Clinical Decision Support Track Kick-Off: Improving Outcomes with Clinical Decision Support

Session S03

AMIA Spring Congress

22 May 2007
Track Co-Chairs

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CDS Track: Voting with Your Feet

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<tr>
<th>Track Name</th>
<th>Total</th>
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<td>Nursing Informatics</td>
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CDS Definition

“Providing clinicians or patients with clinical knowledge and patient-related information, intelligently filtered or presented at appropriate times, to enhance patient care.”

- NOT just physicians…
- NOT just rules and alerts…
- (NOT just computer-based…)
CDS Track: Learning Objectives

- To learn a framework for developing, deploying and assessing clinical decision support.
- To acquire techniques for implementing specific clinical decision support interventions.
- To appreciate how clinical decision support may be deployed to enhance patient safety and disease management.
- To review and gain an understanding of key lessons learned by clinical decision support implementers.
Types of CDS Goals

- Best clinical practices
  - quality measures, dz mgt, accreditation, EBM
- Patient/medication safety
  - Avoid sentinel events, litigation/malpractice
- Patient empowerment
  - satisfaction (MD/patient), retention, quality
- Financial well-being
  - P4P, cost-effective care, adverse events

Deliver the right information to the right person in the right format at the right point in workflow through the right channel
CDS Track Presentations

• 4 panels (18 speakers)

• 8 individual presenters

• 16 posters (2 sessions)
Panel S03: CDS in Context

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How can we improve care process/outcomes with CDS?

I. Identify goals/people
II. Survey info systems
III. Select interventions

IV. Specify and build
V. Test and launch
VI. Evaluate and enhance
Step 1: CDS Stakeholders, Goals

- Who needs to be involved?
- What goals will the CDS program address?
- How will CDS activities be governed/managed?
- How can the CDS program be cost-justified?
CDS is a team sport!

- **Positions:** CMO, CMIO, CQO
- **Committees:** quality, safety, P&T
- **Admin:** hospital/office staff
- **Clinicians:** Nurses, pharmacists, MDs
- **Patients!**
- **Others…**
Determining CDS Goals

- External drivers
  - P4P
  - Reporting, accreditation
- Internal drivers
  - Process/outcome data
  - Committees (quality, safety, P&T, UR)
  - Departments
  - Clinicians/patients/community
Step 2: Catalogue Available Information Systems

- Key Steps
  - Prepare an inventory of available information systems
  - Document:
    - CDS capabilities: 6 types.
    - Coding systems and vocabularies
  - **Tip**: CPOE and EHR systems are key but not the only game in town
Systems to Consider: Data & Knowledge

- Departmental data management
  - Lab, radiology and pharmacy systems
- Clinical Records
  - EHR, OR systems, medication administration
- Ordering
  - CPOE and e-prescribing
- Content
  - Reference for clinicians
- Administrative
  - Charge capture, scheduling and registration
Intervention Types

- Documentation forms and templates
- Relevant Data Presentation
- Order Creation Facilitators
- Time-based Checks and Pathway support
- Reference Information and Guidance
- Reactive Alerts and Reminders
CPOE and Decision Support

- Types of CDS common in CPOE:
  - Order creation facilitators
  - Relevant data display
  - Pathway support
  - Context sensitive reference information
  - Reactive alerts

- CPOE with CDS may result in as much as 55%-86% drop in medication errors.
  - Bates et al. 1998-1999
Step #3: Selecting CDS Interventions

1. Identify objective
2. Identify objective class
3. Map OC to optimal interventions and workflow steps
4. Factor in IT capabilities and local characteristics
5. Review difficulty, adoptability and impact level
Objective Classes

• Prevent Errors
  - Errors of Omission
  - Errors of Commission

• Optimize Decision Making
  • Choice of Individual Tests and Therapies
  - Simple Care Guidelines Compliance
  • Appropriate Acute Workup
  • Chronic Condition Management
  • Compliance with Multi-Step Protocols
Objective Classes

- Improve Care Processes
  - Improve Documentation
  - Improve patient education
  - Improve Communication
Workflow Opportunities

A. Pre-visit questionnaires
   Patient reminder notices

B. Proactive reminders

C. Structured documentation

D. Templates/order sets

E. Relevant info display
   Parameter guidance

F. Intelligent completion

G. Warnings feedback

H. Consequent actions

I. Communication

J. Alerts

K. Communication

L. Time-based checks

START OF VISIT

H&P

END OF VISIT
TRANSACTIONS
(orders, documentation)

RESULTS ARRIVE
Ease / Acceptability / Impact

- An intervention that is not received is not an intervention!
  - Ease of use + acceptability are key

- Special considerations
  - Changing codes
  - Unavailable data
  - Development costs
Moving right along...

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Step #4: Specifying Details and Building Interventions

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Intervention Parameters

- When/How is intervention triggered
- Criteria for intervention delivery
- Source of data to satisfy intervention logic
- Content of intervention
- Method of intervention
- Recipient of intervention
- Method for feedback from recipients
Optimize Intervention
Effectiveness

- Provide clear, practical recommendations
- Link recommendation to action opportunities
- Prepare organization for result of successful interventions
- Special attention to interventions sent to patients (language, education level)
Optimize Intervention
Safety

- Consider potential adverse consequences
- Develop a fail-safe plan if system (CDSS, underlying CIS) fails
- Minimize intervention overload
Management Considerations

- Establish clear accountability for results
  - Team with clinical, administrative, financial and informatics expertise

- Pay close attention to (re-engineering) workflow

- Engage detractors
Step #5: Putting Interventions into Action

Key Tasks

• Test content, mechanics and logistics
• Develop a rollout plan, including training, feedback and monitoring
• Gather and address feedback before, during and after rollout
Testing

- Incorporate typical use cases into testing scenarios
- Unit testing: Check intervention components with appropriate data
- Integration testing: Bring together all the components
- User acceptance testing
- Pilot launch
- Full-live evaluation
Aspects of Communication

- Apprise users of what’s happening
- Listen to feedback
- Use champions/super users
- Use multiple methods (formal & informal):
  - Staff meetings
  - Notices: Email, brochures, posters
Aspects of Rollout

• Wait for stable underlying CIS
• Carefully analyze speed, scope and order of rollout of interventions
  • Complex interventions may require phasing
  • Potentially disruptive interventions may require limited live testing
• Consider pilot locations
  • Representative? Size? Availability of support staff?
• Start with greatest returns posing least disruption
Step # 6: Monitoring Results and Refining the Program

- Evaluate intervention effectiveness using both quantitative and qualitative approaches.
- Plan on iteratively refining interventions to improve their use and benefits.
- Develop a systematic approach to managing organizational knowledge assets.
Evaluation Philosophy

• **Availability** – CDS must be available to clinicians.

• **Use** – Clinicians must use the system.

• **Benefits** – Only after these are assured, can you begin looking for improvements.
Evaluate Availability...

- Did alerts fire?
- Were order templates available in the system?
- Was the web site functioning?
- Were reports printed?
  - Did clinicians get the reports?
Evaluate Use of the CDS

• Assess intervention use and usability.
  • Direct observations of users
  • Subjective user feedback
  • Input from clinical champions
  • Objective measurements of intervention usage.

• How often is each intervention used (reference material accessed, specific order sets and templates completed?)

• How often are alerts presented? Heeded? Overridden?

• What do users perceive as the intervention’s effects on workflow?
Evaluate benefits of CDS

- Let’s see how our other panelists do this…
Maintain Knowledge Assets

• Re-evaluate intervention logic to ensure clinical knowledge is accurate and up to date,
  • Changes to elements require revalidating to ensure that system continues to behave as expected.
• Assign responsibility for the different content areas to respected individuals with domain expertise
• Assign an “expiration date” to all CDS interventions.
• Vocabularies and coding schemes evolve
  • Ensure that changes don’t have any adverse effects on the behavior of CDS interventions.
Thank You!

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Design of the CPOE User Interface to Reduce Medication Errors

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May 22, 2007
CPOE circa 2004

- Terminal-based app: Technicon Data Systems
  - Local install was named “CHIPPER”
- In use at CHOP since the 1980’s
- Plans for CHIPPER retirement in October 2004
- Transition to Eclipsys Sunrise Clinical Manager
- Opportunity to revisit medication errors, build new safeguards
CHIPPER to SCM

- How does an organization prepare for this change?
- How can we derive the most value from the change?
  - Reduce errors?
  - Make patient care safer?
  - Make CPOE use easier, more efficient?

- One solution: turn to other industries for guidance
  - Failure Mode & Effects Analysis
  - Devised by the US Military in 1949
  - Used in aerospace, automotive industry
  - Later adopted for healthcare use
FMEA Principles

- **Step 1:** Create detailed flow diagram of a process
- **Step 2:** For each step, describe what happens if process fails
- **Step 3:** Rate each failure on a standardized scale \( x \) 3
  - Severity of harm if failure occurs \((S)\)
    - 1=none; 5=fatal
  - Likelihood of occurrence \((O)\)
    - 1=rare; 5=common
  - Inability of existing controls to detect failure \((D)\)
    - 1=easily detectable; 5=failure would not be evident
- **Step 4:** Calculate Risk Priority Number \((RPN = S \times O \times D)\)

**Example:** A fatal, but rare and detectable error = 5 \( \times \) 1 \( \times \) 1
High-Risk Meds

- **Opiates / Sedatives**
  - morphine, fentanyl, hydromorphone, codeine
  - midazolam, lorazepam, chloral hydrate

- **Electrolytes**
  - magnesium sulfate
  - calcium gluconate
  - Isotonic NaCl, 3% NaCl
  - KCl, K Phosphate, Bicarbonate

- Insulin

- Continuous med infusions

- **Paralytic agents**
  - vecuronium, pancuronium, cisatracurium

- **Digoxin**

- **Anticoagulants**
  - enoxaparin, warfarin, heparin

- **Various antibiotics**
  - vancomycin
  - gentamicin
  - amoxicillin

- **Total Parenteral Nutrition**
FMEA Analysis: Acetaminophen

- **Analysis**
  - High RPN (very commonly ordered, errors were common)
  - Most potential errors were *interval* related
  - Changes frequently in newborn period
  - Potential for hepatotoxicity

- **CPOE Recommendations**
  1. Combine various dosage forms into one order set
  2. Use order set layout to guide therapeutic choices
  3. Stratify dosing by age group to fix errors of interval
  4. Precalculate default doses by indication
<table>
<thead>
<tr>
<th>Order Set:</th>
<th>Acetaminophen Antipyretic &amp; Analgesia</th>
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</thead>
<tbody>
<tr>
<td>Order Items</td>
<td></td>
</tr>
<tr>
<td>Preterm 28-32 wk 10 mg/kg PO</td>
<td></td>
</tr>
<tr>
<td>Preterm 28-32 wk 15 mg/kg PO</td>
<td></td>
</tr>
<tr>
<td>Preterm 28-32 wk Rectal</td>
<td></td>
</tr>
<tr>
<td>Preterm 32-36 wk 10 mg/kg/dose PO</td>
<td></td>
</tr>
<tr>
<td>Preterm 32-36 wk 15 mg/kg PO</td>
<td></td>
</tr>
<tr>
<td>Preterm 32-36 wk Rectal</td>
<td></td>
</tr>
<tr>
<td>0-3 months 10 mg/kg PO</td>
<td></td>
</tr>
<tr>
<td>0-3 months 15 mg/kg PO</td>
<td></td>
</tr>
<tr>
<td>0-3 months Rectal</td>
<td></td>
</tr>
<tr>
<td>&gt;3 months 10 mg/kg/dose PO</td>
<td></td>
</tr>
<tr>
<td>&gt;3 months 15 mg/kg/dose PO</td>
<td></td>
</tr>
<tr>
<td>&gt;3 months Rectal</td>
<td></td>
</tr>
<tr>
<td>Adults PO</td>
<td></td>
</tr>
</tbody>
</table>

- Acetaminophen solution - mg, Oral, Every 6 hours
- Acetaminophen suppository - mg, Rectal, Every 6 hours
- Acetaminophen chewable tablet - mg, Oral
- Acetaminophen tablet - 325 mg, Oral, Every 4 hours
- Acetaminophen tablet - 325 mg, Oral, Every 6 hours
- Acetaminophen tablet - 650 mg, Oral, Every 4 hours
- Acetaminophen tablet - 650 mg, Oral, Every 6 hours
Combined Measurements

<table>
<thead>
<tr>
<th>Height (cm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.07</td>
</tr>
</tbody>
</table>

Date: 01/05/2007 13:20

Dose: 105 mg
Route: Oral

Calculated Dose Information:
15 mg/kg/Dose x 7.07 kg = 105 mg/Dose (Daily Total is 420 mg)

Start Date: 04/08/2007
Schedule: Every 6 hours
### Laboratory

- **Gentamicin Trough Level - Blood Clinician to Collect**
  - Do not 'Add Specimen' to Peak and Trough at the same time.
  - With third dose

- **Gentamicin Peak Level - Blood Clinician to Collect**
  - Do not 'Add Specimen' to Peak and Trough at the same time.
  - With third dose

---

<table>
<thead>
<tr>
<th>Postnatal</th>
<th>Gentamicin injection - mg, Intravenous, q24h</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postnatal &lt;7 days, &lt;28 wk gest</td>
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<tr>
<td>Postnatal &lt;7 days, 28-34 wk gest</td>
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</tr>
<tr>
<td>Postnatal &lt;7 days, &gt;34 wk gest</td>
<td>.</td>
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</tr>
<tr>
<td>Postnatal &gt;7 days, 1.2-2 kg</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>Postnatal age &gt;7 days, &gt;2 kg</td>
<td>.</td>
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</tr>
<tr>
<td>ECMO pts (full term neonates)</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>Infants &amp; Children &lt;10 years</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>&gt;10 years &amp; Adult: 6 mg/kg/day</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>Cystic fibrosis patients</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>Oncology patients &gt;1 year old</td>
<td>.</td>
<td></td>
</tr>
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Did it work?
FMEA Project Evaluation

- **Hypothesis**
  - Does FMEA-directed design of a CPOE user interface reduce prescribing errors?

- **Design**
  - Two-group non-equivalent quasi-experimental study

<table>
<thead>
<tr>
<th></th>
<th>2/04</th>
<th>3/04</th>
<th>4/04</th>
<th>2/05</th>
<th>3/05</th>
<th>4/05</th>
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<tbody>
<tr>
<td>FMEA</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Non-FMEA</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
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</table>
Project Evaluation

- Compared monthly error rates for 3 month period on CHIPPER and 3 month period on SCM

- Chose time points to mitigate “training effect” and seasonality of hospital census
  - “Pre” observation in Feb, March, April 2004
  - Transition took place October 2004
  - “Post” observation in Feb, March, April 2005
Project Evaluation

- Chose three representative **FMEA meds**
  - Gentamicin - IV anti-infective
  - Midazolam - IV or oral sedative
  - Acetaminophen - oral or rectal analgesic

- Chose three representative **non-FMEA meds** with high error rates
  - Oxacillin - IV anti-infective
  - Heparin - anticoagulant
  - Digoxin - cardiac glycoside with narrow therapeutic margin
Project Evaluation

- Compared rates of intercepted prescribing errors
- Data obtained from pharmacy-reported QI data
- Details the medication, intercepted-error, and action
- Normalized rates per 1000 inpatient episodes
- Categorized errors by type:
  - Drug-Allergy / Drug-Drug Interaction
  - Duplicate order
  - Therapeutic monitoring decision
  - Wrong route
  - Wrong interval
  - Wrong dose
## Inpatients per Month

<table>
<thead>
<tr>
<th>Month</th>
<th>Inpatient Episodes</th>
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<tr>
<td>Feb 2004</td>
<td>1747</td>
</tr>
<tr>
<td>March 2004</td>
<td>1866</td>
</tr>
<tr>
<td>April 2004</td>
<td>1623</td>
</tr>
<tr>
<td>2004 Total:</td>
<td>5236</td>
</tr>
<tr>
<td>Feb 2005</td>
<td>1636</td>
</tr>
<tr>
<td>March 2005</td>
<td>1824</td>
</tr>
<tr>
<td>April 2005</td>
<td>1617</td>
</tr>
<tr>
<td>2005 Total:</td>
<td>5077</td>
</tr>
</tbody>
</table>
## Errors per 1000 Patients

<table>
<thead>
<tr>
<th>Medication</th>
<th>Feb-Apr 2004</th>
<th>Feb-Apr 2005</th>
<th>IRR*</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentamicin</td>
<td>19.1</td>
<td>4.5</td>
<td>0.24</td>
<td>0.14-0.38</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Acetaminophen</td>
<td>22.3</td>
<td>8.7</td>
<td>0.39</td>
<td>0.27-0.55</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Midazolam</td>
<td>10.7</td>
<td>4.7</td>
<td>0.44</td>
<td>0.26-0.72</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Oxacillin</td>
<td>4.0</td>
<td>2.7</td>
<td>0.69</td>
<td>0.32-1.42</td>
<td>0.28</td>
</tr>
<tr>
<td>Heparin</td>
<td>4.0</td>
<td>2.2</td>
<td>0.54</td>
<td>0.24-1.17</td>
<td>0.10</td>
</tr>
<tr>
<td>Digoxin</td>
<td>2.5</td>
<td>1.4</td>
<td>0.55</td>
<td>0.19-1.50</td>
<td>0.21</td>
</tr>
</tbody>
</table>

*Incidence rate ratio
Gentamicin Errors

Erros per 1000 Inpt. Visits

- Allergy/Interaction
- Duplicate
- Therapeutic
- Route
- Interval
- Dose

Month

Feb 04  Mar 04  Apr 04  Feb 05  Mar 05  Apr 05

Erros per 1000 Inpt. Visits

* * *

p < 0.001

The Children’s Hospital of Philadelphia®
Hope lives here.
Acetaminophen Errors

*p < 0.001

- Allergy/Interaction
- Duplicate
- Therapeutic
- Route
- Interval
- Dose

The Children’s Hospital of Philadelphia®
Hope lives here.
Midazolam Errors

** p < 0.001

Month

- Feb 04
- Mar 04
- Apr 04
- Feb 05
- Mar 05
- Apr 05

Legend:
- Red: Allergy/Interaction
- Purple: Duplicate
- Light Blue: Therapeutic
- Yellow: Route
- Burgundy: Interval
- Blue: Dose
Heparin Errors

- Feb 04: 1.6
- Mar 04: 0.8
- Apr 04: 1.2
- Feb 05: 1.2
- Mar 05: 0.6
- Apr 05: 1.2
Results

● FMEA meds
  ● significant reduction in incidence of prescribing errors

● Non-FMEA meds
  ● no significant reduction in errors

● Simply upgrading CPOE systems doesn’t reduce errors
● Rational design of user interface can be used for targeted reduction of prescribing errors
Limitations & Next Steps

- Quasi-experimental design
- Focused on meds with high rates of prescribing errors
- Only looked at 6 medications – really need all FMEA meds
- Only looked at 6 months – really need a run chart, time series
- Couldn’t look at total orders in time-period
- Based on total charges, prescribing rate of heparin was lower and digoxin was higher in post-intervention period
  - Looking at all FMEA meds vs. all non-FMEA meds will minimize this variability
Acknowledgements

CHOP - CDS
- Rick Womer
- Tara Trimarchi
- Winson Soo-Hoo
- Deb Joers
- Gordon Zeis
- CDS Members

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CBMI
- Pete White
- Bob Grundmeier

IRB
- Barbara LoDico

OHSU - MBI
- Bill Hersh
- Dean Sittig
- Paul Gorman
CDS implementation to improve VTE prophylaxis at an academic medical center

AMIA Spring Congress 2007
CDS Panel S03

Bill Galanter MD/PhD
Medical Director, Clinical Information Systems
Department of Medicine
University of Illinois at Chicago
- 450 Bed tertiary teaching hospital
- 400,000 outpatient visits
- Near paperless inpatient & outpatient
- Large residencies

CPOE with TDS 1982 → 1999
CPOE with Cerner Millennium® > 1999
Implemented CDS at UICMC

Medication related

Radio contrast Renal ↔ Renal/Metformin
Enoxaparin ↔ Heparin
Drug ↔ Renal Function
Drug ↔ Liver Disease
Digoxin
IV → PO

Renal Function ↔ Nephrotoxic Drug
Hyperkalemia ↔ Medication
Heparin Dosing
Promethazine in Infants
NPO-Insulin
Drug ↔ Pregnancy
MRI-Patch
Saquinavir-Ritonavir-Rifampin
VTE Prophylaxis Checks
Drug ↔ Tube Feeds
Erythropoetin ↔ HCT

Medication Indication Documentation

Quality of Care

Lipid Screening
Mammography
Diabetic
Influenza
VTE Risk Assessment
VTE Treatment Prompts

Communications

Admission notification
Discharge notification
New pathology notification
Renal Insufficiency

Administrative

Admit Order
Unsigned orders at discharge

Calculations

Anion Gap
Creatinine Clearance
MDRD eGFR
Non-HDL Cholesterol
Adjusted Dilantin
Mean Blood Pressure

Documentation

Airborne Isolation
Fall Alerts
Discharge Planning
Social Work
Smoking Cessation Referral
Polypharmacy referral
Diagnosis Documentation
Alerts for Contraindication

Proportion of patients with renal dysfunction receiving Metformin when order started by clinician
4-months pre-alert vs. 4-months post-alert

Alerts for Contrast Studies in patients with Renal Insufficiency

Orders for IV contrast in patients with CrCL < 50 ml/min.
Asynchronous Alerts

Lab results
Compliance with alert recommendations
Low [Mg++] when on Digoxin

VTE prophylaxis at UIH

Stakeholders:
- Risk Management, VTE prophylaxis committee

Objectives:
- Increase risk assessments, increase use of prophylaxis & prevent events

Challenges:
- Making an accepted mandatory intervention.

Interventions:
- Real time alerts
- Risk assessment forms
- Order sets with pushed results
- Active surveillance with reminders.
VTE risk assessment Alerts

**DVT Form Alert**

**DISCERN, CUBBY** does not have a completed DVT Risk Assessment from this admission. Hospital guidelines require that a DVT Risk Assessment is completed at the time of admission.

If you plan on placing orders without completing this assessment, please click ‘Ignore Alert’ and enter a reason.

Otherwise, please click ‘DVT Form’ to complete the assessment.

*This alert will continue to appear until the DVT Risk Assessment is completed.*
# VTE risk assessment

## DVT Risk Assessment

**Is the intent to fully anticoagulate this patient (warfarin, IV heparin, treatment dose enoxaparin)?**

- [ ] Yes
- [ ] No

**Does the patient have any of the following contraindications to pharmacologic prophylaxis?**

- [ ] None
- [ ] High risk of or current major bleeding
- [ ] Spinal tap or epidural removal within last 2 hours

**Has the patient undergone or suffered any of the following?**

- [ ] None
- [ ] Hip arthroplasty
- [ ] Knee arthroplasty
- [ ] Major trauma (multiple organ system injuries, multiple extremity fractures or pelvic fractures)
- [ ] Acute spinal cord injury resulting in lower extremity paralysis

If hip arthroplasty is checked, use one of the following:
- Warfarin (goal INR 2.5) starting the evening of surgery
- Enoxaparin 30 mg SC Q12 hr starting 12-24 hr post-op
- Fondaparinux 2.5 mg SC Q24 hr starting 6-8 hr post-op

If knee arthroplasty is checked, use one of the following:
- Warfarin (goal INR 2.5) starting the evening of surgery
- Enoxaparin 30 mg SC Q12 hr starting 12-24 hr post-op
- Fondaparinux 2.5 mg SC Q24 hr starting 6-8 hr post-op

If "Major trauma" or "Acute spinal cord injury..." is checked, use enoxaparin 30 mg SC Q12 hr once primary hemostasis is ensured.
### VTE risk assessment

#### WARNINGS

Warfarin is absolutely contraindicated during pregnancy.
Enoxaparin dose in patients with creatinine clearance < 30 ml/min is 30 mg SC Q24 hr.
Enoxaparin dose in extremely obese patients (BMI > 50 kg/m2) is 40 mg SC Q12 hr.

Fondaparinux is contraindicated in patients with creatinine clearance < 30 ml/min.
Enoxaparin and heparin are absolutely contraindicated in patients with a history of being heparin-induced-thrombocytopenia antibody positive (HIT+).

#### Does the patient have any of the following risk factors for DVT?

- [ ] None
- [ ] Acute ischemic stroke
- [ ] Age > 60 years
- [ ] Cancer or brain tumor
- [ ] Congestive Heart Failure
- [ ] Current estrogen or estrogen receptor modulator (tamoxifen) use
- [ ] Expected or current immobility > 24 hours
- [ ] History of DVT or PE
- [ ] Hypercoagulable state (e.g., protein C deficiency, protein S deficiency, antithrombin deficiency, antiphospholipid syndrome, prothrombin G20210A, etc.)
- [ ] Lung disease requiring oxygen or inability to walk > 1 block
- [ ] Obesity (BMI > 30 kg/m2)
- [ ] Surgery requiring full admission

If anything other than "None" is checked, use heparin 5,000 Units SC Q8-12 hr.

#### WARNING

Enoxaparin and heparin are absolutely contraindicated in patients with a history of being heparin-induced-thrombocytopenia antibody positive (HIT+).
Order sets for VTE

### General Methods of DVT Prophylaxis

<table>
<thead>
<tr>
<th>Component</th>
<th>Order Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>Encourage, Early</td>
</tr>
<tr>
<td>Heparin</td>
<td>50,000 Units, INJECTION, SC, Q12H</td>
</tr>
<tr>
<td>Heparin</td>
<td>50,000 Units, INJECTION, SC, Q8H</td>
</tr>
<tr>
<td>Sequential Compression Device (SCD) - Apply</td>
<td>For Greater Than 18 Hours Per Day When Non Ambulatory</td>
</tr>
<tr>
<td>Anti-Embolism Stockings - Apply</td>
<td></td>
</tr>
</tbody>
</table>

### Acute Spinal Cord Injury or Other Neurological Injury Resulting in Lower Extremity Paralysis

**Enoxaparin should be ordered ONCE PRIMARY HEMOSTASIS IS ENSURED**

<table>
<thead>
<tr>
<th>Component</th>
<th>Order Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enoxaparin</td>
<td>30 mg, INJECTION, SC, Q12H</td>
</tr>
<tr>
<td>Enoxaparin</td>
<td>40 mg, INJECTION, SC, DAILY, Starting 12 hours post op</td>
</tr>
</tbody>
</table>

**For creatinine clearance < 30 mL/min, use the order below**

<table>
<thead>
<tr>
<th>Component</th>
<th>Order Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enoxaparin</td>
<td>30 mg, INJECTION, SC, DAILY</td>
</tr>
</tbody>
</table>

**For extremely obese patients (BMI > 50kg/m²), use the order below**

<table>
<thead>
<tr>
<th>Component</th>
<th>Order Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enoxaparin</td>
<td>40 mg, INJECTION, SC, Q12H</td>
</tr>
</tbody>
</table>

### Joint Arthroplasty or Proximal Femur Fracture

**Enoxaparin should be ordered ONCE PRIMARY HEMOSTASIS IS ENSURED**

<table>
<thead>
<tr>
<th>Component</th>
<th>Order Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enoxaparin</td>
<td>30 mg, INJECTION, SC, Q12H</td>
</tr>
<tr>
<td>Enoxaparin</td>
<td>40 mg, INJECTION, SC, DAILY, Starting 12 hours post op</td>
</tr>
</tbody>
</table>

**For creatinine clearance < 30 mL/min, use the order below**

<table>
<thead>
<tr>
<th>Component</th>
<th>Order Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enoxaparin</td>
<td>30 mg, INJECTION, SC, DAILY</td>
</tr>
</tbody>
</table>

**For extremely obese patients (BMI > 50kg/m²), use the order below**

<table>
<thead>
<tr>
<th>Component</th>
<th>Order Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enoxaparin</td>
<td>40 mg, INJECTION, SC, Q12H</td>
</tr>
</tbody>
</table>
Pushed labs for VTE orders

<table>
<thead>
<tr>
<th>View</th>
<th>Related Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCT</td>
<td>28.3</td>
</tr>
<tr>
<td>INR</td>
<td>1.362</td>
</tr>
<tr>
<td>INR-PTG</td>
<td>454</td>
</tr>
<tr>
<td>PTT</td>
<td>543</td>
</tr>
<tr>
<td>enoxaparin</td>
<td>30 mg</td>
</tr>
<tr>
<td>heparin</td>
<td>3.75 mg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medications</th>
<th>Order Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>warfarin</td>
<td>Order: mg. TABLET, PO, QHS, Routine, First Dose 4/25/2007 9:00 AM, Stop 4/29/2007 9:00 AM</td>
</tr>
<tr>
<td>aspirin</td>
<td>Order: 81 mg. EC TABLET, PO, DAILY, Routine, First Dose 4/25/2007 9:00 AM, <strong>Do Not Crush</strong></td>
</tr>
<tr>
<td>aspirin</td>
<td>depot from the stock of the dose order 4/25/2007 8:16 AM</td>
</tr>
<tr>
<td>heparin</td>
<td>Order: Units: INJECTION, IV PUSH, Routine, First Dose 4/25/2007 8:16 AM</td>
</tr>
<tr>
<td>enoxaparin</td>
<td>Order: 30 mg. POD, ROUTINE, First Dose 4/25/2007 8:16 AM</td>
</tr>
<tr>
<td>warfarin</td>
<td>Order: mg. TABLET, PO, QHS, Routine, First Dose 4/25/2007 9:00 AM, Stop 4/29/2007 9:00 AM</td>
</tr>
</tbody>
</table>

*This is a screenshot of a medical record system showing orders and medications.*
Nightly active surveillance

CDS Engine

Med Orders

data risk form

Physician team
What Happened
VTE risk assessment
Assessment completion vs. Time
# VTE prophylaxis CDS at UIH

Results of a 5-month trial on prophylaxis rates

<table>
<thead>
<tr>
<th></th>
<th>Historical Control</th>
<th>Trial</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of patients</strong></td>
<td>5,505</td>
<td>4,598</td>
</tr>
<tr>
<td><strong>Average age</strong></td>
<td>46.4 +/-18.3 years</td>
<td>47.1 +/-18.5 years</td>
</tr>
<tr>
<td><strong>% Female</strong></td>
<td>64.9%</td>
<td>64.8%</td>
</tr>
<tr>
<td><strong>Type of prophylaxis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enoxaparin</td>
<td>2.94%</td>
<td>2.65%</td>
</tr>
<tr>
<td>Fondaparinux</td>
<td>0.16%</td>
<td>0.20%</td>
</tr>
<tr>
<td>Heparin sub-cutaneous</td>
<td>24.7%</td>
<td>33.7%</td>
</tr>
<tr>
<td>Warfarin for total knee or hip arthroplasty</td>
<td>0.25%</td>
<td>0.24%</td>
</tr>
<tr>
<td><strong>Total pharmacologic</strong></td>
<td>27.6%</td>
<td>36.5%</td>
</tr>
<tr>
<td><strong>Mechanical</strong></td>
<td>30.0%</td>
<td>29.8%</td>
</tr>
<tr>
<td><strong>Any form of prophylaxis</strong></td>
<td>43.1%</td>
<td>50.6%</td>
</tr>
</tbody>
</table>
VTE prophylaxis CDS at UIH

Results of a 1 year trial on clinical outcomes

NNT: 1 additional patient on Sub-Q Heparin for every 11 adult admissions
Acknowledgements

**IS:** Lisa Canonge, Marla Lax, Amy Looi, Audrius Polikaitis, Jennifer Welch,

**Pharmacy:** Carson Bording, Rob Didomenico, Kelly Kopek, Jamie Paek, Mat Thambi

**Medical Staff:** Dan Hier, Mark Kushner, Holly Rosencranz, David Sarne, David Williams
History of the EHR in VHA

CPRS - Computerized Patient Record System

Mark Graber, MD

• Official deployment in 1982
  – Lab, pharmacy, scheduling

• Imaging - 1992

• Order Entry / Results Reporting 1994

• GUI 1998

• BCMA 2000
CPRS Usage

- 1.1B orders, 1M/day
- 200M Images, 350k/day
- 500M Notes & Documents, 500k/day
- 500M Meds admin via BCMA, 500k/day
- 1M lab results /day
- 200M Outpatient Rx’s dispensed/year
Integrated Packages – Clinical

- CPRS - Order Entry / Results Reporting
- Pharmacy, Laboratory, Radiology / Imaging
- Surgery, Medicine, Procedures
- Nursing, Social Work,
- Nutrition & Food Service
- Audiology and Speech Pathology
- Billing, Scheduling, Registries
### Active Problems
- Arrhythmia Unstable
- Cardiac Dysrhythmia
- Dental Caries
- Gingivitis
- Loss Of Teeth, Acquired
- Skin Lesion
- Coronary Artery Disease
- Sensorineural Hearing Loss, Bilateral (ICD-9-CM 380.89)
- Penicillin Allergy
- Headache
- Schiz, Catatonic
- Headaches
- Jock's Syndrome
- Hypertension

### Allergies / Adverse Reactions
- Phenytion
- Erythromycin Stearate Tab
- Morphine
- Percocet
- Crab
- Bee Sting
- Beeswax, Yellow
- Sedating
- Morphine Sulfate
- Wod Vax Alcohol
- Peanuts
- Corn
- Shellfish
- Listeria
- Mangoes

### Recent Lab Results

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>103.1</td>
<td>Aug 03, 2006 08:24</td>
</tr>
<tr>
<td>P</td>
<td>88</td>
<td>Aug 03, 2006 08:24</td>
</tr>
<tr>
<td>R</td>
<td>18</td>
<td>Aug 03, 2006 08:24</td>
</tr>
<tr>
<td>SP</td>
<td>118/88</td>
<td>Aug 03, 2006 08:24</td>
</tr>
<tr>
<td>HT</td>
<td>69</td>
<td>Aug 03, 2006 08:24</td>
</tr>
<tr>
<td>WT</td>
<td>190</td>
<td>Aug 03, 2006 08:24</td>
</tr>
<tr>
<td>PN</td>
<td>4</td>
<td>Aug 03, 2006 08:24</td>
</tr>
<tr>
<td>PCX</td>
<td>98</td>
<td>Aug 03, 2006 08:24</td>
</tr>
<tr>
<td>CG</td>
<td>Refused</td>
<td>Aug 03, 2006 08:10</td>
</tr>
</tbody>
</table>

### Active Medications
- Dubusone Hcl 20mg Oral Cap: Active
- Diltaze Hcl 120mg Sr Cap: Active
- Triamterone 0.1% In Eucerin 45g: Active
- Non-VA: Non Va Med Not Listed Miscellaneous
- Non-VA: Non Va Med Not Listed Miscellaneous
- Non-VA: Glibizide 5mg Tab: Active

### Clinical Reminders
- Diabetes-Creatinine
- Diabetic Food Exam
- Pain Assessment
- Patient Educator (Provider)
- (Provider) Tobacco Use Screen

### Due Date
- Jul 16, 05
- Due NOW
- Aug 03, 06
- Due NOW
- Aug 03, 06

### Vitals
- ORAL
- SITTING, FALPATED
- SITTING, AT REST
- LARM, SITTING, ADULT CUFF, CUFF-MANL
- SITTING AT REST
- (175.3 cm) STATED
- (81.5 kg) ACTUAL, STANDING WEIGHT
- NASAL CANNULA 31/min

### Appointments / Visits / Admissions
- Aug 02, 2006 15:04
- Rheumatology Fellowship
- Jul 27, 2006 13:06
- MSHL Health Improvement Group
- Jul 25, 2006 08:32
- Ptsd
- Jul 25, 2006 08:14
- Ptsd
- Jul 24, 2006 09:25
- Primary Care Behavioral Health
- Jul 36, 2006 10:36
- Cardi C.Hall Estee/Md
- Jul 33, 2006 11:01
- Eye Attendings Clinic
- Jun 27, 2006 10:54
- Sys/Telecom Checkers
- Jun 26, 2006 11:10
- Procedures Amb Med Cath
- Jun 26, 2006 11:08
- Procedures Amb Med Cath
- Jun 22, 2006 15:43
- Chaplain Inpatient Ind
- Jun 22, 2006 09:03
- Oncology Consult Clinic
- Jun 22, 2006 08:40
Decision Support in CPRS

- Alerts (Order checking, allergies, meds)
- Reminders
- Smart orders
- Dialogue notes with embedded links
- Online access to books, journals, e-tools
Using “Reminders”

• VHA has set national goals for providing preventive health services
• These goals are communicated to the field, CDS provided in the form of “Reminders”
### Active Problems

<table>
<thead>
<tr>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aroma, Unstable</td>
</tr>
<tr>
<td>Cardiac Dystrophy</td>
</tr>
<tr>
<td>Dental Caries</td>
</tr>
<tr>
<td>Gingivitis</td>
</tr>
<tr>
<td>Loss Of Teeth, Acquired</td>
</tr>
<tr>
<td>Skin Lesion</td>
</tr>
<tr>
<td>*Headache</td>
</tr>
<tr>
<td>Coronary Artery Disease</td>
</tr>
<tr>
<td>Sensory/neural Hearing Loss Of Comb</td>
</tr>
<tr>
<td>Hearing Loss, Bilateral (ICD-9-CM 38)</td>
</tr>
<tr>
<td>Penicillin Allergy</td>
</tr>
<tr>
<td>Headache</td>
</tr>
<tr>
<td>Alcohol</td>
</tr>
<tr>
<td>Headaches</td>
</tr>
<tr>
<td>Job's Syndrome</td>
</tr>
<tr>
<td>Hypertension</td>
</tr>
</tbody>
</table>

### Allergies / Adverse Reactions

<table>
<thead>
<tr>
<th>Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenotin</td>
</tr>
<tr>
<td>Erythromycin Stearoate Tablo</td>
</tr>
<tr>
<td>Morphine</td>
</tr>
<tr>
<td>Percocet</td>
</tr>
<tr>
<td>Crab</td>
</tr>
<tr>
<td>Bee Sting</td>
</tr>
<tr>
<td>Beeswax, Yellow</td>
</tr>
<tr>
<td>Squalid</td>
</tr>
<tr>
<td>Morphine Sulfate</td>
</tr>
<tr>
<td>Wod Vax Alcohol</td>
</tr>
<tr>
<td>Peanuts</td>
</tr>
<tr>
<td>Corn</td>
</tr>
<tr>
<td>Corn</td>
</tr>
<tr>
<td>Listeriol</td>
</tr>
<tr>
<td>Mangos</td>
</tr>
</tbody>
</table>

### Active Medications

<table>
<thead>
<tr>
<th>Medication</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dubuspre Hol 20mg Oral Cap</td>
<td>Active</td>
</tr>
<tr>
<td>Diltazen Hol 120mg S Cap</td>
<td>Active</td>
</tr>
<tr>
<td>Triamcinolone.0.1% In Eucerin 454mg</td>
<td>Active</td>
</tr>
<tr>
<td>Non-VA Non Va Med Not Listed Miscellaneous</td>
<td></td>
</tr>
<tr>
<td>Non-VA Non Va Med Not Listed Miscellaneous</td>
<td></td>
</tr>
<tr>
<td>Non-VA Glipizide 5mg Tab</td>
<td>Active</td>
</tr>
</tbody>
</table>

### Clinical Reminders

<table>
<thead>
<tr>
<th>Reminder</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Creatinine</td>
<td>Jul 16,05</td>
</tr>
<tr>
<td>Diabetic Foot Exam</td>
<td>DUE NOW</td>
</tr>
<tr>
<td>Pain Assessment</td>
<td>Aug 03,06</td>
</tr>
<tr>
<td>Patient Educator (Provider)</td>
<td>DUE NOW</td>
</tr>
<tr>
<td>Tobacco Use Screen</td>
<td>DUE NOW</td>
</tr>
</tbody>
</table>

### Recent Lab Results

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>103.1 F</td>
<td>Aug 03,06, 08:24</td>
</tr>
<tr>
<td>P</td>
<td>88</td>
<td>Aug 03,06, 08:24</td>
</tr>
<tr>
<td>R</td>
<td>18</td>
<td>Aug 03,06, 08:24</td>
</tr>
<tr>
<td>SP</td>
<td>118/88</td>
<td>Aug 03,06, 08:24</td>
</tr>
<tr>
<td>HT</td>
<td>69 in</td>
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</tr>
<tr>
<td>WT</td>
<td>190 lb</td>
<td>Aug 03,06, 08:24</td>
</tr>
<tr>
<td>PN</td>
<td>4</td>
<td>Aug 03,06, 08:24</td>
</tr>
<tr>
<td>PDX</td>
<td>96</td>
<td>Aug 03,06, 08:24</td>
</tr>
<tr>
<td>CG</td>
<td>Refused</td>
<td>Aug 03,06, 08:10</td>
</tr>
</tbody>
</table>

### Vitals

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORAL</td>
<td></td>
</tr>
<tr>
<td>SITTING AT REST</td>
<td></td>
</tr>
<tr>
<td>LARM, SITTING Adult Cuff Cuff-Manual</td>
<td></td>
</tr>
<tr>
<td>STATED</td>
<td></td>
</tr>
<tr>
<td>ACTUAL STANDING WEIGHT</td>
<td></td>
</tr>
<tr>
<td>NASAL CANNULA 31/min</td>
<td></td>
</tr>
</tbody>
</table>
DECISION SUPPORT

How do you get people to use it??
Give them the Beef!

The carrot: Performance bonus;
The stick: Constant humiliation & threats
Reminder Resolution: COLORECTAL CANCER SCREEN

Screening for colorectal cancer can be accomplished by one of two options, fecal occult blood detection or colonoscopy. Each method satisfies this screen for different time periods—see below. Testing usually begins at age 50 in the general population. This institution has decided that for general screening, fecal occult blood detection will be the test of first choice.

A. FECAL OCCULT BLOOD TEST—satisfies reminder for one year

Most recent FOB T done OCCEBL1: comment 11/24/1999:12:42 feces
OCCEBL2: comment 11/24/1999:12:42 feces
OCCEBL3: comment 11/24/1999:12:42 feces

- Click here to order Fecal Occult Blood test X 3

Patient's Colorectal Cancer screening is being done by a non VA provider; the most recent FOB T was performed outside this medical center.

Date: [ ] 2006 [ ] Location: [ ]

- Patient refuses FOB T today.
- Patient refuses BOTH occult blood testing AND colonoscopy

Previous Colonoscopy: No previous Colonoscopy found
- Click here to record results of a recent colonoscopy
- Screening is not indicated in this patient.

This patient has a definitive diagnosis of colorectal cancer indicated. Clicking here will inactivate this reminder.

COLORECTAL CANCER SCREEN:
Colorectal cancer screening is being done by recent FOB T was performed:
Date: 2006

Health Factors: OUTSIDE FOB T RESULT (Historical)

* Indicates a Required Field
Cancer Measure
Screening for Colorectal Cancer – 52-80yrs

Target 75%  VHA 77%

Percent

EX = 78%
Floor = 67%

Measure 8c – Perf. Period 10/06 – 8/07
## Quality Measures

<table>
<thead>
<tr>
<th>CLINICAL PERFORMANCE INDICATOR</th>
<th>VA FY 05</th>
<th>HEDIS (2) Commercial 2004</th>
<th>HEDIS (2) Medicare 2004</th>
<th>HEDIS (2) Medicaid 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer screening</td>
<td>86%</td>
<td>73%</td>
<td>74%</td>
<td>54%</td>
</tr>
<tr>
<td>Cervical cancer screening</td>
<td>92%</td>
<td>81%</td>
<td>Not Reported</td>
<td>65%</td>
</tr>
<tr>
<td>Colorectal cancer screening</td>
<td>76%</td>
<td>49%</td>
<td>53%</td>
<td>Not Reported</td>
</tr>
<tr>
<td>LDL Cholesterol &lt; 100 after AMI, PTCA, CABG</td>
<td>Not Reported</td>
<td>(3) 51%</td>
<td>54%</td>
<td>29%</td>
</tr>
<tr>
<td>LDL Cholesterol &lt; 130 after AMI, PTCA, CABG</td>
<td>Not Reported</td>
<td>(3) 68%</td>
<td>70%</td>
<td>41%</td>
</tr>
<tr>
<td>Beta blocker on discharge after AMI</td>
<td>98%</td>
<td>96%</td>
<td>94%</td>
<td>85%</td>
</tr>
<tr>
<td>Diabetes: HgbA1c done past year</td>
<td>96%</td>
<td>87%</td>
<td>89%</td>
<td>76%</td>
</tr>
<tr>
<td>Diabetes: Poor control HbA1c &gt; 9.0% (lower is better)</td>
<td>17%</td>
<td>31%</td>
<td>23%</td>
<td>49%</td>
</tr>
<tr>
<td>Diabetes: Cholesterol (LDL-C) Screening</td>
<td>95%</td>
<td>91%</td>
<td>94%</td>
<td>80%</td>
</tr>
<tr>
<td>Diabetes: Cholesterol (LDL-C) controlled (&lt;100)</td>
<td>60%</td>
<td>40%</td>
<td>48%</td>
<td>31%</td>
</tr>
<tr>
<td>Diabetes: Cholesterol (LDL-C) controlled (&lt;130)</td>
<td>82%</td>
<td>65%</td>
<td>71%</td>
<td>51%</td>
</tr>
<tr>
<td>Diabetes: Eye Exam</td>
<td>79%</td>
<td>51%</td>
<td>67%</td>
<td>45%</td>
</tr>
<tr>
<td>Diabetes: Renal Exam</td>
<td>66%</td>
<td>52%</td>
<td>59%</td>
<td>47%</td>
</tr>
<tr>
<td>Hypertension: BP &lt;= 140/90 most recent visit</td>
<td>77%</td>
<td>67%</td>
<td>65%</td>
<td>61%</td>
</tr>
<tr>
<td>Follow-up after Hospitalization for Mental Illness (30 days)</td>
<td>70%(4)</td>
<td>76%</td>
<td>61%</td>
<td>55%</td>
</tr>
<tr>
<td>Immunizations: influenza, (note patients age groups) (6) (7)</td>
<td>75%</td>
<td>39%</td>
<td>75%</td>
<td>68%</td>
</tr>
<tr>
<td>Immunizations: pneumococcal, (note patients age groups) (6)</td>
<td>89%</td>
<td>Not Reported</td>
<td>Not Reported</td>
<td>65%</td>
</tr>
</tbody>
</table>
Cardiovascular Measure - ISHD, % Prior AMI and LDLC<100 on Most Recent Test and Had a Full Lipid Profile in the Past 2 Years

Measure 9c1 – Perf. Period 10/06 - 8/07
## Quality Measures

<table>
<thead>
<tr>
<th>CLINICAL PERFORMANCE INDICATOR</th>
<th>VA FY 05</th>
<th>HEDIS (2)</th>
<th>HEDIS (2)</th>
<th>HEDIS (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer screening</td>
<td>86%</td>
<td>73%</td>
<td>74%</td>
<td>54%</td>
</tr>
<tr>
<td>Cervical cancer screening</td>
<td>92%</td>
<td>81%</td>
<td>Not Reported</td>
<td>65%</td>
</tr>
<tr>
<td>Colorectal cancer screening</td>
<td>76%</td>
<td>49%</td>
<td>53%</td>
<td>Not Reported</td>
</tr>
<tr>
<td>LDL Cholesterol &lt; 100 after AMI, PTCA, CABG</td>
<td>Not Reported (3)</td>
<td>51%</td>
<td>54%</td>
<td>29%</td>
</tr>
<tr>
<td>LDL Cholesterol &lt; 130 after AMI, PTCA, CABG</td>
<td>Not Reported (3)</td>
<td>68%</td>
<td>70%</td>
<td>41%</td>
</tr>
<tr>
<td>Beta blocker on discharge after AMI</td>
<td>98%</td>
<td>96%</td>
<td>94%</td>
<td>85%</td>
</tr>
<tr>
<td>Diabetes: HgbA1c done past year</td>
<td>96%</td>
<td>87%</td>
<td>89%</td>
<td>76%</td>
</tr>
<tr>
<td>Diabetes: Poor control HbA1c &gt; 9.0% (lower is better)</td>
<td>17%</td>
<td>31%</td>
<td>23%</td>
<td>49%</td>
</tr>
<tr>
<td>Diabetes: Cholesterol (LDL-C) Screening</td>
<td>95%</td>
<td>91%</td>
<td>94%</td>
<td>80%</td>
</tr>
<tr>
<td>Diabetes: Cholesterol (LDL-C) controlled (&lt;100)</td>
<td>60%</td>
<td>40%</td>
<td>48%</td>
<td>31%</td>
</tr>
<tr>
<td>Diabetes: Cholesterol (LDL-C) controlled (&lt;130)</td>
<td>82%</td>
<td>65%</td>
<td>71%</td>
<td>51%</td>
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Keys to Success

• Clear goals
• LEADERSHIP
• Effective communication
• Appropriate incentives
• Constant feedback – hopefully POSITIVE