CPRS Notifications/View Alerts and Primary Care Workflow: Results of a Preliminary Evaluation

VISN 6 Patient Aligned Care Team Demonstration Lab
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Today’s presentation is part of a tiered, multiple phase VISN 6 PACT Demonstration Laboratory Evaluation Project to evaluate the impact of CPRS Notifications/View Alerts on PACT across 3 levels of evaluation:

1) Workflow and job-related stress, burnout
2) Quality, patient safety, and PACT outcomes monitoring
3) Identify variability of setup across facilities and current best practices to improve operator efficiency

Agenda

- Present data on site variability of notification/view alert parameters among 14 medical centers in VISN 6, 7, and 8 of Region 1 and 2
- Review outcomes of a small scale project designed to better understand how modifications to notification/view alert parameters impact workload
- Review findings that illustrate the extent of staff education and training in management of notifications/view alerts
- Discuss implications and future directions
Poll Question #1: Your Role

Getting to know our audience... What is your role?

a) Primary Care PACT Provider (MD/DO, NP, PA)
b) PACT Team Member (RN, LPN, Psychologist, SW, PharmD)
c) Specialty Care Provider (MD/DO, NP, PA)
d) Administrator, Researcher, or Program Analyst/Electronic Health Record Support
e) Other
Introduction and Background

**General Trends and Findings**
- VA operates a fully integrated electronic health record (EHR)
- Medical systems and clinics employing a form of EHR increased from 13% to 72% between 2008 and 2012\(^1,2\)
- Integrated EHRs are integral to efficient synthesization of health factors.
  - Automation is necessary to improve response to critical patient care needs\(^3\)
  - Allows for decreased response time to critical results\(^3\)
  - EHR promotes improved coordination of care

**Important Quality/Safety Findings**
- Potential for “information chaos”\(^4,12\)
- Survey of VA PCPs (N=106):\(^5\)
  - 37% reported at least one patient with a missed test result during the previous 2-week period leading to a diagnostic delay
  - 15% reported 2+ events in the same time period
- A review of VA EHR-related investigations: 94% of noted safety concerns were related to the equivalent of information chaos\(^6\).
- VA facilities demonstrating lower risk of missed results use specific strategies to prevent view alerts from being lost to followup\(^7\)
CPRS and notifications
- Hysong et al.\textsuperscript{8}: 57 notifications/daily/provider
- Murphy et al.\textsuperscript{9}: 63 alerts/daily/provider

2010 survey of VA PCPs (N=2,590): nearly 50% of notifications were perceived as irrelevant to day-to-day patient care\textsuperscript{10}.

46% of VA PCPs (N=28) reported a personal “work-around” strategy to reduce the burden of CPRS notifications\textsuperscript{8}.

Only one non-VA study investigated the impact of EHR utilization on burnout, stress, and job satisfaction\textsuperscript{11}.
- Physicians (N=379) exposed to moderately-high EMR requirements reported significantly more job-related stress and lower job satisfaction.
- Time pressure as an increasing function of EMR complexity and workload demand was significantly associated burnout and intent to leave one’s current employment.
Method

- Survey to Program Analysts in VISNs 6, 7 and 8; N = 14 medical centers
  - 19 items, 8 domains
    - Hardware and software
    - Clinical content and data
    - User interface
    - People
    - Organizational Policy
    - State and Federal Policy
    - Workflow and Communication
    - Monitoring and measurement
- Pre-Post, site-based case study examining the impact of changes to notification set up; N = 26 PACTs
- Analyses
  - Frequency and qualitative content analysis
  - Parametric analyses
Initial Outcomes: People, and Hardware and Software

**Requested Support for Missed or Lost Notifications**

- 64.20%
- <2 calls/week
- 36.80%
- 2+ calls/week

**Use of Supplemental Software to Support Management of Notifications**

- Yes
- No
- 92.90%

- One site reported use of a grandfathered modification/software that turns off notifications for procedure orders that are entered; ability to modify for each consulting service’s needs.
Initial Outcomes: Monitoring and Measurement

Use of Pre-Existing VISTA Tools to Ensure Processing of Notifications

- Use of Tools: 42.90%
- No Consistent Use of Tools: 57.10%

Use of VISTA notification management tools to notify supervisors/providers about outstanding notifications

- Yes: 14.20%
- No: 85.80%

- Multiple sites report use of the XQAL Backup Reviewers parameter to monitor unprocessed notifications; automatic auto-forward to a backup reviewer within 21 days.
- One site assigns admin staff to receive XQAL UNPROCESSED ALERTS notifications, upon which a supervisor is notified to designate a surrogate.
Initial Outcomes: Organizational Policy, Workflow and Communication

Use of a Committee or Quality Assurance Staff to Monitor Notifications Related to Critical/Abnormal Results

- Yes: 78.60%
- No: 21.40%

Methods to Monitor Notifications and Workload/Workflow

- Yes: 100%
- No: 0%

- One site reported use of an oversight committee to review notifications not processed within 13 days; findings are forwarded to the designated service chief.
- One site reported that notifications are tracked through the Compliance Committee.
- One site reported that a quality assurance person within each service monitors unprocessed notifications.
Site-to-Site Variability in Notification Setup and a Single Site Project to Determine How Parameter Modifications Impact Workload
Poll Question #2:
Perceived Burden of Notifications/View Alerts

For those who frequently utilize CPRS, how would you respond to the following statement?

*The volume of CPRS notifications/view alerts I receive is burdensome to my clinical duties.*

a) Strongly agree  
b) Agree  
c) Disagree  
d) Strongly disagree
Understanding Notifications/View Alerts

- **TIU Alerts**
  - Unsigned documents
  - Uncosigned documents
  - Documents for additional signature
  - Overdue for signature

- **Vista Notification Categories**
  - Lab orders
  - Lab results
  - Imaging orders
  - Imaging results
  - Medications
  - Consults
  - Orders
  - Other Packages
  - Patient Movement(s)
Significant differences in use of notifications were reported across VA medical centers\textsuperscript{7,14}.

There is a general lack of consistent best practices for setup that promote operator efficiency.
Site-to-Site Variability:
Lab Result Category Parameters

Category = Lab Results
Level = System
MANDATORY

Category = Lab Results
Level = System
Enabled

Category = Lab Results
Level = System
Disabled

Category = Lab Results
Level = Team
Enabled

Category = Lab Results
Level = Team
Disabled

ANATOMIC PATHOLOGY RESULTS
0.00%

LAB THRESHOLD EXCEEDED
0.00%

ABNORMAL LAB RESULT (INFO)
14.29%

CRITICAL LAB RESULTS (ACTION)
35.71%

STAT RESULTS
50.00%

LAB ORDER CANCELED
50.00%

CRITICAL LAB RESULT (INFO)
50.00%

ABNORMAL LAB RESULTS (ACTION)
50.00%

LAB RESULTS
57.14%
Site-to-Site Variability: Orders Category Parameters

Category = Orders
Level = System
MANDATORY

Category = Orders
Level = System
Enabled

Category = Orders
Level = Team
MANDATORY

Category = Orders
Level = Team
Enabled

VETERANS HEALTH ADMINISTRATION
Two modifications to notification parameters; April and November 2015

Pre-Post analysis to examine:
- Change in Notifications pending
- Change in the ratio of notifications/encounters

<table>
<thead>
<tr>
<th>Notification</th>
<th>Value</th>
<th>Notification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAB RESULTS</td>
<td>Disabled</td>
<td>STAT ORDER</td>
<td>Disabled</td>
</tr>
<tr>
<td>ORDER_requires_chart_signature</td>
<td>Mandatory</td>
<td>STAT RESULTS</td>
<td>Disabled</td>
</tr>
<tr>
<td>FLAG ORDER FOR CLARIFICATION</td>
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<tr>
<td>ABNORMAL LAB RESULTS (ACTION)</td>
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<td>MEDICATIONS EXPIRING - INPT</td>
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<tr>
<td>ADMISSION</td>
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<td>UNVERIFIED MEDICATION ORDER</td>
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<tr>
<td>UNSCHEULED VISIT</td>
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<td>NEW ORDER</td>
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<td>DECEASED PATIENT</td>
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<td>STAT IMAGING REQUEST</td>
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<td>URGENT IMAGING REQUEST</td>
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<tr>
<td>IMAGING RESULTS, NON CRITICAL</td>
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<td>IMAGING RESULTS AMENDED</td>
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<tr>
<td>CONSULT/REQUEST RESOLUTION</td>
<td>Mandatory</td>
<td>FOOD/DRUG INTERACTION</td>
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<tr>
<td>CRITICAL LAB RESULT (INFO)</td>
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<td>ERROR MESSAGE</td>
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<td>ABNL IMAGING RESLT, NEEDS ATTN</td>
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<td>CRITICAL LAB RESULTS (ACTION)</td>
<td>Disabled</td>
</tr>
<tr>
<td>IMAGING REQUEST CANCEL/HELD</td>
<td>Disabled</td>
<td>ABNORMAL LAB RESULT (INFO)</td>
<td>Disabled</td>
</tr>
<tr>
<td>NEW SERVICE CONSULT/REQUEST</td>
<td>Mandatory</td>
<td>FLAGGED OI ORDER - OUTPT</td>
<td>Enabled</td>
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<tr>
<td>SERVICE ORDER REQ CHART SIGN</td>
<td>Mandatory</td>
<td>CONSULT/REQUEST UPDATED</td>
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<td>Mandatory</td>
<td>CONSULT/PROC INTERPRETATION</td>
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<tr>
<td>NPO DIET MORE THAN 72 HRS</td>
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<td>ANATOMIC PATHOLOGY RESULTS</td>
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<td>FLAGGED OI RESULTS - INPT</td>
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<tr>
<td>ORDERER: FLAGGED RESULTS</td>
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<td>SUICIDE ATTEMPTED/COMPLETED</td>
<td>Enabled</td>
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<td>DISCHARGE</td>
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<td>TRANSFER FROM PSYCHIATRY</td>
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<tr>
<td>ORDER requires CO-SIGNATURE</td>
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</tr>
<tr>
<td>FLAGGED OI ORDER - INPT</td>
<td>Mandatory</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>LAB ORDER CANCELED</td>
<td>Disabled</td>
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</tr>
</tbody>
</table>
## Outcomes: Single Site Project

<table>
<thead>
<tr>
<th></th>
<th>Pre Intervention (Mean)</th>
<th>Post Intervention (Mean)</th>
<th>Change</th>
<th>t</th>
<th>Sig.</th>
<th>Eta Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total notifications</td>
<td>4,121.15</td>
<td>2,660.19</td>
<td>-1,463.96</td>
<td>-7.01</td>
<td>.000</td>
<td>.67</td>
</tr>
<tr>
<td>Ratio of notifications/</td>
<td>9.83</td>
<td>8.03</td>
<td>-1.80</td>
<td>-3.22</td>
<td>.004</td>
<td>.30</td>
</tr>
<tr>
<td>encounters</td>
<td></td>
<td></td>
<td></td>
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</table>
EDUCATION AND TRAINING OF STAFF
For those who frequently utilize CPRS, please select the primary method by which you were trained (educated) to manage notifications:

a) Video training
b) Assigned personal mentor / trainer
c) Simulation-based scenarios
d) Instructor-based course
e) Self-taught (on your own)
In a 2010 national survey of VHA PCPs (N=2590):  
- 66% primary care providers found education to CPRS inadequate.
- 35% could identify an assigned contact for technical assistance.
- 60% reported receiving the majority of EHR assistance from a colleague.

Nearly 50% VA primary care providers (N =28) in two large VA facilities were completely unaware of existing CPRS functions that may improve efficiency for processing notifications. Use of functions produced:  
- More timely completion of notifications.
- 28% received fewer notifications.
Initial Outcomes:
Education and Training Specific to Notification Management

<table>
<thead>
<tr>
<th>Specific Education Offered</th>
<th>MD/DO</th>
<th>NP/PA</th>
<th>RN/Nursing</th>
<th>Admin Personnel</th>
<th>Medical Residents</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.6%</td>
<td>38.6%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>14.3%</td>
<td>7.1%</td>
<td></td>
</tr>
</tbody>
</table>

- Mean reported time devoted specifically to notifications education: 15 minutes
- Program Analysts report receiving a mean of 8.45 requests from PACT providers/week specific to management of notifications
IMPLICATIONS, LIMITATIONS AND FUTURE DIRECTIONS
### Implications

<table>
<thead>
<tr>
<th>Operator Development</th>
<th>WORKFLOW AND QUALITY/SAFETY</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Investment in EHR education/training</td>
<td></td>
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<tr>
<td>• PACT Staff</td>
<td></td>
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<tr>
<td>• Trainees (Residents and Students)</td>
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<tr>
<td>▪ Emphasis on User Control Management (at a minimum)</td>
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<tr>
<td>▪ SITE TO SITE VARIABILITY</td>
<td></td>
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<tr>
<td>▪ Decrease Variability</td>
<td></td>
</tr>
<tr>
<td>▪ Best Practice(s) ID to optimize workflow and decrease admin burden</td>
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<tr>
<td>▪ Workload burden</td>
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<tr>
<td>▪ System vs Team parameters</td>
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<tr>
<td>▪ Improved design of monitors and tools</td>
<td></td>
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<tr>
<td>▪ Methods for monitoring stress and burnout related to Information Chaos</td>
<td></td>
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<tr>
<td>▪ AWARE(^{14})</td>
<td></td>
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<tr>
<td>▪ eHMP</td>
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<tr>
<td>▪ Future design and workflow</td>
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</tbody>
</table>
Limitations and Future Directions

LIMITATIONS
- Sample: Size and Region
- Reliance on Preliminary Data
- Case Study for Workflow

FUTURE DIRECTIONS
- Connection to PACT Staff stress and burnout
- Identity best practices and perform impact evaluations
- Mapping algorithm as applied to workload and operational efficiency
- Coordinate with eHMP updates
TOOLS
10 Strategies for managing notifications

1. Create a strategy to prioritize
2. Sort your notifications for easier processing
3. Resize the notification window to see more alerts
4. Don’t miss critical information due to small column size
5. Make the Process All feature work for you
6. Prevent alerts from disappearing from CPRS
7. Adjust your notifications according to your preferences
8. Get your notifications to other providers
9. Assign a Surrogate Provider when you are going to be away
10. Remain “alert” about your responsibility
Suggested Tools:
Tool #2 - VEHU courses

- **Go to MyVeHU Campus**
- Search by
  - “Alerts”
  - “Notifications”

- **Suggested Courses:**
  - 102 - Alerts and Notifications
  - 13068 - Back to Basics – Notifications
  - 310 - Notifications / Surrogates / Alerts
Suggested Tools:
Tool #3 - CPRS User Control Management Options
References


Questions?

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