Implementation of non-opioid order panels in Parkview Health emergency departments

Brandon James Euen

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Implementation of Non-Opioid Order Panels in Parkview Health Emergency Departments

Brandon James Euen, PharmD
PGY1 Pharmacy Resident
Parkview Health – Fort Wayne, Indiana

The speaker has no actual or potential conflict of interest in relation to this presentation
The following study was approved by the Parkview Health IRB
Background

- In 2018, 130 people per day died in the United States from opioid overdoses\(^1\)

- One analysis of opioid abusers reported that 75% of participants stated their first abused opioid was a prescription drug\(^2\)

- Acute pain is often encountered in the emergency department (ED), requiring rapid action to achieve pain control\(^3\)

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1. CDC/NCHS, National Vital Statistics System. Mortality. CDC WONDER, Atlanta, GA: US Department of Health and Human Services, CDC; 2018
2. Cicero TJ, Ellis MS, Surratt HL, Kurtz SP. The changing face of heroin use in the United States: a retrospective analysis of the past 50 years. *JAMA Psychiatry*
Panel Benefits

- Non-opioid order panels support the 2017 American College of Emergency Physicians (ACEP) statement on treatment of acute pain in the ED setting\(^4\)
  - “Pharmacologic treatment of many acutely painful conditions should optimally begin with a non-opioid agent.”

- Order panels can:
  - Reduce time placing orders
  - Facilitate combination orders
  - Standardize orders
  - Help meet EQUAL improvement requirements\(^5\)

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5. 2017 Opioid Prescribing and Treatment Guidelines: Confronting the Opioid Epidemic in Colorado’s Emergency Departments. *Colorado ACEP*
E-QUAL Involvement

• E-QUAL: Emergency Quality Network\(^6\)
  - ACEP lead initiative geared towards quality improvement
  - Tied to MIPS (merit-based incentive payment system)

• Methods to improve MIPS score include implementation of improvement activities
  - “Implementation of formal practice improvement processes”
  - “Use of evidence-based aids for shared decision making”

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Self-Assessment Question #1

Which of the following recommendations is found in the American College of Emergency Physicians 2017 policy statement on treatment of acute pain in the ED setting?

A. The use of opioid medications in the emergency department is rarely appropriate

B. Pharmacologic treatment of many acutely painful conditions should optimally begin with a non-opioid agent

C. Non-pharmacologic treatments for pain are generally ineffective and should be avoided in the emergent setting

D. When initiating treatment with opioids, extended-release or long-acting agents are preferred
Self-Assessment Question #1

Which of the following recommendations is found in the American College of Emergency Physicians 2017 policy statement on treatment of acute pain in the ED setting?

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D. When initiating treatment with opioids, extended-release or long-acting agents are preferred
Self-Assessment Question #2

Which of the following is a potential benefit of non-opioid order panel implementation?

A. Total elimination of severe, acute pain is often achieved through panel use
B. Pharmacy involvement in the emergency department setting is minimized
C. The need for non-pharmacologic pain control interventions is removed
D. Order panels can facilitate the ordering of non-opioid pain medication combinations
Self-Assessment Question #2

Which of the following is a potential benefit of non-opioid order panel implementation?

A. Total elimination of severe, acute pain is often achieved through panel use
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D. Order panels can facilitate the ordering of non-opioid pain medication combinations
Parkview Health

- Fort Wayne, Indiana
  - 8 hospital health system
  - Study takes place at Parkview Regional Medical Center (PRMC) and Parkview Hospital Randallia (PVR)

- PRMC: 400 beds
  - Level II Trauma Center
  - 5 ICUs
  - 65,332 ED patients in 2018

- PVR: 174 beds
  - Medical ICU
  - 57,800 ED patients in 2018
Purpose

• To implement non-opioid order panels for use in Parkview Health emergency departments

• Overall, implementation of non-opioid order panels may help optimize opioid prescribing in Parkview Health EDs
Timeline

- **September 18th**: ED Grand Rounds Presentation Given
- **November 16th**: Panel Education Distributed
- **December 3rd**: Panels Implemented
- **February 15th**: Preliminary Data Assessment
- **March 15th**: Data Collection Ends
Panel Education

- Handout-format document including dosing and safety information on panel medications
  - Highlighted therapy combinations
  - Included panel release dates and locations

<table>
<thead>
<tr>
<th>IV Lidocaine(^{4,5})</th>
<th>Default dose: 1.5 mg/kg IV once infused over 15 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Preliminary evidence shows lidocaine may be used to control renal colic, abdominal pain, and some neuropathic pains.</td>
<td></td>
</tr>
<tr>
<td>- All patients receiving IV lidocaine will be required to have cardiac monitoring.</td>
<td></td>
</tr>
<tr>
<td>- IV lidocaine should be avoided in patients presenting with or with a history of cardiac arrhythmias, heart failure, heart block, MI, or seizures</td>
<td></td>
</tr>
<tr>
<td>- Adverse effects include numbness and tingling, lightheadedness, dizziness</td>
<td></td>
</tr>
<tr>
<td>- Tinnitus, confusion, seizure, and cardiac arrhythmias have also been reported and signal possible toxicity.</td>
<td></td>
</tr>
<tr>
<td>- Maximum dose is 200 mg IV once.</td>
<td></td>
</tr>
</tbody>
</table>

PARKVIEW
Timeline

September 18th
ED Grand Rounds Presentation Given

November 16th
Panel Education Distributed

December 3rd
Panels Implemented

February 15th
Preliminary Data Assessment

March 15th
Data Collection Ends
## ED Quicklist

### Manage Orders

<table>
<thead>
<tr>
<th>Quick List</th>
<th>Active</th>
<th>Signed &amp; Held</th>
<th>Home Meds</th>
<th>Cosign</th>
<th>Order History</th>
<th>Recurring Treatment</th>
</tr>
</thead>
</table>

### Order Sets

<table>
<thead>
<tr>
<th>Suggested (2)</th>
<th>ED Courtesy Admission</th>
<th>GEN Adult Primary Care Daily Rounding</th>
</tr>
</thead>
</table>

### ED Med Panels

- **ED Atraumatic Headache Pain Panel**
- **ED Non-Opioid Pain Panel**
- **ED ENT box**
- **ED Eye Tray**

### Common Meds

- acetaminophen (TYLENOL) suspension
- acetaminophen (TYLENOL) tablet
- aspirin chewable tablet
- bacitracin zinc ointment
- calcium chloride 100 mg/mL (10%) syringe
- cloZApine (CLOZARIL) tablet
- diazepam (VALIUM) 5 mg/mL syringe
- dextrose 50% in water (D5W) syringe
- diphenhydrAMINE (BENADRYL) capsule
- diphenhydrAMINE (BENADRYL) injection
- diphenoxylate-atropine (LOMOTIL) 2.5-0.025 mg/tablet
- lidocaine “PF” (XYLOCAINE) 10 mg/mL (1%) injection (2ml Vial)
- lidocaine (XYLOCAINE) 10 mg/mL (1%) injection (20ml Vial)
- LORazepam (ATIVAN) injection
- meperidine (DEMEROL) injection
- methylPREDniSolone (Solu-MEDROL) IV
- methylPREDniSolone (Solu-MEDROL) IV injection
- morphine injection
- nalBUPhine (NUBAIN) injection
- nitroglycerin (NITROSTAT) SL tablet
- nitroglycerin (NITROSTAT) 2% ointment
- norgestrel-ethinyl estradiol (LO/OVRA) tablet
- ondansetron “PF” (ZOFRAN) 4 mg/2 mL injection
- ondansetron (ZOFRAN-ODT) disintegrating tablet 4 mg
- ondansetron (ZOFRAN-ODT) disintegrating tablet 8 mg

### IV Fluids

- **ED IV Fluids**
- **ED Bolus with NS Maintenance Fluids (250ml bolus)**
- **ED Bolus with NS Maintenance Fluids (500ml bolus)**
- **ED Bolus with NS Maintenance Fluids (1000ml bolus)**
- **IV NS Bolus**
- **Intoxication Treatment (Banana Bag)**

### Critical Care

- amiodarone (CORDARONE) bolus and infusion
- atropine 0.1 mg/mL syringe
- diltiazem (CARDIalem) bolus and infusion
- DOBUtamine (DOBUtREX) infusion
- DOPamine (INTROPIN) infusion
- enoxaparin (LOVENOX) injection
- EPINEPhrine (ADRENALIN) injection (1:1000)
- EPINEPhrine (ADRENALIN) 0.1 mg/mL
ED Non-Opioid Pain Panel

- acetaminophen (TYLENOL) tablet
  - 1,000 mg, Oral, Every 6 hours, Starting 3/1/19

- ibuprofen (ADVIL, MOTRIN) tablet
  - 400 mg, Oral, Every 6 hours, Starting 3/1/19

- ketorolac (TORADOL) injection
  - 15 mg, Intravenous Push, Every 6 hours, Starting 3/1/19

- dicyclomine (BENTYL) capsule
  - 20 mg, Every 6 hours, Starting 3/1/19

- dicyclomine (BENTYL) injection
  - 20 mg, Intramuscular, Every 6 hours, Starting 3/1/19

- orphenadrine (NORFLEX) 12 hr tablet
  - 100 mg, Oral, Every 12 hours, Starting 3/1/19

- orphenadrine (NORFLEX) injection
  - 60 mg, Intravenous Push, Once, Starting 3/1/19

- cyclobenzaprine (FLEXERIL) tablet
  - 10 mg, Oral, Every 8 hours, Starting 3/1/19

- lidocaine *PF* (XYLOCAINE) pain infusion 1.5 mg/kg
  - 1.5 mg/kg, Intravenous, Once, Starting 3/1/19, Cardiac monitoring required.

- lidocaine (ASPERCREME) 4%
  - 1 patch, Transdermal, Every 24 hours, Starting 3/1/19

- haloperidol lactate (HALDOL) injection
  - 2 mg, Intravenous Push, Once, Starting 3/1/19
ED Atraumatic Headache Panel

- Acetaminophen (TYLENOL) tablet
  1,000 mg, Oral, Every 6 hours, Starting 3/4/19

- Ibuprofen (ADVIL, MOTRIN) tablet
  400 mg, Oral, Every 6 hours, Starting 3/4/19

- Ketorolac (TORadol) injection
  15 mg, Intravenous Push, Once, Starting 3/4/19

- Diphenhydramine (BENADRYL) injection
  25 mg, Intravenous Push, Once, Starting 3/4/19

- Metoclopramide (REGLAN) injection
  10 mg, Intravenous Push, Once, Starting 3/4/19

- Prochlorperazine (COMPazine) injection
  10 mg, Intramuscular, Once, Starting 3/4/19

- Dexamethasone (DECADRON) injection
  8 mg, Intravenous Push, Once, Starting 3/4/19

- Magnesium sulfate IVPB
  1 g, Intravenous, Administer over 1 hour, Once, Starting 3/4/19

- Rizatriptan (MAXALT) tablet
  10 mg, Oral, Once, Starting 3/4/19, Avoid use within 24 hours of dihydroergotamine administration. Repeat after 2 hours if significant relief is not attained.

- Sumatriptan (IMITREX) injection
  6 mg, Subcutaneous, Once, Starting 3/4/19, Avoid use within 24 hours of dihydroergotamine administration.

- Dihydroergotamine (DHE) injection
  1 mg, Intravenous Push, Once, Starting 3/4/19, Dose may be repeated hourly up to a maximum of 2 mg daily. Avoid use within 24 hours of triptan administration.

- Ondansetron (ZOFran-ODT) disintegrating tablet
  4 mg, Oral, Once

- Ondansetron "PF" (ZOFran) injection
  4 mg, Intravenous Push, Once
Methods

• Two-arm study of patients at PRMC and PVR
  • Order panel and non-order panel patients were compared via retrospective chart review

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit to PRMC or PVR ED without hospital admission</td>
<td>Additional visit to ED within 72 hours</td>
</tr>
<tr>
<td>Age $\geq$ 18</td>
<td>No documented pain scores using 1-10 pain scale</td>
</tr>
<tr>
<td>Receipt of an opioid and/or a medication on the non-opioid panels for pain management</td>
<td>Patients administered methadone, buprenorphine, or extended-release opioids</td>
</tr>
</tbody>
</table>
Outcomes

• **Primary:**
  • Oral Morphine Equivalents (OMEs) received during ED visit

• **Secondary:**
  • ED length of stay
  • Prescription for opioid issued on discharge
  • Non-opioid pain mediation used prior to opioid administration
  • Pain scores
Statistics

- Microsoft Excel, SPSS

- Descriptive Statistics
  - Median, Interquartile range (IQR)
  - Non-normally distributed data

- Inferential Statistics
  - Chi-Squared Tests
  - Mann-Whitney U Tests
  - $\alpha = 0.05$, significant values bolded
Study Enrollment

- 14,741 patients included from 8/1/2018 – 3/15/2019
  - 17,512 patients before exclusion criteria

- Major exclusions:
  - Missing pain scores (1,592 - 9%)
  - Additional visit to ED within 72 hours (931 - 5%)
Time Control Groups

- Outcomes were compared between patients in the pre-intervention and post-intervention periods
  - Served as a control to assess difference in outcomes resulting from concomitant, non-order panel efforts to promote safe opioid prescribing
- Order panel patients were excluded to reduce bias when assessing if date of visit affected outcomes

Pre-Intervention
8/1/2018 – 12/2/2018

Post-Intervention
12/3/2018 – 3/15/2019
Date of visit was associated with significant differences in primary and secondary outcomes. Likely attributable to other concomitant efforts nationwide and at Parkview Health to promote safe opioid prescribing.

<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention (n = 7860)</th>
<th>Post-Intervention (n = 6524)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received Opioids % (n)</td>
<td>50.9% (4001)</td>
<td>47.2% (3082)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Discharge Prescription for Opioid % (n)</td>
<td>27.5% (2158)</td>
<td>22.0% (1435)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Study Groups

- Outcomes were compared between order panel patients and non-order panel patients from the same post-intervention time period.
- Assessed to see if order panels impacted outcomes without bias of visit date.
Baseline Characteristics

- Median age of order panel patients was lower than non-panel patients
- Male-to-female ratio was similar between groups

<table>
<thead>
<tr>
<th></th>
<th>Non-Panel Patients (n = 6524)</th>
<th>Order Panel Patients (n = 357)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years) Median (IQR)</td>
<td>40 (29 - 55)</td>
<td>36 (27 - 45)</td>
</tr>
<tr>
<td>Male Sex % (n)</td>
<td>35.1% (2418)</td>
<td>36.1% (129)</td>
</tr>
</tbody>
</table>
## Results – Primary Outcome

<table>
<thead>
<tr>
<th></th>
<th>Non-Panel Patients (n = 6524)</th>
<th>Order Panel Patients (n = 357)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received Opioids % (n)</td>
<td>47.2% (3082)</td>
<td>21.3% (76)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>OME Average Median (IQR)</td>
<td>12.0 (7.5 - 20)</td>
<td>10 (7.5 - 15)</td>
<td>0.044</td>
</tr>
<tr>
<td>Received Non-Opioids % (n)</td>
<td>67.8% (4425)</td>
<td>100.0% (357)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
## Results – Secondary Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Non-Panel Patients (n = 6524)</th>
<th>Order Panel Patients (n = 357)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge Prescription for Opioid</td>
<td>22.0% (1435)</td>
<td>10.6% (38)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>% (n)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Opioid Administered First</td>
<td>26.3% (259/983)</td>
<td>43.4% (33/76)</td>
<td>0.001</td>
</tr>
<tr>
<td>% (n)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of Stay (min)</td>
<td>152 (108 - 210)</td>
<td>159 (123 - 199)</td>
<td>0.114</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Pain Score Evaluation

<table>
<thead>
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<th>Order Panel Patients (n = 357)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Pain Score</strong></td>
<td>8 (7 – 10)</td>
<td>8 (7 – 10)</td>
<td>0.114</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum Pain Score</strong></td>
<td>6 (4 – 8)</td>
<td>6 (4 – 8)</td>
<td>0.066</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Pain Score</strong></td>
<td>8 (7 – 10)</td>
<td>8 (7 – 10)</td>
<td>0.410</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Average Pain Score</strong></td>
<td>7 (5 – 9)</td>
<td>7 (5 – 9)</td>
<td>0.088</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Conclusions

• Order panel patients used less OMEs
  - Less likely to have received opioids
  - Less likely to receive opioid prescription on discharge

• Order panel patients were more likely to receive a non-opioid prior to opioid administration

• Pain scores and ED length of stay were similar across groups
Limitations

- Retrospective Study Design
  - Inability to account for missing data

- Patients on opioids prior to arrival not excluded

- Small sample size of patients receiving panel orders in the study population
Next Steps

• Further order panel promotion
  • To date, around 1400 unique orders for over 1000 patients have been entered across the health system

• Incorporate ketamine ordering into panel

• Further expand upon current order panels with guidance by pain indication
Acknowledgements

• Mentors
  • Jared Netley, PharmD, BCPS, MPA
  • Will Armstrong, PharmD, BCPS

• Data Collection
  • Sarah Ferrell, PharmD

• Panel Feedback
  • Dr. Thomas Gutwein
  • Parkview Emergency Physicians Group
References


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Brandon James Euen, PharmD
PGY1 Pharmacy Resident
Parkview Health – Fort Wayne, Indiana
Email: brandon.euen@parkview.com