

PDF in Healthcare A Case Study

Presented by:

Carol Shepherd

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MedStar Health

About MedStar Health:



- **Non-Profit, community based healthcare system**
 - 7 Major hospitals in the Baltimore/Washington region
 - 25 integrated businesses
- **Third largest employer in the region**
 - 22,000 employees
 - 4,700 affiliated physicians
- **Serve more than 500,000 patients a year**
- **Areas of Clinical Excellence**
 - Cardiology and Cardiac Surgery
 - Oncology Services
 - Emergency and Trauma Services

About the Speaker:



- Carol Shepherd
- IT background
 - BS
 - MS
- More years in IT than I care to admit
- MedStar employee for 8 years
- Clinical applications

About the Project:




- Web-based ordersets
- Pilot at one Baltimore hospital
- Now at 3 Baltimore hospitals
- Objectives:
 - Support patient safety
 - Standardize patient care
 - Standardize nomenclature and definitions
 - Develop orderset content for future CPOE
 - Review workflows associated with physician ordering

Good Samaritan Clinical Documents

NURSING UNIT	SPECIALTY	TYPE
ED	Cardiology	Ordersets
ADC	ED CP Guidelines/Pathways	Medications
HCU	Medical	Nursing
2 East	Neurology	Guidelines
2 West	Surgical	Protocols
3 West	Oncology	Progress Notes
4 East	Renal	Procedure Notes
4 West	Rehab	
6 East	Respiratory	
6 West	Stroke	
CCU		
ICU		
PACU		
Future		

Alcohol Withdrawal
AntiCoagulation/Wafarin Reversal
AntiCoagulation Reversal Guidelines
Cardiac Activity Guidelines
Chest Pain
CHF
ED CP Guidelines/Pathways
ED Chest Pain Pathway Diagram
ED Chest Pain Orders
GI Bleed
Heart Care
Heparin
Insulin Sliding Scale
NonSTEMI/Unstable Angina Orders
Non Diagnostic Chest Pain Orders
Fibrinolytic Therapy
Pressure Ulcer
Syncope
Tube Feeding
Medication/Treatment
Nesiritde
HCU Progress Note

Patient <input type="text" value="John Smith"/>		Medical Record No <input type="text" value="123456789"/>	
Good Samaritan Hospital 5601 Loch Raven Blvd. Baltimore, MD 21239 		Patient Information	
Asthma/COPD Exacerbation Admission Order Set			
Date Ordered:	<input type="text" value="08/09/2005"/>	Time Ordered:	<input type="text" value="10:01 am"/>
Admit to: <input type="text"/>		Team: <input type="text"/>	
Attending Physician: <input type="text"/>		Phone: <input type="text"/>	
Resident Physician: <input type="text"/>		Pager: <input type="text"/>	
Intern: <input type="text"/>		Pager: <input type="text"/>	
Primary Diagnosis: <input type="radio"/> Asthma <input type="radio"/> COPD Exacerbation			
Secondary Diagnoses: <input type="text"/>			
Condition: <input type="radio"/> Good <input type="radio"/> Fair <input type="radio"/> Serious <input type="radio"/> Critical			
Resuscitation Status: <input type="radio"/> Full CPR <input type="radio"/> If DNR or Limited Resuscitation: Complete DNR Sheet			
Allergies/Sensitivities: <input type="radio"/> No history of allergies/adverse reactions (food, environmental substances, drugs) <input type="radio"/> History of following allergies/adverse reactions has been noted: Allergy: <input type="text"/> Reaction: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>			
Nursing: <input type="checkbox"/> Vital signs and pulse Oximetry every 4 hours for 24 hours and then per protocol <input type="checkbox"/> Call physician if Oxygen saturation less than 90%, Heart Rate greater than 120 or less than 45 or Respiratory Rate greater than 30, Temperature greater than 100.4°F <input type="checkbox"/> Weigh on admission <input type="checkbox"/> I&O every <input type="text"/> hours <input type="checkbox"/> Other: <input type="text"/>			
Diet: <input type="checkbox"/> NPO <input type="checkbox"/> NPO except meds <input type="checkbox"/> Regular (4 gm Na) <input type="checkbox"/> Cardiac (2 gm Na) <input type="checkbox"/> GI Soft <input type="checkbox"/> Renal (80 gm Pro, 2 gm Na, 30 Meq K) <input type="checkbox"/> Diabetic: <input type="text"/> calories <input type="checkbox"/> Full Liquid <input type="checkbox"/> Clear Liquid <input type="checkbox"/> Consistency: <input type="checkbox"/> Solid: <input type="text"/> <input type="checkbox"/> Liquid: <input type="text"/> <input type="checkbox"/> Other: <input type="text"/>			
Activity: <input type="checkbox"/> Up in chair twice daily <input type="checkbox"/> Bathroom with assistance <input type="checkbox"/> May participate in PT/OT <input type="checkbox"/> Other: <input type="text"/>			
IV Therapy: <input type="checkbox"/> IV to medlock <input type="checkbox"/> PICC <input type="checkbox"/> Portocath <input type="checkbox"/> IV fluids <input type="text"/> mL at <input type="text"/> mL/hour: <input type="radio"/> 0.9% Sodium Chloride <input type="radio"/> 0.45% Sodium Chloride <input type="radio"/> 5% Dextrose in 0.9% Sodium Chloride <input type="radio"/> 5% Dextrose in water <input type="radio"/> Other: <input type="text"/>			

Field names carried over to multiple pages have the same name so the information is entered only once and is repeated on the other pages.


For those who will fill the form in on line, the auto fill button, fills in the current date and time. Completing ordersets on line does take longer than handwriting an orderset. For many physicians the additional time is an arguement for not using them. The counter-arguement is time is saved on the back end because the orderset is legible and reduces follow-up contacts to interpret what was written.

Radio buttons are used where only one option can logically be selected. Free text box are limited to areas where standardizing patient care is not a concern.

The Auto fill button and Reset button are visible on the orderset, but do not print. Recently we have begun barcoding forms for the implmentation of an electronic medical record filing system

Reset



Patient	<input type="text" value="John Smith"/>	Medical Record No	<input type="text" value="123456789"/>
Good Samaritan Hospital 5601 Loch Raven Blvd. Baltimore, MD 21239 		Patient Information	

The name and Medical Record number have carried over from page 1

Asthma/COPD Exacerbation Admission Orderset

Admission Labs/Diagnostic Tests:

<input type="checkbox"/> APTT	<input type="checkbox"/> PT/INR (Prothrombin Time & INR)
<input type="checkbox"/> CBC	<input type="checkbox"/> Urinalysis
<input type="checkbox"/> Basic Metabolic Panel (Chem 7/BMP)	<input type="checkbox"/> Fasting Lipid Panel
<input type="checkbox"/> Comprehensive Metabolic Panel (Chem 12)	
Imaging: <input type="checkbox"/> CXR: P/A & LAT Specify Symptoms: <input type="text"/>	
<input type="checkbox"/> Other <input type="text"/> Specify Symptoms: <input type="text"/>	
<input type="checkbox"/> EKG - 12 Lead Specify Symptoms: <input type="text"/>	
<input type="checkbox"/> Other <input type="text"/> Specify Symptoms: <input type="text"/>	

New functionality in Acrobat 7.0 allows for the optional opening of another orderset in a new window

Treatments/Medications:

Oxygen Therapy:

DVT Medication Prophylaxis:

DVT Mechanical Prophylaxis:

Glucose Management: If blood glucose greater than 140mg/dl then follow accuchecks and determine need for sliding scale of Insulin **Press to open the Insulin Sliding Scale Orderset in a New Window**

Hover boxes are used to provide brief informational messages for clinical guidelines

Antimicrobials: [View Antimicrobial Treatment Guidelines](#)

OR

Levofloxacin: [View Levofloxacin Dosing Guidelines](#)

- For community-acquired pneumonia ceftriaxone with azithromycin IV OR levofloxacin IV is recommended, with conversion to an oral agent once the patient is improving clinically.
 - For aspiration pneumonia add clindamycin or unasyn to either ceftriazone or levofloxacin.
 - For nosocomial/immunocompromised pneumonia use anti-pseudomonal agent(s).
 - For the treatment of bronchitis, consider use of an oral agent such as azithromycin, levofloxacin, Augmentin, or Bactrim.

Inhalational Medications: All inhalational medications are administered by Respiratory Therapy. Enter order in SMS as "Respiratory E"

Inhalational Medications: Nebulization treatments:

Inhalational Medications: Metered-dose inhalers: bronchodilators:

Inhalational Medications: Metered-dose inhalers: corticosteroids:

Systemic Corticosteroids (usual dose of methylprednisolone 1 to 2 mg/kg every 24 hours)

Color text is used to highlight special considerations when ordering

Consults:	Indications:	Called:
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

Referrals:

Nutrition

Speech Language Pathologist-Swallowing Evaluation (failed swallowing screen)

Physical Therapy Evaluation & Treatment (Strength/Gait/Mobility)


Occupational Therapy Evaluation & Treatment (UE Dysfunction/ADLs)

Other

Physician's Signature: _____ Printed Name: Pager:

Nurse's Signature: _____ Date/Time: _____

Faxed Pages 1 & 2 to Pharmacy on _____ at _____ by _____

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Asthma/COPD Exacerbation Admission Orderset

Admission Labs/Diagnostic Tests:

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<input type="checkbox"/> CBC	<input type="checkbox"/> Urinalysis
<input type="checkbox"/> Basic Metabolic Panel (Chem 7/BMP)	<input type="checkbox"/> Fasting Lipid Panel
<input type="checkbox"/> Comprehensive Metabolic Panel (Chem 12)	
Imaging: <input type="checkbox"/> CXR: P/A & LAT	Specify Symptoms: <input type="text"/>
<input type="checkbox"/> Other <input type="text"/>	Specify Symptoms: <input type="text"/>
<input type="checkbox"/> EKG - 12 Lead	Specify Symptoms: <input type="text"/>
<input type="checkbox"/> Other <input type="text"/>	Specify Symptoms: <input type="text"/>

Treatments/Medications:

Oxygen Therapy:

DVT Medication Prophylaxis:

DVT Mechanical Prophylaxis:

Glucose Management: If blood glucose greater than 140mg/dl then follow accuchecks and determine need for sliding scale of Insulin Press to open the Insulin Sliding Scale Orderset in a New Window

Antimicrobials: View Antimicrobial Treatment Guidelines

OR

Levofloxacin: View Levofloxacin Dosing Guidelines

Inhalational Medications: All inhalational medications are administered after patient evaluation and education by Respiratory Therapy. Enter order in SMS as "Respiratory Evaluate and Treat".

Inhalational Medications: Nebulization treatments:

Bronchodilator per protocol

Levalbuterol (Xopenex) 0.63mg solution every 6 hours

Levalbuterol (Xopenex) 1.25mg solution every 8 hours

Levalbuterol (Xopenex) 0.63mg solution and Ipratropium (Atrovent) 0.5mg solution every 6 hours

Levalbuterol (Xopenex) 1.25mg solution and Ipratropium (Atrovent) 0.5mg solution every 8 hours

Co

Albuterol (Proventil,Ventolin) 0.5ml solution and Ipratropium (Atrovent) 0.5mg solution every 4 hours

Albuterol (Proventil,Ventolin) 0.5ml solution and Ipratropium (Atrovent) 0.5mg solution every 6 hours



Albuterol (Proventil,Ventolin) 0.25ml solution and Ipratropium (Atrovent) 0.5mg solution every 4 hours

Albuterol (Proventil,Ventolin) 0.25ml solution and Ipratropium (Atrovent) 0.5mg solution every 6 hours

Referrals:

The ordersets are completed online then printed. They are not being submitted anywhere at this time. Orders are required to be signed by the ordering physician and we do not have electronic signature in place. The orders have to be printed so they can be entered into the Health Information System and placed in the patient's chart.

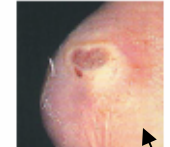
Drop down boxes allow for clarity and accuracy in ordering medications. Generic and brand names of a medication with the proper dosage and frequency selections are included. Also, the complete spelling of the administration of the medication provides compliance with recent JCAHO regulations that prohibit the use of some previously accepted abbreviations and reduces the use of all abbreviations.

Patient <input type="text"/>	Medical Record No <input type="text"/>
Good Samaritan Hospital 5601 Loch Raven Blvd. Baltimore, MD 21239 	Patient Information 

Pressure Ulcer Treatment Orderset

	U/Secy Initials	Date/Time	Nurse Initials	Date/Time
STAGE II WITH DRY TO LIGHT EXUDATE				
<input type="checkbox"/> Ulcer Location(s): <input type="text"/> Cleanse: Wound cleanser Apply Topically: Hydrogel to add moisture IF NEEDED Cover: Hydrocolloid –OR- gauze and secure with thin film (e.g. Tegaderm) Change: Every 3 days Other dressing orders: <input type="text"/>				
STAGE II WITH MODERATE EXUDATE				
<input type="checkbox"/> Ulcer Location(s): <input type="text"/> Cleanse: Wound cleanser Apply Topically: Calcium Alginate/AQUACELL to absorb excess wound fluid Cover: Hydrocolloid or thin film (e.g. Tegaderm) Change: Every 3 days and when wet Other dressing orders: <input type="text"/>				
STAGE III WITH DRY TO LIGHT EXUDATE				
<input type="checkbox"/> Ulcer Location(s): <input type="text"/> Cleanse: Wound cleanser Apply Topically: Hydrogel to add moisture Cover: Gauze and secure with thin film (e.g. Tegaderm) Change: Every other day and when wet Other dressing orders: <input type="text"/>				
STAGE III WITH MODERATE-HEAVY EXUDATE				
<input type="checkbox"/> Ulcer Location(s): <input type="text"/> Cleanse: Wound cleanser Apply Topically: AQUACELL to absorb excess wound fluid Cover: Gauze/foam and secure with thin film (e.g. Tegaderm) Change: Every other day and when wet Other dressing orders: <input type="text"/>				
STAGE IV WITH DRY TO LIGHT EXUDATE				
<input type="checkbox"/> Ulcer Location(s): <input type="text"/> Cleanse: Wound cleanser Apply Topically: Hydrogel to add moisture, fluff gauze to fill in the wound bed (place inside the crater, do not pack) Cover: Gauze and secure with thin film (e.g. Tegaderm) Change: Every day and when wet Other dressing orders: <input type="text"/>				
STAGE IV WITH MODERATE-HEAVY EXUDATE				
<input type="checkbox"/> Ulcer Location(s): <input type="text"/> Cleanse: Wound cleanser Apply Topically: Calcium Alginate/AQUACELL to absorb excess wound fluid (place inside the crater, do not pack) Cover: Gauze/foam secure with thin film (e.g. Tegaderm) Change: Every day and when wet Other dressing orders: <input type="text"/>				
CHEMICAL DEBRIDEMENT AGENTS:				
<input type="radio"/> Collanase (Santyl) Chemical Debridement AND daily dressing changes				

Stage 2 Ulcer



Stage 3 Ulcer



Stage 4 Ulcer



This orderset uses graphics to provide a pictorial guide to the severity level/stage and treatment for bed sores. The color and the graphics are only visible when the orderset is completed on line.

Benefits:



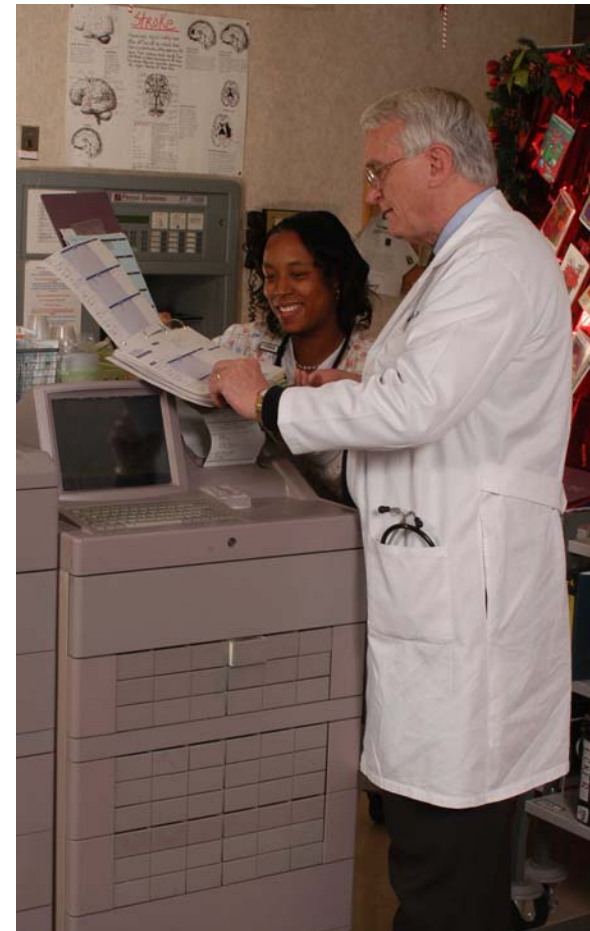
- Reduced time in getting treatment for patient
- Increased use of recommended medications
- Legibility
- Common nomenclature
- Decreased use of unnecessary tests/procedures
- Prompt physician for necessary tests/procedures
- Reduced hospital, CCU/ICU, ED length of stay
- Assurance of evidence based guideline utilization to improve patient outcomes
- Provide continuous quality improvement
- Reduced secondary events – and save lives

Physician's feedback:

“Since using ordersets I have not had any calls from the pharmacy to verify orders or any reported medication errors.

Ordersets ensure that patients receive the quality care they deserve.”

Matthias Goldstein



Nurse's feedback:

“I like the ordersets because they are clear, legible, and they present less room for error.”

Kay Clifton



Unit Clerk's feedback:

“I didn't like them in the beginning, but once I got used to them, I think they're easier because they eliminate handwriting issues and are easier to read.”

Bea Fria



Pharmacist's feedback:

“Orders are clear, easy to read, and accurate. There is no guessing at sound-a-like and look-a-like medications. The complete list of medications which may be needed for a clinical diagnosis is recommended.

Medication orders are not omitted or forgotten.”



Ron Telak

The Future for Ordersets



- Compliance
- Hardware issues
- Orderset revisions
- Requests from customers
 - Import/Export data
 - Electronic signature
 - Intelligence that exceeds Acrobat's capabilities
 - Dynamic forms
- Adobe Live Cycle Designer

Questions?

