: behavioral and spectral analysis assessment of pain control methods. Pediatrics. 2009 Nov;124(5):e921-6.
- Ineffective in preterm infants? Holsti L, Oberlander TF, Brant R. Does breastfeeding reduce acute procedural pain in preterm infants in the neonatal intensive care unit? A randomized clinical trial. Pain. 2011 Nov;152(11):2575-81.





Be Sweet To Babies During Painful Procedures

Video: Sucrose, Breastfeeding & Skin-to-Skin

Harrison, DM. Be Sweet to Babies (August, 2014). Retrieved from YouTube
<https://www.youtube.com/watch?v=L43y0H6XEH4>

Avoid Finger Pokes & Heel Lance

- **Venepuncture versus heel lance?**

Venepuncture, when performed by skilled phlebotomist, appears to be method of choice for blood sampling in term neonates

Shah VS, Ohlsson A. Venepuncture versus heel lance for blood sampling in term neonates. Cochrane Database Syst Rev 2011; (10): CD001452.

- **Finger-Prick?** In order to avoid pain of finger pricking, one straightforward approach was to obtain the blood drop at other sites.

Heinemann L. Finger pricking and pain: a never ending story. Journal of diabetes science and technology 2008; 2(5): 919-21.

- **Pain increased with penetration depth, and at 1.2 mm the thicker lancets were somewhat more painful than the thinner ones.** Blood volumes increased with lancet diameter and penetration depth.

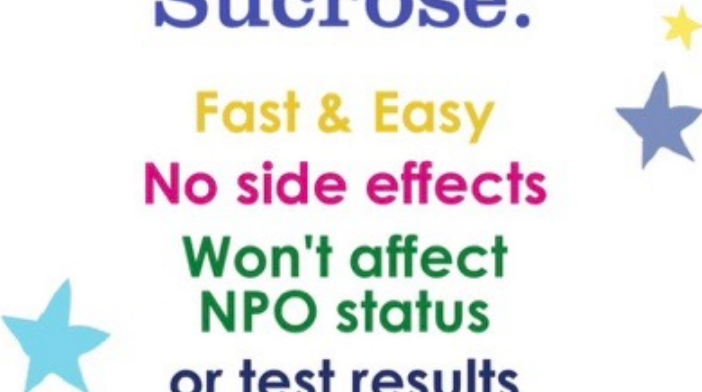
Fruhstorfer H, Schmelzeisen-Redeker G, Weiss T. Capillary blood sampling: relation between lancet diameter, lancing pain and blood volume. Eur J Pain 1999; 3(3): 283-6; Idam-Siuriun DI, Zhirkova lu V, Mikhel'son VA, Sepbaeva AD. [Prevention of pain during finger prick in neonatal infants]. Anesteziologija i reanimatologija 2008; (1): 14-7; Vervoort T, Goubert L, Vandenbossche H, Van Aken S, Matthys D, Crombez G. Child's and parents' catastrophizing about pain is associated with procedural fear in children: a study in children with diabetes and their mothers. Psychological reports 2011; 109(3): 879-95.





Sucrose:

- Fast & Easy
- No side effects
- Won't affect NPO status or test results





Numbing cream

Makes needle procedures less painful



Comfort positions

Helps children feel calm and secure



Distractions

Puts the focus on an entertaining activity



Choices

Provides the patient with some sense of control



Breastfeeding or sugar water

Soothes and reduces babies' pain



Memory-shaping

Frames the experience in a positive way

Comfort Promise Tool Box

Comfort Positioning

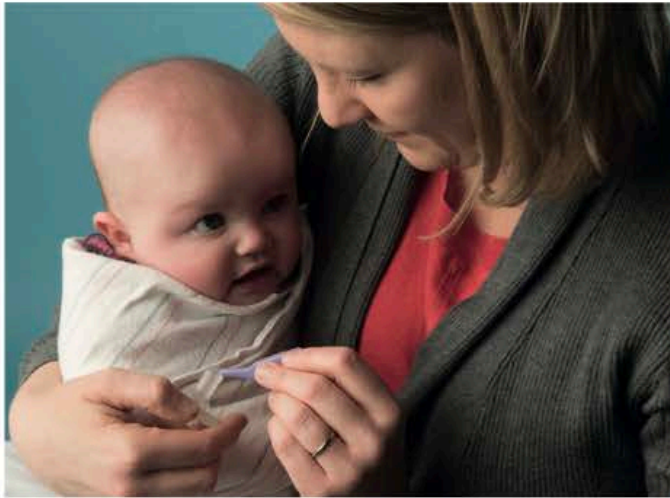
For Children <6 months of age

- Swaddle, warmth
- Skin to skin (kangaroo care)
- Facilitated tucking
- Parent to hold

Johnston C, Campbell-Yeo M, Disher T, Benoit B, Fernandes A, Streiner D, Inglis D, Zee R. (2017) Skin-to-skin care for procedural pain in neonates. Cochrane Database of Systematic Reviews, Issue 2. Art. No.: CD008435.; Campbell-Yeo M, Johnston CC, Benoit B, Disher T, Caddell K, Vincer M, Walker CD, Latimer M, Streiner DL, Inglis D. Sustained efficacy of kangaroo care for repeated painful procedures over neonatal intensive care unit hospitalization: a single-blind randomized controlled trial. Pain 2019.



Comfort Positioning



Babies (0-12 months)

- Held by parent
- Swaddled or skin to skin
- Pacifier with sugar water or breastfeeding
- Distraction: favorite toy, blanket or music



Children's
COMFORT
PROMISE

*We will do everything possible
to prevent and treat pain.*

UCSF  Benioff Children's Hospitals
Stad Center for Pediatric Pain,
Palliative & Integrative Medicine

Comfort Positioning

- For Children > 6 months **Upright position is best**
- **For Toddlers & Preschoolers: Preference is for parents to hold (cuddle)**
- To reduce pain at the time of injection, **do not place children in a supine position** during vaccination (grade E recommendation, based on level I evidence).

Taddio A, Appleton M, Bortolussi R, Chambers C, Dubey V, Halperin S, et al. Reducing the pain of childhood vaccination: an evidence-based clinical practice guideline. CMAJ : Canadian Medical Association journal 2010 Dec 14;182(18):E843-55.



Comfort Positions



Toddlers and preschoolers (1-5 years)

- Held by parent, sitting upright is best
- Distraction: bubbles, books, toys or music



Children's
COMFORT
PROMISE

*We will do everything possible
to prevent and treat pain.*

UCSF 
Benioff Children's Hospitals
Stad Center for Pediatric Pain,
Palliative & Integrative Medicine

Comfort Positioning

- For Children > 6 months **Upright position is best**

- **Use of Restraint Never Supportive:**

Restraining children with cancer for procedures makes them feel ashamed, humiliated, powerless; report having lost right to control his/her own

body Karlson K, Darcy L, Enskär K: The Use of Restraint is Never Supportive (Poster) Nordic Society of Pediatric Hematology/Oncology (NOPHO) 34th Annual meeting 2016 and 11th Biannual Meeting of Nordic Society of Pediatric Oncology Nurses (NOBOS). May 27 - 31, 2016, Reykjavik, Iceland

- **Give children school age and older a choice**

- Whenever feasible, offer choice to child (“Would you like to sit on daddy’s lap?” Next to caregiver?)
- Parents are not “partners in crime” - their job is to comfort / comfortably hold, NOT to restrain



Comfort Positions



School age (6-12 years)

- Held by parents or close by, upright is best
- Distraction: interactive toys, books or electronics
- Child may choose to watch or lay down

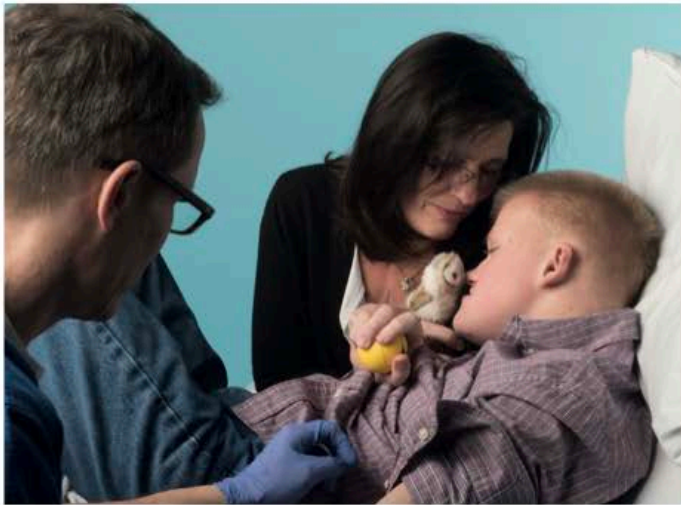


Children's
COMFORT
PROMISE

*We will do everything possible
to prevent and treat pain.*

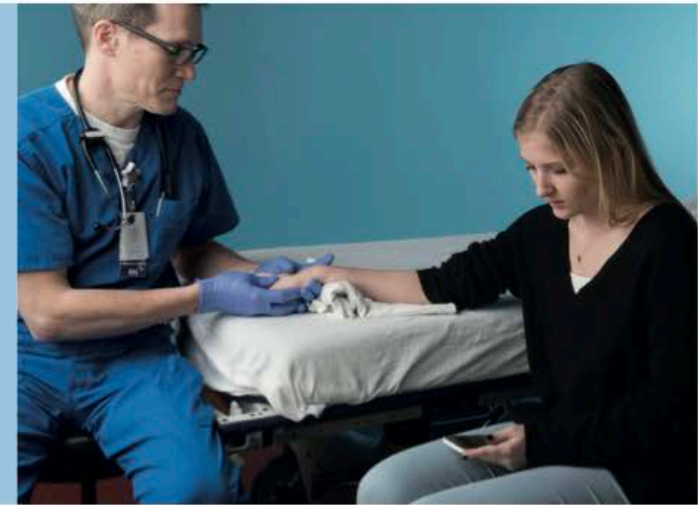
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Palliative & Integrative Medicine

Comfort Positions



Teens (13-18 years)

- Parents available
- Sitting upright is best
- Distraction: interactive toys, books or electronics
- Teen may choose to watch or lay down



Children's
COMFORT
PROMISE

*We will do everything possible
to prevent and treat pain.*

UCSF  Benioff Children's Hospitals
Stad Center for Pediatric Pain,
Palliative & Integrative Medicine

Infant (0-6 months)	Infant (0-6 months)
	
<ul style="list-style-type: none"> • Use 4% lidocaine cream 20-30 minutes before • Sucrose or breastfeeding 2 minutes before • Swaddle (leave out limb for procedure) • Parent holding whenever possible 	<ul style="list-style-type: none"> • Use 4% lidocaine cream 20-30 minutes before • Sucrose or breast feeding 2 minutes before • Chest to chest • Swaddled, cuddled and warm • Gentle patting, soothing voice



For needle procedures, that means:

Numb the skin

4% lidocaine cream

- No age restrictions, including infants
- 30 minutes for effect, shorter with warm packs
- Can stay on for two hours, works for one hour after removed

J-tips

- When there is no time to wait
- Children must be older than two years

Sucrose or breastfeeding (0-12 months)

Sucrose

- 2 minutes before, lasts 4 minutes
- May repeat as needed
- Just a few drops on pacifier or inside cheek
- It is the detection of sweet, not amount that triggers the effect

Breast feeding

- Start 2-5 minutes before procedure
- Continue during procedure

Comfort positioning

- Swaddling for infants 0-6 months
- Upright is best for children older than 6 months
- Parent or caregiver holding or close by

Distraction

- Age appropriate
- Per-patient preference

Available in room carts:

bubbles, pin wheels,
stress balls, "Find it" sheets

Available in tool kits:

spinners, game books by age,
rattles, "Find it" tube



Numbing cream

Makes needle procedures less painful



Comfort positions

Helps children feel calm and secure



Distractions

Puts the focus on an entertaining activity



Choices

Provides the patient with some sense of control



Breastfeeding or sugar water

Soothes and reduces babies' pain



Memory-shaping

Frames the experience in a positive way

Comfort Tool Kit

Distraction for Needle Procedures

- 59 trials (20 new for this update) with 5550 children 2-19 years: Evidence supporting the efficacy of **distraction**, **hypnosis**, combined **CBT**, and **breathing interventions** for reducing children's needle-related pain or distress, or both Birnie KA, Noel M, Chambers CT, Uman LS, Parker JA. Psychological interventions for needle-related procedural pain and distress in children and adolescents. Cochrane Database Syst Rev. 2018;10(10):CD005179.



Distraction for Needle Procedures

Encourage parents to actively distract their child with age appropriate options

- Favorite toy, comfort item
- Music, singing
- Breathing exercises, i.e., bubbles, pinwheels, tissues
- Books, find-it sheets, stories

* Note this will look different in neonates (e.g. spinning light toy)



Parent Coaching for Needle Procedures

- Certain types of parental behaviors (e.g., **nonprocedural talk, suggestions on how to cope, humor**) have been related to decreases in children's distress and pain, whereas others (e.g., reassurance, apologies) have been related to increases in children's distress and pain.

Taddio A, Chambers CT, Halperin SA, et al. Inadequate pain management during childhood immunizations: the nerve of it. Clin Ther 2009;31 (Suppl 2):S152-67.)

- **“Magic Glove”** Simple hypnotic technique, which can be learned by parents and staff: Leora Kuttner, PhD https://www.youtube.com/watch?v=cyApK8Z_SQQ



The Magic Glove



Leora Kuttner, PhD:YouTube

https://www.youtube.com/watch?v=cyApK8Z_SQQ

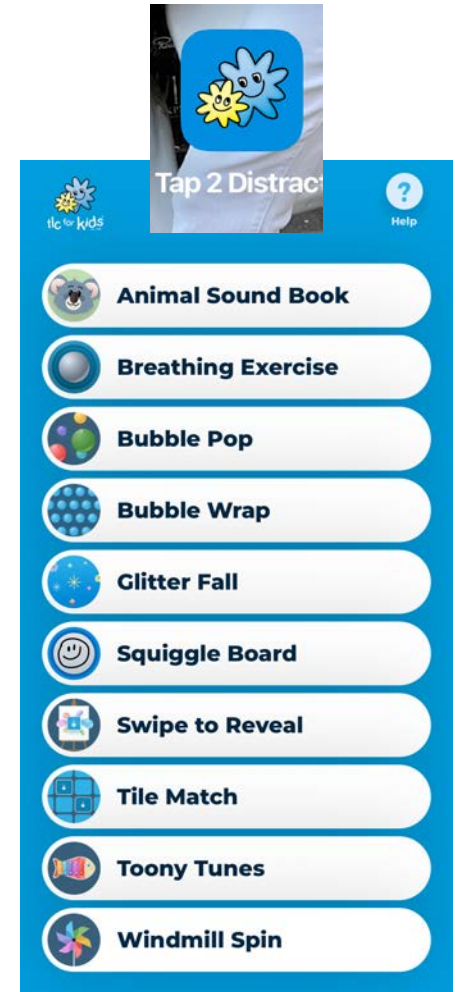
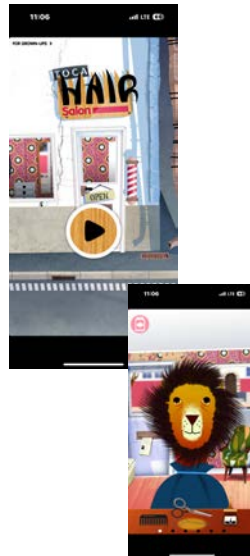
Virtual Reality

- 92 RCTs (n = 7133 participants) Immersive VR technology offers effective pain control across various medical procedures Teh JJ, Pascoe DJ, Hafeji S, Parchure R, Koczoski A, Rimmer MP, Khan KS, Al Wattar BH. Efficacy of virtual reality for pain relief in medical procedures: a systematic review and meta-analysis. BMC Med. 2024 Feb 14;22(1):64
- VR an effective distraction intervention to reduce pain and anxiety in pediatric patients undergoing a wide variety of medical procedures Eijlers R, Utens E, Staals LM, de Nijs PFA, Berghmans JM, Wijnen RMH, et al. Systematic Review and Meta-analysis of Virtual Reality in Pediatrics: Effects on Pain and Anxiety. Anesth Analg. 2019;129(5):1344-53.
- RCT (64 children aged 7 to 16 years) venous cannulation Walther-Larsen S, Petersen T, Friis SM, Aagaard G, Drivenes B, Opstrup P. Immersive Virtual Reality for Pediatric Procedural Pain: A Randomized Clinical Trial. Hospital pediatrics. Jul 2019;9(7):501-507. doi:10.1542/hpeds.2018-0249
 - control group standard of care, including topical numbing cream, positioning, and distraction by a specialized pain nurse
 - study group children were adherent to standard of care and were distracted by an interactive VR game
 - **no difference in pain scores but higher satisfaction when using VR** versus standard care as part of a multimodal approach for management of procedural pain in children.

Apps for Distraction

Check with your Child Life Specialists for suggestions, recommendations include:

- Tap2Distract
- Balloonimals
- Hair Salon
- Fruit Ninja





Numbing cream

Makes needle procedures less painful



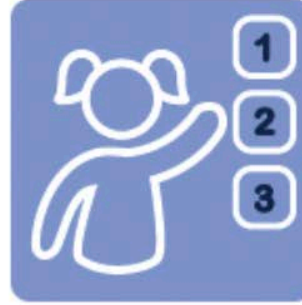
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Comfort Tool Kit

Needle Procedure Language



- **Encourage this discussion beforehand** so that the child and parent has a plan in place tailored to their preferences
- **Offer choices** as much as possible (where to place cream, how to position, whether they want to look or be distracted by bubbles or app etc.)
- **Set range of expectations:** "Some children told us with the numbing cream they didn't feel the straw/vaccination/blood draw at all... others told us they were bothered just a little bit for a brief moment...I wonder what you will experience"

Allow Control: Some Detours are Shortcuts

- **Dring procedures, such as a blood test, the children can hold up the STOP sign when they feel scared. Then the nurses stop what they are doing. Until the child puts down the sign. Then they can continue.** Kvitrud I: Norwegian Journal of Clinical Nursing (2017) <https://sykepleien.no/en/node/60836>
- Has the stop sign made it more difficult for the nurses to do their job?”
- “No, it has been absolutely fantastic to see how safe some of the children can become. Some detours are shortcuts”, says nurse Johannesen.
- “What if the child does not put down the sign?”
- “Then the child tells us that we have to spend more time or find another way. Maybe we'll try again another day. Or we can take the child out of the situation and carry out the procedure with sedatives. We never exceed the sign.”



Barnepoliklinikken på Rikshospitalet, Oslo, Norway

Choices: Allow Control

Offer CHOICES where to place cream, how to position, whether they want to look or be distracted by bubbles or app etc.





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Comfort Tool Kit

**Plan the
“Before”,
“During”,
“After”**

Pain Memories Predict Future Pain & Distress

- **Role of narrative** in development of children's pain memories

Noel M, Pavlova M, Lund T, et al.

The role of narrative in the development of children's pain memories: influences of father- and mother-child reminiscing on children's recall of pain. *Pain*. 2019;160(8):1866-1875.

- Greater parental use of pain words = more negatively biased pain memories
- More elaborative parental reminiscing style & greater use of emotional words = more accurate/positively biased pain memories



Needle Procedure Language



- **Avoid negative words** such as "shot", "needle", "pain", "hurt" etc.
- **Instead use neutral/positive words**, such as “**Ease**”, “Would it be okay...?” “**bother**” “bother for a brief moment”, "protection" “little pinch”, “vaccination” , “thin straw” (instead of IV catheter/needle)
- **Offer choices** as much as possible (where to place cream, how to position, whether they want to look or be distracted by bubbles or app etc.)
- **Encourage this discussion beforehand** so that the child and parent has a plan in place tailored to their preferences
- **Set range of expectations:** "Some children told us with the numbing cream they didn't feel the straw/vaccination/blood draw at all... others told us they were bothered just a little bit for a brief moment...I wonder what you will experience"

Needle Procedure Language



Example Using Therapeutic Language: Starting an IV



“I’m going to apply the numbing medication now to help your arm and body be more comfortable. After this cream has been applied for about 30 minutes, we will place the IV.

“Will it hurt?”

“I am not sure if it will bother you, you may feel a pinch or pressure, let’s think about strategies to help your body relax. Do you want to listen to some music or do some breathing exercises?”
How about using some lavender to help your body relax?”

Needle Procedure Language



- **Do not “count to three”** (heightens anxiety)
- **Don’t say** “It’ll be over soon” or “I am sorry” or “It’s okay, you’ll be okay”
- Instead use **bravery language** to show the child that they have agency and **can do things to help with the procedure like deep breathing, and distraction!**
- **Caregivers and/or clinicians:** Use distraction, non-procedural talk- such as talking about other things like pets, school, music, interests, etc
- ...unless you have the 10%+ Information seeker, who may ask for intel and want to look

Needle Procedure Language



Example of therapeutic language:

“Imagine a gentle breeze helping you relax, and as you take slow breaths, picture your favorite place.

**The little pinch you may or may not feel is like a tiny friend saying hello and keeping you safe.
You’re brave, and it’ll be over quickly.”**

Needle Procedure Language



- When procedure done: “All done...” “let’s get you a sticker...”
- **SHIFT Immediately (!) after procedure** e.g. offer from goody-box to child (choose a sticker, toys, candy etc.) ... or ask to drink a zip water...
- **REFRAME THE PAIN - Shape the memory for next time**
- **PRAISE** (parent/clinician) no matter what: “I am so proud of you. Remember how it bothered you not at all / just a little bit... and afterwards the nice nurse gave you a sticker... you did so well...”
- Doing this means a child **remembers the procedure far less threatening** and has a high chance of being less worried next time

Reframe the Pain

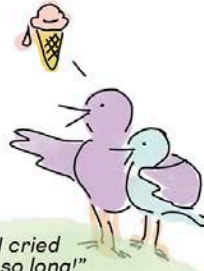
USE POSITIVE TALK

Don't talk about pain or scary feelings. Focus on the positive.



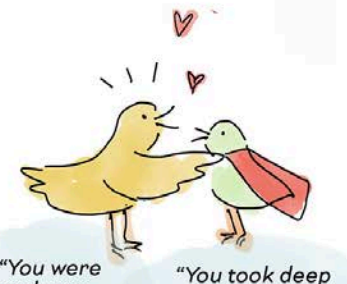
KEEP IT REAL

Catch exaggerations and remind your child what really happened.



BUILD THEM UP

Tell your child that they were brave, and why. Celebrate.



“Do I get a shot...?”

- We are **honest** with kids (Do. Not. Lie!)
- **Reframe** e.g. “at the end there will be a super-short vaccination AND this time we will use magic cream and bubbles...and you get a sticker”
- **Focus** the conversation on all of the **awesome strategies** we can use to make the procedure go well!
- **Set Expectation** (aka Self-Fulfilling Prophecy) “Many kids told me that they didn’t feel anything, and others told me they only felt a little... I wonder what you will feel...”

If this doesn't work....
What is the “Deferral Process”?



What's Plan B?

If adequate procedural analgesia not feasible with the “6 Bundled Modalities” alone, refer patient to:

(1) Child Life (if they have not been involved by now)

(2) Needle Phobia: referral psychology (for desensitization / CBT)

(3) Mild sedation and anxiolysis: Nitrous gas

Zier, J. L. and M. Liu (2011). "Safety of high-concentration nitrous oxide by nasal mask for pediatric procedural sedation: experience with 7802 cases." *Pediatric emergency care* 27(12): 1107-1112.

or consider

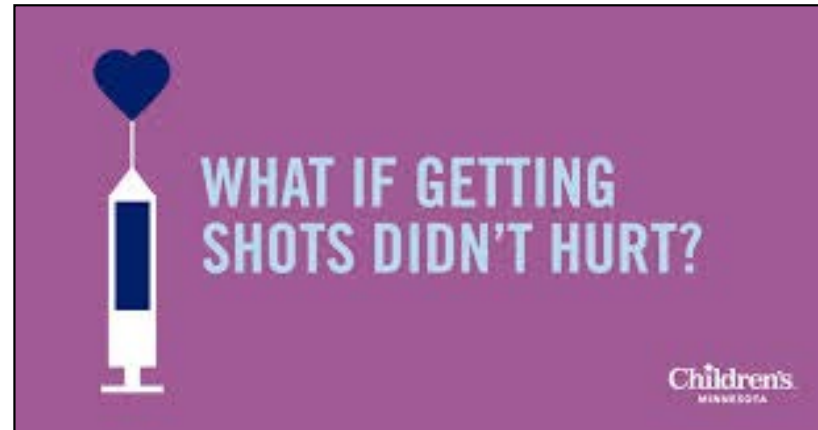
(4) Moderate/deep sedation (e.g. ketamine, propofol, intranasal dexmedetomidine, midazolam/fentanyl) ???

Note:

- **A sedative alone, such as a benzodiazepine...** e.g. Intranasal midazolam (painful due to buffered (!) pH of 3) **can not be a substitute for procedural analgesia**

Nitrous gas analgesia, sedation & anxiolysis

- **Nurse-administered nitrous gas mild sedation programs established in US since 2011** (e.g. Children's Minnesota, UCSF Benioff Children's Hospitals) <https://www.childrensmn.org/educationmaterials/childrensmn/article/15763/nitrous-oxide-for-sedation/>
- Children receiving **nitrous gas before and during painful procedures** have **lower levels of distress, lower pain scores, were more relaxed**, and many have no recollection of the procedure afterwards Hockenberry MJ, McCarthy K, Taylor O, et al. Managing painful procedures in children with cancer. J Pediatr Hematol Oncol. 2011;33(2):119-127.; Pedersen RS, Bayat A, Steen NP, Jacobsson ML. Nitrous oxide provides safe and effective analgesia for minor paediatric procedures--a systematic review. Dan Med J. 2013;60(6):A4627.; Tobias JD. Applications of nitrous oxide for procedural sedation in the pediatric population. Pediatr Emerg Care. 2013;29(2):245-265.
- **Nitrous gas concentrations between 40-70% can be titrated to achieve minimal sedation only, avoiding moderate sedation** Zier, J. L. and M. Liu (2011). "Safety of high-concentration nitrous oxide by nasal mask for pediatric procedural sedation: experience with 7802 cases." Pediatric emergency care 27(12): 1107-1112.; Livingston M, Lawell M, McAllister N. Successful use of nitrous oxide during lumbar punctures: A call for nitrous oxide in pediatric oncology clinics. Pediatr Blood Cancer. 2017;64(11).
- Children receiving **minimal sedation** are able to **respond to verbal commands, maintain and protect their airway, spontaneous ventilation, and cardiovascular functions are unaffected** American Society of Anesthesiologists Task Force on Sedation and Analgesia by Non-Anesthesiologists. Practice guidelines for sedation and analgesia by non-anesthesiologists. Anesthesiology. 2002;96(4):1004-1017.
- **Effective for Lumbar Punctures** Liu Q, Chai XM, Zhang JJ, et al. A Fixed Nitrous Oxide and Oxygen Mixture for Analgesia in Children With Leukemia With Lumbar Puncture-induced Pain: A Randomized, Double-blind Controlled Trial. J Pain Symptom Manage. 2019;57(6):1043-1050.; Livingston M, Lawell M, McAllister N. Successful use of nitrous oxide during lumbar punctures: A call for nitrous oxide in pediatric oncology clinics. Pediatr Blood Cancer. 2017;64(11).; Friedrichsdorf SJ. Nitrous gas analgesia and sedation for lumbar punctures in children: Has the time for practice change come? Pediatr Blood Cancer. 2017;64(11).
- **Botulinum neurotoxin A injections** Friedrichsdorf SJ. Prevention and treatment of pediatric pain and anxiety caused by botulinum neurotoxin A injections: Inadmissible without nitrous oxide analgesia and sedation? Dev Med Child Neurol. 2022;64(12):1437-8.



- WHY
- WHAT
- **HOW**

How to Implement



Map the Process

- Current state vs desired state
- Identify opportunities (tasks)

Type Opportunity (gap) here



Homework - Next Steps

Prior to assembling work group:

- Perform observations (watch, listen, poke around...no pun intended...)
- Engage formal and informal leaders and build trust
- List barriers (myth-based and reality)
- Collect ideas for addressing both types of barriers (gaps)



#1 Numb the skin

Tasks for topical anesthetic

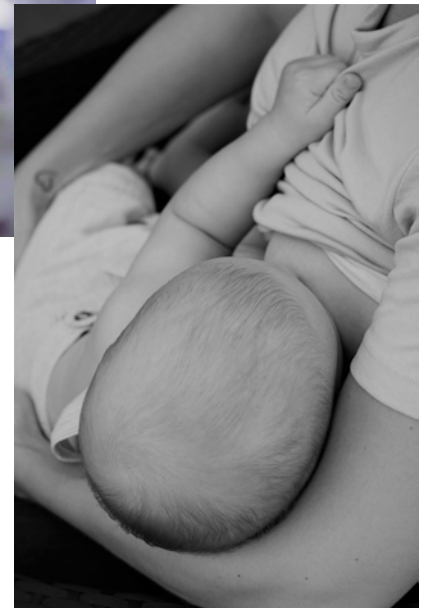
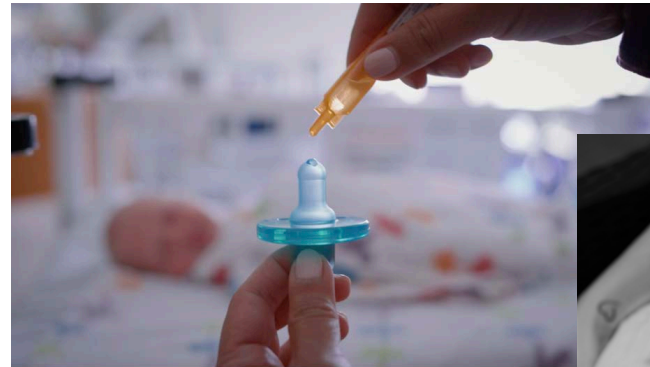
- Who applies
 - For labs
 - For IV starts
 - For injections
- Process for families and staff for each
 - Where to obtain
 - How, when, and where to place
 - How to keep in place
 - Educational resources



#2 Sucrose or Breastfeeding

Tasks for sucrose and breastfeeding

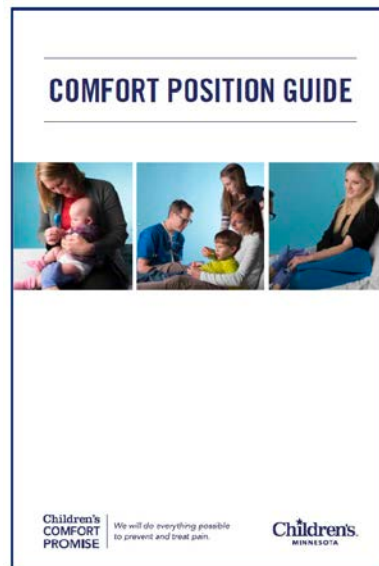
- Sucrose
 - How to stock and replenish
 - Where to keep
 - How to give (educational resources)
- Breastfeeding
 - Look at ergonomics for staff (need medical stool on wheels?)
 - Provide education to staff
 - Education for parents



#3 Comfort Positioning

Tasks for Comfort Positioning

- Education/training for staff
- Education for families
- Quick resources for rooms



#4 Distraction

Tasks for Distraction

- Select options
- Set up plan for ordering and restocking
- Set up cleaning and cues
- Staff education/training



#5 Choices

Tasks for Choices

- Staff education/training
- Education for families

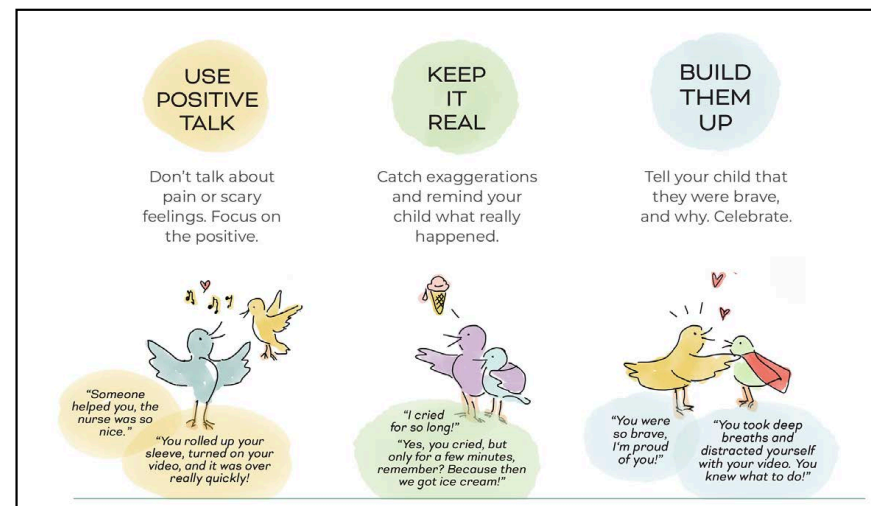
Offer CHOICES where to place cream, how to position, whether they want to look or be distracted by bubbles or app etc.



#6 Praise & Reframe Memory

Tasks for Praise & Reframe Memory

- Staff education/training
- Education for families



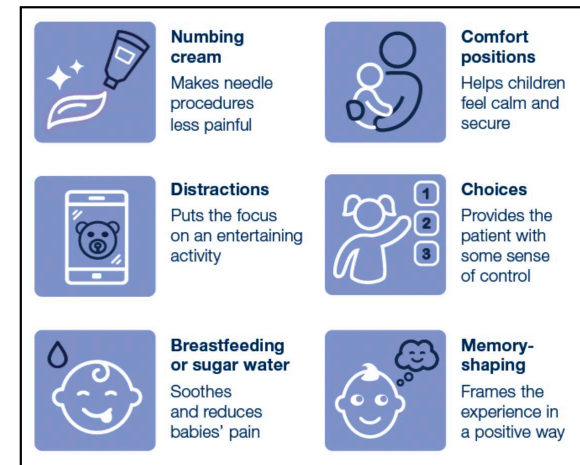
Summary

- Parents and children expect we will do everything possible to reduce or prevent pain
- There is strong evidence for 6 simple steps to eliminate or reduce needle pain

All age groups:

- Topical anesthesia (numbing cream)
- Comfort positioning
- Distraction
- Choices
- plus Infants only: Sucrose or breast feeding
- plus Children only: Praise & Memory-shaping

- Map the process
- Each step presents opportunities (gaps) which requires logistics



Homework - Next Steps

- Know the literature and research
- Assess current state for each of the 6 simple steps
- Where are the gaps?
- What are the solutions?
- Ask why?....and why not? (...and keep asking and listening)



CONCLUSIONS



IASP

INTERNATIONAL ASSOCIATION
FOR THE STUDY OF PAIN

2019 Global Year Against Pain in the Most Vulnerable Populations

“Failure to implement evidence-based pain prevention and treatment for children in medical facilities is now considered inadmissible and poor standard of care”

Friedrichsdorf SJ, Goubert L. Pediatric pain treatment and prevention for hospitalized children. Pain Rep. 2020;5(1):e804.

References



Additional Comfort Promise Videos

- **Children's Minnesota**

- Full Staff Video <https://www.aboutkidshealth.ca/comfortpromise>
- Intro <https://vimeo.com/105979936>
- For Infants: <https://vimeo.com/105979255>
- For Toddlers <https://vimeo.com/105979947>
- For school-aged children <https://vimeo.com/105979937>
- For Teenager <https://vimeo.com/105979942>
- Youth Advisory Council <https://vimeo.com/128990829>

- **Sick Kids, Toronto, ONT, Canada**

- Comfort Promise Learning Hub <https://www.aboutkidshealth.ca/comfortpromise>

- **Children's Mercy Kansas City**

- Comfort Promise <https://www.youtube.com/watch?v=gT4bcG7083M>
- Applying Lidocaine Cream for Immunizations <https://www.youtube.com/watch?v=O7D5wxxp9iEk>

- **Children's Hospitals, London Health Sciences Centre, ONT, Canada**

- Comfort Promise https://www.youtube.com/watch?v=7YdT_uUGLn4

- **U Mass Children's Medical Center, Worcester, MA**

Kids Comfort Promise Video: <https://www.youtube.com/watch?v=qqqZGASoWmM>

- <https://www.ummhealth.org/childrens-medical-center/about-us/kids-comfort-promise>

- **CHU St. Justine, Montreal, Canada** "Tout Doux" Videos in French and English <https://www.chusj.org/fr/Soins-services/D/Douleur/Tout-doux-Pour-des-soins-en-douceur>

Additional Comfort Promise Material

- **IWK Halifax, NS, Canada**

Comfort Promise Patient and Visitor

Guide <https://iwkhealth.ca/patient-and-visitor-guide/comfort-promise>

- Tool Kit [https://iwkhealth.ca/sites/default/files/2024-07/COMFORT_PROMISE_TOOLKIT_IWKHEALTH_MAY_2023\(3\).pdf](https://iwkhealth.ca/sites/default/files/2024-07/COMFORT_PROMISE_TOOLKIT_IWKHEALTH_MAY_2023(3).pdf)
- Our Comfort Promise to Ethan <https://youriwk.com/2021/02/25/our-comfort-promise-to-ethan/>

- **Mississippi Center for Advanced Medicine** <https://msadvancedmedicine.com/comfort-promise/>



- **INOVA Children's, Falls**

Church, VA https://www.inovachildrens.org/upload/docs/childrens/radiation-oncology/Comfort_Promise.pdf

- **St. Jude Research Children's Hospital, Memphis TN C.O.R.E**

<https://www.stjude.org/care-treatment/treatment/clinical-initiatives/core-promise.html#accordion-90cef9cc-5d3b-40d9-8a48-3c0435025629=0>

Additional Comfort Promise Material

- In **Spanish** “Dolor Infantil”

- Positioning, distraction, feelings naming: <https://www.youtube.com/watch?v=CojOhBNL8hw>
- Numbing cream: <https://www.youtube.com/watch?v=89p-Ux6WKKM>
- Explaining how to use pain rating scales: <https://www.youtube.com/watch?v=3cwFjbhEpH0>
- Magic glove (maybe not the best representation, but gives a cursory example): <https://www.youtube.com/watch?v=hhu9ZC9zAIQ>
- Skin to skin contact: <https://www.youtube.com/watch?v=t0PrNIbtLgw>

- **Denmark** <https://www.rigshospitalet.dk/afdelinger-og-klinikker/julianemarie/videnscenter-for-boernesmerter/tilfagfolk/Documents/De-4-obligatoriske-2018.pdf>

- **Indonesia** <https://lms.kemkes.go.id/courses/84b3fa50-8f4e-4f1e-b73e-f4d1eadca027>

- **Children’s Hospital Association**
Kids Comfort Promise <https://www.childrenshospitals.org/news/childrens-hospitals-today/2024/06/4-steps-to-make-shots-less-painful>

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<https://www.ucsfbenioffchildrens.org/services/comfort-promise>



UCSF Benioff Children's Hospitals

The Comfort Promise

We promise to do everything possible to prevent and treat needle pain. For every child. Every time.

No one wants to see their child in pain. That's why – whether your child needs a vaccine, a blood draw or an IV catheter placement – our experienced and compassionate staff partner with you and your child to use simple pain-reduction tools and techniques that work for your family.

Our Comfort Tool Kit

The tools we use – and how we use them – vary by developmental age and what's best for your child. You'll find more details about each one on our website.



Numbing cream

Makes needle procedures less painful



Comfort positions

Helps children feel calm and secure



Distractions

Puts the focus on an entertaining activity



Choices

Provides the patient with some sense of control



Breastfeeding or sugar water

Soothes and reduces babies' pain



Memory-shaping

Frames the experience in a positive way

To learn more, visit ucsfbenioffchildrens.org/comfort-promise



Please fill out and detach the coping card on the right and bring it with you to your appointments.

I also want you to know

Date
Date of birth



MY COPING PLAN

Name/Pronouns



UCSF Benioff Children's Hospitals

Una Promesa de Alivio

Prometemos hacer todo lo posible para prevenir y tratar el dolor causado por las punciones de aguja. Para todos los niños. Siempre.

Nadie quiere ver a su niño sufrir. Por eso, ya sea que su niño necesite una vacuna, una extracción de sangre o la colocación de un catéter intravenoso, nuestro personal experimentado y compasivo colaborará con usted y su niño para utilizar herramientas y técnicas sencillas que funcionen para su familia, para reducir el dolor.

Nuestro kit de herramientas para aliviar el dolor

Las herramientas que utilizamos – y cómo las utilizamos – varían según la edad de desarrollo y lo que es mejor para su niño. Encontrará más información sobre cada una de ellas en nuestro sitio web.



Crema anestésica

Hace que los procedimientos con aguja sean menos dolorosos.



Las posiciones cómodas

Ayudan a los niños a sentirse tranquilos y seguros.



Las distracciones

Captan la atención en una actividad entretenida.



Las opciones

Le brindan al paciente una cierta sensación de control.



La lactancia o el agua azucarada

Calman y reducen el dolor en los bebés.



Moldear las memorias

Reestructura la experiencia de una forma positiva.

Fecha (date) _____
Nombre/Pronombres (name/pronouns) _____
Fecha de nacimiento (date of birth) _____

Mis decisiones
☐ No información por internet
☐ Información limitada (limited information)
☐ Explicaciones paso a paso (step-by-step explanations)
☐ Control progresivo (own over)
☐ Quiero ver a mi hijo feliz
☐ Puedo hacer algo - lactancia - biberón
☐ Puedo hacer algo - recuerdo un momento (I can do it - I need a break)

Mi Plan Para Sobrellevar Dificultades
Por favor complete y devuélvame la tarjeta a su desarrollo y entregue a su hijo.
UCSF Benioff Children's Hospitals



UCSF Benioff Children's Hospitals

舒适承诺

我们承诺为每一个孩子的每一次治疗，尽我们所能预防和减轻治疗计划。

没有人愿意看到自己的孩子遭受痛苦。因此，无论您的孩子需要接种疫苗、抽血还是置入静脉导管，我们经验丰富的工作人员都会与您和您的孩子合作，使用适合您家庭的简单止痛工具和技巧。

我们的舒缓工具箱

我们使用的工具和使用方法因孩子的发育年龄和偏好而异。您会在我们的网站上找到每一项的详细信息。



局部麻醉
让针头过程减少痛苦



舒适的姿势
帮助儿童感到镇静和安全



分散注意力
将注意力集中在娱乐活动上



选择权
让患者得到一定程度的控制感



哺乳和糖水
安抚和减少宝宝的痛苦



塑造记忆
以正确的方式构建体验

了解详情，请访问 ucsfbenioffchildrens.org/comfort-promise



日期 (date) _____
姓名/代词 (name/pronouns) _____
出生日期 (date of birth) _____

我的选择
☐ 无信息 (no information)
☐ 有限信息 (limited information)
☐ 告诉我一切 (tell me everything)
☐ 逐步解释 (step-by-step explanations)
☐ 我想看看 (I want to see)
☐ 我想控制过程 (I want to control)
☐ 我可以做 - 母乳喂养 - 糖水
☐ 我可以做 - 回忆一个时刻 (I can do it - I need a break)

我的应对计划

请填写并取下右侧的应对卡，并在就诊时随身携带。



Taking the Work Out of Blood Work: Helping Your Patient With Autism



A Provider's Guide



This toolkit is funded in part by cooperative agreement UA3 MC 11054 through the U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Research Program.

Page 1 of 22



This toolkit is funded in part by cooperative agreement UA3 MC 11054 through the U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Research Program.



Parent's Guide to Blood Draws for Children with Autism



These materials are the product of on-going activities of the Autism Speaks Autism Treatment Network, a funded program of Autism Speaks. It is supported by cooperative agreement UA3 MC 11054 through the U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Research Program to the Massachusetts General Hospital. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the MCHB, HRSA, HHS, or Autism Speaks.™

My Autism Guide
SIGN UP



Information
based on
your needs

[guide.autismspeaks.org](https://www.autismspeaks.org/guide)

<https://www.autismspeaks.org/tool-kit/providers-guide-blood-draws>

The Comfort Promise

Eliminating (or easing) pain and anxiety caused by needle procedure for children in pediatric healthcare settings

Donna J. Eull, PhD, MA, RN, CHPPN

Clinical Associate Professor | School of Nursing

Child and Family Health Cooperative | University of Minnesota

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Elisa and Marc Stad Professor in Pediatric Pain Medicine, Palliative Care and Integrative Medicine

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Medical Director, Stad Center for Pediatric Pain, Palliative and Integrative Medicine. UCSF Benioff Children's Hospitals

The
MAYDAY
Fund

The logo for Children's Minnesota, featuring a blue star above the word "Children's" in a serif font, with "MINNESOTA" in a blue sans-serif font below it.

The logo for UCSF Benioff Children's Hospitals, featuring a row of five colorful stick figures (orange, red, purple, blue, green) holding hands above the text "UCSF Benioff Children's Hospitals" in a bold sans-serif font, with "Stad Center for Pediatric Pain, Palliative & Integrative Medicine" in a smaller sans-serif font below it.