

Application Development: Alert Technology

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Partners Healthcare

Information Systems

Agenda

- Clinical Alert System Requirements
 - Describe how the alerting system works and what it needs in order to succeed
- The DVT Alert Process
 - Describe the specific process* we developed to use the BWH alerting system for Proactive Prophylaxis Prevention of PE and DVT

* Patent Applied For

The Clinical Alert System

Requirements

- Shareable Data
- Rule Editor
- Trigger Process
- Dispatch Process
- Inferencing Engine
- Notification Information
- Action Choices

Shareable Data

- Admission / Patient Location
- Diagnosis or Problem List
- Demographics
- Vital Signs
- Surgery Details
- Lab Results
- Orders

Rule Editor

Rule: 978 DVT HIGH RISK [Unmodified]

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----- LOGIC -----

If DVT assessment score greater than 3
And patient does not have an active Anti-Embolism order
And patient is not on ANTICOAGULANTS

----- MESSAGE -----

High risk VTE patient without prophylaxis orders.

----- NOTIFICATION -----

Initial: SIGNON to COVERING MD.
Wait 24 hours, then PAGE ALPHA to ATTENDING.
Episode of Care: 4 hours.

----- ACKNOWLEDGMENT -----

Order set: DVT PROPHYLAXIS TEMPLATE.
1. Consider combined pharmacological and mechanical prophylaxis in high-r
2. MECHANICAL PROPHYLAXIS
3. Select one or more.
4. TED stockings KNEE HIGH
5. TED stockings THIGH HIGH
6. Anti-Embolism - Pneumatic Compression - CALF ONLY

<F1> info

< enable >< Logic >< Message >< Notify >< Acknowl >
< triggers >< Rptclass >< sIdeeff >< oWnership >< Title >

K

Cancel

Trigger Process

- Gathers data from an Event
 - Filing of Lab Result
 - Updating of Daily Census
- Organizes into Packets
 - One packet per patient
- Sends Packets to the Dispatcher

Dispatch Process

- Routes the Programs
 - Receives Data Packets
 - Places Program Calls on Queue
- Queue Manager
 - Passes to Inference Engine
 - Receives Results
 - Passes to Notifier

Inference Engine

- Evaluates rule logic

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If DVT assessment score greater than 3  
And patient does not have an active Anti-Embolism order  
And patient is not on ANTICOAGULANTS
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- Stores result in a log

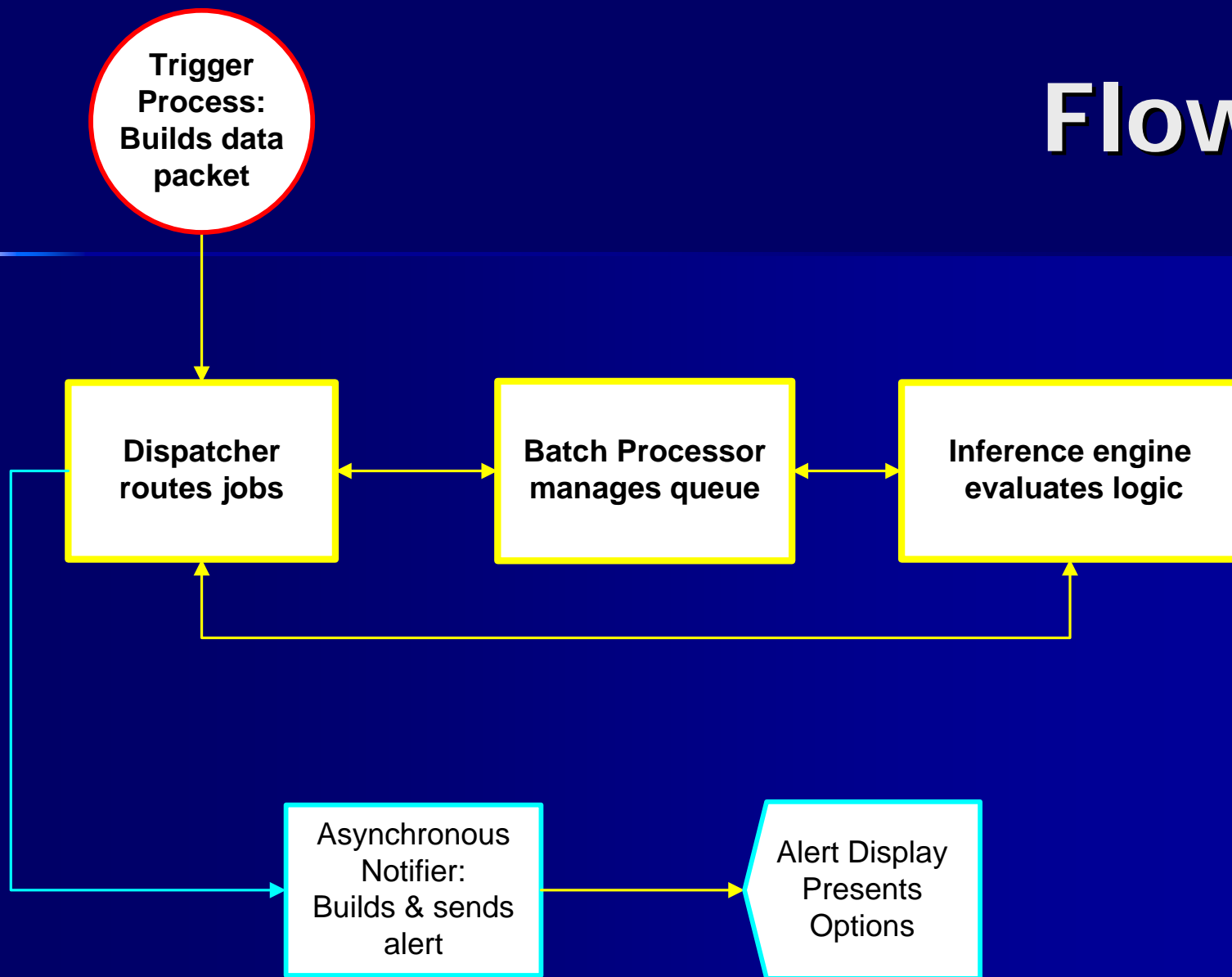
Notification Information

- We must know who to notify
 - Covering MD
 - Attending MD
- We must know how to inform
 - Pager
 - Email
 - Unit or Pod monitor
 - Sign on to System
- We must be able to escalate

Action Choices

- Present Information about the alert
 - Links to Partners' Handbook
- Provide Ordering templates specific to the rule
- Create Orders from the alert screen
 - Labs, Medications, Order Sets
- Redirect clinician into Order Entry

Flow



The DVT Alert

Alert Process for DVT

- Discover Patients at Risk
- Trigger the Rule to Fire
- Notify the Right Person
- Detect Actions Taken
- Follow up
 - If no orders
 - If no acknowledgement

Discover Patients at Risk

- A background process runs between 3 and 4 am daily
 - Searches entire BWH census
 - Computes risk score
 - Collects data on patient with high risk scores

Trigger the Rule to Fire

- At 8:30 am a background process sends each high risk patient through the alert dispatcher
- Rule evaluates
 - DVT risk score > 3
 - Patient has no anticoagulant med orders
 - Patient has no anti-embolism orders

Notify the Right Person

- The resident, or covering MD, who is assigned to the patient should be told.
- Rules are evaluated at 8:30 am so that the alerts will appear when residents sign on after rounds.
- The covering MD receives the alert notice when he or she signs on to the computer.

Detect Actions

- Actions offered

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Act- [ JA Order set: DVT PROPHYLAXIS TEMPLATE.  
ions:[ JB Partners Handbook: Partners Handbook- VTE Guidebook 4th edition  
      [ JC Exit to order entry
```

- Option A opens an order template and places the orders selected directly
- Option B opens the Partners Handbook to the specified page
- Option C takes the clinician directly to the CPOE system.

Follow Up

- The system detects what was done or not done and can follow up in two ways.
 - No action selected. Additional screens will be presented (See *Navigating Program Development* presentation)
 - No acknowledgement by the house officer in 24 hours. In this event, the attending physician will be paged.

Summary – Key Features

- Uses existing systems
- Links
 - to web-based information
 - to CPOE
 - to Patient Information in departmental systems
- Records all actions in a complete audit log
- Runs “behind the scenes”

Questions?

Thank you