Learning Objectives

- Identify state of the science regarding pediatric pain
- Explain the current use of Pain AIR cycle
- Describe the data on use of interventions to date from the current pain measure
- Identify research, policy and practice implications

Purposes

- To test an adapted Pain AIR cycle instrument for use in hospitalized children
- Determine feasibility of using this adapted instrument which could assist in exploring the prevalence and frequency with which hospitalized children between the ages of 3-18 report relief of pain during the use of a Pain AIR cycle
- To explore whether the interventions provided by RNs actually resulted in reports of pain relief by these children
- Investigate the barriers that nurses perceive as preventing the achievement of reported pain relief in these children

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Details of a Literature Search

- Systematic search of PubMed (1992-Jan 2010) and CINAHL using MeSH headings as below
- Focused on articles describing children between ages of 3-18 years of age
- Focused on literature no older than 10 years in effort to capture best practices and literature on quality indicators
- Looked at review articles summarizing use of pain measures, indicators and pain relief for adults as well as children

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MeSH Terms

- Child, Children, Pediatric
- Pain
- Pain measurement
- Pain assessment
- Pain indicators
- Quality Indicators
- Staffing Indicators

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Significance: What does Pain Mean for Children?

- Pain is an important component of most disease processes and surgical interventions
- For children, who have little control over pain when it occurs and how to reduce it, management of the child's pain is critical to the long term perception of the illness and/or hospitalization

Societal Costs of Pain in Children

- Systematic review noted associations between pain, acute stress disorder (ASD), and post traumatic stress disorder (PTSD)
- Children tended to report significantly more stress reactions than their parents for weeks after accidents
- Aggressive pharmacological pain management at the time of initial hospitalizations for children suffering physical trauma such as burns, can reduce the likelihood of PTSD

*Gold J.I., Kant A.J., & Kim S.H. (2008) The impact of unintentional pediatric trauma: A review of pain, acute stress and posttraumatic stress. *Journal of Pediatric Nursing,* 23 (2) 81-91.

Children’s Pain Perceptions

- Children’s experience of pain during procedures creates a legacy that increases perceived pain with subsequent procedures

*Weisman S.J., Bernstein, B., & Schechter, N.L. (1998). Consequences of inadequate analgesia during painful procedures in children. *Archives of Pediatrics and Adolescent Medicine*, 152, 147-149.

- Inadequate relief of pain and distress during childhood painful medical procedures may have long-term negative effects on future pain tolerance and pain responses

*Young, K.D. (2005) Pediatric procedural pain. Annals of Emergency Medicine, 25(2), 160-171.

Children’s Pain Perceptions

Children who initially reported higher levels of pain tended to over-estimate their anxiety at follow-up, whereas children who reported lower levels of pain accurately- or underestimated their anxiety.

*McMurtry N, Chambers CT and McGrath PJ. Children’s memory for Painful Procedures: The relationship of Pain Intensity, anxiety, and adult Behaviors to subsequent recall. J Pediatric Psychology. 2009 Nov 4

Historical Challenge of Pain Management

- Pain is multidimensional and involves sensory-discriminatory, motivational-affective, and cognitive-evaluative processes

  *Melzack R., & Wall P. (1965). Pain mechanisms: A new theory. *Science , 150*, 971-979
- Silkman describes the challenge of assessing seven dimensions of pain, including physical, sensory, behavioral, socio-cultural, cognitive, affective, and spiritual, that contributes to the event of pain, whether caused by procedural, postoperative or traumatic conditions

  *Silkman, C. (2008). Assessing the seven dimensions of pain. *American Nurse Today , 3* (2), 13-15

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Systematic reviews of pediatric pain assessment measures

Ped-IMMPACT commissioned two reviews

- One looks at Observational (behavioral) measures of pain in children 3-18 (20 scales)
- One looks at Self-report measures of pain intensity for children 3-18 (34 measures)

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Findings from the Meta-Analyses

- Of 34 self report pain intensity measures, 6 single-item measures had well established evidence of reliability and validity
- No single scale was reliable and valid across age-groups or types of pain
- The majority of self-report scales lacked reliability and validity particularly in pre-school children
- None of the measures was ideal for preschool children but the Pieces of Hurt Tool had the best established reliability and validity for acute procedure-related and post operative pain in preschool children, but not for chronic pain

Self Report Pain Scales

- For school-aged children (4-12 years old) the Faces Pain Scale-Revised appeared to be the most psychometrically sound measure and had validity for use in both acute and chronic disease-related pain.
- A 100mm visual analogue scale was recommended for acute procedure-related, post-operative, and disease-related pain in children over the age of 8 years and adolescents.
- For children between the ages of 8 and 12 years it might be useful to use the Faces Pain Scale-Revised as a secondary outcome measure.

*Stinson, J., Kavanagh, T., Yamada, J., Gill, N., & Stevens, B. (2006). Systematic review of the psychometric properties, interpretability and feasibility of self-report pain intensity measures for use in clinical trials in children and adolescents. *Pain.* , *125* (1-2), 143-157

Observational Pain Scales

- The second systematic review evaluated 20 observational (behavioral) pain scales including behavior checklists, behavior rating scales, and global rating scales
- Six observational pain scales were found useful on the basis of established criteria under certain circumstances
- For assessment of pain associated with medical procedures and other brief painful events, recommended use of either the FLACC (Face, Legs, activity, Cry, Consolability) or the CHEOPS (Children's Hospital of Eastern Ontario Pain Scale)
- For postoperative pain in the hospital, the FLACC was recommended as the first choice while for post-operative pain at home following discharge, the PPPM (Parents' Post-Operative Pain Measure) was recommended

*von Baeyer, C., & Spagrud, L. (2007). Systematic review of observational (behavioral) measures of pain for children and adolescents aged 3 to 18 years. *Pain. , 127* (1-2), 140-150

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Observational Scales (cont)

- For children in critical care environments, the COMFORT scale was recommended since it makes explicit accommodation for constraints placed on the behavioral expression of pain by mechanical ventilation and physical restraint
- Recognized need to have a measure for distress, fear and anxiety as well as pain intensity because of the importance of distinguishing pain responsive to analgesics from other kinds of behavioral stress
- Recommended the PBCL (Procedure Behavior Check List) and the PBRS-R (Procedure Behavior Rating Scale-Revised).
- There was no valid and reliable observational instrument for assessing chronic or recurrent pain lasting weeks, months or longer, due to the habituation or dissipation of overt behavioral signs, despite continued reported pain.

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Current State of Literature about Pain Measurement Tools

- Validation of the Wong-Baker FACES pain Rating Scale (WBS) in Pediatric Emergency Departments with VAS
- 120 children between 8-17, 50% female, 78% Caucasian. Most commonly extremity, abdomen, and back/neck pain.
- Agreement between WBS and VAS was excellent with Spearman's rho +.9; 95% confidence interval No association between age, sex or pain location with either pain score.
- Garra, Singer, et al, Validation of the Wong-Baker FACES pain Rating Scale (WBS) in Pediatric Emergency Department Patients, In *Academy of Emergency Medicine*, 2009; 16:1-5

Pain Measurement (Cont)

- 3 independent but simultaneous observations by nurses of 29 adults and 8 children
- 2 Nurses Used FLACC, and 1 used either the Checklist of Nonverbal Pain indicators (for adults) or the COMFORT scale(peds)
- For 73 observations, FLACC scores correlated highly with the other 2 scores; significant decreases in FLACC after analgesia; inter rater reliability confirmed

Voepel-Lewis, Zanotti, Dammeyer and Merkel, Reliability and Validity of FACE, Legs, Activity, Cry, Consolability Behavioral Tool in Assessing Acute pain in Critically Ill Patients. *American Journal Critical Care* 2010: 19:55-61

So Where is the Problem?

- Pain assessment tools are reasonably valid
- Age tested
- Inter rater reliability documented
- So what else is going on?

Lack of Pain Assessments

- Lack of pain assessment has been determined to be one of the most problematic barriers to achieving good pain control for all patients, adults or children

  Anderson, K., Mendoz, a. T., & Valelroo, N. (2000). Minority cancer patients and their providers:Pain management attitudes and practice. *Cancer* , *88*, 1929-1938

- A systematic review of literature and research in the 1990's described marked discrepancies between analgesic administration for children as compared to adults. They also conducted a survey of 260 pediatric nurses in a pediatric hospital in the western United States. Their results supported the position that **nurses are not consistently assessing** pain in children and that the pain management practices are not based upon systematic assessment

  *Jacob, E., & Puntillo, K. (1999). A survey of nursing practice in the assessment and management of pain in children. *Pediatr Nurs.* , *25* (3), 278-286

Lack of Pain Assessments

- A study in Norway found nearly the same results.
- Nurses said they valued the importance of preoperative information about pain, yet the observations of these same nurses revealed that such information was very rarely given and only if the patient specifically asked for information.
- Nurses stated they assessed post-op patients for pain, yet the methods they used when doing so had a wide range of effectiveness.
- Often nurses asked patients indirect and general questions such as "how are you?"
- **If patients said nothing it was interpreted as everything was all right, including their level of pain**

*Dihle, A., Bjølseth, G., & Helseth, S. (2006). The gap between saying and doing in postoperative pain management. *J Clin Nurs.* , *15* (4), 469-479

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Increasing Number of Assessments

- Two randomized control trials looked at the effects of coaching on the rate of assessments of children's pain.
- One which studied nurses did show an increased rate of assessment with coaching of the nursing staff

*Johnston, C., Gagnon, A., Rennick, J., Rosmus, C., Patenaude, H., Ellis, J., et al. (2007). One-on-one coaching to improve pain assessment and management practices of pediatric nurses. *J Pediatr Nurs.* , *22* (6), 467-478

- The other, focused on increasing assessment of pain postoperatively by parents at home, found no improvement

*Sutters, K., Miaskowski, C., & Holdridge-Zeuner, D. (2004). A randomized clinical trial of the effectiveness of a scheduled oral analgesic dosing regimen for the management of posoperative pain in children following tonisllectomy. *Pain* , *110*, 49-55

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What Happens for Children?

- A quasi-experimental study employed quality improvement strategies to enhance pediatric pain assessment
- Researchers determined that even though during the second testing period, parents reported increased pain assessment and improved responsiveness of staff to the child's pain, and increased compliance was noted with assessment guidelines, **that 40 % of patients still complained of limited effectiveness of medications to reduce their pain**

*Treadwell, M., Franck, L., & Vichinsky, E. (2002). Using quality improvement strategies to enhance pediatric pain assessment. *International Journal for Quality in Health care , 14* (1), 39-47

What is the Rest of the Story?

Do children get the intervention once assessed as being in pain or having reported pain?

Are Children Receiving Pain Relief?

- Children are not being adequately medicated to relieve their pain
  - Sutters, Miaskowski, & Holdridge-Zeuner, 2004
  - Tesler, Holzemer, & Savedra, 1998
  - Van Cleve, Bossert, & Beecroft, 2004
  - Van Hulle Vincent, 2005
- Nurses' attitudes and/or inadequate knowledge have been implicated as reasons for under-medication
  - Schecter, et al., 2003
  - Sloman, Wruble, Rosen, & Rom, 2006

Pain Relief In Children or Not

- Nurses' attitudes have been noted, particularly in dismissing the child's self-report of pain, in treating according to stereotypes, such as attractiveness, and even in reporting actions that did not match the observed lack of appropriate interventions on behalf of a child's pain

  *Vincent, C., & Denyes, M. (2004). Relieving children's pain: Nurses abilities and analgesic administration practices. *Journal of Pediatric Nursing , 19*, 40-50

  *Dihle, A., Bjølseth, G., & Helseth, S. (2006). The gap between saying and doing in postoperative pain management. *J Clin Nurs. , 15* (4), 469-479

- One study found in that 55 % of pediatric nurses thought that 20% or more of children over-reported their pain

- These researchers further found that when behavioral manifestations were present, 82% of the nurses believed the child's self report of pain. When behavioral manifestations were absent, only 29% of nurses believed the child's self report of pain

  *Van Hulle Vincent, C. (2005). Nurses' knowledge, attitudes, and practices: regarding children's pain. *MCN Am J Matern Child Nurs. , 30* (3), 177-183.

Relief or No Relief

- Study measured whether nurses' recommendations for managing children's pain were influenced by stereotypes based upon children's personal attributes, such as sex, race, and attractiveness using vignettes to measure nurses' perceptions and recommended pain treatments.
- Study did not support such claims; yet generalizability was limited due to the narrow age range of the children studied (9-11 years), and the much higher than average educational levels of "pediatric nurses."
- This sample of nurses was 70% BSN prepared, compared to the national norm for bedside pediatric nurses of 30-40%.
- One-third of the sample had advanced degrees. Virtually all of these were nurse practitioners who would not be likely to be in the role of a bedside nurse providing that level of care in an acute care setting.
- Also found during this study of 663 nurses was a wide variation among nurses who offered interventions to relieve pain.
- In fact, there were nurses who offered no intervention, even in scenarios where the child indicated the most extreme level of pain.

*Griffin, R., Polit, D., & Byrne, M. (2007). Stereotyping and nurses' recommendations for treating pain in hospitalized children. *Res Nurs Health.* , *30* (6), 655-666

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Routine Pain Scoring Does Not Improve Analgesia

- Two audits; First showed that of 187 children under 12, only 73% of children received anagesia-69 received opiates while scoring pain in 74%. 2nd audit showed that 74% of children with upper limb fractures had some form of documented pain assessment.
- Ensured mandatory scoring at triage during the introduction of computerized note system. Did a retrospective audit looking for completion of a pain score, provision of and type of analgesia. Subjects were children with long bone fractures or partial of full-thickness burns attending the ED.
- 163 children, 97% had their pain scored on a zero to 10 scale but only 66% received analgesia and only 10% were given opiates.
- **Conclusion:** While intervention was effective at achieving nearly universal early assessment and documentation, this did not translate to an improvement in analgesia provision
- Jadav MAR, Lloyd G, McLauchlan C, Hayes C. routine pain scoring does not improve analgesia provision for children in the Emergency Department. Emergency Medicine Journal 2009;26:695-697.

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When do nurses provide pain relief?

- Seven day audit of all patients admitted to the PACU were included- Children's in Vancouver
- Pain scores within 5 minutes of eye opening used to initiate the FLACC or another pain scale
- This study assumed that a pain score of <u><</u>4 was a measure of adequate pain control
- 171 children in study; 70% had a score of 0/10 and 120 had a score of <u><</u>4/10. 24 children had a score >4. Average time administration of analgesia was 6.7 minutes
- A total of 56 children received analgesia, 33 of whom had a score of <u><</u>4

*Trudeau J, Lamb E, Gowans M, Lauder G.(2009) A prospective audit of Postoperative Pain control in Pediatric Patients. AORN Journal. 90; 4:531-542

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What is a Clinically Meaningful Level of Pain Reduction?

- Evidence in the literature has identified that numeric systems are less useful for answering this question and that converting patient ratings into percentages, such as 30% was more effective.
- In one study of adults, 30%, 40% or greater reduction in postoperative pain was identified as significant by adult patients

Farrar, J., Young, J. L., Werth, J., & Poole, R. (2001). clinical importance of changes in pain intensity measured on an 11 -point numerical pain rating scale. *Pain* , *94*, 149-158

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Also in Adults

- One study investigated post operative pain in ambulatory adult patients and found that the relationship between a numeric score and a percentage depended upon the baseline pain intensity level. Patients with moderate pain required a 20% reduction to achieve minimal improvement, 25% for much improvement, and 45% for very much improvement

  *Cepeda, M., Aficano, J., Polo, R., Alcala, R., & Carr, D. (2003). what decline in pain intensit is meaningful to patients with acute pain. In J. Dostrovsky, D. Carr, & M. Koltzenburg (Ed.), *Proceedings of the 10th World Congress on Pain, Progress in Pain Research and Management. 24*, pp. 601-609. Seattle: IAsP Press

- Another study of 150 adult postoperative surgical patients found that for patients to experience much improvement they would need to have at least 70% reduction in pain. Pain reduction of less than 30% was perceived as minimal and more than 90% reduction was needed for pain relief to be perceived as “complete”

  *Sloman, R., Wruble, A., Rosen, G., & Rom, M. (2006). Determinination ofclincially meaningful levels of pain reduction in patients experienceing acute postoperative pain. *Pain management nursing , 7* (4), 153-158

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How do we Demonstrate Improvement in Relief of Pain for Children?

Use a theoretical framework for measuring improvement in pain outcomes for children

COMBINED WITH

Use of a framework for assessing the quality of the nurses’ care in this regard

TO

Measure the reduction in the gap between theories and best practice evidence and implementation of best practice

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Theoretical Framework for Measuring Quality Improvement

- Donabedian Model of Patient Safety
  - First proposed by Avedis Donabedian in 1966

Quality of medical care

- "Outcomes are the ultimate validators of the effectiveness and quality of medical care"
- "Examine the Process of care…to determine whether "good" medical care has been applied"
- Examine settings and instrumentalities..the assessment of structure.. With the assumption that given the proper (structure), good medical care will follow"

**Milbank Memorial Fund Quarterly* (1966). 22 (3) Pt.2, 166-203 and reprinted in *The Milbank Quarterly* (2005), 83 (4), 691-729.

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So What?

Improvement initiatives have focused to date upon process and structure that support improved assessment and documentation, not on pain management strategies

*Gordon, D.B. & Dahl, J.L. (2004) Quality improvement challenges in pain management. *Pain*, 107, 1-4.

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The Commitment to Quality Improvement

- Quality improvement in the management of pain requires the work unit's culture to value the treatment of that pain

  *Howell, S., Foster, R., & Hester, N. (1996). evaluating a pediatric management research Evaluating a pediatric pain management research utilization program. *Canadian Journal of Nursing Research , 28*, 37-57
- Nursing staff at the unit level must subscribe to relief of pain as a priority in care.
- Can the quantity, skill level and education of those nurses positively impact this outcome, given the significant role nurses play in pain relief for children in hospitals?

Patient Outcomes and Nurse Staffing

- A Delphi survey was completed of a selected expert panel form 10 countries consisting of 24 researchers and 8 nurse administrators, to review all evidence related to 39 patient outcome, 24 nurse staffing and 31 background variables and asked to rate importance/usefulness of each. Pain was assessed and ranked highly by nearly all respondents in conjunction with sensitivity to skill mix

*Vanden Heede, K., Clarke, S.P., Sermeus, W., Vleugels, A. & Aiken, L.H. (2007). International experts' perspectives on the state of the nurse staffing and patient outcomes literature. Journal of Nursing Scholarship, 39 (4),290-297.

What is currently being done to measure nurses' interventions to relieve pain in children?

- Lacey, et al proposed quality indicators for Pediatrics. They recommended and pilot tested a process measure related to pediatric pain in acute care settings

*Lacey, S.R., Klaus, S.F., Smith, J.B., Cox, K.S., & Dunton, N.E. (2006). Developing measures of pediatric nursing quality. *Journal of Nursing Care Quality,* 21(3) 210-220.

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What is being Measured?

Currently NDNQI measures

Pain Assessment-Intervention-Reassessment (Pain AIR)

Cycle for pediatric patients

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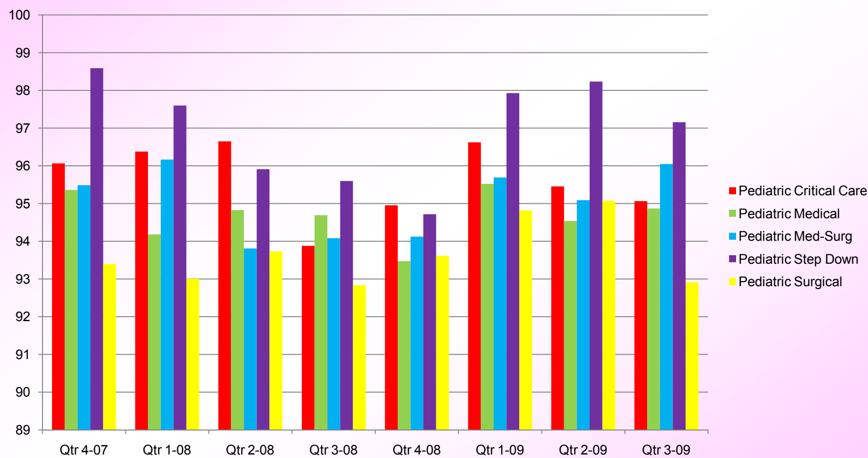
Average number of pain assessments initiated per patient in a 24 hour period

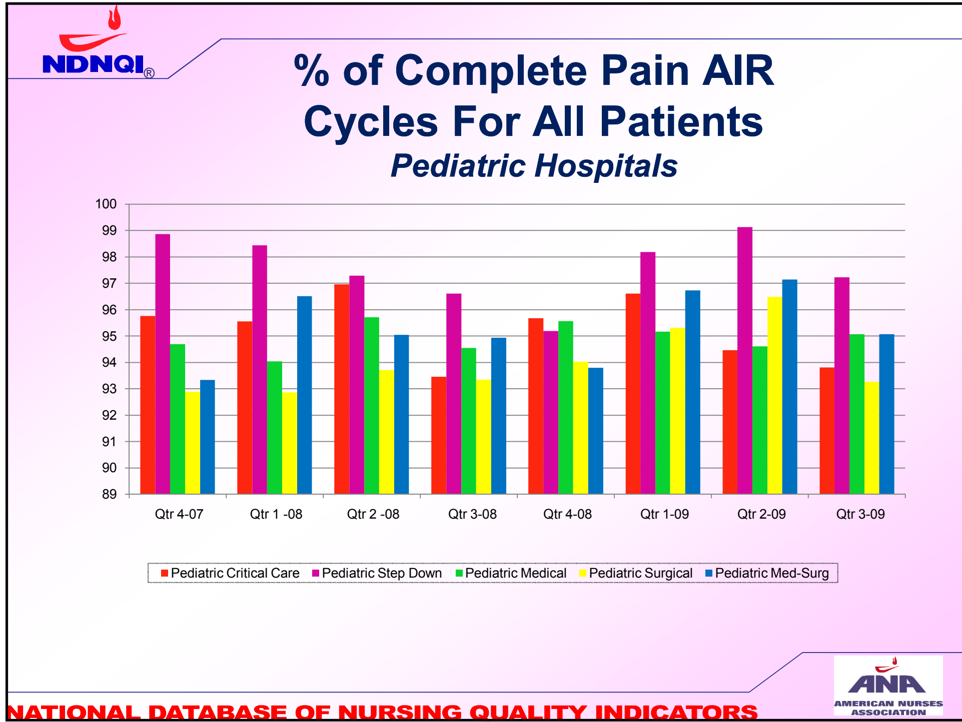
This measure was significantly positively associated with RN nursing hours per patient day on the following unit types:

– pediatric critical care
– step down
– medical
– surgical
– combined medical surgical

And with % RN hours on pediatric step down units

% of Complete Pain AIR Cycles for All Pts
All Units




NDNQI®
% of Complete Pain AIR Cycles For All Patients
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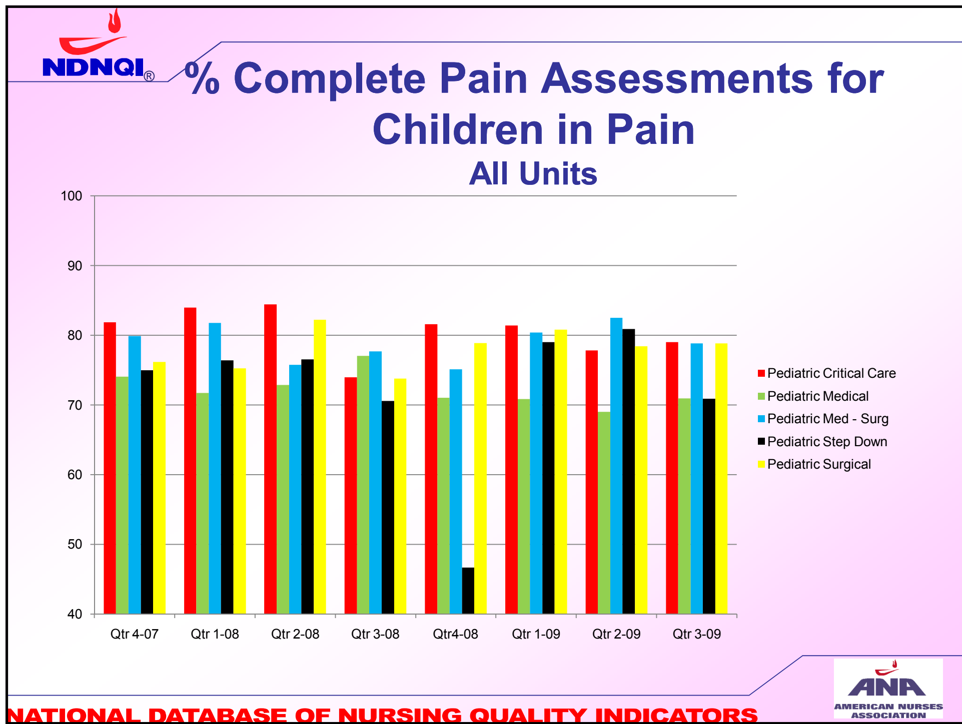
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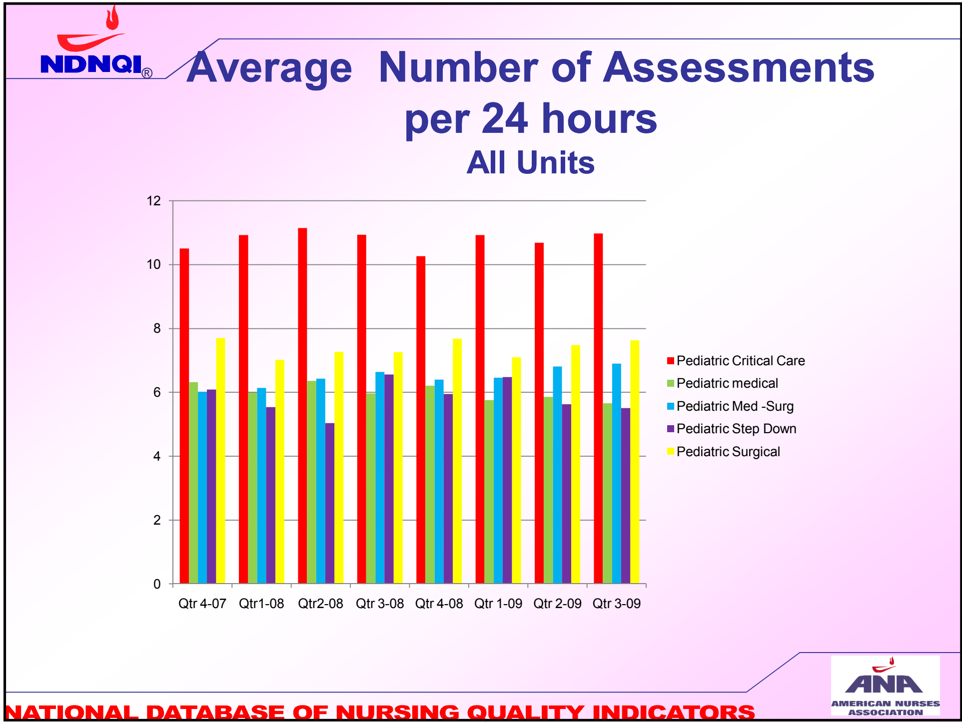
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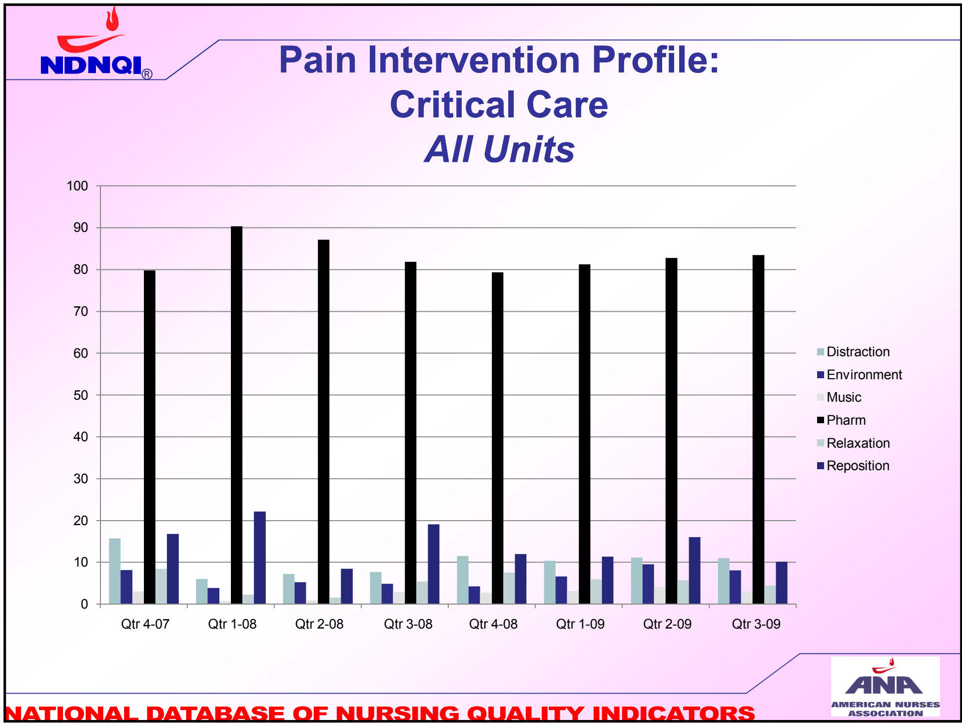
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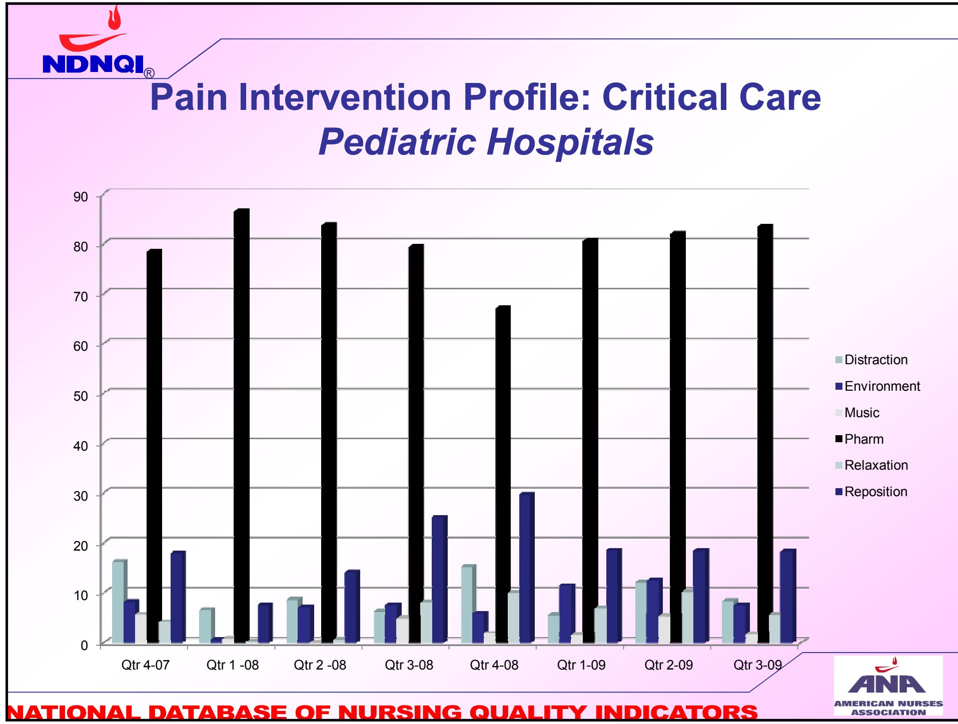
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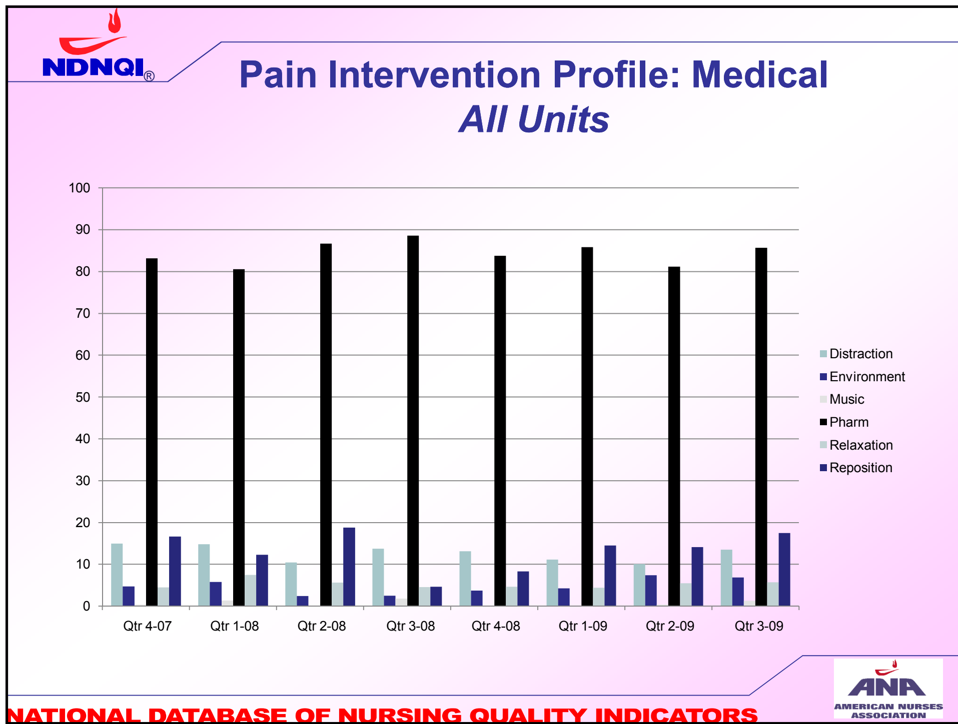
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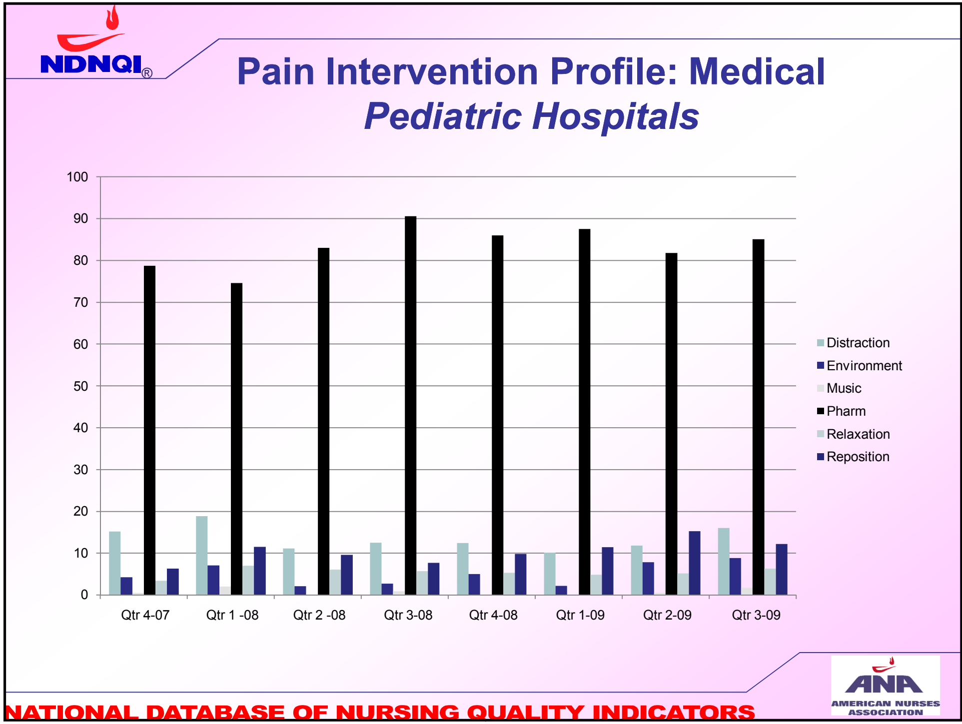
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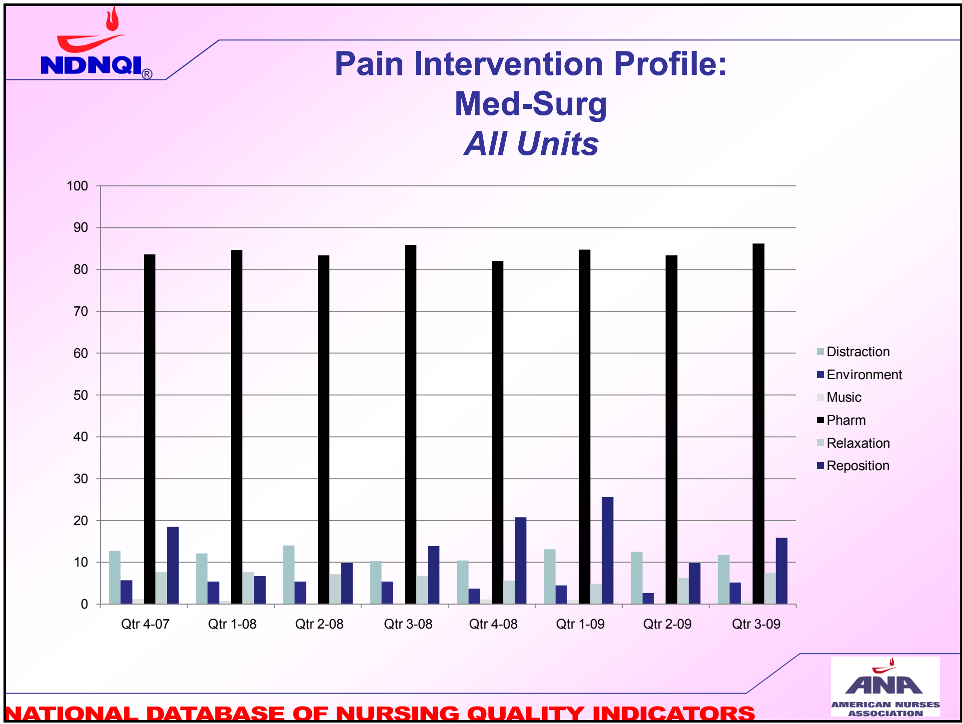
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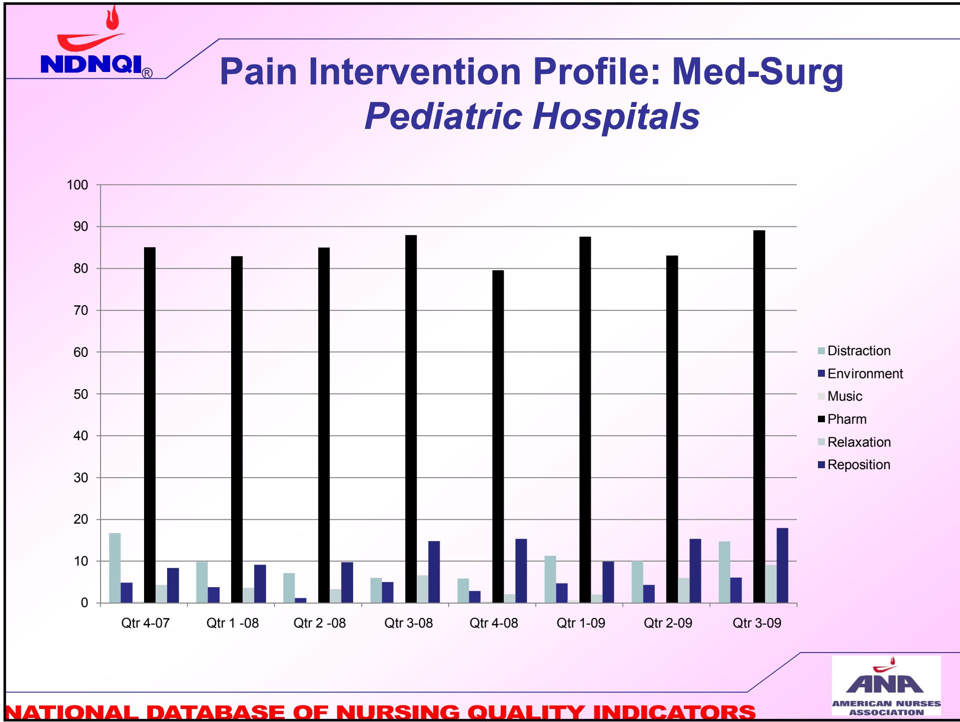
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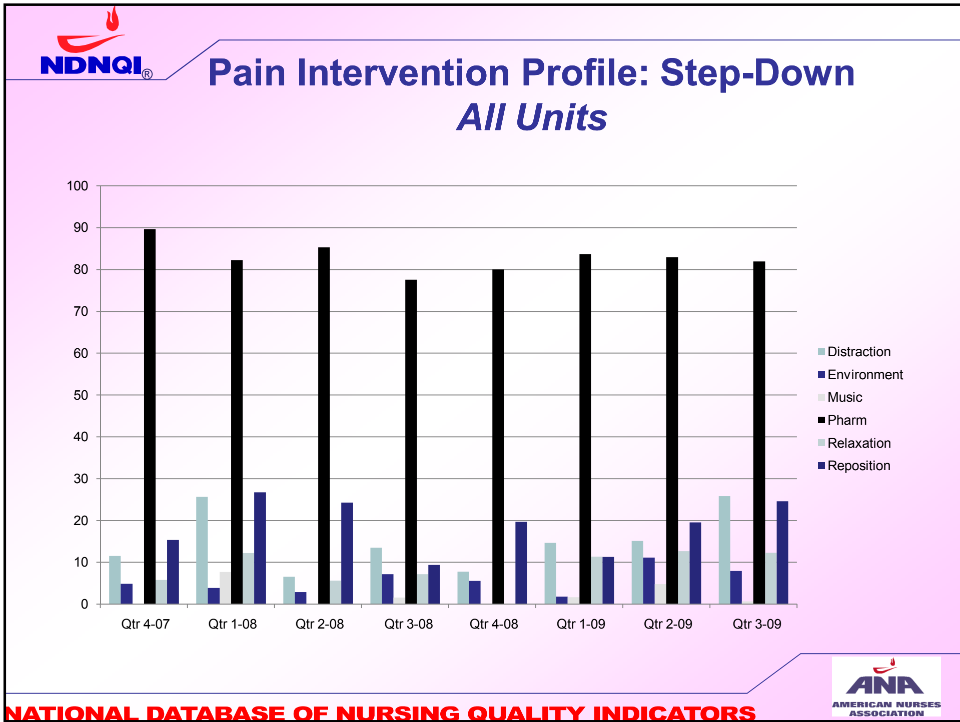
NDNQI®
Pain Intervention Profile: Step-Down
All Units
100
90
80
70
60
50
40
30
20
10
0
Qtr 4-07
Qtr 1-08
Qtr 2-08
Qtr 3-08
Qtr 4-08
Qtr 1-09
Qtr 2-09
Qtr 3-09
Distraction
Environment
Music
Pharm
Relaxation
Reposition
NATIONAL DATABASE OF NURSING QUALITY INDICATORS
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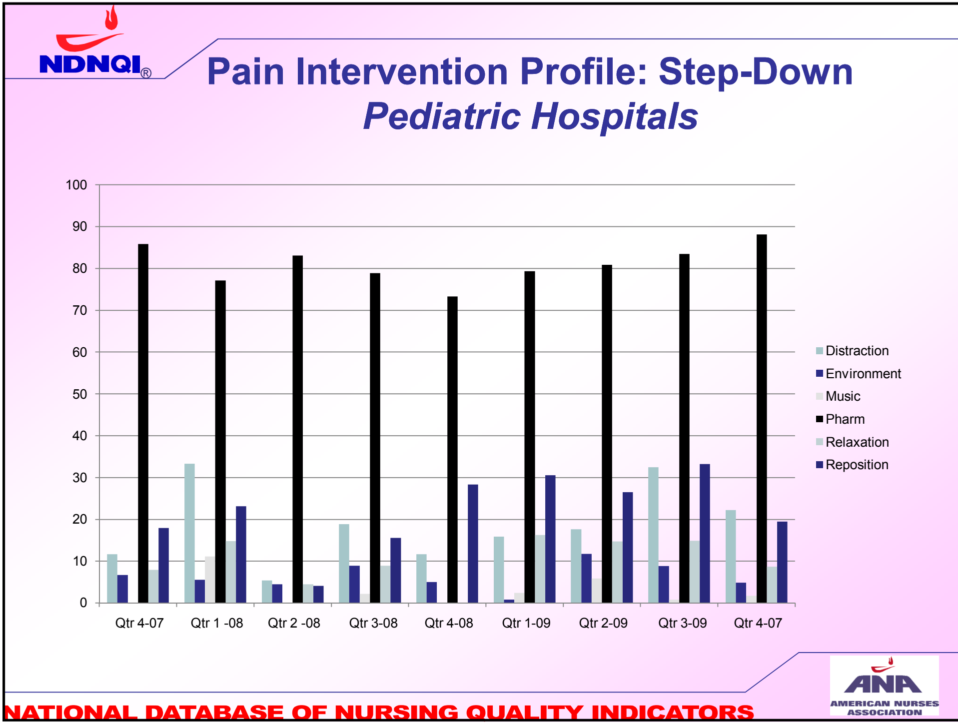
NDNQI®
Pain Intervention Profile: Step-Down
Pediatric Hospitals
100
90
80
70
60
50
40
30
20
10
0
Qtr 4-07
Qtr 1 -08
Qtr 2 -08
Qtr 3-08
Qtr 4-08
Qtr 1-09
Qtr 2-09
Qtr 3-09
Qtr 4-07
Distraction
Environment
Music
Pharm
Relaxation
Reposition
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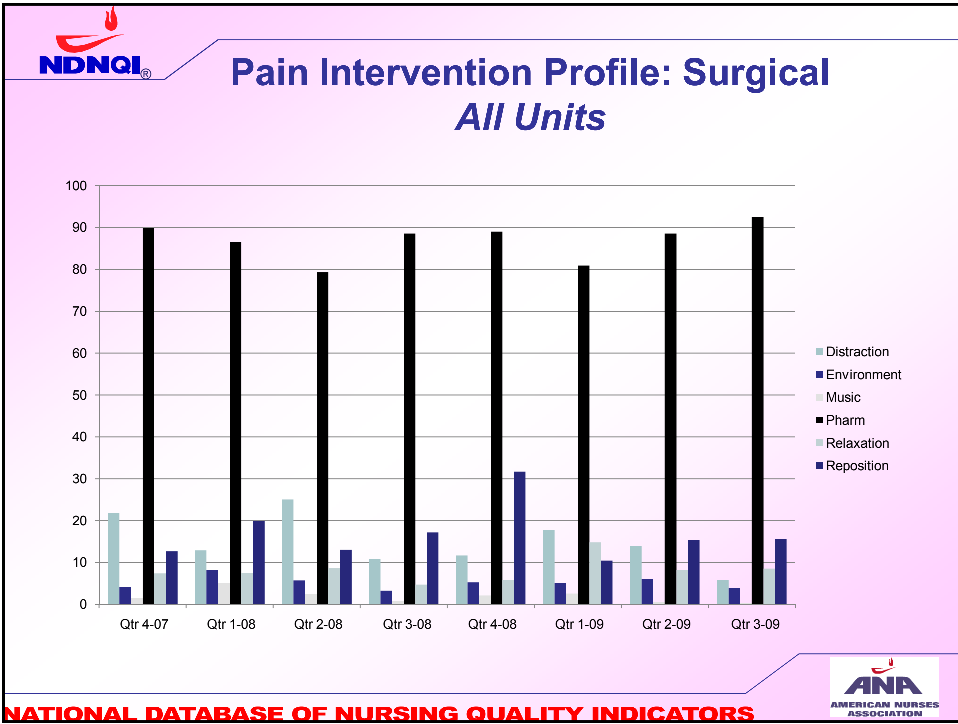
NDNQI®
Pain Intervention Profile: Surgical
All Units
100
90
80
70
60
50
40
30
20
10
0
Qtr 4-07
Qtr 1-08
Qtr 2-08
Qtr 3-08
Qtr 4-08
Qtr 1-09
Qtr 2-09
Qtr 3-09
Distraction
Environment
Music
Pharm
Relaxation
Reposition
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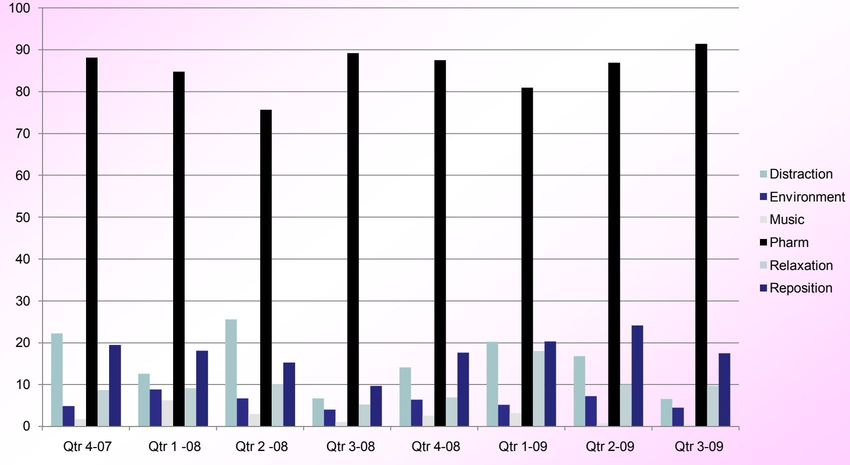
Pain Intervention Profile: Surgical *Pediatric Hospitals*



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What is the significance of this data and the literature?

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Research Challenges

- Current measurement tools have not captured the level of pain before and after assessment and intervention
- Determining what constitutes actual relief of pain: is it a reduction in the pain score by 20%, 30%, 40%?
- Determining when nurses actually decide to provide an intervention – when the pain is a 2, 3, 4, 5?
- Determining a gap between what nurses do and what they say they do

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GAPS

- Huge gap between the theory and the practice of nurses
- Little evidence to show that interventions do result in pain relief
- Little relevant literature in either pediatric or adult patients suggesting sound pain indicators
- No good definitions of pain relief

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Clinical Practice Questions

What barriers exist in the work environment that prevent nurses from intervening appropriately?

What happens when there a conflict between what nurses perceive the child's pain to be and the child's self-report?

Is pain medication readily available when the child is in pain?

Is it acceptable practice to withhold intervention unless the child reports pain as a 4 or 5?

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Policy Challenges

- Every person's right to be pain free
- Ethical obligation to provide pain relief when at all possible
- Implications for Health care reform legislation and coverage
- Mayday Foundation Report on Pain
- Participated in the development of this national position now endorsed by organizations, including ANA

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What can you do to Improve Pain Management for Children

- Examine your own practice habits around assessment and interventions
- Consider your own biases and expectations for others perceptions of pain
- Participate in studies to capture data about whether children actually receive relief from pain and what interventions work
- Identify barriers in your own practice settings

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