



# **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**



ORDERS WITHOUT CLINICAL INFORMATION WILL NOT BE PROCESSED

TIME	PHYSICIAN'S ORDER
00 <sup>20</sup>	CM - [REDACTED] - COPD Consult [REDACTED] "COPD"
7/25	SoluMedrol 40mg IV q 6h → <del>3.804</del> all done 2.804 On 3.804 Prednisone 50mg po daily Combivent 4 puffs qid + Spiriva q 12h Flovent 125 4 puffs bid
C	ABC - tempura - CK - UPT - Chemistries qd - STANDARD SE SUIVINO SE Tiazac 80 po daily Mitomycin / Carboplatin 500 mg IV





## 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:
  - Institute Of Medicine Report on Error 2000

- **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 Effective Solution:

## Order Sets a Clinical Decision Support Tool

- **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





Document allergies on organization approved form

Reference document only  
ADDRESSOGRAPH

<b>ICU Post Cardiac Arrest with Anoxic Brain Injury Admission Order Set</b>	<b>ACTION</b>
<p style="text-align: center;"><b>Anticoagulation Continued...</b></p> <p><b>VTE Prophylaxis</b> <b>Pharmacological Prophylaxis</b> If Creatinine less than 150 µmol/L: <input type="checkbox"/> Enoxaparin 40 mg Subcutaneous once daily If Creatinine is 150 µmol/L or greater: <input type="checkbox"/> Enoxaparin 30 mg Subcutaneous once daily</p> <p style="text-align: center;"><b>OR</b></p> <p><b>Mechanical Prophylaxis</b> (Consider only if high bleeding risk) <input type="checkbox"/> GCS: Bilateral Graduated Compression (Antiembotic) Stockings <input type="checkbox"/> 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 reassess daily for change to Pharmacological Prophylaxis</p> <p><input type="checkbox"/> No VTE Prophylaxis Reason: <input type="checkbox"/> Patient on therapeutic anticoagulation Other: _____</p> <p>• Reassess VTE Prophylaxis daily if not ordered</p>	
<p style="text-align: center;"><b>Cardiac Medications</b></p> <p><b>Antiarrhythmic</b> • Atropine 1 mg IV x 1 PRN for symptomatic bradycardia less than 40/minute and call MD <input type="checkbox"/> Amiodarone 300 mg IV bolus over 15 minutes</p> <p style="text-align: center;"><b>THEN</b></p> <p><input type="checkbox"/> 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 18<sup>th</sup> hour</p>	
<p style="text-align: center;"><b>Clinical Protocols</b></p> <p>• Hypoglycemia Management Clinical Protocol • ICU Potassium Clinical Protocol. Change to Potassium Oral Dosing Clinical Protocol when transferred to the floor</p>	



Document allergies on organization approved form

Reference document only  
ADDRESSOGRAPH

<b>ICU Post Cardiac Arrest with Anoxic Brain Injury Admission Order Set</b>	<b>ACTION</b>
<p style="text-align: center;"><b>Therapeutic Hypothermia: Post Cooling Phase</b></p> <p><b>Rewarming:</b></p> <ul style="list-style-type: none"><li>• After 12 hours cooling remove ice packs and cooling blanket +/- cooling fan Allow patient to passively re-warm</li><li>• After 12 hours cooling discontinue Paralytic agent</li></ul> <p><b>Blood Pressure Management</b></p> <ul style="list-style-type: none"><li>• Goal BP is MAP between 60 – 130 mmHg</li><li><input type="checkbox"/> Norepinephrine 16 mg/250 mL 0.9% NaCl IV infusion, titrate rate to maintain MAP greater than 60 mmHg PRN</li><li><input type="checkbox"/> If MAP greater than 130 mmHg, Nitroglycerin _____ mcg/minute IV infusion, increase to <b>max 200 mcg/minute</b> PRN</li><li><input type="checkbox"/> If MAP greater than 130 mmHg, Labetalol 0.5 mg/minute IV infusion, increase to 3 mg/minute PRN</li></ul> <p><b>Pain and Nausea Management</b></p> <ul style="list-style-type: none"><li>• Acetaminophen 650 mg PO/NG/PR q4h PRN (<b>max 4,000 mg in 24 hours</b>)</li><li><input type="checkbox"/> morphine 1 – 5 mg IV q10minutes PRN</li><li><input type="checkbox"/> morphine 0 - 6 mg/h IV infusion PRN</li><li>• dimenhyDRINATE 25 – 50 mg IV/NG q4h PRN</li></ul> <p><b>Sedation</b></p> <ul style="list-style-type: none"><li>• Use sedation when needed but allow increased level of consciousness as tolerated</li><li>• Richmond Agitation Sedation Scale (RASS) q4h and PRN or _____</li><li>• Titrate to Richmond Agitation Sedation Scale (RASS) goal of 0 or _____</li><li>• Propofol 0.3 – 3 mg/kg/h IV infusion. Adjust rate q10minutes PRN (only use if ventilated)</li><li><input type="checkbox"/> Hold sedation/analgesia daily at 0600 hrs. If needed restart sedation/analgesia at half previous rate</li><li><input type="checkbox"/> LORazepam 1 – 2 mg IV q1h PRN</li><li><input type="checkbox"/> Midazolam 1 – 5 mg IV q10minutes PRN</li><li><input type="checkbox"/> Midazolam 0 – 6 mg/h IV infusion PRN</li></ul>	

ORDERS WITHOUT CLINICAL INFORMATION WILL NOT BE PROCESSED

TIME	PHYSICIAN'S ORDER
00 <sup>20</sup>	CM - [REDACTED] - COPD Consult [REDACTED] "COPD"
7/25	SoluMedrol 40mg IV q 6h → <del>3.804</del> all done 2.804 On 3.804 Prednisone 50mg po daily Combivent 4 puffs qid + Spiriva q 12h Flovent 125 4 puffs bid
C	ABC - tempura - CK - UPT → Chemistries qd - STANDARD SE SUDINO SE Tiazac 80 po daily
	Mitomycin / Carboplatin 500 mg IV q 3w

Hold sedation/analgesia daily at 6am, if needed restart sedation/analgesia at half previous rate

### Ventilation

**\*\*BiPAP is absolutely contraindicated in patients with pneumonia or temp  $\geq 37^{**}$**

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 V<sub>T</sub> > 8ml/kg dry body weight

•Chlorhexidine 0.12% Solution 20cc mouthwash swab BID until extubated.

•Salbutamol 4- 8 puffs q1 h prn

•Combivent 4-8 puffs q4h prn

Combivent 4 puffs q6h

11:00 hrs  
M.D.

MD #

Date:

Time

Pg 3/4

MAN

MAN

KS

MAN

MAN

MAN

11/14/11  
18/4

PATIENT ALLERGIC TO



# 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**

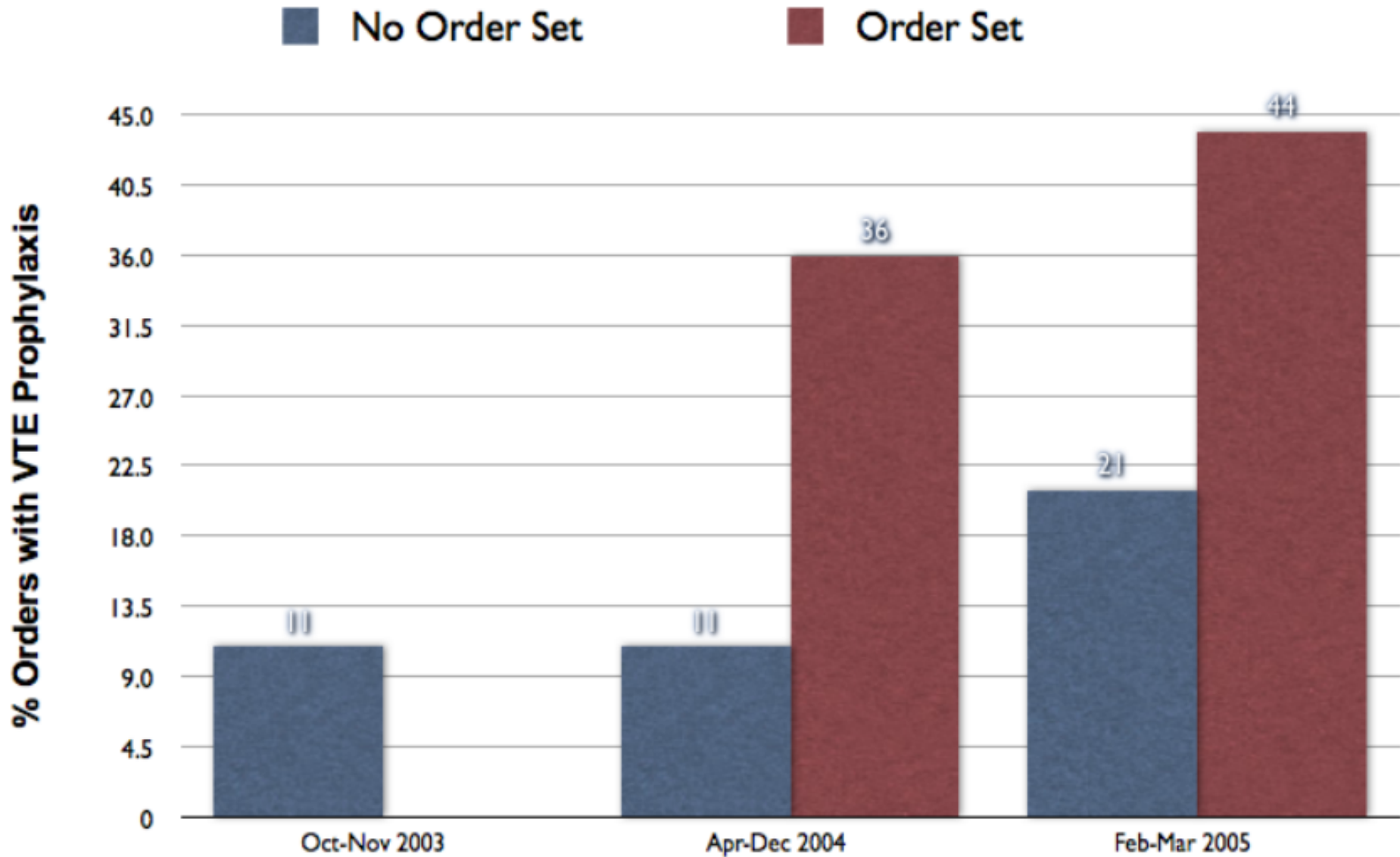


# Data Collection

- **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







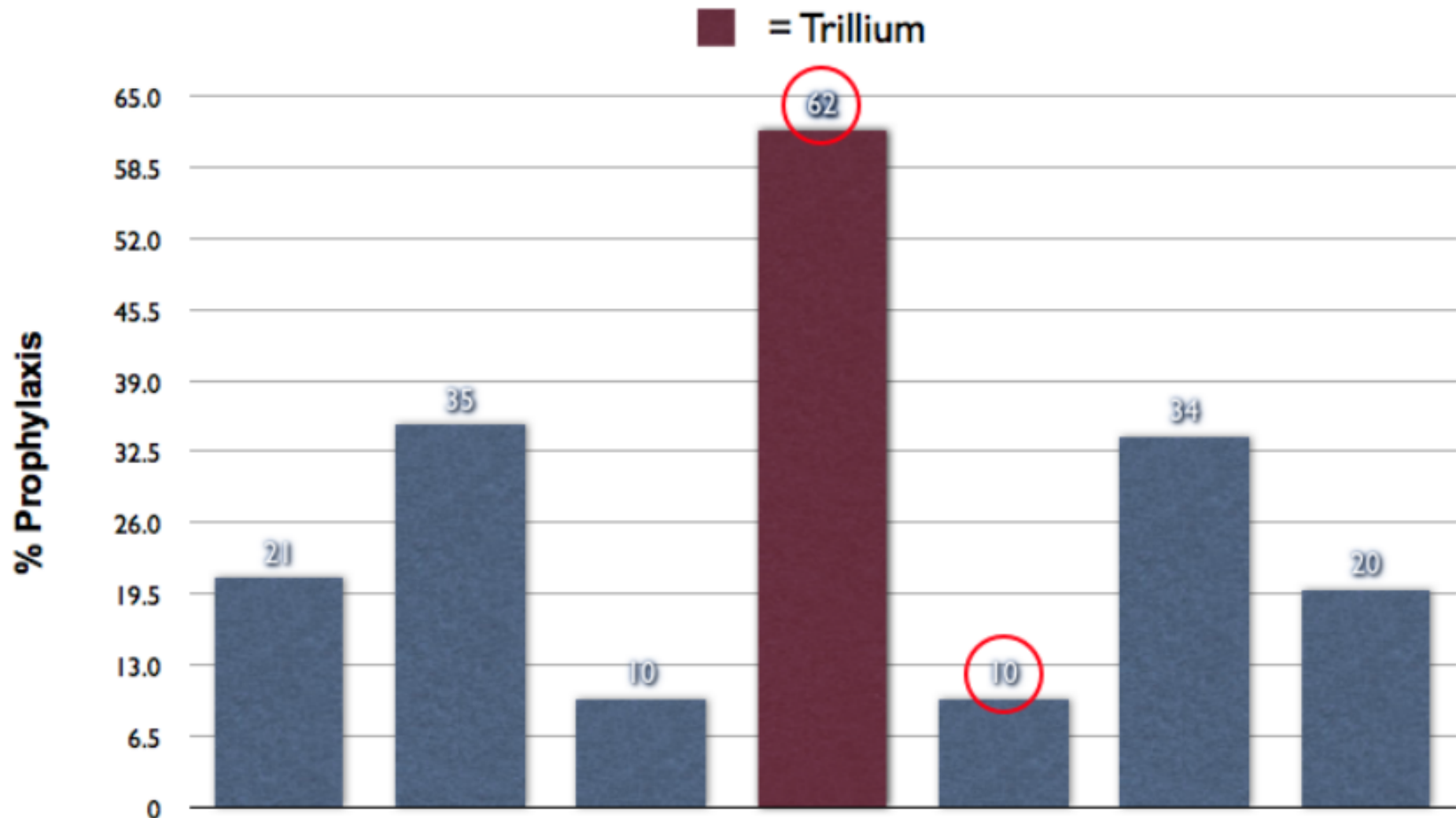
# Toronto Thromboprophylaxis Patient Safety Initiative

- **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)





# Canadian Anticoagulant Survey (2006)

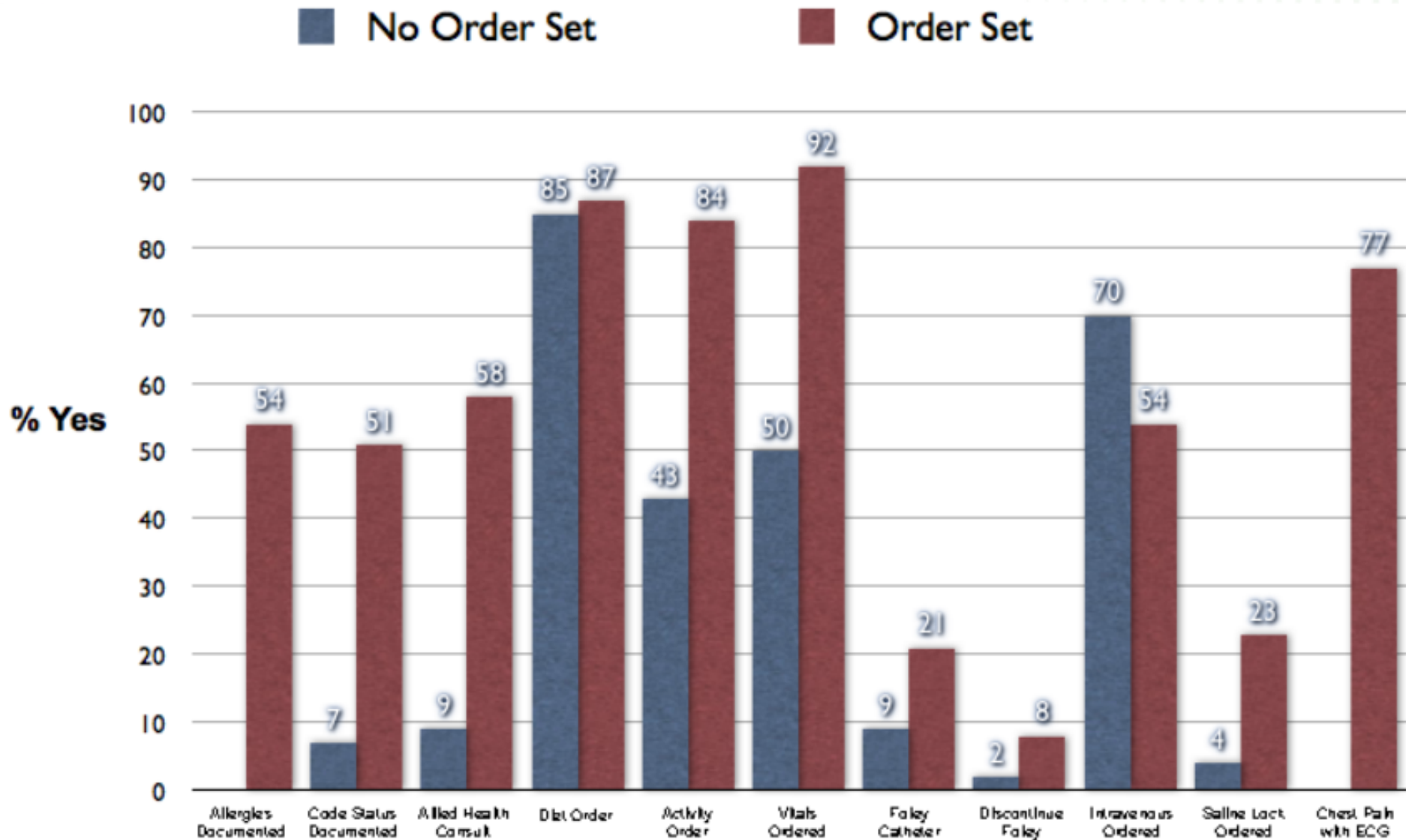
Correlation between prophylaxis use and:

Use of pre-printed orders 0.96

Individual MD ordering - 0.97

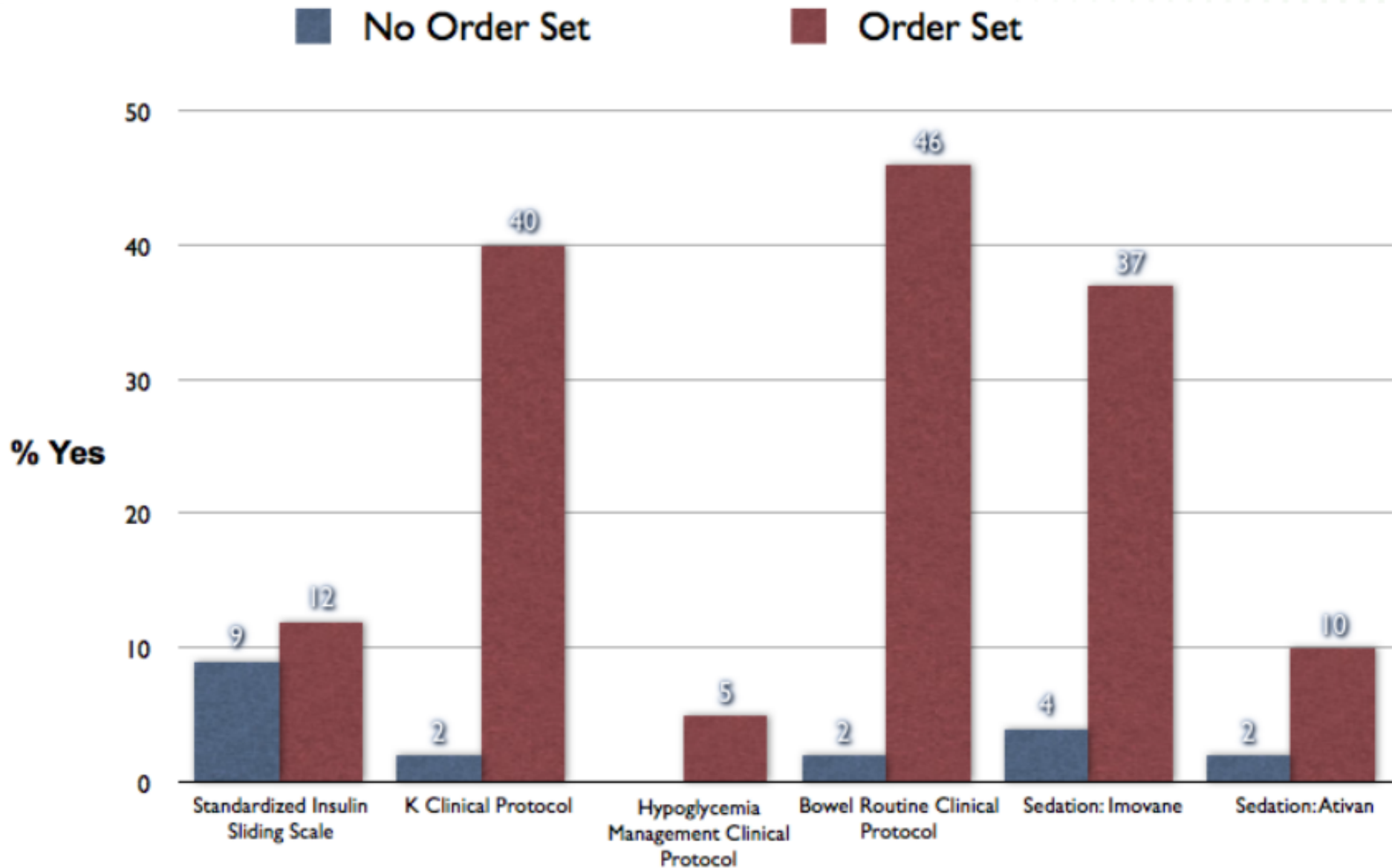


# Improvement in Many Areas





# Standardization of Care





# Order Sets Improving Outcomes: Ontario

- **Emergency Care of Children with Asthma – All Ontario Emergency Departments 2003-2005** Astrid Guttman 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



# Order Sets in Canada: A Critical Time

- **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**



# Order Sets and Computerized Physician Order Entry (CPOE)

- **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



# An Order Set Collaborative

## 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