Improving Pain Management in Orthopedic Surgical Patients with Chronic Opioid Use
Evidence-Based Nursing Project

Kaiser Permanente Hawaii Region
Conflict of Interest Disclosure

None
# Authors

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<thead>
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Today’s Presenters

Gregory Gibbons, BSN, CCRN, CPAN, CAPA - gregory.gibbons@kp.org

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Learning Objectives

• State elements of the Evidence-Based Nursing Process.

• Identify triggers that prompted development of this project.

• Describe examples of the practice change elements resulting from the literature review.

• List two examples of positive outcomes resulting from the implemented practice guidelines.
Diamond Head Crater
Ko’olina Resort
How It All Began ...

- Hawaii State Center for Nursing.
- Over 50 teams mentored for an 18-month internship.
- EBP projects completed using the Iowa Model as a guide.
- Knowledge disseminated via presentations and publishing.
The Perfect Storm

- Increasing Health Care Costs
- Aging Baby Boomer Population
- Rising Chronic Opioid Use
## Health Spending as Percentage of GDP

<table>
<thead>
<tr>
<th>Country</th>
<th>Health Spending as Percentage of GDP</th>
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<tbody>
<tr>
<td>Spain</td>
<td>9%</td>
</tr>
<tr>
<td>Germany</td>
<td>11%</td>
</tr>
<tr>
<td>United States</td>
<td>17%</td>
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Health Cost Projections

20 Year Health Care Expenditure Projections

- Percentage increase
- Years

Hawaii
USA
The “Boomers” – 1945 - 1963
Each day, nearly 9,400 people in America turn 65.

77.5 MILLION “Boomers” will be age 65 by 2030.
Total Joint Replacement Projections

![Graph showing Actual and Projected (2030) Total Joint Surgeries - USA]
Opioid Use Increasing

- Americans are 4.6% of the global population and are consuming 80% of the opioid supply.
- 85% of opioids are dispensed to patients with chronic pain.
- At least 8 million Americans fall asleep at night under the influence of an opioid.
- Every morning, 40 of them do not wake up.
Rising Opioid Use

Figure 1
Significance

- The number of opioid-tolerant patients is increasing along with their need for surgical procedures.
- Pain management is challenging in these patients because regular opioid intake is associated with mechanisms of tolerance and dependence.
EBP Process
Disseminate Knowledge

Generate New Knowledge

Apply Findings in Practice

Identify Questions

Conduct Research

Quality Clinical Practice

Generate New Knowledge

Disseminate Knowledge

Apply Findings in Practice

Identify Questions

Conduct Research

Quality Clinical Practice
The Iowa Model

- The Iowa Model of Evidence-Based Practice to Promote Quality Care.
The Big Why
Observations by Kaiser Hawaii Pain and Nursing Services

• By 2030, it is projected more than 4,000,000 hip and knee replacements will be performed annually in the United States.
• Opioid-tolerant patients experienced poor pain management with longer recovery times, decreased satisfaction and increased cost of care.
• Organizational priority to implement best practices for pain management, provide consistency in practice, and enhance the quality of care.
Is it an Organizational Priority?

- Increase best practices for pain management in orthopedic surgical joint patients with opioid tolerance.
- Improve patient satisfaction, decrease hospital length of stay, and overall financial cost.
- Provide consistency in practice and pain management to enhance quality of care.
- Increase utilization of Evidence-Based Practice (EBP) to improve nursing knowledge and performance.
Team Membership: Considerations

- Opinion leader(s)
- APRN – clinical expert
- Nurse Manager
- Users of the EBP
- Unit change champions
- Core group
- Physician colleagues
- Other disciplines
Building a Successful Team

Rosanne Shimoda, RN – Pre Operative Evaluation and Education Center
Gregory Gibbons, BSN, CCRN, CPAN, CAPA – Post Anesthesia Care Unit
Kathleen Doi, APRN, MS, CNS – Pain Service
Cecilia Gue, APRN, NP, CNS – Pain Service
Louisa Jim, RN – Orthopedic Medical/Surgical
Scott Aihara, RN – Pediatrics
Milagros Lazaro, RN – Orthopedic Surgery Clinic
Tami Maruyama, RN, BSN – Clinical Decision Unit
Terri Tymn, RN – Pediatrics
Rayna Garner, RN – Pediatrics
Veronica Antoine, MD – Pain Services
Michael Reyes, MD - Orthopedics
P.I.C.O. Model for Clinical Questions

**Problem**: Patients taking chronic opioid medications prior to surgery often have unsatisfactory postoperative pain management. This frequently delays their recovery and rehabilitation and results in poor patient satisfaction with their hospital course.

- **P (Population)**: Patients undergoing elective Orthopedic Joint Surgery and taking chronic opioids (defined as > 3 months of daily use).

- **I (Intervention)**: EBP Guideline to include use of a tool for better identification of the opioid-tolerant patient, development of a comprehensive plan of care for pain management by the Pain Service MD, enhanced communication through hospital transitions, and changes in patient and staff education.
P.I.C.O. Model for Clinical Questions

Problem: Patients taking chronic opioid medications prior to surgery often have unsatisfactory postoperative pain management. This frequently delays their recovery and rehabilitation and results in poor patient satisfaction with their hospital course.

- **C (Comparison):** 20 opioid-tolerant patients undergoing Joint Replacement Surgery prior to implementation of the Guideline would be compared to 20 opioid-tolerant patients after Guideline implementation.

- **O (Outcome):** Improved identification of opioid-tolerant patients resulting in a comprehensive plan of care for pain management, better pain management, shorter time in the PACU and in the overall hospital length of stay (LOS).
Finding the Evidence

- Search was done using PubMed/MEDLINE, CINAHL, OVID and the Kaiser Permanente National Librarian.

- Search terms included: Arthroplasty, opioids, pre-emptive medication, multimodal analgesia, preoperative assessment, and total knee and hip replacement.

- A total of 63 articles were critiqued by the team and 31 were found to be relevant.

The Evidence Pyramid
From the Evidence

- Levels of Evidence: I (6), II (11), III (3), IV (13), VI (10), VII (20).
- Early patient identification process will translate into improved outcomes.
- Preemptive strategies for pain management are helpful with opioid-tolerant patients.
- Multimodal pain strategies are especially effective for chronic pain patients.
- Optimal education includes mutual goal setting between patient and caregivers as well as keeping goals realistic.
Change In Practice
Project Interventions: Three Strategic Phases

**PREOPERATIVE**
- Early identification of patients with chronic opioid use
- Develop a Pain Screening Tool
- Create a Pain Service referral process
- Enhance patient and family education
- Incorporate a multidisciplinary approach

**INTRAOPERATIVE**
- Plan of care developed by Pain Service
- Plan communicated in Electronic Medical Record
- Chronic opioid patients identified for staff handoffs
- Surgical record flagged with visual cue
- Evolving anesthesia practices with emphasis on spinal anesthesia and use of peripheral nerve blocks

**POSTOPERATIVE**
- Nursing assessment for earlier pain intervention
- Use of multimodal pain management
- Early mobilization with Physical Therapy
- Patient and staff education
- Discharge follow-up phone calls
Pre Operative Phase

- Early Identification of patients with chronic opioid use
- Pain Screening Tool development
- Creation of the Pain Service referral
- Utilize Ortho Clinic and PEEC (Pre operative Evaluation and Education Center) for patient and family education
Intraoperative Phase

- Plan of Care developed by Pain Service
- Multidisciplinary communication via the Electronic Medical Record
- Chronic opioid patients identified for staff handoffs
- Surgical Record was flagged with visual cue
- Staff education about evolving anesthesia and orthopedic practices, including use of nerve blocks
Postoperative Phase

- Following the Pain Plan of Care
- Nursing assessment for earlier pain intervention
- Use of multimodal pain approaches
- Early mobilization with Physical Therapy
- Patient and staff education
- Discharge follow-up phone calls

<table>
<thead>
<tr>
<th>Patient Name and MR #</th>
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**RECOMMENDATIONS/PLAN:** Recommendations are made with the understanding that the anesthesiologist will provide the appropriate care based on the patient’s assessment on the day of surgery

**PREOPERATIVE:**
- Continue current doses of Opana ER and oxycodone IR
- Lyrica 75mg po x 1, one to two hours prior to surgery

**INTRAOPERATIVE:**
- Regional anesthesia per anesthesiologist
- Ketorolac 30mg IV x 1

**POSTOPERATIVE:**
- Continue Opana ER 20mg po q 12 hrs
- Dilaudid IV PCA 0.2mg per hr (may need 0.3mg), 0.4mg q 8 minutes, clinician bolus 1mg IV q 2 hrs prn severe pain
- Lyrica 25mg po q 8 hrs
- Ketorolac 30mg IV q 6 hrs x 48 hrs (if no contraindications)
- Methocarbamol 1000mg po q 6 hrs prn pain/spasm
- Continuous pulse oximetry

**POD #1:**
- Discontinue continuous rate on IV PCA
- Increase Opana to 25mg po q 12 hrs

**POD #2:**
- Discontinue IV PCA
- Begin oxycodone 10mg (may need 15mg) po q 3 hrs prn pain
**Multidisciplinary Approach**

**Pain Service Plan of Care communication**

- Pain Service, Surgery, Anesthesia and Nursing departments.
- Plan of Care communicated across all surgical phases.
- Electronic medical record, visual reminder and verbal handoffs.
Process Flow

PROCESS FLOW – PT WITH CHRONIC OPIOID USE & ORTHOPEDIC JOINT SURGERY

Orthopedics Clinic
- Pt scheduled for Office Visit with Surgeon for poss OR
- Pain Assessment Tool completed by Ortho RN or MA
- IS PT AT RISK and Chronic Opioid Use?
  - NO: No further Action required
  - YES: Referral to Pain Service for Chart Review
    - Date of OR and PEEC to be included in Referral
    - Ortho MD enters orders for POC (Plan of Care) for Pain Mgmt prior to OR.

Pain Clinic
- Pain clinic receives Referral for Chart Review
- MA creates Chart Review appointment with Pain MD
- Pain MD reviews patient's chart and completes Encounter
- Encounter is routed to C PEEC/ANES

PEEC
- PEEC RN will teach patient at time of visit
- Anesthesiologist completes Anesthesia Assessment and is aware of pain POC
- Documentation in EMR re: POC for Pain Management
- Prior to Surgery – PEEC RN will place PAIN MGT ALERT sign on surgical record

OR
- CRNA and Anesthesiologist aware of opioid tolerant patient. Identified by Pain Mgmt Alert sign on Surgical Record.
- Reviews information for pain POC.
- Utilizes POC as possible dependent upon Anesthesiologist and pt condition.

PACU
- PACU RN is informed of Pain POC for patient
- Pain POC implemented dependent upon pt condition

Nursing Unit
- RN receiving pt on nursing unit. Is informed of Pain POC for the Opioid Tolerant patient.
- RN communicates PAIN POC at change of shift via the Nursing Handoff.
Celebrating Milestones!!
Data Collection Process
Data Comparison
Baseline vs. Intervention Groups

- 20 patients selected prior to implementation of the Evidence-Based guideline.
- Compared with 20 patients after guideline implementation.
- Data collection was done by team members utilizing a tool for analysis.
# Baseline Data Collection

<table>
<thead>
<tr>
<th>Patient Demographics</th>
<th>Preoperative</th>
<th>Intraoperative</th>
<th>Postoperative PACU</th>
<th>Postoperative Medical Surgical Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Opioids</td>
<td>Anesthesia type</td>
<td>PCA started in Post Anesthesia Care Unit (PACU)</td>
<td>Opioids Name, Rx</td>
</tr>
<tr>
<td>Sex</td>
<td>Name/dosing</td>
<td>Nerve Block</td>
<td>Total time in PACU</td>
<td>Non-opioids Name, Rx</td>
</tr>
<tr>
<td>Type of Surgery</td>
<td>Non-opioids for pain</td>
<td>Patient Controlled Analgesia (PCA)</td>
<td>Pain scores in PACU</td>
<td>Postoperative complications</td>
</tr>
<tr>
<td>Illicit drug use</td>
<td>Preoperative Pain Scores</td>
<td>Epidural</td>
<td>Hospital Length of Stay (LOS)</td>
<td>Postoperative Pain Scores</td>
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<td>Alcohol use</td>
<td></td>
<td></td>
<td></td>
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Sorting through all the data!
Pre Operative Phase
Intra Operative Phase

- **Use of PCA in PACU**: Pre: 9, Post: 15
- **PACU Pain Scores**: Pre: 3.50, Post: 0.83
- **Minutes in PACU**: Pre: 106, Post: 78
Post Operative Phase

**Postoperative Pain Scores**
(on a 0 to 10 scale)

- Pre: 5.25
- Post: 3.70

**Hospital LOS (days)**

- Pre: 5.95
- Post: 3.35
Additional Qualitative Findings

- Pain tool demonstrated that it could capture pain patients not identified by MD.
- No “rescue” calls to Pain Service from PACU staff.
- Improved PACU throughput - also decreases OR delays and OT.
- Better use of medication strategies.
  (Examples: gabapentin in preop and oxymorphone in PACU)
- Ortho Clinic noted fewer patient phone calls and MD visits needed from the post-guideline group.
We’re All Getting Older…
I’m the winner?!?
EBP Project Accomplishments
PATIENT SATISFACTION

PRE GUIDELINE  POST GUIDELINE
Positive Outcomes

- Improved identification of opioid-tolerant patients resulted in a comprehensive Plan Of Care for pain management.
- Patients tolerated their postoperative rehabilitation better and became more active participants in their care.
- Outcomes included better pain management, shorter time in PACU, and decreased overall hospital LOS.
- A practice guideline for opioid-tolerant patients can result in cost savings and improved patient satisfaction, while maintaining a high level of patient safety.
Strategies for Success

- Interdisciplinary team approach.
- Lots of networking and checking in.
- Computer literacy and shared file access.
- Integration of care – all disciplines within the Kaiser system.
- Early involvement of key stakeholders, including MD champions.
- Nursing leadership support and promotion of the EBP process.
Estimated Cost Savings
Mean time in PACU reduced by 30 minutes. (27%)

Estimated PACU costs:

$234. labor  
+ $9. supplies  
= $243. total/hour  
X 30 minutes = $121. savings
Estimated Hospital Cost Savings

Mean Hospital Length of Stay reduced 3 days. (44%)

Estimated Hospital costs:

$470. labor

+$40. supplies

= $510. total/day

X 3 days = $1530. savings
Estimated Financial Savings of Guideline

<table>
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<tr>
<th>Patient Savings</th>
<th>Project Savings</th>
<th>Annual Savings</th>
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<tbody>
<tr>
<td>$1651.00</td>
<td>$33,000.00</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>Per patient</td>
<td>4 months</td>
<td>One year</td>
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Sustainability

- 2011 – EBP Internship
- 2012 – Pilot Study
- 2013 – Data Presentation
- 2014 – Manuscript Development and Publication

- Continued use of the PROCESS and decreased referrals to Pain Service
Professional Growth of Nursing Staff

- Hawaii State Center for Nursing
- Staff Nurse education
- University of Hawaii – writing class
- National Conferences – Poster/Podium presentations
- Mentoring for colleagues
Looking to the Future...
Looking to the Future...

- Validation of the Pain Screening Tool.
- Expanding the practice guideline to thoracic, abdominal, pelvic and additional orthopedic surgeries.
- Computerized pain assessments from home.
- Goal for reduction of chronic use of opioids – system strategies.
- Journal publication of project –
  - September 2014 - *Nursing Clinics of North America*
  - Possible future publication in American Journal of Nursing
Acknowledgements

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Linda Puu – Chief Nursing Officer, Hospital and

Jeannette Bala – Associate Chief Nursing Officer, Nursing Director of Adult Primary Care

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Kathryn Menor, RN, BSN – Perinatal Services, NICU, Inpatient Pediatrics
Melanie Jordan, RN, MS – PACU
Manlee Velasco, RN, BSN – Orthopedic Medical/Surgical Unit

**In addition to our team members**
Frank Bing – Production assistant
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Dick Tam, RN – Computer support
Lisa Ushiroda-Garma, APRN, CNS-BC – Pain Service
John Pang – Media Services
References


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“KIRIN”

Mahalo! … Questions/Comments?

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