

Using Clinical Decision Support to Optimize Your EHR

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HealthEast Care System

MN e-Health Summit: From Vision to Action
June 26, 2008

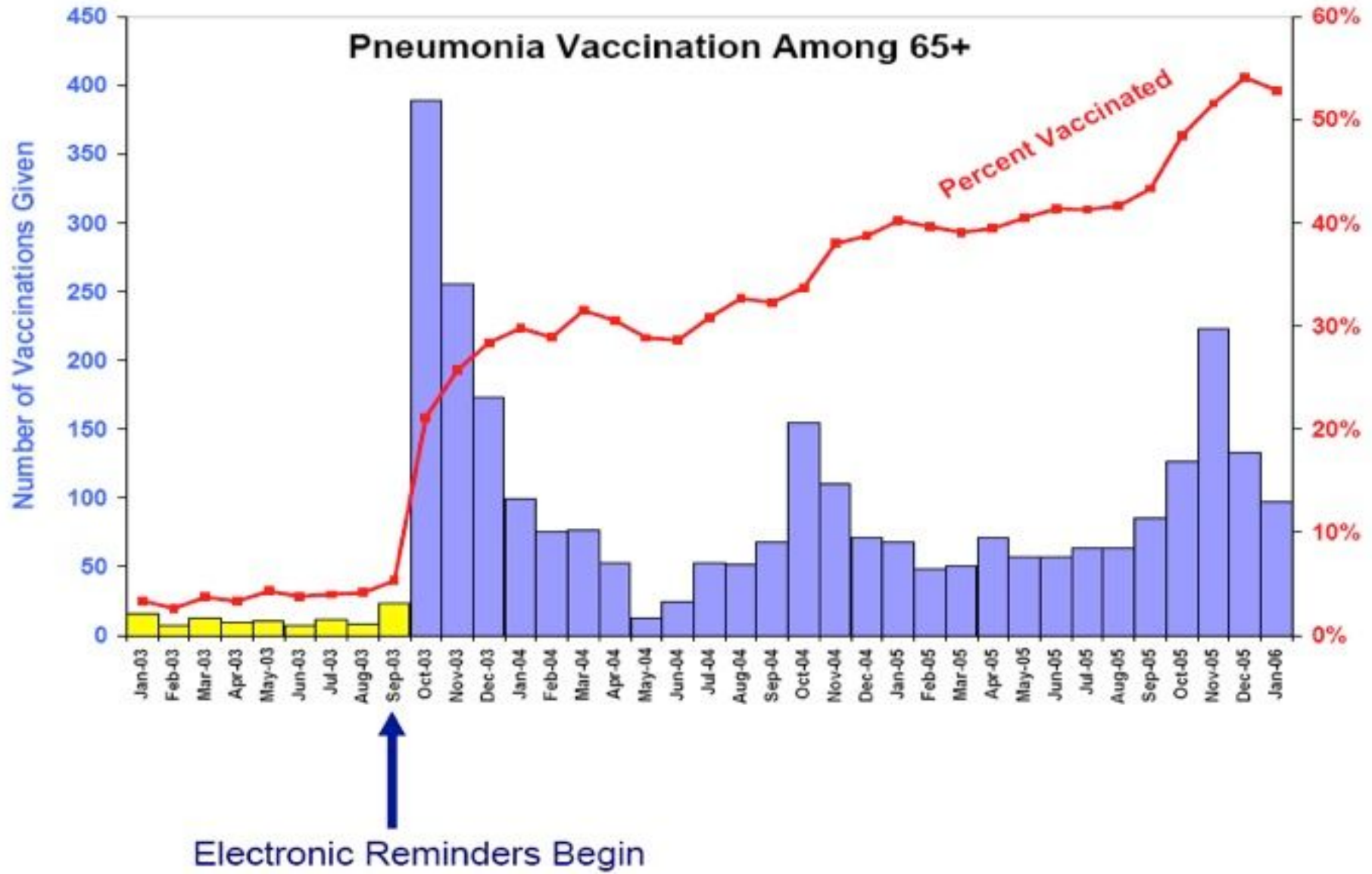
Implementing an EHR

- Basic Steps:
 - User buy-in in choosing the system
 - Road show to help them envision the future
 - Build
 - Components of the system (orders, templates, etc)
 - Integrated testing
 - Usability testing
 - Mock go-live
 - Go-live
 - Lots of support
 - Be prepared for lots of learnings
 - Have a change control process in place

What is Clinical Decision Support?

- A variety of approaches for delivering clinical knowledge, and intelligently filtered patient information, to clinicians and/or patients for the purpose of improving healthcare processes and outcomes*
- Making the right thing to do the easiest thing to do

Clinical Decision Support – Impact on Vaccines



Examples of CDS

- Documentation forms or templates
- Situation-specific flowsheets
- Relevant data presentation
- Referential information
- Order sets
- Alerts and reminders
- Protocols and Pathways

Templated Documentation

- Help to prompt complete documentation for quality measures and compliance.
- Guide the care provider in asking the right questions.
- Allow for capture of discreet data elements which can be used in other places.

Logged in User: PAUL KLEEBERG |true|HEDADMT|

File Review Report Flowcharts Orders Utilities Resources Help

Patient: **TESTER, DR. PAUL** ! Allergy Refresh MONITOR

Age: 55 yr Gender: M Attending: SACCOMAN, Fac - Dept: Woodwinds - DOB: 05/23/1953 Acct: 0180931
 Diagnosis: (A) TESTING REPEATER Service: MED Rm-Bed: W220-P Admit Dt: 04/30/2... MRN: 018093...

Vitals IO Pain/Healing Arts ICU Graphics IV Admin IV Lines/Pumps Inspect Wnd BRADEN MorseSafety/Restmts
 Events/Falls Reported Protocols Blood Products Death Beds Postpartum Newborn Care Alerts Lab Results
 Radiology Results Dictation Education M/S Post-Op MEDS FJowsheet
 Dyach Family Admission Beds Admission Problems Hx Chart Allergy Med Hx Pam Review Qbcv/ProcedureTrans/DC

Show All + Expand All - Collapse All Add Selection 06/23/2008

Admission Data More Results 07:42

Medical History	Admission Data	← Add Show All	
Medications	Admit Date/Time		mm/dd/yyyy hh:mm
Verbal/Sensory	Bands		
Nutrition	ID Band		
Elimination	Allergy Band		
Psych/Soc/Spirit	Oriented to		
Activ Daily Liv	Medical History	← Add Show All	
Assistive Devices	Reason/Admit		
Belongings	Pt perception		
Complementary	Anesthesia hx		
	Flu vaccine		
	Date		year
	Pneumococcal		
	Date		year
	Recent Exposure		
	Recent Diagnosis		
	Other		
	TB Screening		
	Lst menstr period		mm/dd/yyyy
	Pregnancy poss		
	Post Menopausal		
	Medications	← Add Show All	
	Disposition/meds		
	Takes meds		
	Verbal/Sensory	← Add Show All	

Save Cancel



Relevant Data Presentation

- Relevant lab, age or weight display when ordering a medication or scheduling a test or procedure
- Suggested medication choice list
- Bed availability and tracking
- Targeted patient lists (based on disease, abnormal labs or the like)

Dictate Addendum Ready 0/0s Record Play Cancel Done

Clinician Break Link Hide VTB Tools Help Lock Logoff

Chart Snapshot ChartViewer Problems Meds New Rx Immun HMP Results Vitals Flow sheets Note

Patient **TEST, HOLLY** MRN: 103538 DOB: 02/02/1950 Allergies: Yes PCP: Brombach, William Security: No Restricted Data
 Schedule Sex: F AKA: HOLLY Directives: ONFILE Pri Ins: BLUE CROSS (IN STATE)
 TW Tasks Age: 58 Years H Phone: (554)345-2345 FYI: **RY** Note: **Select**

Health Management Plan

Problems Active All

- Atrial Fibrillation 427.31
- Benign Essential Hypertension 401...
- Type II Diabetes Mellitus With Co...

Health Management Plan Items
 To add an item select only one problem

New Problem Details... Resolve Assess New Item... Add to Patient HMP

HMP Active All

HMP Item	Frequency	Last Done	Due Date	Status	Problem
BMI	1 year	13 Nov 2007	13 Nov 2008	Active	HEALTH MAINTENAN...
Colonoscopy	10 years	07 Apr 2006	07 Apr 2016	Active	HEALTH MAINTENAN...
⚠ Diabetes Follow-up	6 months	07 Jan 2008	07 Jul 2008	Near Due	Type II Diabetes...
⚠ Eye Exam	1 year	07 Aug 2007	07 Aug 2008	Near Due	Type II Diabetes...
Healthcare Directi...	5 years	13 Apr 2005	13 Apr 2010	Active	HEALTH MAINTENAN...
⚠ Hemoglobin A1C	6 months	07 Jan 2008	07 Jul 2008	Near Due	Type II Diabetes...
⚠ Lipid Profile	1 year	16 Apr 2007	16 Apr 2008	Overdue	Type II Diabetes...
⚠ Mammogram	1 year	30 Apr 2007	30 Apr 2008	Overdue	HEALTH MAINTENAN...
Microalbumin, urin...	1 year	05 Sep 2007	05 Sep 2008	Active	Type II Diabetes...
⚠ Pap Smear	1 year	16 Apr 2007	16 Apr 2008	Overdue	HEALTH MAINTENAN...
⚠ Prothrombin Time (...)	4 weeks	05 May 2008	02 Jun 2008	Overdue	Atrial Fibrillat...

Post Text to Current Note

HMP Details... Dgne D/C Completed New Task... Cite View Cite Selected Print

Save Cancel Entry

HealthEast Care System ALLSCRIPTS

User: Clinician Site: HealthEast Enc Date: 18 Jun 2008 02:19 PM Enc Type: AUDIT Done Trusted sites

Microsoft Internet Explorer window: Allscripts - Microsoft Internet Explorer

Address: http://m0c1ptm.healtheast-inc.com/ehweb/

Script Message -- Web Page Dialog

Pharmacy: SureScripts Test Pharmacy 1 Phone: (555) 555-5555

Patient Info in Request: Patient Info in TouchWorks

Name: WILLIAMS, FULLER Name: WILLIAMS, FULLER
 DOB: 8 Sep 1942 DOB: 08 Sep 1942
 Address: 123 PAYNE AVE Address: 123 PAYNE AVE
 ST PAUL MN 55104 ST PAUL MN 55104
 MRN: 104072

Rx Info from Pharmacy:

Drug: PLAVIX 75 MG TABLET Qty: 30 Days Supply: 30 Refills: 0
 Written: 27 Aug 2005 By: Carter Clinician
 SIG: TAKE 1 TABLET ORALLY VERY DAY RX Id: 63653117106
 Last Fill: 08/27/2005

Drug Name in TouchWorks: Plavix 75 MG Tablet

Considerations and Disclosures: No Considerations and Disclosures [Full text]

Rx Info in Response:

Drug: PLAVIX 75 MG TABLET
 Days Supply: 30 Qty: 30 Refills: 0
 SIG: TAKE 1 TABLET ORALLY VERY DAY
 Rx By: Clinician, Carter [All]

Message to Pharmacy: [Text Area]

Post Text to Current Note

Buttons: Grant, Refuse, Cancel

Active Medications:

- Actos 15 MG Tablet
- Allopurinol 100 MG Tab
- Amoxicillin 500 MG Cap
- Aspirin 81 MG Tablet
- Carvedilol 12.5 MG Tab
- Saw Palmetto 1000 MG

Active Allergies:

- Penicillins
- Animal dander - Cat

MRN List:

- 103835
- 103835
- 104074
- 104074
- 104074
- 104072
- 104072
- 104093
- 104091
- 104091

HealthEast Care System logo and ALLSCRIPTS logo are visible in the bottom left corner.

User: Clinician Site: HealthEast Enc Date: 20 Jun 2008 03:57 PM Enc Type: AUDIT

Task buttons: Go To..., In Progress, Done, New..., Reply..., Reassign..., Remove..., Copy To Note, Undelegate, Details..., Original..., Print List..., Print Task...

System tray: start, Inbox - Microsoft Out..., Another 2 Slides - Me..., Allscripts - Microsoft I..., 3:57 PM

ADC VAAN DISML display

Admission »

• weight: 88.00kg/194.0lb; »Jun 19 12:08...

Diagnosis »

Condition »

Vital signs »

• vital signs q4hrs if stable, more frequently if condition warrants
»Jun 11 13:18...

Activity/limitations »

Allergies »

• allergy: penicillins mild lives severe »Jun 11 13:14...

Nursing instructions »

Diet »

Medications

IV fluids »

TPN orders

Laboratory tests »

=One time labs

vancomycin level (van) x1 times contact pharmacy to set up the recommended drawing schedule last dose mndddy hhmm or unknown unknown »Jun 19 12:20

Dose:

[HEORx](#)

\$0.00

Literature

[Internet](#)

- a 500 MG
- b 750 MG
- c 1000 MG
- d 250 MG
- e =W*15 MG

or enter another value (in MG)

print <F1>

display <F2>

D/C <F3>

renew

reorder

outlines <F4>

Open <F5>

help <F6>

complain <F7>

done <F8>

Situation Specific Flowsheets

- Allow for a single view of a patient relevant to the condition
- Eliminates the need to search for the information
- Increases the likelihood that important information will be seen
- Decreases the likelihood that interventions will go unordered

Allscripts - Microsoft Internet Explorer

Address: http://m0clntrn.healtheast.loc/ahsweb/

Links: Customize Links, Free Hotmail, Windows, Windows Marketplace, Windows Media

Dictate: Addendum, Ready, Record, Cancel, Done

Clinician: Break Link, Hide YTB, Tools, Help, Lock, Logoff

Chart: Snapshot, ChartViewer, Problems, Meds, New Rx, Immun, HPI, Results, Vitals, Flowsheets, Note

Patient: **TEST, DIANE**
 MRN: 8000099, DOB: 01/16/1950, Allergies: NKA, PCP: Abrahamson, April, Security: No Restricted Data
 Sex: F, AKA: DIANE, Directives: FTY, Pri Ins: BLUE PLUS -NON HMO, Note: [select]
 Age: 58 Years, H Phone: (651)210-7486

Flowsheet Show Blank Rows

Name: DM/CAD Flowsh Time Range: All Sort: Rev Chrono Columns: Encounter

	31 Aug 2007 AUDIT	31 Aug 2007 ResultChrg	31 Aug 2007 AUDIT	11 Jun 2007 Oth	09 Jun 2007 AUDIT	11 Apr 2007 AUDIT
<input type="checkbox"/> Systolic	112 mm Hg			120 mm Hg	120 mm Hg	120 mm Hg
<input type="checkbox"/> Diastolic	68 mm Hg			78 mm Hg	60 mm Hg	80 mm Hg
<input type="checkbox"/> Tobacco Use	1 ppd	1 ppd				Negative
<input type="checkbox"/> Taking Aspirin	Positive	Positive				
<input type="checkbox"/> Direct LDL			102			
<input type="checkbox"/> Glycosylated Hemoglobin A1...			6.9			

HealthEast Care System
ALLSCRIPTS
User: Clinician Site: HealthEast

Done Trusted sites 4:02 PM

HorizonWP Physician Portal - Mozilla Firefox

http://in01vseal1.healtheast.loc:81/pezo/portal/site/peo/index.jsp

Paul Kleeberg 11 June 18, 2008 **my portal** **help** **logout** Site Controls: <Select>

Census Facesheet Results **Clinical Flowsheet** DocView Orders MEDS PAM Medical Records (HPF) Deficiency Completion MY LINKS

Patient: [] Encounter: 6/12/08; WICU

CM Flowsheet last refresh: 10:15

Report: Lab Results Time Interval: 8 Hours

Encounter: Dates: 06/12/2008 -> Present Diag: CELLULITIS

Start On: 06/18/2008 Go Back: 7 Days Significant Only Refresh

Hotlinks: Lab Results Dictation CLINICAL BHS

06/15/08-06/18/08

	06/15/08 07:01-15:00	15:01-23:00	06/16/08 23:01-07:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00
BASIC METABOLIC PROFILE Back to Top								
Sodium			133 L	132 L	127 L			129 L
Potassium			4.1	4.6	5.3 H			4.8
CO2, Total			20 L	18 L	19 L			19 L
Chloride			97 L	97 L	94 L			97 L
Anion Gap, Calculated			15		24			13
BUN			44 H	48 H	52 H			58 H
Creatinine			2.8 H	3.3 H	3.4 H			3.4 H
Glucose			151 H	184 H	178 H			168 H
Calcium			9.2 L	7.9 L	7.9 L			7.8 L
GFR, Estimated			17 L	15 L	16 L			14 L
GFR, Estimated if Black			21 L	18 L	17 L			17 L
BLOOD GASES, ARTERIAL Back to Top	06/15/08 07:01-15:00	15:01-23:00	06/16/08 23:01-07:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00
pH, Arterial						7.42		
PCO2, Arterial						33 L		
PO2, Arterial						77		
Bicarbonate, Arterial Calc						23.0 L		
Base Excess, Arterial Calc						-3.0		
Calculated O2 Saturation						98.0		
Oxygen Administration						2.0		
Ventilation Mode						NC		
Date Drawn						06/17/08		
Time Drawn						1340		
C-REACTIVE PROTEIN Back to Top	06/15/08 07:01-15:00	15:01-23:00	06/16/08 23:01-07:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00
C-Reactive Protein								
CLOSTRIDIUM DIFFICILE TOXIN Back to Top	06/15/08 07:01-15:00	15:01-23:00	06/16/08 23:01-07:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00
C. difficile Toxin		Toxin detect						
CULTURE, BLOOD Back to Top	06/15/08 07:01-15:00	15:01-23:00	06/16/08 23:01-07:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00
Culture, Blood								
D-DIMER Back to Top	06/15/08 07:01-15:00	15:01-23:00	06/16/08 23:01-07:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00
d-Dimer Assay	4.75 H							
ERYTHROCYTE SED RATE Back to Top	06/15/08 07:01-15:00	15:01-23:00	06/16/08 23:01-07:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00
ESR								

Done

HorizonWP Physician Portal - Mozilla Firefox

http://invoisee1.healtheast.loc:81/pezoportal/site/pep/index.jsp

Paul Kleeberg 11 June 18, 2008 **my portal** **help** **logout** Site Controls: <Select>

Census Facesheet Results **← Clinical Flowsheet** DocView Orders MEDS PAM Medical Records (HPI) Deficiency Completion MY LINKS

Patient: [] Encounter: **6/12/08; WICU**

06/16/08-06/18/08

Temp F

Temp F	06/16/08 23:01-07:00	07:01-15:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00	07:01-15:00
103.5								
102.5								
101.5								
100.5								
99.5								
98.5								
97.5								

■ TEMP #1

Vital Signs

Vital Signs	06/16/08 23:01-07:00	07:01-15:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00	07:01-15:00
TEMP #1	97.8F Oral	97.7F Oral	97.7F Oral	97.6F Oral	97.6F Ax	97.3F		95.5F Ax
Temp equip	Yes Probe	Yes Therm	Yes Probe	Yes Probe	Yes Therm			
PULSE #1	110 Brachl	101	114	99 Brachl	86	92	87	96
Pulse equip	Yes NonIntr	Yes NonIntr	Yes NonIntr	Yes NonIntr	Yes NonIntr			
RESPIRATIONS	20 Visual	18 Visual	18 Visual	18 Visual	26	19	18	22
O2 saturation	93% Rarest	94% Rarest	96% O2rest	94% O2rest	95%	97%	98%	97%
Oxygen L			3L/min Nc	3L/min Nc	2L/min Nc	2L/min Nc		
BP #1	97/60 Larmly	113/68	108/85 Larml...	110/68 Larml...	101/48	102/50	115/54	116/62
BP #1 MEAN					74	69	78	80
BP Equip		Yes Nibp	Yes Nibp	Yes Nibp	Yes Nibp	Yes Nibp	Yes Nibp	
BLOOD GLUCOSE					173mg/dL	113mg/dL	150mg/dL	
WEIGHT					81.2kg			
HEIGHT/LENGTH					6	10	6	
BGA								
CVP								

Event Summary

Event Summary	06/16/08 23:01-07:00	07:01-15:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00	07:01-15:00
Event Note 1								

ALL MEDS

ALL MEDS	06/16/08 23:01-07:00	07:01-15:00	15:01-23:00	06/17/08 23:01-07:00	07:01-15:00	15:01-23:00	06/18/08 23:01-07:00	07:01-15:00
ALBUMIN 5%								
SUMEX							3 MG IV	
FLUCONAZOLE 5% N			100 MG IV		50 MG IV			
FUROSEMIDE		Not Given-Pe...						
HEPARIN SODIUM L	250 UNIT IV			250 UNIT IV				
HYDROXYUREA						500 MG		500 MG
INSULIN REG HUMA					(4 UNIT SUBC...		4 UNIT SUBCU...	
K-CHLORIDE		Not Given-Pe...						
METRONIDAZOLE 1% N		500 MG IV	500 MG IV		500 MG IV	500 MG IV		500 MG IV
ONDANSETRON	4 MG IV		4 MG IV	8 MG IV	8 MG IV			
PANTOPRAZOLE SOD		40 MG						
PHYTONADIONE								
SPERACILLIN-TAZ					5 MG			
POTASSIUM CL	3.375 G IV					5 MG		
BROCHLORPERAZINE								

Referential Materials

- Links from EHR to articles, protocols, drug monographs, dosing calculators, flowsheets, tables and the like.
- Information pertinent to the task at hand is made available on or two clicks away

ADC VAAN DISML display**Admission**

- o admit status xl times inpatient ; start on 6/16 at 1332

Diagnosis »

- o diagnosis acute coronary syndome ; start on 6/16 at 1332

Condition »

- o condition fair ; start on 6/16 at 1332

Vital signs »

- o vital signs q4hrs if stable, more frequently if condition warrants ; start on 6/16 at 1331

Activity/limitations

- o activity: per pathway ; start on 6/17 at 0900

Allergies »**Nursing instructions »**

- o cardiac monitoring : document cardiac rhythm q4hrs and with any changes or ectopy ; start on 6/16 at 1331
- o catheter insertion - urinary foley prn urinary retention or incontinence ; start on 6/16 at 1331
- o intake and output ; start on 6/16 at 1500
- o measure weight on admission and daily thereafter ; start on 6/17 at 0900
- o notify: cardiac rehab for recurrent chest pain management ; start on 6/16 at 1500
- o notify: rd that patient is on cad orders; rd to assess mi/cad pt for diet education needs ; start on 6/16 at 1331
- o nursing: initiate potassium replacement protocol po1006 ; start on 6/16 at 1500
- o smoking cessation counseling & education if hx of use within last

Dose:

- a 30 MG
- b 40 MG
- c 60 MG
- d 80 MG
- e 100 MG
- f 120 MG
- g 150 MG
- h =W*1 MG

[HEORx](#)

S0.00

[Literature](#)[Internet](#)

print <F1>

display <F2>

D/C <F3>

renew

coign

outlines <F4>

Oeps <F5>

help <F6>

complain <F7>

done <F8>

Monograph Enoxaparin Sodium

Class: ANTICOAGULANTS (20:12.04)

Introduction

Enoxaparin, a low molecular weight heparin prepared by alkaline degradation of unfractionated benzylated heparin of porcine intestinal mucosa origin, is an anticoagulant.

Uses

Enoxaparin is used for the prevention of postoperative deep-vein thrombosis and associated pulmonary embolism in patients undergoing hip- or knee-replacement surgery, patients undergoing general (e.g., abdominal, gynecologic, urologic) surgery, and in patients with acute medical conditions and severely restricted mobility who are at risk for thromboembolic complications. Enoxaparin is used concurrently with an oral anticoagulant (e.g., warfarin) in hospitalized patients for the treatment and secondary prevention of deep-vein thrombosis with or without pulmonary embolism and in selected outpatients for the treatment of acute deep-vein thrombosis *without* accompanying pulmonary embolism. Enoxaparin also is used concurrently with aspirin and/or other therapy (e.g., nitrates, β -adrenergic blockers, clopidogrel, platelet glycoprotein [GP] IIb/IIIa-receptor inhibitors) for the prevention of ischemic events associated with unstable angina or non-ST-segment elevation/non-Q-wave myocardial infarction (i.e., non-ST-segment elevation acute coronary syndromes).

The use of a low molecular weight heparin such as enoxaparin also is recommended by the American College of Chest Physicians (ACCP) for prevention of thromboembolism in patients with medical conditions associated with a high risk of thromboembolism (e.g., cancer, bedrest, heart failure, severe lung disease); in selected patients with major trauma[†], including acute spinal cord injury[†]; in those undergoing intracranial neurosurgical procedures[†]; and in patients with acute ischemic stroke[†]. Therapy with a low molecular weight heparin also has been recommended for prevention or treatment of thromboembolism occurring during pregnancy and for prevention of embolism in selected patients with atrial fibrillation or flutter[†] who require prolonged (exceeding 1 week) interruption of oral anticoagulant therapy for diagnostic or surgical procedures or during shorter periods of interrupted therapy in high-risk patients (e.g., those with mechanical prosthetic heart valves[†]). Although a causal relationship has not been established and the number of patients involved appears to be small, cases of valve thrombosis resulting in death (including maternal and fetal deaths) and/or requiring surgical intervention have been reported with enoxaparin prophylaxis in patients (including pregnant women) with prosthetic heart valves; insufficient data, underlying conditions, and the possibility of inadequate

[Back](#)[Home](#)[Print](#)[Close](#)

Order Sets

- Physician orders grouped based on disease, procedure, problem type or function
- Can be used in paper or electronic system
- Can be built based on best practice, convenience, common practice or a combination
- Allow you to guide your users to best practice
- Can migrate users to a standard of care
- Successful adoption requires user buy in.
- Can convert currently existing order sets or buy from a content vendor

ADC VAAN DISML displayAdmissionDiagnosis »Condition »Vital signs »Activity/limitationsAllergies »

allergy: penicillins hives moderate »Jun 18 10:30...

Nursing instructions »Diet »MedicationsIV fluids »TPN ordersLaboratory tests »Radiographic studies »Miscellaneous orders »

AUTOMATIC ORDERS

1. diagnosis: chronic obstructive pulmonary disease
 - + vital signs per hensa policy v-1
 - + intake and output - measure
 - + measure weight
 - + pain assessment per unit protocol
 - + smoking cessation counseling if applicable
 - + respiratory therapy assessment to evaluate and initiate copd education
 - + oxygen - resp therapy to titrate fio2 to maintain o2 sat of 92% unless otherwise stated
 - + ondansetron inj [zofran] 4 mg iv q4h pm
 - + prochlorperazine inj [compazine] 10 mg iv q6h pm nausea and vomiting (if ondansetron ineffective)
 - + prochlorperazine [compazine] 10 mg oral q6h pm nausea and vomiting (if ondansetron ineffective or no iv site)
 - + acetaminophen [tylenol] 650 q4h pm for temp greater than 101f
 - + albuterol-ipratropium 0.5 mg-2.5 mg/3 ml inhli soln [duoneb] 0.5 ml via nebulizer q4h

Select an item from the list

HEORx

\$0.00

or enter another order

or press [END](#) to return to the previous list

Literature

[Internet](#)

COPD

print <F1>

display <F2>

D/C <F3>

reset

coign

outline <F4>

Oops <F5>

help <F6>

complain <F7>

done <F8>

ADC VAAN DISML display

Admission

Diagnosis »

- o diagnosis chronic obstructive pulmonary disease ; start on 6/18 at 1123

Condition »

Vital signs »

- o vital signs per hensa policy v-1 ; start on 6/18 at 1500

Activity/limitations

Allergies »

allergy: penicillins hives moderate »Jun 18 10:30...

Nursing instructions »

- o culture and gram stain - sputum (spu) (nurse collect) ; start on 6/18 at 1123
- o intake and output q shift - measure ; start on 6/18 at 1500
- o measure weight daily ; start on 6/19 at 0900
- o nursing: initiate pneumococcal vaccine orders po1162 ; start on 6/18 at 1123
- o pain assessment q shift per unit protocol ; start on 6/18 at 1500
- o smoking cessation counseling if applicable ; start on 6/18 at 1123
- o urinalysis (ua) (nurse collect) ; start on 6/18 at 1123

Diet »

Medications

=Scheduled medications

- o albuterol 0.5 mg-ipratropium 2.5 mg/3 ml inhl soln [duoneb] 0.5 ml inhl q4h-rt ; start on 6/18 at 1123

AUTOMATIC ORDERS

- 2. dvt prophylaxis po1190 >

FOR PATIENT ON STEROIDS and NOT DIABETIC

- 3. bedside blood glucose monitoring 2x/day for patients on steroids and not diabetic

+ if any blood glucose is greater than 150 mg/dl, start 4x/day fingersticks and notify md

FOR PATIENT ON STEROIDS AND DIABETIC

- 4. nursing: refer to paper version of diabetes med mgmt orders po1657
- 5. -- pdf of diabetes med mgmt orders po1657 for completion by ordering provider

ADMISSION

- 6. admit status - to icu
- 7. admit status - to med surg
- 8. admit status - to telemetry

Select an item from the list

HEORx

\$0.00

or enter another order

or press [END](#) to return to the previous list

[Literature](#)

[Internet](#)

print <F1>

display <F2>

D/C <F3>

reset

coign

outlines <F4>

Oops <F5>

help <F6>

complain <F7>

done <F8>

Alerts and Reminders

- Automated “pop-ups” to alert care giver to a problem (i.e. drug allergy or interaction) or new data (i.e. lab result) or passage of time without a specified event occurring
- A balance must be maintained between desired outcomes and interruption of workflow

ADC VAAN DISML displayAdmission*admit status - to med surg »Jun 18 10:29*Diagnosis »

- diagnosis chronic obstructive pulmonary disease »Jun 18 10:29...

Condition »

- condition fair »Jun 18 10:29...

Vital signs »

- vital signs per hensa policy v-1 »Jun 18 15:00...

Activity/limitations

- activity: with assist q shift »Jun 18 15:00...
- activity: ambulate q shift »Jun 18 15:00...
- activity: up ad lib prn »Jun 18 10:29...

Allergies »

allergy: penicillins hives moderate »Jun 18 10:30...

Nursing instructions »

culture and gram stain - sputum (spu) (nurse collect) »Jun 18 10:29

- elevate head of bed degrees 30 »Jun 18 15:00...
- intake and output q shift - measure »Jun 18 15:00...
- measure weight daily »Jun 19 09:00...
- nursing: initiate pneumococcal vaccine orders po1162 »Jun 18 10:29*
- pain assessment q shift per unit protocol »Jun 18 15:00...
- smoking cessation counseling if applicable »Jun 18 10:29...
- urinalysis (ua) (nurse collect) »Jun 18 10:29*

Diet »

- regular diet 3 meals »Jun 18 11:00...

Enter an order

HEORx

\$0.00

[Literature](#)[Internet](#)

print <F1>

display <F2>

DIC <F3>

reset

config

outlines <F4>

Oops <F5>

help <F6>

complain <F7>

done <F8>

W220 P. TESTER, DR. PAUL 018093179 55 years M (KLEEBERG)

- *ambuventor 100 mcg ipratropium 10 mcg puu and (combreast) 2...*
- puff inhl q4h prn-rt respiratory care to convert to mdi per rt protocol for wheezing/sob »Jun 18 10:29...
- ondansetron inj [zofran] 4 mg iv q4h prn for nausea/vomiting »Jun 18 10:29...
- prochlorperazine inj [compazine] 10 mg iv q6h prn if ondansetron ineffective for nausea and vomiting »Jun 18 10:29...
- prochlorperazine [compazine] 10 mg oral q6h prn if ondansetron ineffective or no iv site for nausea and vomiting »Jun 18 10:29...

IV fluids »

TPN orders

Other interventions

- abg - arterial blood gas draw & lab - ww »Jun 18 10:29*
- mdi - inhaler - resp care to convert to mdi per rt protocol »Jun 18 10:29*
- oxygen -rt titrate fio2 to maintain 92% »Jun 18 15:00...
- respiratory therapy assessment to evaluate & initiate copd ed »Jun 18 10:29*

Laboratory tests »

=One time labs

- blood gases, arterial (agi) »Jun 18 10:29*
- blood urea nitrogen (bun) »Jun 18 10:29*
- creatinine (cre) »Jun 18 10:29*
- electrolyte profile (lt4) »Jun 18 10:29*
- hemogram 2 platelet (hm2) »Jun 18 10:29*

Radiographic studies »

- chest two views - xray x1 times reason for exam shortness of breath »Jun 18 10:29*

Miscellaneous orders »

1. CHANGE hemogram 2 platelet (hm2)
 2. hemogram 1 platelet and differential (hm1)
 3. hemoglobin - plasma (hpl)
 4. hemoglobin (hgb)
 5. hemogram 2 platelet (hm2)
 6. hemoglobin electrophoresis qualitative (elb)
 7. glycosylated hemoglobin a1c (a1c)
 8. ed hemogram 2 platelet (hm2) - stat
 9. ed hemogram 1 platelet and differential (hm1) - stat
 10. ed glycosylated hemoglobin a1c (a1c) - stat
 11. ed hemoglobin (hgb) - stat
 12. bone marrow bilateral, includes hemogram 1 (bmb)
 13. bone marrow aspirate, includes hemogram 1 (bma)
- ...or maybe...
14. hemovac evacuator 2500-04 - x1 occurrences
 15. hemovac/hemo drain - x1 occurrences
 16. hemodialysis - x1 occurrences

Select an item from the list

HEORx

\$0.00

or enter another order
or press **END** to return to the previous list

[Literature](#)

[Internet](#)

hemo

Alternative Selection

ROFECOXIB 50 MG TAB

Web Links

FDA Press Release 09.30.2004
Allina COX II advisory 10.28.2004

On Sept. 30, 2004, the FDA and Merck announced a voluntary withdrawal of rofecoxib (VIOXX) from the market. Refer to the weblink to the right.

Please select an alternative COX-2 listed below, or click "Cancel Filing Process" to go back to order entry.

Alternative	Dose	Route	Frequency	End Date	Class	Cost
CELECOXIB 100 MG CAP [29743]						
CELECOXIB 200 MG CAP [254]						
CELECOXIB 400 MG CAP [52288]						

Accept Alternative

Continue With Original Order

Cancel Filing Process

Too many alerts are counterproductive

- 90% override rate of drug-allergy and high severity drug interaction alerts (Weingart, 2003)
- Create a strong feelings in the end user (Sittig, 2005)
- Can distract the user from important information or completing an important task
- Complicates an already steep learning curve



Protocols and Pathways

- Tools for managing/monitoring multi-step processes
- Tools for managing prolonged medical conditions over time
- In an EHR, the timing and execution of protocols and pathways are automated to maximize outcomes

Recommendations and guidelines for ENOXAPARIN therapy in ACS / AMI

Unfractionated heparin is preferred over enoxaparin unless cath will be performed >24 hours from initiation of treatment.
DO NOT SWITCH BETWEEN enoxaparin and unfractionated heparin.

Before enoxaparin is started

- check for [contraindications](#) to heparin and enoxaparin therapy
- obtain a baseline CBC, aPTT, and stool hemocult if not already done

Enoxaparin dosing

- (optional) enoxaparin IV bolus: 30 mg IV
- enoxaparin SQ dosing: 1 mg/kg subq q12 hr (maximum dose 150 mg subq q12 hr)
- adjust dosing, use with caution when CrCl <40 ml/min
- continue enoxaparin until cardiac catheterization (or for 3 days if catheterization not planned)
- discontinue ≥24 hours before CABG

Additional recommendations

- platelet count and stool for occult blood daily while on enoxaparin
- be vigilant for the development of [heparin-induced thrombocytopenia](#)

Orders - avoid duplicate orders - the system does NOT check for existing medication orders.

Baseline studies (if not already done)

- CBC (COMPLETE BLOOD COUNT) urgent
- aPTT (partial thromboplastin time) urgent
- Stool for occult blood

Required - Dosing weight: kg **Creatinine clearance:** ml/min **Age:**

- Enoxaparin 30 mg IV bolus now (optional)
 - Enoxaparin subq: mg now x3d: q12h q24h (round to nearest 10 mg, max 150 mg q12h)
- Calculate: - standard therapeutic dosing
 (if renal dysfunction - CrCl <30 ml/min)
 (if age >=75 and nml renal fct)

Lab Results (Most Recent)		
Lab	Value	Date & Time
PTT	@@@lab_result.PTT.value@@@	@@@lab_result.PTT.date@@@
PT	@@@lab_result.PT.value@@@	@@@lab_result.PT.date@@@
INR	@@@lab_result.INR.value@@@	@@@lab_result.INR.date@@@
Platelets	@@@lab_result.Plt.Ct.value@@@	@@@lab_result.Plt.Ct.date@@@
BUN	@@@lab_result.BUN.value@@@	@@@lab_result.BUN.date@@@
Creatinine	@@@lab_result.Creat.value@@@	@@@lab_result.Creat.date@@@

Additional orders

- anti-Xa level qAM urgent x3 days (if obese, renal dysfunction, pregnant, elevated bleeding risk, pediatric)
- CBC (COMPLETE BLOOD COUNT) qAM urgent x3 days
- Nursing: send stool for occult blood daily x3 days

[Back To Top](#)

Learnings: Building Order Sets

- Multi-facility - migrate to one formulary before the build.
- Begin the process of cleaning up existing order sets.
- Establish Content experts
- Don't spend too much time refining paper order sets. Things change when you go electronic.

Learnings: Using Decision Support

- Just because you can does not mean you should
- Better to start slowly and build gradually
- Be aware of the unintended consequences of seemingly good decisions:
 - Completing allergies
 - Ordering pneumovax

Six Opportunities for CDS during CPOE*

- When the CPOE Session is Initiated
- When selecting the patient from the census or list
- When opening the patient's chart
- When initiating orders
- When completing an order
- When signing an order

* Miller RA, Waitman LR, Chen S, Rosenbloom ST. The anatomy of decision support during inpatient care provider order entry (CPOE): empirical observations from a decade of CPOE experience at Vanderbilt. J Biomed Inform. 2005 Dec;38(6):469-85.

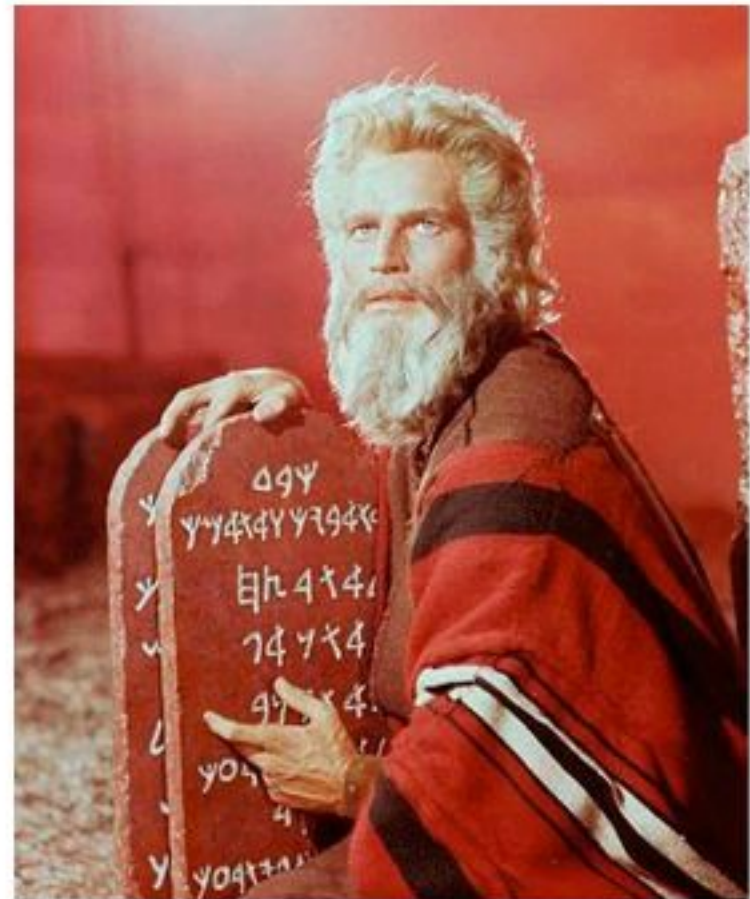
Six Types of CDS Interventions*

- Passive display of passive relevant information
- Passive display of linked educational opportunities
- Interactive sequential advice (branching logic) for user-directed order construction
- “Recallable” best practice guidelines with individually selectable pre-formed orders (Order Sets)
- “Pop-up” alerts interrupting workflow process
- Complex computer-based protocols where patient-specific calculations are made by the system and displayed as options for the clinician-user

* Miller RA, Waitman LR, Chen S, Rosenbloom ST. The anatomy of decision support during inpatient care provider order entry (CPOE): empirical observations from a decade of CPOE experience at Vanderbilt. J Biomed Inform. 2005 Dec;38(6):469-85.

The 10 Commandments of Clinical Decision Support*

1. Speed is everything
2. Anticipate needs and deliver in real time
3. Fit into the user's workflow
4. Little things can make a big difference (usability matters)
5. Recognize that physicians will strongly resist stopping
6. Changing direction is easier than stopping
7. Simple interventions work best
8. Ask for additional information only when you really need it
9. Monitor impact, get feedback, and respond
10. Manage and maintain your knowledge-based systems



* Bates DW, Kuperman GJ, Wang S, et al. Ten commandments for effective clinical decision support: Making the practice of evidence-based medicine a reality. J Am Med Inform Assoc. 2003;10:523-530.

Improving Outcomes with Clinical Decision Support: An Implementer's Guide

- Good resource for setting up a CDS program:
 - Identifying the stakeholders
 - Cataloging available information systems
 - Selecting and specifying CDS interventions
 - Specifying and validating the details and building the interventions
 - Putting interventions into action
 - Measuring results and refining the program

http://www.himss.org/ASP/topics_cds_workbook.asp?faid=108&tid=14

Using Clinical Decision Support to Optimize your EHR

Questions?

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