Order Sets: Quality Improvement Now While Building a Foundation for CPOE Success

CNIA

November 23, 2009
Outline

- The Current Context: The Need for Order Sets
- Order Sets Improving Patient Care
- The Order Set Challenge
- Order Set Best Practices
- Order Sets and CPOE
- A Collaborative Approach to Order Set Development
<table>
<thead>
<tr>
<th>TIME</th>
<th>PHYSICIAN'S ORDER</th>
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<tbody>
<tr>
<td>0020</td>
<td>Con vit H 1 ml 6600</td>
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<tr>
<td>0125</td>
<td>Sol Nurol 40 IV q6h → 3.504 all day 2.804</td>
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<td>On 3-8-04 Predisone 50 j podal</td>
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<td>Combiant 4 µg 4 tid 1 t 8pigs 9th pm</td>
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<td>Clovent 125 µg 5½ tid</td>
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<td>ABC - troporin CI - CPT</td>
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<td>Tiazac (80 j podal)</td>
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<td>Methenol 5 1 0 4 AM</td>
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Context: Massive Gap Between the Possible and the Actual

- **Quality**
  - Misuse, under use, overuse on a massive scale:
    - Crossing the Quality Chasm 2001

- **Safety**
  - Medical error is common:

- **Variation in Care**
  - Variability in care not explained by patient preferences or different disease patterns:
    - British Medical Journal 2002; 325: 961-964
Context: The Canadian Adverse Events Study

- G. Ross Baker et al, CMAJ May 25 2004 170(11)
  - The adverse event (AE) rate due to health care management in Canadian Hospitals was 7.5%
  - The rate of preventable adverse events was 2.8%
  - The rate of preventable AE’s causing death was 0.66%
  - This would mean between 9,200 and 23,750 preventable deaths/yr in Canada
An Order Set:

- Is a group of orders with a common functional purpose used by the clinician to create orders for an individual patient.
- Integrates knowledge into the care delivery process “knowledge where the clinician needs it most”
  - Most treatments - medications, investigations, etc need to be ordered for patients to receive them
- Organizes clinical knowledge so it is easy to remember, easy to use and has maximum benefit to the patient
  - Contain evidence-based best practices
  - Source of education
- Can be used in paper or computerized ordering systems
## ICU Post Cardiac Arrest with Anoxic Brain Injury Admission Order Set

### Anticoagulation Continued...

**VTE Prophylaxis**

**Pharmacological Prophylaxis**
- If Creatinine less than 150 µmol/L:  □ Enoxaparin 40 mg Subcutaneous once daily
- If Creatinine is 150 µmol/L or greater:  □ Enoxaparin 30 mg Subcutaneous once daily

**OR**

**Mechanical Prophylaxis** (Consider only if high bleeding risk)
- □ GCS: Bilateral Graduated Compression (Antiembolic) Stockings
- □ IPC: Bilateral Intermittent Pneumatic Compression (Sequential Compression Device) with stockinettes
  - If GCS or IPC ordered: use continuously on both legs except during bathing, walking and TID skin care
  - If only Mechanical Prophylaxis ordered reasseess daily for change to Pharmacological Prophylaxis

□ No VTE Prophylaxis Reason: □ Patient on therapeutic anticoagulation

Other: ___________________________

- Reassess VTE Prophylaxis daily if not ordered

### Cardiac Medications

**Antiarrhythmic**
- □ Atropine 1 mg IV x 1 PRN for symptomatic bradycardia less than 40/minute and call MD
- □ Amiodarone 300 mg IV bolus over 15 minutes
  **THEN**
  □ Amiodarone 900 mg in 500 mL IV D5W and infuse at 33 mL/h x 6 hours, then infuse at 16.6 mL/h x 18 hours
  MD to reassess Amiodarone infusion at end of 18th hour

### Clinical Protocols

- Hypoglycemia Management Clinical Protocol
- ICU Potassium Clinical Protocol. Change to Potassium Oral Dosing Clinical Protocol when transferred to the floor
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| **Rewarming:**  • After 12 hours cooling remove ice packs and cooling blanket +/- cooling fan  
  Allow patient to passively re-warm  
  • After 12 hours cooling discontinue Paralytic agent |
| **Blood Pressure Management** |
| • Goal BP is MAP between 60 – 130 mmHg  
  □ Norepinephrine 16 mg/250 mL 0.9% NaCl IV infusion, titrate rate to maintain MAP greater than 60 mmHg PRN  
  □ If MAP greater than 130 mmHg, Nitroglycerin ______ mcg/minute IV infusion, increase to max 200 mcg/minute PRN  
  □ If MAP greater than 130 mmHg, Labetalol 0.5 mg/minute IV infusion, increase to 3 mg/minute PRN |
| **Pain and Nausea Management** |
| • Acetaminophen 650 mg PO/NG/PR q4h PRN (max 4,000 mg in 24 hours)  
  □ morphine 1 – 5 mg IV q10minutes PRN  
  □ morphine 0 - 6 mg/h IV infusion PRN  
  □ dimenhydrinate 25 – 50 mg IV/NG q4h PRN |
| **Sedation** |
| • Use sedation when needed but allow increased level of consciousness as tolerated  
  • Richmond Agitation Sedation Scale (RASS) q4h and PRN or ____________________________  
  • Titrate to Richmond Agitation Sedation Scale (RASS) goal of 0 or ____________________________  
  • Propofol 0.3 – 3 mg/kg/h IV infusion. Adjust rate q10minutes PRN (only use if ventilated)  
  □ Hold sedation analgesia daily at 0600 hrs. If needed restart sedation analgesia at half previous rate  
  □ Lorazepam 1 – 2 mg IV q1h PRN  
  □ Midazolam 1 – 5 mg IV q10minutes PRN  
  □ Midazolam 0 – 6 mg/h IV infusion PRN |
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<tr>
<td></td>
<td>Comm: H/H 6826</td>
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<tr>
<td>0125</td>
<td>SOL/MED: 40 IV q6h → 3.504 all day &amp; 2.504 On 3.504 Predniion 50j pred.</td>
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<td>Combiant: 1000 qd t x 8 wks q6hs</td>
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<td>Clobenent 125 q6hs q6hs</td>
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<td></td>
<td>ABC - troponin CK-CPTs</td>
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<tr>
<td></td>
<td>electrolytes qd 1 STANDARD SC monitoring</td>
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<tr>
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<td>Tiazac (50) qd qd</td>
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<td>Metformin</td>
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Ventilation

**BiPAP is absolutely contraindicated in patients with pneumonia or temp ≥37°C**

If patient is on BiPAP or Intubated:
- Ranitidine 50 mg IV q8h, change to ranitidine 150 mg PO/NG q12 h when tolerating PO clear fluids or NG diet
- Elevate head of bed to 45 degrees at all times except during hypotension
- Ventilation Parameters:
  - pH > 7.25
  - SpO2 > 90%
- Call MD if FiO2 > 0.6, peak pressure > 35, MAP > 25 or Vp > 8 ml/kg dry body weight
- Chlorhexidine 0.12% Solution 20 cc mouthwash swab BID until extubated.
- Salbutamol 4-8 puffs q1h prn
- Combivent 4-8 puffs q4h prn
- Combivent 4 puffs q6h

M.D.  [Signature]  Date: 17/4  Time: 18:34

PATIENT ALLERGIC TO [Redacted]

C/8/Med/ICU/-/MD/11-04/V3/GeneralAdmission
Order Sets Improving Care
VTE: The Preventable Epidemic

- VTE is the formation of blood clots in the legs
- VTE is very common in hospitalized patients
- VTE can cause death or serious disability
- There is excellent treatment to prevent VTE
- Studies have shown that many patients do not get this treatment which can save their lives

“The disconnect between evidence and execution as it relates to VTE prevention amounts to a public health crisis”

- S. GoldHaber, Associate Professor Harvard Medical School, 2003

- General Medical Admission Order Sets Contain a VTE Prophylaxis Module
Data Collection

- **Primary Outcome VTE Prophylaxis Rates**:  
  - Random chart audit from three time periods  
  - October-November 2003  
  - April – December 2004  
  - February – March 2005

- **VTE Prophylaxis Rates in the Department of Medicine**  
  - April 2003 to March 2005

- **Secondary Outcomes: Assess in Second Chart Period**  
  - Multiple quality metrics assessed including standardized protocols, documentation, ordering of lab tests
Impact of Order Set Use on VTE Prophylaxis Orders
Assessment of rate of VTE prophylaxis rates
  - Audit of 8 Regional GTA hospitals from 2005-2007
  - Study Jointly run by Sunnybrook, ISMP Canada, Sanofi-Aventis
    - Bill Geerts, MD
    - Tina Papastavros, BScPharm, PharmD

Trillium Health Centre had double the average rate of VTE prophylaxis for general medical patients compared to other hospitals in the study
Baseline Appropriate Prophylaxis
General Medicine

Group mean: 30% (n=418)
Correlation between prophylaxis use and:
Use of pre-printed orders 0.96
Individual MD ordering - 0.97
Improvement in Many Areas

- Allergies Documented: No Order Set 54%, Order Set 77%
- Code Status Documented: No Order Set 51%, Order Set 58%
- Allied Health Consult: No Order Set 9%, Order Set 21%
- Diet Order: No Order Set 85%, Order Set 87%
- Activity Order: No Order Set 84%, Order Set 92%
- Vitals Ordered: No Order Set 43%, Order Set 50%
- Foley Catheter: No Order Set 20%, Order Set 70%
- Intravenous Ordered: No Order Set 8%, Order Set 54%
- Saline Lact Ordered: No Order Set 4%, Order Set 28%
- Chest Pain with ECG: No Order Set 0%
Standardization of Care

![Bar Chart showing comparison between No Order Set and Order Set for different medical protocols and procedures.](chart.png)
Order Sets Improving Outcomes: Ontario

- Emergency Care of Children with Asthma – All Ontario Emergency Departments 2003-2005  
  Astrid Guttmann et al, Pediatrics December 2007; 120(6)
  - Order Sets and referral to a pediatrician were the only strategies to improve care
  - Order Sets and Pediatricians both reduced return ER visits by over 20%
  - Only 17% of Ontario emergency departments were using order sets!
  - Unlike pediatricians which are expensive and in short supply, Order Sets could be used to care for every child with Asthma in Ontario
Most Organizations are in the Planning Stages or Early Build of Their CPOE Projects

Now is the Ideal Time:
- To standardize order set structure and content, before it is coded into CPOE systems
- For implementing order set lifecycle best practices

How Organizations Meet the Order Set Challenge Will Have a Major Impact On:
- Clinician adoption of CPOE
- Clinical impact of CPOE
The Order Set Challenges

- Content
- Translation of knowledge to order sets is complex
- Standardized modular format
- Correct order set lifecycle practices
- Order set project management
- Canadian organizations working in Isolation
Order Set Best Practices

- **Content**
  - Comprehensive

- **Format**
  - Structured
  - Clinically Intelligent

- **Order set process review and redesign**
  - Streamlined Governance
  - Clinician Ownership

- **Interdisciplinary Development Teams**

- **Interdisciplinary Order Set Committee**

- **Order Set Project Resources**
Like it or Not CPOE is Coming to Your Organization

A CPOE Project is One of the Most Risky and Expensive Projects an Organization will Undertake. Many Projects:
- Fail to achieve clinician adoption
- Fail to achieve expected clinical benefits
- Run over budget
- Are late

Clinicians, Particularly Physicians, are Often Not Positively Inclined Towards CPOE
- Physician adoption and ownership is one of the key project risks
Order Sets and CPOE

- **Order Sets Address Key CPOE Project Risks:**
  - **Clinician Adoption**
    - The content clinicians need to use the system
    - Essential for workflow. Entering individual orders into the system is not feasible. Saves clinicians time
    - Easy to use format designed the way clinicians think
  - **Clinical Impact**
    - Order sets contain the best practices that will lead to improved care
  - **Reduced Build Time and Cost**
    - Standardized order item catalogue
    - Modular content can be reused. Build once, use many times
    - Organize current ordering process
Paper Based Order Sets and CPOE

- Paper Based Order Set Projects are a Critical Precursor for any CPOE project.
- The Organizational Changes Required to Develop an Effective Order Set Project Can Take 2-4 Years:
  - Develop best practice content
  - Standardization of care across departments and organizations
  - Clean up of current ordering process
  - Cultural transformation
  - Clinician engagement and adoption
Pediatric Diabetic Ketoacidosis (DKA) Revisited
New Pediatric DKA Guidelines

- 3 organizations independently reviewing new guidelines, updating Pediatric DKA order sets
- Challenged by lack of resources
- Recognized the limitations of working in silos
- Opportunity to collaborate embraced
Collaborative Goals

- Optimize child safety
- Embed clinical intelligence within the order set
- Work together, maintain the momentum with enthusiasm and commitment
- Share research, knowledge and resources
- Commit to timely communication
- Anticipate the challenges
Anticipate Challenges

- Enlist a supportive physician expert
- Emphasize child safety
- Achieve a consensus based on best practice
- Allow others time to get to those ‘AH HA! moments
Facilitate Adoption

- Include all stakeholders in the process
- Work toward a common goal to develop safe order sets for the child in DKA
- Utilize all resources and expertise
- Set realistic timelines
  - To update supporting tools
  - For education
  - Physician information rounds
Standardization Optimizes Child Safety

- Order sets use approved standardized format
- Imbedded researched best practices
  - Provide guidance to safe practices
- Incorporate medication safety recommendations
  - e.g. from the Institute of Safe Medication Practices (ISMP)
  - Safe Insulin ordering practices (High Alert medication)
  - Safety enhanced/child focused order lines
  - Drug, dose, route frequency
  - Minimize abbreviations
Optimize Safety: Reflect ‘Current’ Phase of Care

- ER Pediatric DKA
- Cerebral Edema in DKA
- Pediatric Admission
- Transition from IV Insulin to Subcutaneous Insulin
- Discharge
Objectives Achieved

- Enhanced ordering practices minimize risk of harm
- **Success!** Collaborative and practical approach to the development of order sets for the child in DKA
  - 3 organizations
  - Shared people, research and knowledge resources
  - 4 ED’s, 1 Urgent Care Centre, 2 Pediatric Units

**Next steps**
- Discharge Order Set
- Quality Indicator tool