HEN 2.0 ADE WEBINAR: OPIOIDS & HYPOGLYCEMIA
MULTIMODAL THERAPY TO REDUCE INPATIENT OPIOID USE & SUCCESSFUL STRATEGIES TO PREVENT HYPOGLYCEMIA

June 16, 2016
11:00 a.m. – 12:00 p.m. CT
WELCOME AND INTRODUCTIONS

Emily Koebnick, Program Manager, HRET | 11:00 – 11:05
## AGENDA FOR TODAY

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Description</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:00-11:05 AM</td>
<td><strong>Welcome and Introductions</strong></td>
<td>Open and housekeeping information, including review of relevant HEN resources, change packages and Listserv®.</td>
<td>Emily Koebnick Program Manager, HRET</td>
</tr>
<tr>
<td>11:05-11:10 AM</td>
<td><strong>HEN Data Update</strong></td>
<td>ADE data update.</td>
<td>Julia Heitzer Data Analyst, HRET</td>
</tr>
<tr>
<td>11:10-11:25 AM</td>
<td><strong>Multi-modal Pain Management Therapy</strong></td>
<td>Opioids are not the only treatment for pain. Learn from an expert how to optimize pain management by using other options as replacements for, or additions to, opioid therapy.</td>
<td>Jayne Pawasauskas, PharmD Clinical Professor University of RI College of Pharmacy Pharmacy Specialist, Pain Mgmt. Kent Hospital, Warwick, RI</td>
</tr>
<tr>
<td>11:25-11:40 AM</td>
<td><strong>Hospital Story</strong></td>
<td>Learn about one hospital’s journey to reduce ADEs through a culture of quality and safety, data transparency, staff and leadership engagement and small changes.</td>
<td>Tereasa DeMeritt MSN, APRN-NPc Quality Director Labette Health, Parsons, Kansas</td>
</tr>
<tr>
<td>11:40-11:55 AM</td>
<td><strong>Successful Strategies to Prevent Hypoglycemia</strong></td>
<td>Optimal glycemic management for inpatients is the key to quick and safe rehabilitation and return to pre-illness function. Dr. Kulasa will discuss foundational principles of glycemic management along with tips for successful implementation.</td>
<td>Kristen Kulasa, MD Asst. Clinical Professor of Medicine Director, Inpatient Glycemic Control University of California, San Diego</td>
</tr>
<tr>
<td>11:55 AM-12:00 PM</td>
<td><strong>Bring it Home</strong></td>
<td>Action items and tying together of didactic, hospital-level and improvement science information.</td>
<td>Emily Koebnick Program Manager, HRET</td>
</tr>
</tbody>
</table>
ADE CHANGE PACKAGE

- ADE driver diagrams and change ideas
- Example PDSA cycles
- Descriptions and guidance on how to use change package effectively
- Referenced appendices
Catalogued measure information available on the HRET HEN website
- HEN Core Topics – (evaluation measures)
- HEN Core Process Measures
- HEN Additional Topics

<table>
<thead>
<tr>
<th>ADE: AHA/HRET Evaluation Measure</th>
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</tr>
<tr>
<td>Rate calculation</td>
</tr>
<tr>
<td>Specifications/definitions Sources/Recommendations</td>
</tr>
<tr>
<td>Data source (s)</td>
</tr>
<tr>
<td>NHSN data transfer</td>
</tr>
<tr>
<td>Baseline period</td>
</tr>
<tr>
<td>Monitoring period</td>
</tr>
<tr>
<td>CDS Measure ID(s)</td>
</tr>
<tr>
<td>AHA/HRET HEN 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<tr>
<td>Adverse Drug Events due to Opioids</td>
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<td>CDS Measure ID(s)</td>
</tr>
<tr>
<td>AHA/HRET HEN 1</td>
</tr>
</tbody>
</table>
SIGN UP TODAY: ADE LISTSERV®

- ADE Analytics Listserv® is available for:
  - Sharing of:
    - HRET resources
    - Publicly available resources
    - Best practices
    - Learnings from subject matter experts
  - Troubleshooting for data reporting and analysis

[Sign Up Here]
HEN DATA UPDATE
Julia Heitzer, Data Analyst, HRET | 11:05 – 11:10
ADVERSE DRUG EVENTS DUE TO OPIOIDS

Data submitted to AHA/HRET as of: 5/27/2016

Results for months in which data submission was less than 50% should be interpreted cautiously, as the data on which the results are based is not yet complete.
HYPOGLYCEMIA IN INPATIENTS RECEIVING INSULIN

Data submitted to AHA/HRET as of: 5/27/2016

<table>
<thead>
<tr>
<th>Hypoglycemia in Inpatients Receiving Insulin</th>
<th>Baseline</th>
<th>2015-10</th>
<th>2015-11</th>
<th>2015-12</th>
<th>2016-01</th>
<th>2016-02</th>
<th>2016-03</th>
<th>2016-04</th>
<th>Relative reduction, baseline to 1Q2016 (Jan, Feb, Mar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number (%) of hospitals reporting</td>
<td>924 (72%)</td>
<td>894 (69%)</td>
<td>899 (70%)</td>
<td>900 (70%)</td>
<td>840 (65%)</td>
<td>691 (53%)</td>
<td>433 (34%)</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

Results for months in which data submission was less than 50% should be interpreted cautiously, as the data on which the results are based is not yet complete.
DEFINITION/RATIONALE

Multimodal analgesia involves the concurrent administration of **two or more** analgesic agents with different mechanisms of action.

The combination therapy often produces a synergistic effect, and allows for better analgesia using lower doses of a given medication than if it were to be used alone.

Many studies have demonstrated an opioid-sparing effect from concurrent use of NSAIDs. More recently, adjuvant medications such as anticonvulsants have demonstrated similar results.

Opioids
α₂-agonists
NMDA antagonists
Acetaminophen
Anti-epileptics
TCAs & similar

Local anesthetics
Opioids
α₂-agonists

NSAIDs/COXIBs
Local anesthetics
Anti-epileptics
### DEVELOPMENT OF MMA PROTOCOL

<table>
<thead>
<tr>
<th>Non-Opioids to Consider:</th>
<th>Base Multimodal Regimen On:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Acetaminophen</td>
<td>• Efficacy</td>
</tr>
<tr>
<td>• NSAIDs</td>
<td>— Consider neuropathic</td>
</tr>
<tr>
<td>— Ketorolac, ibuprofen,</td>
<td>component</td>
</tr>
<tr>
<td>celecoxib, etodolac</td>
<td>— Patient-specific factors</td>
</tr>
<tr>
<td>• NMDA receptor antagonists</td>
<td>— Age</td>
</tr>
<tr>
<td>— Ketamine</td>
<td>— Organ function</td>
</tr>
<tr>
<td>• Alpha2 agonists</td>
<td>• Renal, GI</td>
</tr>
<tr>
<td>— Clonidine, dexmedetomidine</td>
<td>— Tolerability &amp; ease of use</td>
</tr>
<tr>
<td>• Gabapentinoids</td>
<td>— Cost</td>
</tr>
<tr>
<td>— Gabapentin, pregabalin</td>
<td></td>
</tr>
<tr>
<td>• Local anesthetics</td>
<td></td>
</tr>
<tr>
<td>— Bupivacaine, lidocaine,</td>
<td></td>
</tr>
<tr>
<td>liposomoal bupivacaine</td>
<td></td>
</tr>
</tbody>
</table>
# EXAMPLES OF MMA IN SURGICAL PATIENTS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-operative</strong></td>
<td>Acetaminophen</td>
</tr>
<tr>
<td></td>
<td>Gabapentin or Pregabalin</td>
</tr>
<tr>
<td></td>
<td>NSAID</td>
</tr>
<tr>
<td></td>
<td>Opioid</td>
</tr>
<tr>
<td><strong>Intra-operative</strong></td>
<td>Regional analgesia with local anesthetic or opioid</td>
</tr>
<tr>
<td></td>
<td>Epidural or intrathecal opioid</td>
</tr>
<tr>
<td><strong>Post-operative</strong></td>
<td>Opioid (i.e. PCA or other)</td>
</tr>
<tr>
<td></td>
<td>Acetaminophen</td>
</tr>
<tr>
<td></td>
<td>NSAID</td>
</tr>
<tr>
<td></td>
<td>Gabapentin or Pregabalin</td>
</tr>
</tbody>
</table>

EXAMPLE OF RECOMMENDATIONS IN PUBLISHED GUIDELINES

• “Unless contraindicated, patients should receive an around-the-clock regimen of COXIBS, NSAIDS, or acetaminophen. Central regional blockade with local anesthetics should be considered.”
  – American Society of Anesthesiologists: Practice Guidelines for Acute Pain Management in the Perioperative Setting¹

• “The panel suggests that clinicians routinely incorporate around-the-clock nonopioid analgesics and nonpharmacologic therapies into multimodal analgesia regimens.”
  – American Pain Society: Guidelines on the Management of Postoperative Pain²

RECOMMENDATIONS FROM PROFESSIONAL SOCIETIES & ACCREDITING AGENCIES

The multimodal concept is supported by numerous professional and regulatory organizations

- **AAEM** (American Academy of Emergency Medicine)\(^1\)
- **AAOS** (American Academy of Orthopaedic Surgeons)\(^2\)
- **ACS** (American College of Surgeons)\(^3\)
- **AGS** (The American Geriatrics Society)\(^4\)
- **AHA** (American Heart Association)\(^5\)
- **AHRQ** (Agency for Healthcare Research and Quality)\(^6\)
- **ASA** (American Society of Anesthesiologists)\(^7\)
- **ASSPAN** (American Society of PeriAnesthesia Nurses)\(^8\)
- **ASPMN** (American Society for Pain Management Nursing)\(^9\)
- **ERAS** Society (Enhanced Recovery After Surgery Society)\(^10\)
- **SCCM** (Society of Critical Care Medicine)\(^11\)
- **TJC** (The Joint Commission)\(^12\)

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**References:**
BENEFITS OF MULTIMODAL ANALGESIA

**EFFICACY**

- Reduced doses of analgesics in the treatment plan, especially opioids\(^1,2,3,4\)
  - Recent federal focus on limiting opioid use\(^14,15\)
- Superior pain relief, secondary to synergistic or additive effects of the various agents in the treatment plan\(^1,2,5,6,7\)
- Fewer “analgesic gaps” \(^1,2\)
- Reduce LOS\(^9\)
- Improved patient satisfaction\(^10\)

**SAFETY**

- Improved functional outcomes\(^1,2,8\)
- Reduced adverse events (including drug-related, and post-op related – i.e. fever, PONV)\(^11,12,13\)
- Decreased need for use of naloxone\(^11\)

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14. www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm491739.htm
15. http://www.cdc.gov/mmwr/volumes/65/rr/rr6501e1.htm
INCORPORATE MULTIMODAL ANALGESIA INTO TREATMENT

- Utilize a stepwise approach
- Recommend continuation of non-opioids for an opioid-sparing effect

**Step 1**
- Non-opioid
- +/- Adjuvant

**Step 2**
- Weak opioid
- +/- Non-opioid
- +/- Adjuvant

**Step 3**
- Strong opioid
- +/- Non-opioid
- +/- Adjuvant

Pain persisting

Pain persisting

Adapted from the World Health Organization (WHO) Pain Relief Ladder.
SUMMARY OF GENERAL APPROACHES

• Use an individualized, *multimodal* treatment plan to manage pain, which includes:
  • Nonpharmacologic approaches
  • Non-opioid medications
• The best approach may be to start with a *non-narcotic*
• Take extra precautions with *opioid-naïve* patients
  • Short-term trial with sufficient time to assess response before increasing the dosage
  • Recognize that opioid-tolerant patients often have more complex needs

* *Opioid-naïve is defined as having taken < 60 mg morphine equivalents daily for the prior 7 days*
EXAMPLE OF MMA ORDER SETS: KENT HOSPITAL

Warwick, RI

- Development of 6 “Sliding Scale” Acute Pain Protocols
- Intended for use in medical patients
- For opioid-tolerant patients: Medium (50-100 MED/d) and High level (>100 MED/d) protocols

<table>
<thead>
<tr>
<th>Level</th>
<th>Low Dose (&lt;50MED/d or Opioid Naïve)</th>
<th>Low Dose NPO (&lt;50MED/d or Opioid Naïve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1:</td>
<td>Acetaminophen 650 mg PO q6h*</td>
<td>Acetaminophen 650 mg PR q6h*</td>
</tr>
<tr>
<td>Mild Pain</td>
<td>Celecoxib 100 mg PO BID</td>
<td>Acetaminophen 1000 mg IV q6h*</td>
</tr>
<tr>
<td>(1-3)</td>
<td>Etodolac 400 mg PO BID</td>
<td>Ketorolac 15 mg IV q6h</td>
</tr>
<tr>
<td></td>
<td>Ibuprofen 400 mg PO q6h</td>
<td></td>
</tr>
<tr>
<td>Level 2:</td>
<td>Tramadol 25 mg PO q6h</td>
<td>Morphine 4 mg IV q4h</td>
</tr>
<tr>
<td>Moderate</td>
<td>Morphine 7.5 mg PO q4h</td>
<td>Hydromorphone 0.5 mg IV q4h</td>
</tr>
<tr>
<td>Pain</td>
<td>Oxycodone 5 mg PO q4h</td>
<td></td>
</tr>
<tr>
<td>(4-7)</td>
<td>Give with Level 1 drug</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 3:</td>
<td>Oxycodone 10 mg PO q4h</td>
<td>Morphine 6 mg IV q4h</td>
</tr>
<tr>
<td>Severe Pain</td>
<td></td>
<td>Hydromorphone 0.5 mg IV q3h</td>
</tr>
<tr>
<td>(8-10)</td>
<td>Give with Level 1 drug</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Prescriber may select acetaminophen + NSAID for Mild Pain; May select only one option for moderate and severe pain
Examples of MMA Order Sets

<table>
<thead>
<tr>
<th>Medications</th>
<th>Status</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrocodone</td>
<td></td>
<td>0.4 mg, IV push, sc/hj, q6h, PRN Other</td>
</tr>
<tr>
<td>Acetaminophen</td>
<td></td>
<td>650 mg, PO, tab, q6h, PRN Mild Pain (Level 1-2)</td>
</tr>
<tr>
<td>Fentanyl</td>
<td></td>
<td>400 mg, PO, tab, q4h, PRN Mild Pain (Level 1-2)</td>
</tr>
<tr>
<td>Ibuprofen</td>
<td></td>
<td>400 mg, PO, tab, q4h, PRN Mild Pain (Level 1-3)</td>
</tr>
<tr>
<td>Level 1: For Mild Pain</td>
<td></td>
<td>These medications are ALWAYS offered when pain scale is &gt;0</td>
</tr>
<tr>
<td>Level 2: For Moderate Pain</td>
<td></td>
<td>Pick only ONE (1) These are given IN ADDITION to Level 1 medication for pain scale 4-7</td>
</tr>
<tr>
<td>tramadol</td>
<td></td>
<td>25 mg, PO, tab, q4h, PRN Moderate Pain (Level 4-7)</td>
</tr>
<tr>
<td>morphine (morphine immediate release)</td>
<td></td>
<td>7.5 mg, PO, subcut, q6h, PRN Moderate Pain (Level 4-7)</td>
</tr>
<tr>
<td>oxycodone (oxycodone immediate release)</td>
<td></td>
<td>5 mg, PO, tab, q4h, PRN Moderate Pain (Level 4-7)</td>
</tr>
<tr>
<td>Level 3: For Severe Pain</td>
<td></td>
<td>Pick only ONE (1)</td>
</tr>
<tr>
<td>oxycodone (oxycodone immediate release)</td>
<td></td>
<td>10 mg, PO, tab, q4h, PRN Severe Pain (Level 8-10)</td>
</tr>
<tr>
<td>morphine</td>
<td></td>
<td>4 mg, IV push, sc/hj, q6h, PRN Severe Pain (Level 8-10)</td>
</tr>
<tr>
<td>HYDROxyzphone</td>
<td></td>
<td>0.5 mg, IV push, sc/hj, q6h, PRN Severe Pain (Level 8-10)</td>
</tr>
<tr>
<td>Notify Provider</td>
<td></td>
<td>If patient receives more than three (3) Level 3 doses in 24 hours, page</td>
</tr>
</tbody>
</table>
Order Set, cont’d
LABETTE HEALTH, PARSONS, KS

Tereasa DeMeritt, RN, MSN, APRN, NP-c | 11:25 – 11:40
ABOUT US

- Acute care hospital in the rural southeast Kansas region since 1961
- Licensed for 99 beds
- Med/Surg, intensive care, orthopedic program, OB/GYN, hospitalist program, level III trauma center, inpatient rehabilitation unit
- 2016 Blue Cross Blue Shield Distinction+ orthopedic and maternity care
- Engaged in the HEN since 2012
OUR JOURNEY: NALOXONE REDUCTION

• HEN 1.0 AIM: Reduce all ADEs by 40 percent by December 31, 2015
  – Data collection began and baseline established
  – Data transparency hospital-wide
• Secondary AIM focusing on naloxone use
  – Established PI team with anesthesia champion lead by the pharmacy director
    • Provider-specific education by anesthesia champion
    • Shared data with anesthesia committee and surgery committee
PARALLEL INTERVENTION

- Pain management recommendation from anesthesia committee
  - IV acetaminophen
- Large movement created with change in orthopedic practice
- Orthopedic protocols updated
  - IV acetaminophen pre-operative and post-op
  - Added gabapentin pre-operative
  - Resulted in a reduction of opioid administration; increase in HCAHPs pain management

![Graph showing the number of patients receiving opioids from March 2014 to March 2016.](image-url)
BARRIERS AND HOW WE RESOLVED

• Compliance with ADE reporting from frontline staff
  – Back to the basics
  – Face-to-face education at staff meetings: reviewed policy, forms and how to report
• Juggling multiple responsibilities
  – Support, team-oriented approach
• Collecting data multiple systems
  – No interface between Omnicel and Evident
  – Manual data pull required
  – Process improved with time
MEASURES – PROCESS AND OUTCOMES

Compliance Rate of Reporting All ADEs
Reported ADEs/Total ADEs Reported or Found

- Compliance of Reporting
- Goal

50%

MEASURES – PROCESS AND OUTCOMES

ADEs Due to Opioids: Naloxone Administration

- Baseline
- Goal
- Labette Health

Chart shows the percentage of ADEs due to opioids over time from March 2014 to March 2016, with peaks and troughs indicating variations in the data.
**MEASURES – PROCESS AND OUTCOMES**

**ADE-Annual Naloxone Administration by Unit**

- **2014**
  - Medical ED
  - OB
  - ICU
  - Surgical
  - OR
  - Recovery

- **2015**
  - Medical ED
  - OB
  - ICU
  - Surgical
  - OR
  - Recovery

- **2016**
  - OR
  - Recovery

**51% Reduction in Naloxone Use in One Year**
ADVICE FOR OTHERS

• Culture of quality and patient safety throughout the organization is critical
  – High level of engagement from frontline staff, medical staff, administration and board
  – Concurrently reviewing data with frontline staff and providers is key
• Data transparency with the good, the bad and the ugly
• Small changes can make a big difference
  – No overall system changes
• Proactively researching and implementing evidenced-based practice
WRAP UP AND NEXT STEPS

• Continue our journey in HEN 2.0 and beyond
• Stay abreast of evidence-based practice and multimodal pain management initiatives

• Questions?

Tereasa DeMeritt, RN, MSN, APRN, NP-c
Labette Health, Parsons, Kansas
tdemeritt@labettehealth.com
620-421-4880 ext. 5554
Successful Strategies to Prevent Hypoglycemia

Kristen Kulasa, MD, UCSD | 11:40 – 11:55
IATROGENIC HYPOGLYCEMIA A TOP SOURCE OF INPATIENT ADES

- ADEs are most common cause of inpatient complications
  - Affecting $1.9 million stays annually
  - Costing $4.2 billion per year
  - Responsible for one-third of hospital acquired conditions (HACs)
- 50-60 percent of ADEs are preventable
- 57 percent of ADEs are from hypoglycemic agents
- > 10 percent of those on a hypoglycemic agent suffer at least one hypoglycemic ADE

WHERE TO START?

• Institutional support – buy in – alignment
• Multidisciplinary Steering Committee – stakeholders all at the table together
• Develop specific aims that are time-defined, measurable and achievable
• Assess the current state
• Defined goals, best practice defined in protocol
• Metrics – reliable, practical, rapid feedback
• Reliable Interventions and strategies
  – Hardwired, sustainable and spreadable
  – Reinforce protocol in multiple ways
• Ongoing informed improvement, refine the process
“GLUCOMETRICS” – UNIT OF MEASURE
OPERATIONAL DEFINITIONS

• Unit of analysis –
  – The individual reading (not recommended)
  – The patient-day
  – The patient-stay

• No consensus on best methods yet, SHM offers a variety of measures

• Hypoglycemia: < 70 mg/dL
• Severe hypoglycemia: < 40 mg/dL
• DWM ≥ 180 mg/dl
• Percent patient-days with BG > 299 mg/dL
• Recurrent hypoglycemia: > 1 hypoglycemic day
# Adverse Drug Event – Hypoglycemia in Inpatients Receiving Insulin

<table>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypoglycemia in Inpatients Receiving Insulin</strong></td>
<td></td>
</tr>
<tr>
<td>Measure type</td>
<td>Outcome</td>
</tr>
<tr>
<td>Numerator</td>
<td>Hypoglycemia in inpatients receiving insulin or other hypoglycemic agents</td>
</tr>
<tr>
<td>Denominator</td>
<td>Inpatients receiving insulin or other hypoglycemic agents</td>
</tr>
<tr>
<td>Rate calculation</td>
<td>( \left( \frac{\text{Numerator}}{\text{Denominator}} \right) \times 100 )</td>
</tr>
<tr>
<td>Specifications/definitions</td>
<td>See references below for guidance</td>
</tr>
<tr>
<td>Sources/Recommendations</td>
<td></td>
</tr>
</tbody>
</table>
| Data source (s) | Numerator: incident reporting systems, trigger tools, pharmacists’ intervention systems, medical record review  
Denominator: billing systems |
| NHSN data transfer | No |
| Baseline period | Calendar year 2010 OR  
Next oldest calendar year OR  
Jul – Sept 2015 |
| Monitoring period | Monthly, beginning Oct 2015 |
| CDS Measure ID(s) | HEN2-ADE-1b |
| AHA/HRET HEN 1 | EOM-ADE-13\textsuperscript{22} |
GLYCEMIC CONTROL – Y AXIS
HYPOGLYCEMIA – X AXIS:

Non-Critical Care

Outlier hospitals with a result greater than 10% for 'Percent Days with Results < 70' are excluded from the scatter plot.

Hospital(s): 28, 37
## Table 1.
**Expert Panel-Identified High-Priority Insulin Errors, by Phase of Medication-Use Process**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribing</td>
<td>Incorrect dosage/irrational insulin orders</td>
</tr>
<tr>
<td></td>
<td>Nomenclature-related errors</td>
</tr>
<tr>
<td>Transcribing</td>
<td>Incorrect transcription of verbal or telephone orders</td>
</tr>
<tr>
<td></td>
<td>Transcription of an incorrect dose</td>
</tr>
<tr>
<td>Dispensing and storage</td>
<td>Failure to double-check insulin products (i.e., preadministration)</td>
</tr>
<tr>
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<td>Look-alike containers</td>
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Recommendation 1
Develop protocol-driven and evidence-based order sets for specific uses of insulin:

- IV and subcutaneous insulin, transitions IV to Subcu, DKA, etc.
- Include decision support to guide insulin use based on patient’s nutritional status and need for appropriate monitoring

Recommendation 2
Eliminate the routine administration of correction/sliding scale insulin doses as the primary strategy to treat hyperglycemia.

Recommendation 3
Eliminate the use of “free text” insulin orders in electronic and paper records. Replace them with protocol-driven and evidence-based order sets that allow for the prescribing of complex insulin regimens.

INTEGRATE BEST PRACTICE INTO PROTOCOLS, ORDER SETS, DOCUMENTATION

- Actionable glycemic target
- Consistent carbohydrate/dietary/consult
- A1c
- Patient education plan
- Hypoglycemia protocol
- Guidance for transitions (linked protocols)
- Coordinated monitoring/nutrition/insulin
- DC oral agents, insulin preferred
- Insulin regimens for different conditions
- Dosing guidance
• Critically Ill Patients
  – Insulin gtt if BG > 180 mg/dL
  – BG maintained 140-180 mg/dL
  – Lower may be appropriate in selected patients, but targets < 110 mg/dL are not recommended
• Noncritically Ill Patients
  – Premeal glucose targets should be < 140 mg/dL
  – Random BG < 180 mg/dL
  – If BG < 100 mg/dL, consider reassessing insulin regimen
  – If BG < 70 mg/dL, modification is necessary
**INPATIENT HYPERGLYCEMIA MANAGEMENT OF THE NON-PREGNANT ADULT**

**Step 1:** Discontinue non-insulin antihyperglycemic agents

**Step 2:** Calculate the estimated total daily dose (TDD) of insulin patient may require; consider adjusting this up or down based on pt's home regimen and their A1C:
- Standard (pt w/ normal body habitus): 0.4 units/kg/day
- If pt very lean, on hemodialysis or very sensitive to insulin (hypoglycemia risk factors): 0.3 units/kg/day
- If pt overweight: 0.5 units/kg/day
- If pt obese, on steroids, or known to be insulin-resistant: 0.6 units/kg/day (or more)
- If transitioning off of an iv insulin infusion, call pharmacy for assistance and take the average hourly rate over the last 6 hours and multiply by 20:
  - if pt was receiving nutrition (tube feeds, TPN, D5 > 50 mL/hr or eating), this is the estimated TDD
  - if insignificant nutrition during the last 6 hours, double the number to determine estimated TDD

**Step 3:** Determine the distribution of the TDD calculated above based on nutrition regimen.

- If pt eating or receiving bolus tube feeds:
  - Check blood glucose qac and qhs
  - Basal insulin: glargine (Lantus) -- 0.5 x TDD, given once daily
  - Nutritional insulin: lispro (Humalog) -- 0.16 x TDD, given with each meal
  - Correction insulin, in addition to nutritional insulin: use CPOE default values (adjust if necessary)

- If pt receiving continuous infusions of tube feeds or parenteral nutrition:
  - Check blood glucose q6h
  - Basal insulin: glargine (Lantus) -- 0.5 x TDD, dosed once a day
  - Nutritional insulin: regular insulin -- 0.125 x TDD, given q6h
  - Correction insulin, in addition to nutritional insulin: use CPOE default values (adjust if necessary)

- If pt NPO (or nearly NPO, taking Zero Carb clear liquids only):
  - Check glucose qac/hs or q6h
  - Basal insulin: glargine (Lantus) -- 0.5 x TDD, dosed once a day
  - Nutritional insulin: none (discontinue previous)
  - Correction insulin: recommend regular insulin scale q 6 hours if pt NPO > 24hrs, otherwise lispro is OK
  - Consider starting low-dose dextrose infusion (D5/NS at 75mL/hr)

**Step 4:** Re-evaluate & adjust the TDD daily based on the glycemic control of the previous 24h:
- If any glucose > 180, and no threat of hypoglycemia, increase TDD by 10-20%
- If glucose consistently > 180-200, increase TDD by 30%
- If any episodes hypoglycemia (FS < 70), decrease TDD by 20% and consider starting D51/2NS at 75cc/hr

**See reverse for special situations & more information about footnoted items**
Prompt to d/c all orals

Glycemic target, prompt for education, diets all CHO limited.

Admonition to avoid sliding scale. Different SQ regimens for different intake. Indication and holding parameters built into each order.
Hypoglycemia protocol
A1c order pre-checked if none in 60 days

RT, PRN starting Today at 2343 Until Specified.
Test blood glucose within 15 to 30 minutes of the initial glucose test showing blood glucose < 70 mg/dL with or without symptoms OR glucose < 80 mg/dL with symptoms (e.g., shakiness, diaphoresis, confusion, irritability). If blood glucose is still below 80 mg/dL after treatment, RE-TREAT and check blood glucose again in 15 to 30 minutes. Continue to check blood glucose every 15 to 30 minutes until the glucose is greater than or equal to 80 mg/dL for TWO consecutive values.

Hypoglycemia Protocol
Link to UCSD Hypoglycemia Protocol

☑ glucose chewable tablet 16 g

16 g (4 tablet), Oral, PRN starting Today at 2343 Until Discontinued, Low Blood Sugar, Per Hypoglycemia Protocol
Hypoglycemia is defined as a glucose less than 70 mg/dL, or a glucose less than 80 mg/dL with the presence of symptoms. Give glucose tab or gel per patient preference to correct hypoglycemia if the patient is conscious and is tolering oral intake.

☑ glucose oral gel 1 Tube

1 Tube, Oral, PRN starting Today at 2343 Until Discontinued, Low Blood Sugar, Per Hypoglycemia Protocol
Hypoglycemia is defined as a glucose less than 70 mg/dL, or a glucose less than 80 mg/dL with the presence of symptoms. Give glucose gel or tab per patient preference to correct hypoglycemia if the patient is conscious and is tolering oral intake.

☐ dextrose 50% solution 12.5 g

12.5 g, IntraVENOUS, PRN starting Today at 2343 Until Discontinued, Low Blood Sugar, Per Hypoglycemia Protocol
Hypoglycemia is defined as a glucose less than 70 mg/dL, or a glucose less than 80 mg/dL with the presence of symptoms. Give IV dextrose to correct hypoglycemia if the patient is unconscious or is not tolerating oral intake, and has a functioning IV line.

☐ glucagon (GLUCAGON) injection 1 mg

1 mg, IntraMUSCULAR, ONCE PRN, 1 dose starting Today at 2343 Until Discontinued, Low Blood Sugar, Per Hypoglycemia Protocol
Hypoglycemia is defined as a glucose less than 70 mg/dL, or a glucose less than 80 mg/dL with the presence of symptoms. Give IM glucagon to correct hypoglycemia if the patient is unconscious or is not tolerating oral intake, and does not have a functioning IV line. When administering glucagon, place the patient on his or her side, as the medication may induce emesis. After glucagon is administered, establish IV access promptly and slowly administer 25 mL of 50% dextrose IV.

LABS
Note: This patient already has a hemoglobin A1c result on file within the past 60 days (see Results Review). Only order another A1c if clinically indicated.

☐ Glycosylated Hgb(A1C), Blood
   Routine, ONCE

CONSULTS

Ancillary Consults
☐ IP Consult to Nutrition -- Select For New Diabetic Patients or Patients with Poor Glycemic Control
☐ IP Consult to Endocrinology - Select for a Diabetes Team Consult

Discharge Prescriptions

Discharge Prescription for Glucometer
Table 1. Expert Panel-Identified High-Priority Insulin Errors, by Phase of Medication-Use Process

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Basal/bolus regimen mimics normal insulin profile

- Normal insulin profile
- Short-acting insulin bolus
- Long-acting insulin basal coverage

Plasma insulin μU/ml

Breakfast  Lunch  Dinner

4 AM  8 AM  Noon  4 PM  8 PM  Midnight  4 AM  8 AM

Magaji V, Johnston J M Clin Diabetes 2011;29:3-9
RELATIONSHIP OF INSULIN ADMINISTRATION TO NUTRITION

- Controlled carbohydrate meal plan standard for patients with diabetes and/or hyperglycemia
- Controlled carbohydrate meal plan provides flexibility in calorie content and food choices (should not restrict calories in acutely ill patients)
- Snacks not necessary with basal insulin and appropriate insulin dosing, but can be provided based on patient need and preference
- Coordination of meal tray, BGM and insulin administration often lacking
- Multiple barriers including trays arriving at varying times, BGM too early before mealtime, trays delivered to room without coordination of either BG or insulin, room service/meals on demand, etc.
- Goal: BGM, meal delivery and insulin administration to occur within a 30 minute time frame
- Clear communication between food tray arrival, person checking BG and RN administering insulin
## Table 1.
Expert Panel-Identified High-Priority Insulin Errors, by Phase of Medication-Use Process

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DAILY ADJUSTMENTS

• Having all necessary data *in one place is KEY*.

• Many EMR’s have *glucose management page* where information can be consolidated.

• Minimize number of places provider must go to to gather information to make informed clinical decision: *BGs & Insulin Usage*. 
Available at the Society of Hospital Medicine Glycemic Control Website

www.hospitalmedicine.org/gc

- Best practice review
- Assess current state
- Metrics and data collection
- High performing teams
- SC insulin orders/protocols
- Insulin infusion protocols
- DKA protocols/order sets
- Perioperative DM management
- Transitions and reliability
- Education programs
- Hypoglycemia reduction bundle
- Coordination of nutrition/insulin
- Insulin pens
- Insulin pumps
- Example order sets and tools
BRING IT HOME

Emily Koebnick, Program Manager, HRET | 11:55 – 12:00
PHYSICIAN LEADER ACTION ITEMS

What are you going to do by next Tuesday?

- Check with physician colleagues and determine their awareness of alternative therapeutic modalities for pain.
- Do walk-arounds and learn how you are *really* managing glucose control.

What are you going to do in the next month?

- Find a physician champion for multimodal pain management.
- Look at your hypoglycemia data. Discover where it is occurring and identify strategies to prevent it.
What are you going to do by next Tuesday?

- Check with pharmacist colleagues and determine their awareness of alternative therapeutic modalities for pain.
- Check with unit-based staff and assess their understanding of insulin and meal coordination.

What are you going to do in the next month?

- Find a pharmacist champion for multimodal pain management.
- Look at automated drug cabinet reports. How often are they dispensing amps of D50? Which units of the hospital are using them?
UNIT-BASED TEAM ACTION ITEMS

What are you going to do by next Tuesday?
- Chat with coworkers to check the level of knowledge and interest in multimodal pain therapies.
- Collect stories of patients who became hypoglycemic under the unit’s care.

What are you going to do in the next month?
- Test how to better coordinate meals and insulin administration.
- Brainstorm how to best communicate to physicians that the glucose is <70 and you think a change in orders is warranted (per the ADA!); consider scripting as part of your tests of change.
HOSPITAL LEADERS ACTION ITEMS

What are you going to do by next Tuesday?

☐ Perform leadership walk-rounds. Learn about the processes used for pain management and glucose control in your facility. Are they standard work?

☐ Talk with physician, pharmacy and nursing leaders and begin to seek for champions for both topics.

What are you going to do in the next month?

☐ Convene a multi-disciplinary task force to begin to address how to initiate or improve access to multimodal pain management.

☐ Make adverse drug event prevention a top organizational priority. Ensure that opioid and hypoglycemic harm outcomes, along with process measures, are reported monthly.
PFE LEADS ACTION ITEMS

What are you going to do by next Tuesday?

- Talk to patients. Assess the level of interest for opioid alternatives for pain management.
- Collect stories of hypoglycemia from patients. Understand how it happened in the hospital. What did it feel like to not be safe there?

What are you going to do in the next month?

- Insist that all opioid and glycemic harm data is shared in a meaningful way with PFE representatives and that their feedback is heard.
- Understand the processes for mitigation of these harms. See the process measure data. Learn how often a nurse calls for new orders when a patient has a glucose >70 and is rebuffed.
THANK YOU!

Find more information on our website: www.hret-hen.org

Questions/Comments: hen@aha.org