ASSESSMENT OF PAIN

Pediatric Pain PRN Curriculum

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The MAYDAY Fund

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Objectives

- Critically evaluate pain assessment tools for reliability, validity, feasibility and utility for communicating pediatric patients' pain experiences
- Formulate processes and policies to ensure the organization's pain assessment and care planning for pediatric patients is sensitive to children's pain by acknowledging the sensory, cognitive and affective experience of pain and behavioral responses as influenced by social, cultural, spiritual and regulatory context.
- Engage in pain assessment demonstrating evidence-based processes, modeling assessment principles, and using valid and reliable tools that are appropriate for the developmental level, cognitive ability, language, and care needs of pediatric patients cared for in your clinical area.

Why Assess Pain in Children?

Why do you think it is important to screen for and assess pain in children?

Type your answer here.

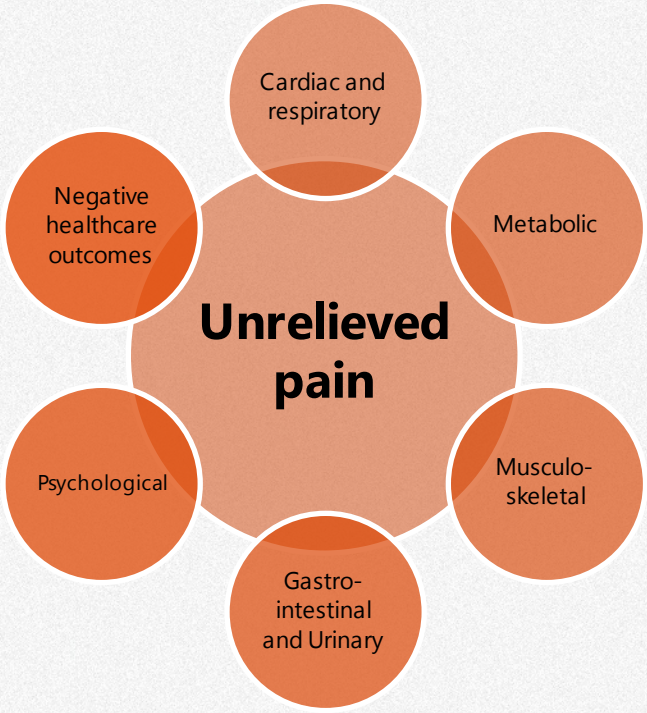
Because…

Assessment and treatment of pain is a fundamental human right.

Declaration of Montreal , The International Association for the Study of Pain., 2011

- Pain in children occurs across a spectrum of conditions including everyday pains, acute injuries and medical events, recurrent or chronic pain, and pain related to chronic or life-limiting conditions.
- Accurate assessment guides diagnosis and pain management (type of interventions and to adjust interventions).
- To treat pain effectively, ongoing monitoring of the presence and severity of pain and the child's response to treatment is essential.

Consequences of Unrelieved Pain



Acute and chronic pain has negative consequences

May alter breathing patterns

- Splinted breathing is rapid and shallow, which can lead to hypoxemia and alkalosis
- Inadequate expansion of lungs and poor cough can lead to retention of secretions and atelectasis

May increase metabolic rate through increased stress hormones (cortisol, adrenaline, catecholamines)

- Impedes healing and decreases immune function
- Increases heart rate and elevates blood pressure
- Increases myocardial oxygen requirements, which may lead to ischemia and cardiac morbidity

Psychological consequences

- Anxiety, fear, distress, feelings of helplessness or hopelessness
- Avoidance of activity

Causes muscle tension, spasm and fatigue

- May lead to reluctance to move spontaneously and/or refusal to ambulate, further delaying recovery

Sleep disturbances

Slows gastrointestinal and urinary systems

- May lead to nausea, vomiting, ileus and urinary retention

Loss of appetite

When uncontrolled, acute and chronic pain contributes to negative healthcare outcomes

- Prolonged hospital stays
- Increased healthcare utilization with increased rates of hospital re-admission, ED and outpatient visits
- Avoidance of medical procedures

Challenges of Measuring Pain in Children

Historic challenges in assessing children's pain

Pain is subjective and complex; evidence-based pediatric pain assessment is not consistently implemented by healthcare professionals.

In the 20th century, healthcare professionals did not think infants could feel pain.

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Research now indicates neonates can feel pain and almost all healthcare professionals acknowledge this fact

Noxious stimuli have been shown to produce a cortical pain response in preterm babies.

Pain pathways are present at 20-24 weeks gestation; therefore at birth

Painful stimuli are transmitted by both myelinated and unmyelinated fibers. Incomplete myelination implies only a slower conduction speed in the nerves, which is offset by the shorter distances the impulse has to travel.

Neonates exhibit hormonal, metabolic and behavioral responses to pain.

Principles of Pain Assessment

Juan

What is your response?

- What would a thorough pain assessment with Juan include?
- How could Juan's family be engaged in his pain assessment?
- What questions should be asked to assess Juan's pain?
- How would the assessment change if Juan was cognitively impaired?

Juan is a 9-year-old Hispanic boy with a previous medical history of migraine headaches. He presents with a 10-day history of headaches, joint pain, right leg pain, and anorexia.

He looks unwell and his vital signs are: heart rate 136, respiratory rate 32, blood pressure 124/70, oxygen saturation 98% and temperature 37.0°C orally.

He lives at home with his mother, father, and two brothers. He is a good student and enjoys school, playing football, and listening to music.

Pain Assessment Principles

Pain assessment is

- Fundamental for assuring quality pain care
- Individualized and ongoing.
- More than just obtaining a pain intensity score or observing the pediatric patient

The impact of pain on function and quality of life must be assessed and documentation of assessments is critical.

Pain is the most common reason parents seek healthcare services for their children; therefore pediatric healthcare providers must be attentive to reports of pain and remain vigilant for signs and symptoms of children's pain.

All persons, including infants, children and adolescents, the cognitively impaired, and those unable to respond, should be assessed for pain. **Assessment is the first essential step towards achieving effective pain management.**

Comprehensive pain assessment requires learning about a child's pain and the impact of pain on child and family function and quality of life. Therefore, **the child and family must be engaged** in pain assessment and in developing and evaluating the pain treatment plan, Most pain assessment tools just measure pain intensity.

Factors influencing Pain Perception and Experiences

Many factors influence a child's perception of pain and the ways in which they behave when in pain.

An evaluation of a child with pain should include consideration of these factors within a developmental context.

Factors influencing Pain Perception and Experiences

Factors	Affected by:	
Biological	• Age • Gender	• Genetics • Cognitive level
Physical	• General health and fitness	• Sleep habits
Environmental	• Family pain attitudes, beliefs and behaviors • Family pain history • Family environment and functioning	• School environment • Weather • Socioeconomic status • Health care utilization
Psychological	• Temperament • Anxiety and mood • Coping skills • Beliefs about pain • Stress • Fear avoidance behaviors	• Depression • Somatization • Low self-worth • Prior negative experience • Learned helplessness
Physiological	• Disease • Pain characteristics	• Hormone levels • Injury
Sociocultural	• Peer interactions • School attendance • Social interactions	• Spirituality • Cultural and religious influences

Age-specific perceptions of pain

Children's perceptions of pain reflect their developmental differences. Understanding these developmental levels can guide communication with children about their pain, selection of pain assessment tools, as well as pain interventions.

Piaget's stage of development	Perception/presentation of pain
Sensorimotor (0 – 2 years)	• Pain is a physical experience primarily expressed by changes in behaviors such as withdrawal reflex, facial expressions, crying, irritability, tension, abnormal posture and movements
Preoperational (2 – 7 years)	• Pain is primarily perceived as a physical experience, with an inability to distinguish between the cause of pain and its effect • Pain is often perceived as a result of their own behavior (punishment for a wrongdoing) • Pain may also be perceived as the responsibility of someone else and the child may believe magical acts can cause or relieve pain • Increased language skills allow for self-report of pain
Concrete operational (7 – 12 years)	• Pain and its relationship to body parts, function, disease, medical procedures, and activities is developed. Language skills allow for thorough descriptions of pain and pain experiences. • Fears about the consequence of pain and damage to the body are great (vivid imaginations); but toward the end of this period rational thinking is developed • Able to describe what influences pain ('if' and 'when')
Formal operational (12 + years)	• More in-depth understanding of pain develops but may be inconsistently communicated due to limited life experiences. Therefore, may imagine sinister consequences of pain.

Factors influencing Pain Perception and Experiences

For a variety of reasons, everyone responds differently to pain and to strategies for pain relief.

Studies have provided evidence of factors that influence individual perceptions of pain. Pain management strategies must be tailored to the individual needs and responses of the person with pain.

Physiologic differences may explain some variability of individual pain experiences. For example, both genetic differences for sensitivity to pain and analgesic metabolism have been found. Research related to genetic differences is ongoing. Genetic differences may explain variable responses to medications as well as to biobehavioral interventions. Identifying with individual patients medications and biobehavioral interventions that have worked best in the past is an important part of a comprehensive initial pain assessment.

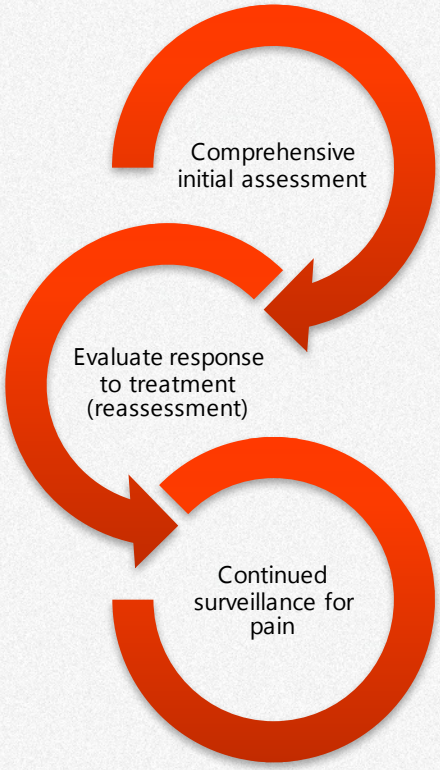
Depression, fear, anxiety, sleep disturbances, and other factors increase pain perception.

Cultural and spiritual values and beliefs shape the meaning of pain, responses to pain treatments, and expectations for pain relief.

Avoid stereotyping children and their families based on their race or ethnicity, intracultural differences are often greater than intercultural differences. Assess individual and family values and beliefs that impact pain care.

Pain Assessment Process

Organizational Assessment Process



Routinely screen all patients for presence of pain

To ensure an organization's pain assessment and care planning process is sensitive to children's pain, patients must be routinely screened for the presence of pain.

Screening processes may need to vary by patient population, clinical unit, or availability of healthcare providers. Consider how the process of screening for pain might differ in the emergency department as compared to a primary care practice or an inpatient neonatal intensive care unit.

Pain assessment process

When pain is identified, a thorough assessment is required to identify potential causes of pain and to guide the pain management treatment plan.

Essential element of the initial assessment will include a physical exam, imaging, laboratory, diagnostic and psychological tests as appropriate.

Treatment plan effectiveness is evaluated through subsequent assessments (reassessment).

This process is cyclical. Continued surveillance for pain is necessary to address new sites and sources of pain.

Documentation of assessments is critical for communication.

Initial Assessment

Suzie

What is your response?

What additional assessments would you make to help with diagnosis and treatment?

Suzie, aged 13 years, presents with a 9-month history of cramping, periumbilical pain and nausea. She has seen her pediatrician several times over the past 6 months for pain and has had 3 visits to the Emergency Department due to pain.

Her blood work (complete blood count, differential, erythrocyte sedimentation rate) is normal, her Celiac screen is negative and her abdominal x-ray shows fecal loading. She is on regular doses of laxatives.

Suzie reports that she can't go to school because she feels she can't make it to the bathroom in time and that she is not sleeping very well at night.

Comprehensive Initial Assessment

The initial evaluation should begin with a history of the child's current pain, including a careful description of the pain. Detail the sensory characteristics, intensity, quality, location, duration, variability, predictability, exacerbating and alleviating factors, and impact of pain on daily life (sleeping, eating, school, social and physical activities, family and peer interactions).

Assess:	Ask:
Location	Where do you hurt?
Intensity (use valid tools)	How much does it hurt?
Quality	What does it feel like?
Duration	How long does it last?
Frequency	How often do you hurt?
Accompanying symptoms	What else do you feel?
Seasonal/temporal variation	When do you hurt?
Alleviating/Aggravating factors	What makes the pain better/worse?

Comprehensive Initial Assessment

Acronyms can help you remember the components of the initial pain assessment.

WILDA	
W	When onset
I	Intensity
L	Location
D	Duration
A	Aggravating & Alleviating factors

OLD CARTS	
O	Onset
L	Location
D	Duration
C	Characteristics/quality
A	Aggravating & Alleviating factors
R	Radiating
T	Temporal
S	Severity

PQRST	
P	Pain (Y/N)
Q	Quality
R	Radiation/Location
S	Severity
T	Timing/Triggers/Treatment

What are the differences between acute and chronic pain?

Type your answer here.

Acute Pain:

Chronic Pain:

Key Assessment Elements for Acute and Chronic Pain

Acute pain signals a specific nociceptive event and is self-limited.

Chronic pain may begin as acute pain, but it continues beyond the normal time expected for resolution of the problem or persists or recurs for other reasons.

Characteristic	Acute pain	Chronic pain
Cause	Usually single obvious cause (e.g. tissue damage due to surgery)	Usually multiple causative or triggering factors Neuronal or CNS abnormality (plasticity, sensitization)
Type	Nociceptive, neuropathic or mixed; psychosocial factors	Nociceptive, neuropathic or mixed; psychosocial factors
Purpose	Protective; activation of sympathetic nervous system	No protective function; rarely accompanied by signs of activation of sympathetic nervous system
Duration	Short-lived (days to weeks)	Long lasting or recurring beyond time of normal healing; may be associated with chronic disease
Pain Intensity	Usually proportionate to severity of injury	Often out of proportion to objective physical findings
Treatment	Usually easy to treat or self-limited. May only require single modalities (pharmacological or biobehavioral)	More difficult to treat, requiring interdisciplinary, multi-modal treatment approach
Outcome	Expected to resolve with healing	Pain persists in significant proportion (30-62%); with smaller proportion developing pain associated disability syndrome (5-8%)

Physical Examination

Typically, the physical examination for acute pain is very focused, whereas the physical examination for a patient with chronic pain will be more comprehensive.

The physical examination should always include observation of the child's general appearance, posture, gait, and emotional and cognitive state. Muscle spasms, trigger points, and areas of sensitivity to light touch should be assessed. Vital signs should be obtained. For recurrent and chronic pain, a complete neurological examination should be conducted.

It can be helpful to examine the painful area(s) multiple times during the examination. Somatic pain (pain from damage to tissues, such as the skin, muscles, connective tissues, skeleton, and joints) may be elicited when the child tenses his or her muscles due to fear of the examination.

It is common for children with chronic pain to develop secondary myofascial pain (pain from muscles and fascia, connective tissue that covers the muscles) because of abnormal body posturing and prolonged inactivity.

Assess the impact of pain on function and quality of life

- Assess current pain experience
- Perform a thorough physical examination
- Obtain appropriate imaging, lab and other diagnostic tests
- Acquire a psychologic assessment, pain history, and identify cultural considerations
- Assessment may be more comprehensive for children with chronic pain

If significant findings that have not been previously addressed are identified, referral to the appropriate subspecialist is indicated for more thorough evaluation.

Key Acute Pain History Questions

Conduct a thorough history of the child's prior pain experiences and talk with the child and parents about pain. It is also important to assess the situational factors that might affect a child's self-report of pain, and a more comprehensive history may be needed for the child with chronic pain.

Child Questions	Parent Questions
Tell me what pain is.	What word(s) does your child use for pain?
Tell me about the hurt you have had before.	Describe the pain experience your child has had before.
Do you tell others when you hurt? If so, who?	Does your child tell you or others when he or she is hurting?
What do you want to do for yourself when you are hurting?	How do you know your child is in pain?
What do you want others to do for you when you hurt?	What do you do for your child when he or she is hurting?
What helps the most to take your hurt away?	What does your child do for him/herself when he or she is hurting?
Is there anything special that you want me to know about when you hurt (if yes, have the child describe)?	What works best to decrease or take away your child's pain?
(Hester et al., 1998)	Is there anything special that you want me to know about your child and pain (if yes, describe)?

Key Chronic Pain History Questions

Family pain history

- Do any other family members have chronic pain?

There is a strong relationship between parental history of chronic pain and disability and pain in children.

Child's previous pain history

- Has the child had other recurrent pains (headaches, stomach ache)?

In addition to the previous pain history, a typical pediatric history should include medical-surgical history, birth and early childhood history, developmental milestones, social history (school, friends, interests), and family medical and social history. Attention should be paid to recent stressful events, such as deaths, marital disruption, moves, and other changes in life circumstances (new school).

Psychological factors

- How does frustration, sadness, and worry about pain and the impact of pain influence the child's life?
- What are the child and parents' beliefs about pain, perceived cause and prognosis?
- Underlying psychological factors (anxiety, mood disorder, bullying, PTSD)
- Fear of pain, pain avoidance and catastrophizing influences pain and function
- Family coping and stress may influence pain

Inquiry should include the magnitude of distress the child and family attribute to pain, and the impact of pain on cognitive functioning, anxiety, depression, and feelings of hopelessness. Assessment should include what the child and family members perceive as the cause of the pain and how they respond to it.

Key Pain Treatment History Questions

Past & current pain control methods and their effectiveness

Previous experiences influence perspectives of pain and pain management. Review with the child and family past and current treatments for pain. Inquire about home remedies and use of complementary, alternative, and integrative therapies. Ask why past treatments were stopped. Were they not effective, no longer effective, too expensive, or did they cause side effects limiting their usefulness?

Pain Control Method		
Pharmacological	Over-the-counter (OTC) drugs Topical ointments and creams Prescription medications Opioids Neuropathic pain medications	
Comfort	Manage the environment Pacing & bundling care	Positioning Supportive devices
Physical	Physiotherapy Massage Thermal (Cold/heat) Transcutaneous Electrical Nerve Stimulation (TENS)	Biofeedback Taping Compression
Psychological	Cognitive Behavioral Therapies Relaxation Music Mindfulness Guided imagery	Distraction Virtual Reality Reframing Self-hypnosis
Complementary & Alternatives	Herbal Nutraceuticals Traditional therapies	Acupuncture Yoga Prayer/Spirituality

ABCs of Pain Assessment

Pain Screening and Assessment Process

A. Ask and assess pain regularly and systematically
B. Believe reports of pain
C. Choose treatments based on thorough pain assessment
D. Deliver pain treatments in a timely, coordinated manner
E. Evaluate treatment efficacy

Documentation of assessments is critical for communication

The ABC acronym can be used to remember the pain assessment process

Routinely screen for pain. In hospital settings, screen for the presence of pain at least every shift and more often as needed.

For patients with pain, initiate *comprehensive pain assessment* at the first point of contact – for example, on admission to an inpatient setting.

Assess pain regularly after surgery and/or if the patient has a known painful medical condition (sickle cell disease).

Chronic pain assessment may be more complex than acute pain assessment and should be detailed and multidimensional in nature.

Chronic pain management requires *longitudinal pain assessment* (i.e. frequent assessments over a period of days to weeks)

In summary

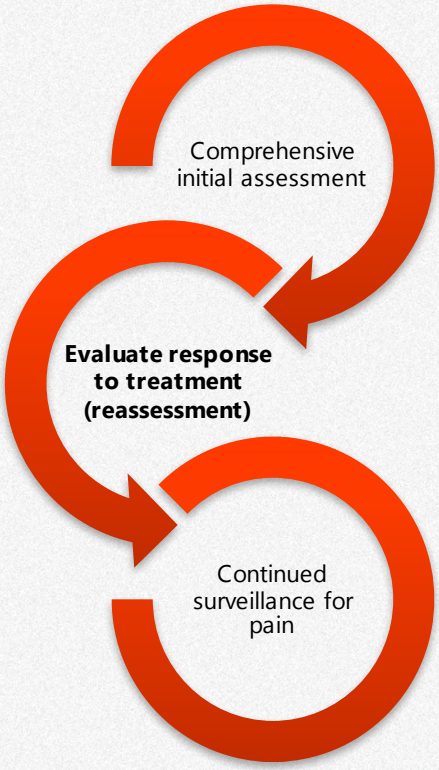
A comprehensive pain assessment should be completed on admission, and when pain is reported, anticipated, or suspected. Each treatment must be evaluated and this evaluation (reassessment) should be documented.

Your practice

- ***Review your organization's policies for pain screening frequency, components of an initial assessment, time intervals for evaluation of treatment efficacy, and continued surveillance of pain.***

What needs to change?

How to Evaluate Response to Treatment (Reassess)



Use the same pain intensity tool for screening, assessing and evaluating pain.

Standard pain assessment tools should be used at a time interval appropriate to evaluate the effectiveness of a pain treatment and the pain treatment plan.

Document and compare pain intensity scores before and after interventions. Evaluate pain relief (analgesia) expectations, goals and results.

- Did the pain treatment plan result in recovery and improved function?
- Was meaningful pain reduction or relief achieved?

Evaluate the patient's and family's understanding of the treatment plan and identify potential barriers to adherence.

- For example, will concerns or misconceptions about pain management prevent treatment adherence?

Evaluate

- Patient and family's understanding of the treatment plan
- Patient and family's reported goals and meaningful improvements (both pain intensity and function)
- Analgesic efficacy
- Non-drug treatment efficacy
- Analgesic side effects and adverse effects
- Functional changes
- Treatment plan adherence

Choosing Pain Assessment Tools

Challenges of Measuring Pain in Children

Challenges

- Subjective and complex nature of pain
- Developmental and language limitations that preclude comprehension and self-report
- Dependence on others to infer pain from behavioral and physiological indicators
- Social context of pain (differences in pain perception and expression depending on age, sex, race, and ethnicity)

"Pain is whatever the experiencing person says it is, existing wherever they say it does." (McCaffery 1968, p.11).

"Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. Pain is always subjective. Each individual learns the application of the word through experiences related to injury in early life." (Mersky & Bogduk [Eds], IASP, 1994, p. 249).

Why might these definitions be problematic in infants and children?

- The inability to communicate in no way negates the possibility that an individual is experiencing pain and needs appropriate pain-relieving treatment (IASP 2001, p. 2).
- Sleep may be the result of exhaustion due to persistent pain
- Children are able to report pain and point to where they hurt by the age of 2 years.
- By 4 years, some children can report pain intensity with FACES scales and most can show where they hurt on a body chart despite not knowing the names of those body parts

Hierarchy of Assessments for Children unable to Self-Report

Methods of assessing pain in children unable to self-report should follow this hierarchy. Anticipate and treat pain. Attempts should be made to obtain self-report from all patients, even if it's a simple "yes/no" when asked "do you have pain?" It may be possible to obtain a self-report from patients with intellectual disabilities and those who are critically ill.

- Review the patient's clinical condition. Are there any problems or diagnoses that commonly cause pain? If so, assume pain is present and treat it.
- Anticipate and treat pain caused by procedures.
- Ask patient about pain, and ask them to report pain
- Rule out other conditions such as constipation or infection. Be sure the patient is dry, warm, or cool enough, positioned in a comfortable way, and that other basic needs are met.
- Be vigilant for subtle behavioral changes. Remember that behavioral changes do not translate to a pain intensity rating, but should raise suspicion of the presence of pain.
- Ask others (surrogate reporting), if the child is in pain. Those who know a patient best can help identify specific behaviors that indicate pain for this individual.
- If pain is likely, attempt an analgesic trial and look for changes in behavior or other signs of improvement.

Herr , Coyne , Ely & Manworren (accepted for publication 2019) Pain Assessment in the Patient Unable to Self- Report: Position Statement with Clinical Practice Recommendations.
Herr, Coyne, McCaffery, Key, Manworren & Merkel. (2011).Pain assessment in the patient unable to self-report: Position statement with clinical practice recommendations. *Pain Management Nursing* 12 (4), 230-250.

Physiologic Measures

It is important to note that vital signs and physiologic measures are not included in the hierarchy of pain assessment measures.

Physiologic Responses

- Neonates and children clearly display metabolic, hormonal, and physiological responses to pain
- Physiological changes should be recognized as lacking specificity for pain, since these respond to exertion, fever, anxiety and other stresses, including disease processes.
- Physiologic changes are neither specific nor sensitive to pain

Neonates and children display metabolic, hormonal, and physiological responses to pain. These physiological reactions all indicate the activation of the sympathetic nervous system, which is part of the autonomic nervous system, and is responsible for the fight or flight response associated with stress. These physiological changes should be recognized as:

- reflecting stress reactions;
- occurring in response to other states such as exertion, fever, and anxiety.

On their own, physiological indicators do not constitute a valid clinical pain measure for children.

A multidimensional or composite tool incorporates physiological and behavioral indicators of distress.

Choosing the *RIGHT* tool

Tools used to assess pain in your organization should be:

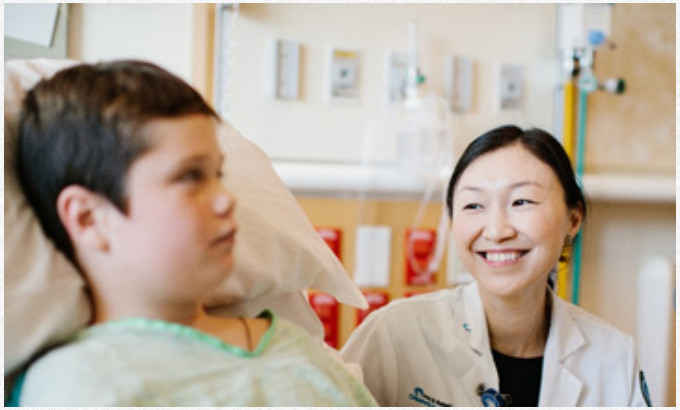
- **reliable** (consistent and trustworthy ratings regardless of time, setting or who is administering tool)
- **valid** (unequivocally measures a specific dimension of pain)
- **responsive** (able to detect change in pain due to treatment)
- **feasible** (simple to use and not long, short training time, easy to administer and score)
- **practical** (for assessing different types of pain and different populations)

There are many reliable, valid, and clinically useful pain assessment tools for assessing pain in neonates, infants, children, and adolescents. However, no easily administered, widely accepted, uniform technique exists for assessing pain for all children.

- Selection of the right tool will depend on the child's condition, age, ethnic background and cognitive/developmental level.
- Careful explanation and appropriate timing of administration are necessary.
- It is helpful for children to have an opportunity to practice using the tool before pain is expected, for example in a surgical pre-admission program.
- Offer the child a chance to practice using the tool by having them rate hypothetical situations that would produce low (skinned knee) and high levels of pain (broken leg).

Pain Assessment Tools for Self-Report

Self-Report



There is no single pain assessment tool that can be used to reliably measure pain in all children due to children's developmental differences:

- age-related vocabulary
- language comprehension
- comprehension of health concept measured
- duration of recall (recall bias)
- ability to use rating scales
- response burden
- culturally sensitive

Self-report is the gold standard

Self-report is the most reliable measure of pain and pain relief in those who can self-report. Unfortunately, many clinicians are reluctant to believe, accept, and respect self-report, especially if self-report is not consistent with the clinicians' expectations or their functional assessments of the patient. Cultural differences, diversity of beliefs, and difference in values may impact clinicians' pain assessments.

Due to developmental differences, not all children are able to provide self-report of pain, and not all children are able to describe characteristics (quality, timing) of their pain.

Parent/caregiver report may be a useful alternative for young children

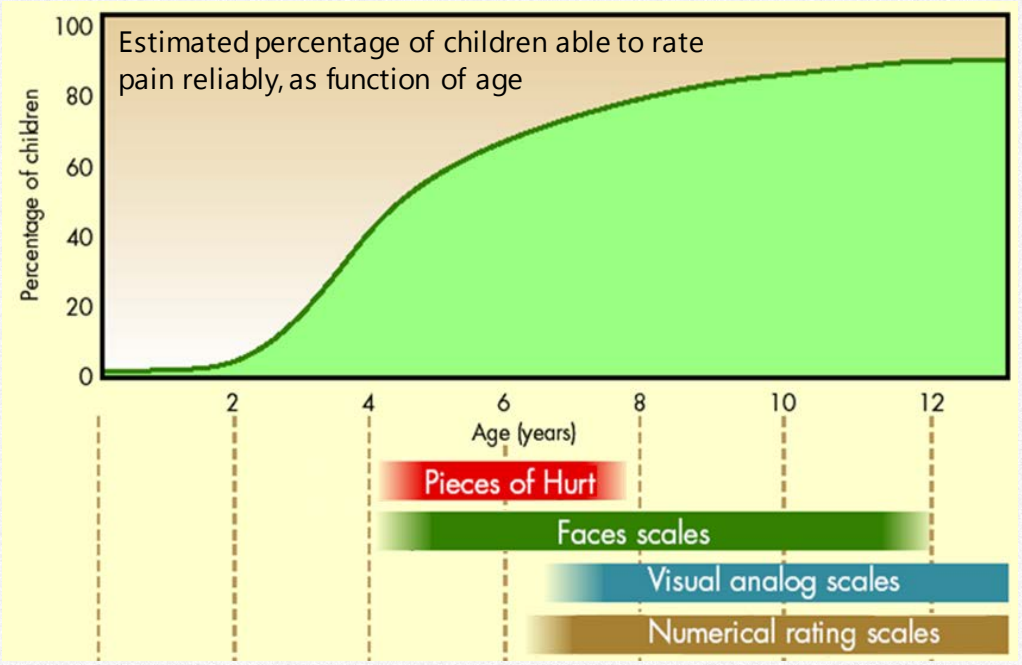
Parents and significant family members can recognize subtle changes in their child and therefore, they have a particularly important role in pain assessment.

These proxy reports are more accurate for observable information (such as behaviors like movement and appetite) than for subjective evaluation. It is important to note that proxy reports will be based on different information and expectations. They reflect different experiences then the patient's self-report and are affected by the parent/caregiver's mental and physical health.

What skills are needed for children to use self-report measures?

Type your answer here.

Self-Report



Cognitive skills needed to provide self-report

- Matching
- Seriation
- Estimation of quantity

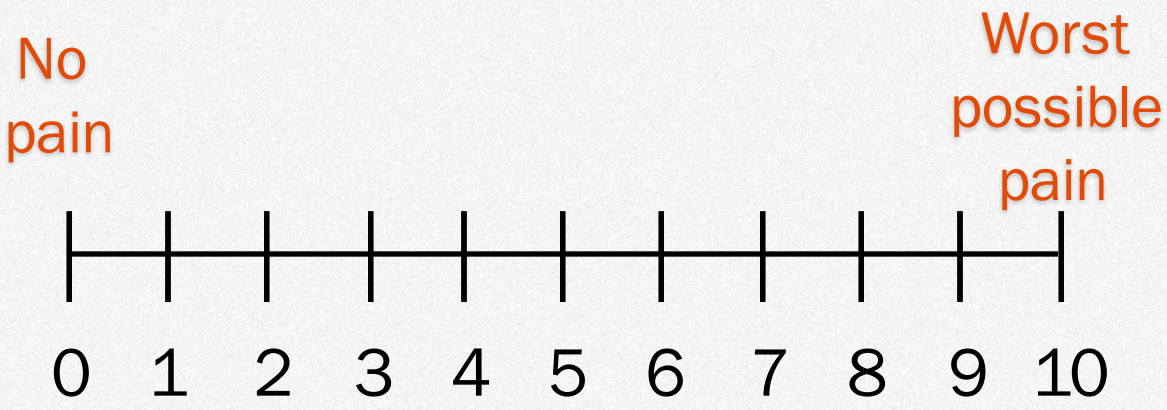
Rating scales such as 0-10, faces, and others, measure pain intensity. Pain intensity is only one component of a comprehensive pain assessment. Intensity rating scales help to quantify how much pain hurts and to evaluate pain and pain relief over time. These tools are easy to use but individual age and developmental differences must be considered when selecting a pain intensity scale.

No screening method is better than chronological age to determine tool selection. Use a simpler tool if a more advanced tool is not understood.

If a patient is sleeping, the patient cannot report pain intensity using a self-report tool. Patients may sleep despite experiencing intense pain. Do not replace the self-report intensity rating with an observational score or zero, instead document asleep.

Numerical Rating Scale (NRS)

The tool most commonly used in clinical practice is the Verbal Numerical Rating Scale. This is a reliable, valid, and developmentally appropriate pain intensity tool for children over 8 years of age, as well as adults. It consists of a range of numbers (0-5, 0–10, or 0–100) that can be represented in a verbal or graphic format (shown here).



NRS scales can be verbally administered without a print copy and are easy to score.

Children are told that the lowest number represents '*no pain*' and the highest number represents '*the worst possible pain*'. They are instructed to circle, record, or state the number that best represents their level of pain intensity.

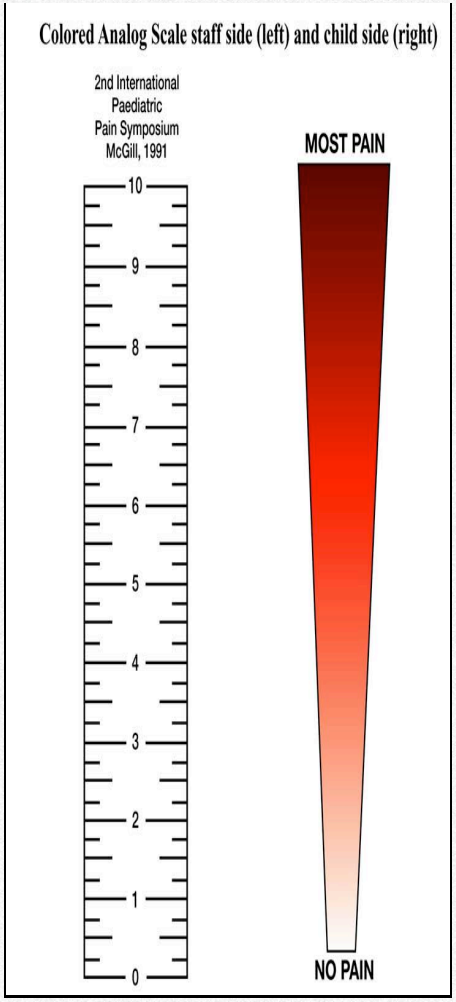
There is inconclusive evidence regarding the ability of NRS to detect changes in pain in response to medical treatments and procedures in children with chronic pain.

Further research is needed on the lower age limit of children that can use the scale as well as standardized age-appropriate anchors (phrases at the extreme ends of the scale) and instructions for use.

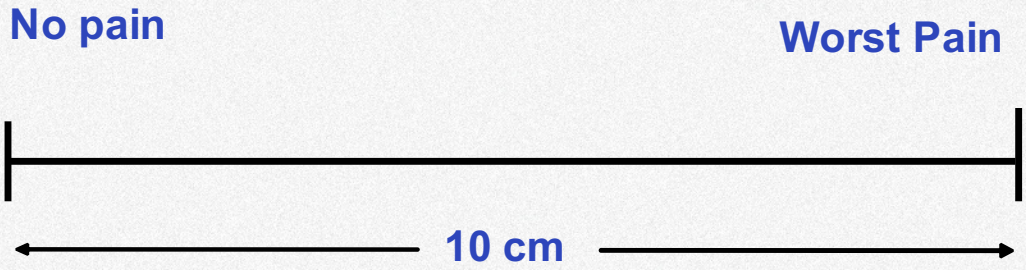
Verbal Rating Scales (VRS)

- Verbal rating scales (VRS) consist of a list of simple word descriptors or phases each indicating various degrees or intensities of pain.
- Each word or phrase on a VRS may be associated with a number.
- Children are asked to select the word or phrase that best represents their level of pain intensity,

Visual Analogue Scales (VAS)



McGrath et al. 1996. Used with permission.



Visual analogue scales (VAS) require the child to select a point on a vertical or horizontal 10-cm line where the ends of the line are defined as the extreme limits of pain intensity. The child is asked to make a mark along the line to indicate the intensity of his/her pain. The distance from the lowest anchor of the VAS to the patient's mark is used as a severity of the pain rating. The phrase used to define the anchor can vary. For example, common upper anchors are "worst pain," "most pain," and "worst possible pain."

There are many versions of VAS for use with children. In addition, creative strategies have been employed to improve the reliability and validity of VAS for use in children by using graphic or other methods to enhance the child's understanding of the tool (Color Analogue Scale; McGrath et al. 1996). VAS have been used extensively for research and have been recommended for most children > 8 years of age.

While VAS are easy to reproduce, photocopying may alter the line length. VAS also requires the extra step of measuring the line, which increases the burden and likelihood for errors in assessment.

Faces Pain Scales

Faces pain scales present the child with drawings or photographs of facial expressions representing different levels of pain intensity, in rank order.

- The child is asked to select the picture of a face that best represents his/her pain intensity, and the score is the number of the expression chosen.
- Faces scales have been well validated for use in patients over 3-5 years old and across several ethnic and cultural groups

Advantages of Faces pain scales include:

- Preferred by children
- No expressive language needed
- No counting or seriation
- Little dependency on specific language
- Cheap, easy to reproduce, disposable

There are two types of faces scales, line drawings (Faces Pain Scale–Revised and Wong-Baker FACES) and photographs (Oucher).

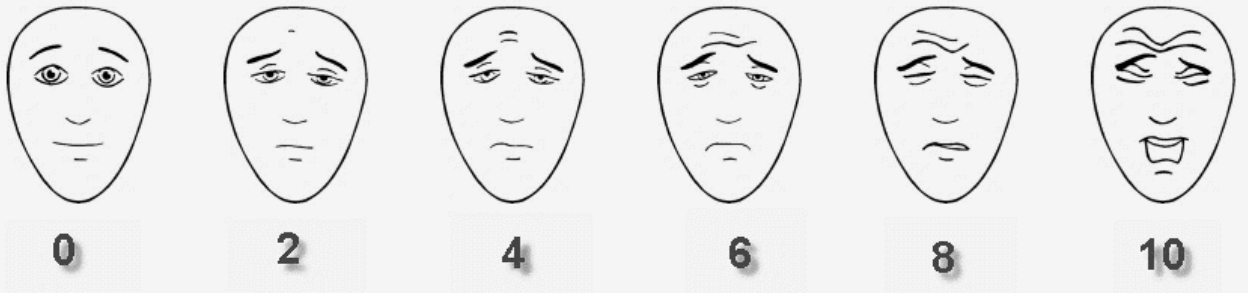
The Oucher comprises 2 separate scales: the photographic faces scale and a 0–10 vertical NRS. Older school-aged children and adolescents normally use the NRS.

The Oucher was also developed to be culturally sensitive by providing several versions depicting children of different races and ethnicity.

You can see examples of the Oucher scales at http://www.oucher.org/differences.html.

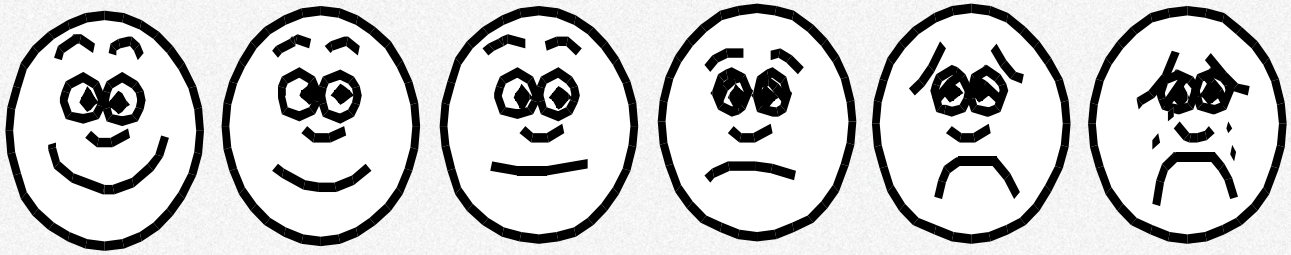
Faces Pain Scale – Revised (FPS-R)

The Faces Pain Scale-Revised (FPS-R) is a valid, reliable and developmentally appropriate tool for children >4 years of age through adulthood. This self-report pain assessment tool is a six-point pain intensity rating scale that is anchored by a neutral face to indicate 0 for no pain; and a grimacing face to indicate the worst possible pain or 10 on a 0-10 scale.



Wong-Baker FACES Pain Rating Scale

The Wong-Baker FACES Pain Rating Scale is a valid, reliable, and developmentally appropriate self-report pain intensity assessment tool for children over 3 years of age. The pictorial representation of pain intensity is valid for use through adulthood too.



0	1	2	3	4	5
No hurt	Hurts little bit	Hurts little more	Hurts even more	Hurts whole lot	Hurts worst

What is the difference between the FPSR and Wong-Baker FACES Pain Rating Scale?

Faces pain scales with a happy and smiling no pain face or faces with tears for most pain possible have been found to affect the pain scores recorded. For example, the smiling lower anchor of the Wong-Baker FACES Pain Scale has been found to produce higher pain ratings than those with neutral faced anchors.

Multidimensional Pain Tools

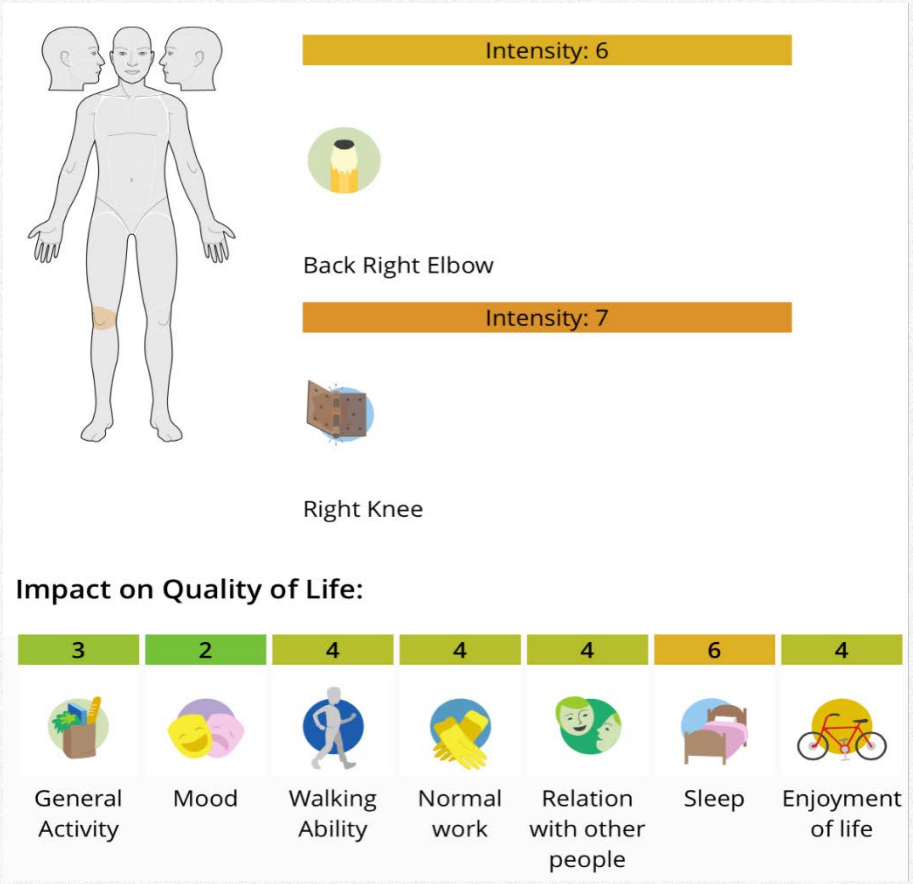
There are several multidimensional self-report pain tools that have been validated for acute, recurrent, and chronic pain in children. They measure pain intensity, location of pain, and word descriptors.

Tool	Components	Considerations
Adolescent Pediatric Pain Tool (APPT) *Savedra, Tesler, Holzemer, & Ward, 1999*	Pain intensity measured using: • a 0-100 mm word graphic rating scale • body outline to describe location of pain • word descriptors	• Originally developed for children and adolescents with post-operative pain; has been used in children with acute and chronic disease-related pain (cancer, sickle cell disease, arthritis) • Intended for use in children aged 5-16 years; used in children 4-18 years • Well established evidence of reliability, validity, and ability to detect change • Easy to use, well liked and takes 3-6 minutes to complete
Pediatric Pain Assessment Tool (PPAT) *Abu-Saad, Kroonen & Halfens, 1990*	Pain intensity measured using: • 0-10 cm VAS • body outline (number of body areas marked) • 32 word descriptors	• Initially developed for acute medical and post-operative pain; has also been used with recurrent pain (headaches) and chronic pain (arthritis) • Intended for use in children aged 5-16 years • Well established evidence of reliability and validity and some evidence of ability to detect change • Child, parent, and healthcare professional forms • Easy to use and takes 5-10 minutes to complete
Pediatric pain Questionnaire (PPQ) *Varni, Thompson, & Hanson, 1987*	Pain intensity measured using: • 0-10 cm VAS anchored with happy and sad faces for present and worst pain • gender neutral body outline to describe location of pain (number of body areas marked) • pain intensity (choosing four of eight colored crayons to represent various levels of pain intensity from none, mild, moderate and severe) • 46 word descriptors to assess the sensory, affective and evaluative qualities of pain	• Originally developed for children and adolescents with recurrent and chronic pain (juvenile arthritis) • Intended for use in children aged 5-16 years; used in children 4-18 years • Child, adolescent, and parent versions • VAS and body outline instructions can be read to children younger than 7 years so they can use the tool. • Well established evidence of reliability and validity and some evidence of ability to detect change • Minimal training and takes 10-15 minutes to complete

Pain diaries

The PainQuiLT is available at http://app.painquilt.com

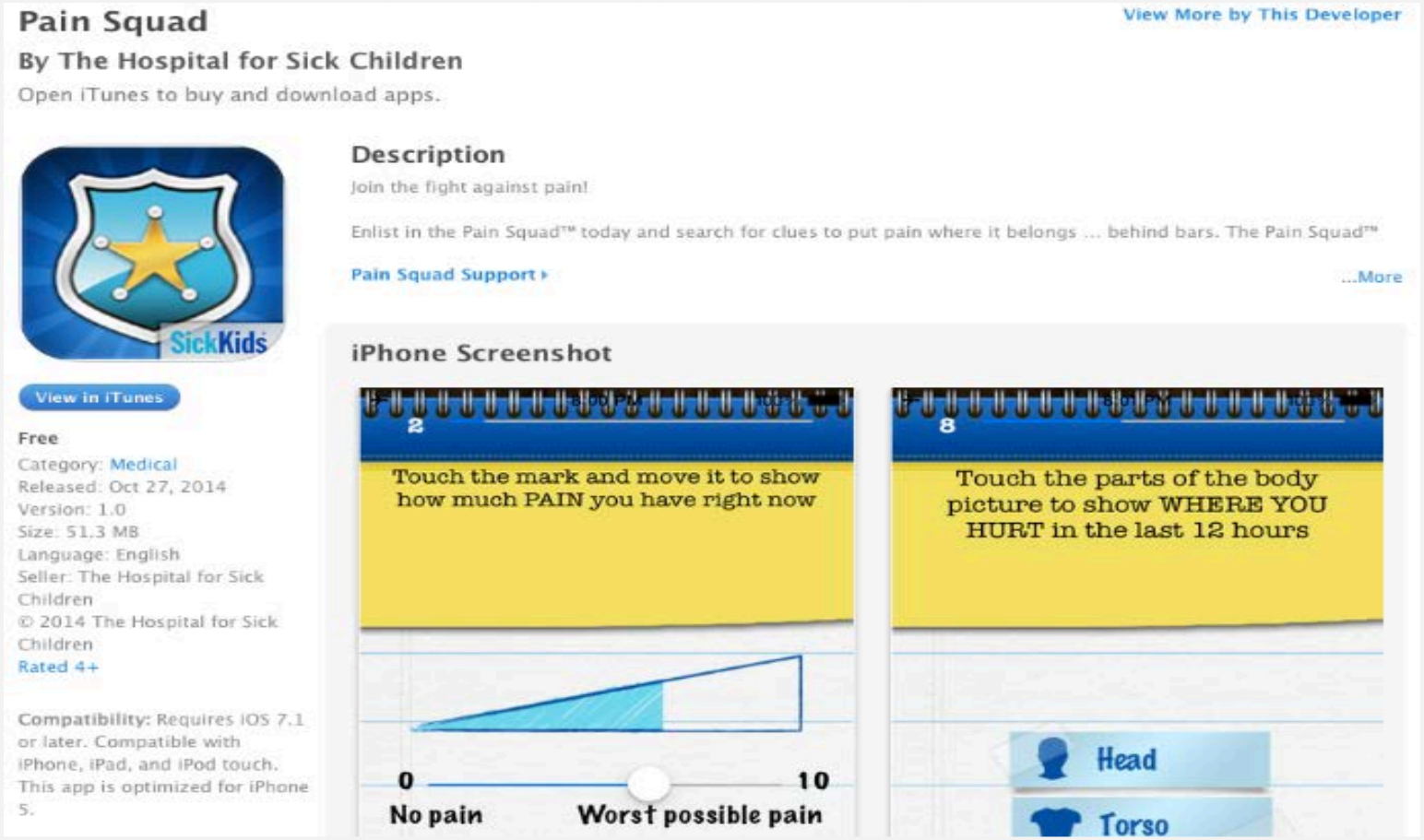
Pain diaries are another way to track pain in children with recurrent or chronic pain. While paper-based diaries have been used in clinical and research practice for decades, they are prone to recall biases and poor compliance. There are now several electronic multidimensional pain tools that can track pain intensity, quality, location, and impact on function in real time.



Pain diaries

The Pain Squad app is freely available for download in the Apple store.

Pain Squad has been developed and validated for use in children and adolescents with cancer. This App includes both assessment tools and coaching aids to reinforce biobehavioral strategies for pain relief and support patients in coping with pain.



Assessment of Those Unable to Self-Report

Premature infants

Infants and toddlers

Individuals with intellectual disabilities

Behavioral Measures

Over 60 observational tools have been developed to assess children's pain from birth through adolescence. These tools generally rely on observations of behaviors associated with pain.

Of all behaviors associated with pain, withdrawal reflex and facial expressions are the only ones that have been associated with brain-based evidence of pain.

Commonly identified behaviors indicative of pain in infants and young children are:

- Individual behaviors (facial expression and crying)
- Large movements (withdrawal of the affected limb, touching the affected area, and movement or tensing of limbs and torso)
- Changes in social behavior or appetite
- Changes in sleep/wake state or cognitive functions

Challenges with Observational measures include:

- Difficulty observing the behavior due to medical equipment or restraints (for example, tape on face, intubation, arm boards, or sedatives and chemical neuromuscular agents)
- Loss of behavioral response with adaption and persistence of pain
- No way to distinguish pain behaviors from other kinds of distress (fear) behaviors.
- Learning to control behavioral communication (starts during infancy) based on social norms (by 2 years of age). For example, crying to gain parents attention versus learning not to cry when injured playing because toy will be removed.

Jasmyn

Jasmyn's parents ask how the nurses will know if Jasmyn is in pain.

How would you answer?

Jasmyn was born at 39 weeks gestational age. Now 15 days old, she is hospitalized for pyloric stenosis.

Her vital signs are: heart rate 179, respiratory rate 60, blood pressure 50/32, oxygen saturation 88% and temperature 38.0°C axillary. She is also mildly lethargic.

As the nurse is preparing for venipuncture to start IV fluids, Jasmyn's parents ask questions…

Neonatal Infant Pain Scale (NIPS)

The **Neonatal Infant Pain Scale or NIPS** is a valid and reliable tool for assessing preterm to term infants up to 12 months of age with acute and acute procedural pain. There are 5 indicators. (Lawrence, et al., 1993)

Face	Breathing	Arms	Legs	Arousal

Over 20 observational tools have been developed to assess preterm and term infants' pain. These tools rely on facial expression, other observations of behaviors associated with pain, and vital signs.

See neonatal material for pain assessment tools for preterm infants

NIPS

- Neonates and infants up to 12 months
- Acute and procedural pain
- Scored 0 – 7
  - Face (0 or 1)
  - Breathing (0 or 1)
  - Arms (0 or 1)
  - Legs (0 or 1)
  - Arousal (0 or 1)
  - Cry (0 or 1 or 2 points)

FLACC and r-FLACC: Face, Legs, Activity, Cry, Consolability

The FLACC behavioral assessment tool has high clinical utility and is valid and reliable for use in children aged 2 months to 7 years in the post-anesthesia care unit and children 0-3 years of age with acute pain. Like other behavioral tools, it cannot be used with paralyzed patients. The r-FLACC, includes pain behaviors common to individuals 4-21 years of age with cognitive impairments. These behaviors are listed in **bold**. Other patient specific behaviors should be added to the r-FLACC. Preliminary data suggests the FLACC and r-FLACC may also be useful for ventilated patients.

Indicator	0	1	2
FACE Individualized behavior:	No particular expression or smile	Occasional grimace or frown, withdrawn or disinterested; **appears sad or worried**	Consistent grimace or frown; frequent/constant quivering chin; clenched jaw; **distressed-looking face; expression of fright or panic**
LEGS Individualized behavior:	Normal position or relaxed; usual tone & motion to limbs	Uneasy, restless, tense, **occasional tremors**	Kicking, or legs drawn up; marked increase in spasticity, **constant tremors or jerking**
ACTIVITY Individualized behavior:	Lying quietly, normal position, moves easily, regular and rhythmic respirations	Squirming, shifting back/forth, tense or guarded movements, **mildly agitated, shallow splinting respirations, intermittent sighs**	Arched, rigid or jerking, severe **agitation, head banging, shivering, breath holding, gasping or sharp intake of breaths, severe splinting**
CRY Individualized behavior:	No cry/verbalization	Moans or whimpers, occasional complaint, **occasional verbal outburst or grunt**	Crying steadily, screams or sobs, frequent complaints, **repeated outbursts, constant grunting**
CONSOLABILITY* Individualized behavior:	Content or relaxed	Reassured by occasional touching, hugging, being talked to, distractible	Difficult to console or comfort, **pushing away caregiver, resisting care or comfort measures**

The child should be observed for 2-5 minutes before calculating a score

*Consolability requires an attempt to console the patient and rating of the patient's response to the intervention.

Scores of <6 represent no response or minimal response to pain, while scores >12 represent more robust response to pain

Pain Assessment in Children Unable to Self-Report Pain

While there are several pain assessment tools for children with cognitive impairments, developmental delays, or intellectual disabilities who are unable to provide self-report, only 4 tools have been found reliable and are well validated.

- Revised Faces, Legs, Activity, Cry, Consolability (rFLACC; Malviya et al. 2006);
- Paediatric Pain Profile (PPP) (Hunt et al. 2004, 2007, see www.ppprofile.org.uk/).
- The INRS Individualized Numeric Rating Scale (Solodiuk & Curley, 2003).
- Non-Communicating Children's Pain Checklist–Revised (NCCPC-r; Breau et al. 2002);

Children with cognitive impairment, developmental delays, or intellectual disabilities who are unable to report pain may be at greater risk for under-treatment of pain. These include children with cerebral palsy, neurodevelopmental disorders, and autism spectrum disorders.

It is particularly difficult to accurately assess pain experienced by these children, but we know by their rate of healthcare service utilization they have a disproportionately high risk and burden of pain among pediatric patients.

Proxy assessment from a parent or caregiver who knows the child well may be credible.

However, proxy judgements have been shown to underestimate pain experiences of others, perhaps due to the variety of ways these individuals may respond to new and unique pain experiences.

Factors to consider in the assessment of pain in children > 3 years of age who are unable to report pain:

- underlying condition/process (children with neurological conditions may have spasticity, or children with spina bifida may be unable to move their legs, the underlying condition may be stable or progressive, as in SMA);
- developmental level (cognition, communication, motor function);
- usual behavior and health condition (baseline condition, pain experiences);
- usual means of communication (verbal, non-verbal, pain behaviors);
- caregiver's views;
- impact of concurrent illnesses (social, emotional, physical);
- differential diagnosis (all possible sources of distress and pain).

Pain Assessment in Children Unable to Self-Report Pain

The r-FLACC includes pain behaviors common to individuals 4-21 years of age with cognitive impairments.. Other patient specific behaviors should be added to the r-FLACC. The clinical utility of the rFLACC has been rated higher than other tools for neurologically impaired children, suggesting it may be more readily adopted into clinical practice.

The **PPP** has been used to assess persistent daily pain in this group of children**.**

The **INRS** is based on proxy ratings. Parents use their knowledge of their child's pain behaviors to rank these behaviors on a 0-10 scale to correspond to the intensity of pain they perceive their child to be having when the child exhibits these behaviors.

The **NCCPC-r** has been used to assess acute pain (resulting from a fall), chronic pain (due to a medical condition) and postoperative pain, in neurologically impaired children

Behavior:

I. Vocal
II. Social
III. Facial
IV. Activity
V. Physiological
VI. Eating/Sleeping

See the full tool on the next page. ➔

Non-communicating Children's Pain Checklist – Revised (NCCPC-R)

NAME:_____ UNIT/FILE #: _____ DATE:_____ (dd/mm.yy)

OBSERVER:_____ START TIME:_____AM/PM STOP TIME:_____AM/PM

How often has this child shown these behaviours in the last 2 hours? Please circle a number for each item. If an item does not apply to this child (for example, this child does not eat solid food or cannot reach with his/her hands), then indicate "not applicable" for that item.

0 = NOT AT ALL	1 = JUST A LITTLE	2 = FAIRLY OFTEN	3 = VERY OFTEN	NA = NOT APPLICABLE

I. Vocal						
1.	Moaning, whining, whimpering (fairly soft)	0	1	2	3	NA
2.	Crying (moderately loud)	0	1	2	3	NA
3.	Screaming/yelling (very loud)	0	1	2	3	NA
4.	A specific sound or word for pain (e.g., a word, cry or type of laugh)	0	1	2	3	NA
II. Social						
5.	Not cooperating, cranky, irritable, unhappy	0	1	2	3	NA
6.	Less interaction with others, withdrawn	0	1	2	3	NA
7.	Seeking comfort or physical closeness	0	1	2	3	NA
8.	Being difficult to distract, not able to satisfy or pacify	0	1	2	3	NA
III. Facial						
9.	A furrowed brow	0	1	2	3	NA
10.	A change in eyes, including: squinching of eyes, eyes opened wide, eyes frowning	0	1	2	3	NA
11.	Turning down of mouth, not smiling	0	1	2	3	NA
12.	Lips puckering up, tight, pouting, or quivering	0	1	2	3	NA
13.	Clenching or grinding teeth, chewing or thrusting tongue out	0	1	2	3	NA
IV. Activity						
14.	Not moving, less active, quiet	0	1	2	3	NA
15.	Jumping around, agitated, fidgety	0	1	2	3	NA
V. Body and Limbs						
16.	Floppy	0	1	2	3	NA
17.	Stiff, spastic, tense, rigid	0	1	2	3	NA
18.	Gesturing to or touching part of the body that hurts	0	1	2	3	NA
19.	Protecting, favoring or guarding part of the body that hurts	0	1	2	3	NA
20.	Flinching or moving the body part away, being sensitive to touch	0	1	2	3	NA
21.	Moving the body in a specific way to show pain (e.g. head back, arms down, curls up, etc.)	0	1	2	3	NA
VI. Physiological						
22.	Shivering	0	1	2	3	NA
23.	Change in color, pallor	0	1	2	3	NA
24.	Sweating, perspiring	0	1	2	3	NA
25.	Tears	0	1	2	3	NA
26.	Sharp intake of breath, gasping	0	1	2	3	NA
27.	Breath holding	0	1	2	3	NA
VII. Eating/Sleeping						
28.	Eating less, not interested in food	0	1	2	3	NA
29.	Increase in sleep	0	1	2	3	NA
30.	Decrease in sleep	0	1	2	3	NA

SCORE SUMMARY:

Category:	I	II	III	IV	V	VI	VII	TOTAL
Score:								

Special Populations

Autism Spectrum disorder

Ventilated Patients

Chronic pain
or
Neuropathic pain

Assessing Pain in Children with Autism

Children with Autism Spectrum Disorder (Autism) may be at greater risk for under-treatment of pain

- Often lack the ability to engage verbally and non-verbally to report and describe their pain
- Usual pain behaviors are often not manifested

Children with Autism, because of the core deficits attributed to an Austism Spectrum Disorder diagnosis, often lack the ability to engage in the social interactive aspects necessary to communicate pain experiences. There is a wide range of cognitive and communication capabilities among those with a diagnosis of Autism.

A qualitative study of 40 children with Autism, experiencing acute postoperative pain found:

- individualizing pain assessment was imperative,
- parents/caregivers play a vital role in helping their child with Autism communicate about their pain,
- describing and locating pain was preferred to rating pain intensity,
- facial expressions and body language often are incongruent with verbal reports of pain.

To Assess Pain in Children with Autism:

- Individualize pain assessment
- Attempt to obtain self-report of pain location and description.
- Pain intensity ratings may not be informative.
- Engage parents/caregivers to help the child with Autism communicate about their pain.
- Expect objective indicators of pain, like facial expressions and body language to be incongruent with verbal reports of pain.

Pain Assessment in Ventilated Children Unable to Self-Report

Attempt to obtain self-report

- Consider diagnosis and potential cause of pain, like intubation, suctioning, and turning
- Observe behaviors but with caution since patients requiring ventilation may be unable to respond robustly to pain
- Anticipate and manage pain in sedated and paralyzed patients
- Assume pain is present

(Herr, et al, 2019 & 2011)

Assessing pain in ventilated infants and children remains a challenge. Ventilated children may not be able to express their pain because they:

- are intubated;
- are usually sedated (with or without pharmacological paralysis);
- may have neurological impairment due to trauma, health condition or medications.

Other factors adding to the complexity of assessing pain in ventilated children include:

- child's age (limited ability to display pain behaviors; lack of association of pain behaviors and self-report in older children)
- severity of the child's illness may alter physiological and behavioral responses that would be seen in healthy children.
- difficulty differentiating pain from distress, anxiety, and agitation;

Periodically reevaluate the patient's ability to provide self-report.

Consider the person's condition and diagnoses. Many ventilated and intubated patients are acutely ill with multiple medical problems that may cause pain.

Is the person at risk for pain? If so, treat it.

Patients who are chemically paralyzed experience pain. Sedatives sedate, but do not relieve pain. Anticipate and manage pain in the chemically sedated/paralyzed person. Behavioral pain scales are not appropriate for patients who are chemically paralyzed or those with flaccid paralysis who can't demonstrate behavioral responses to pain. Assume pain is present and administer analgesics appropriately.

COMFORT Scale
COMFORT-B Scale

The COMFORT scale remains the only tool that has been well validated for pain assessment in ventilated children. (Ambuel, et al, 1992). However, the major limitation of this tool is that it does not differentiate between pain and sedation.

The tool was validated without physiologic items as the COMFORT-B Scale or COMFORT Behavioral Scale (van Dijk, et al, 2000).

COMFORT Scale

- Intended for use in children 0 to 17 years of age but has been used in children 0 to 18 years
- On ventilator or in critical care (only validated tool for this purpose)
- Well established evidence of reliability and validity; however inconsistent ability to detect change
- Score 8 items from 1-5 with total score ranging from 8 to 40
- Alertness, calmness or agitation, respiratory response, blood pressure, heart rate, muscle tone, physical movement, facial tension
- Administration time is about three minutes
- 2 hours for training to use tool (low/medium clinical utility)
- Also modified to include crying for non-ventilated infants (van Dijk et al. 2005)

Chronic Pain

How has pain impacted the child's life?

Pain-related disability

- Sleep
- Mood
- School/role function
- Social
- Physical
- Relationships (peers, family)

It is important to assess the impact of the child's pain on all aspects of their lives (physical, social, emotional, spiritual and vocational functioning).

Specific measures for physical functioning assessment include:

- Functional Disability Inventory (FDI) (Walker & Greene, 1991)
- Child Activity Limitations Interview (CALI) - Pain related limitations on 21 activities (Palermo et al., 2004)

There are several comprehensive questionnaires that can be used to assess impact of chronic pain in children and their families.

Bath Adolescent Pain Questionnaire

Teens and Parents – assesses multiple domains of impairment (social and physical functioning and depression)

PROMIS

The measures are ideally suited to be used as individual scales or as a more comprehensive set of measures to determine pain intensity and impact.

- Pain intensity
- Pain interference
- Anxiety
- Depressive symptoms
- Family and peer relationships

Neuropathic Pain

Peds-mTNS

- Consists of questions pertaining to sensory symptoms, pain, and motor and autonomic function.
- This tool was specifically developed for assessing chemotherapy-induced peripheral neuropathy.
- Includes a 5-part neurologic examination that includes light touch testing and testing of manual muscle strength, vibration sensation, pin sensation, and deep tendon reflexes. (Gilchrist & Tanner, 2013)

There are multiple measures validated to screen adults for neuropathic pain. However in pediatrics there is only one validated tool, the Pediatric modified Total Neuropathy Score (peds-mTNS).

Clinicians may be using the PPQ, and APPT (word descriptors)

Many pediatric chronic pain centers use the Leeds Assessment of Neuropathic Symptoms and Signs LANSS (Bennett, 2001) or PainDetect (Freyhagen, et al., 2006)

More work is needed in this area.

Amanda

Amanda, 15 years old, twisted her right ankle while dancing. She instantly felt pain but continued her lesson. Over the next day, she noticed bruising and swelling. Her ankle was x-rayed and no fracture was found; however, as her ankle remained swollen and she complained of significant pain, she was prescribed a support brace and the family purchased crutches to assist her with mobilization.

Over the next 4 weeks, she was noted to have increased ankle pain, and at times her toes were blue. She reported her foot and lower leg hurt to touch and she could not wear her socks or shoes due to pain.

On examination, her right foot appeared blue and swollen compared to her left, with strong equal pulses bilaterally. Temperature differences were noted to touch between the limbs with the right leg feeling cooler than the left. Amanda described her foot and lower leg as like 'feeling like it is on fire' and rated her pain severity at 8/10. She was afraid to go to school in case her foot gets bumped. Her mother was very concerned that 'something is very wrong.'

- *What questions would you like to ask Amanda about her pain to help with diagnosis and treatment?*
- *What additional assessments would you make to help with diagnosis and treatment of Amanda's pain?*

In Summary…

Key Points

Assessment and treatment of pain is a fundamental human right

The child's self-report of pain should be accepted as reported.

Pain Assessment is vital for effective pain management

- Screen patients for pain
- Obtain a pain history and comprehensive initial pain assessment including thorough physical examination
- Use valid, reliable, and developmentally appropriate pain assessment tools
- Evaluate the effectiveness of pain management interventions
- Continue regular surveillance for pain.
- Document the pain facilities communication among the healthcare team and across the healthcare system

The child's self-report of pain is important and should be sought whenever possible

- Children who are unable to provide self-report are particularly vulnerable for underestimation and undertreatment of their pain
- Physiological and behavioral response to pain are not sensitive or specific to pain and are not measures of pain intensity

Pain

- Pain can exist independent of physical cause or "organic" reason (for example, headache).
- Pain differs for individuals even when pain stimulus is similar
- Children with persistent pain may be more sensitive to pain stimulus
- There are consequences for unrelieved and persistent pain

- **How would you rate your ability to assess pain in children?**
- **What resources do you need to review with your team?**
- **What is your next step?**

Type your answer here.

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