Building Health Information Technology Capacity: They May Come But Will They Use It?

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Introduction

- Overview
- Literature Review
- Methods
- Results
- Discussion
- Recommendations
- Limitations
- Translation in Practice
- Summary
- References

Background

- COSTLY
- Patient Safety
  - Medical errors: 98,000 deaths/year U.S. hospitals
  - Medication errors: 1/3 of those errors
  - 1.5M patients harmed yearly by preventable med errors
- Healthcare Dollars (annual)
  - $177B → hospitals, long-term & ambulatory care*
  - $887M→ ambulatory care**

* Medication Errors Panel. *Prescription for Improving Patient Safety: Addressing Medication Errors.* California Senate Concurrent Resolution 49, March 2007. http://www.cdcan.us/Health/MedicationsErrorPanel-FULLFINALREPORT.pdf

** Field T, Gilman B, Subramanian S, Fuller J, Bates D, Gurwitz J. The cost associated with adverse drug events among older adults in the ambulatory setting. *Med. Care.* 2005; 43 (12): 1171-1176.

Background

- Policy Influence Medication Safety
  - IOM, HHS, IHI, ISMP, TJC
    - **medication reconciliation (MR)** - standard of practice

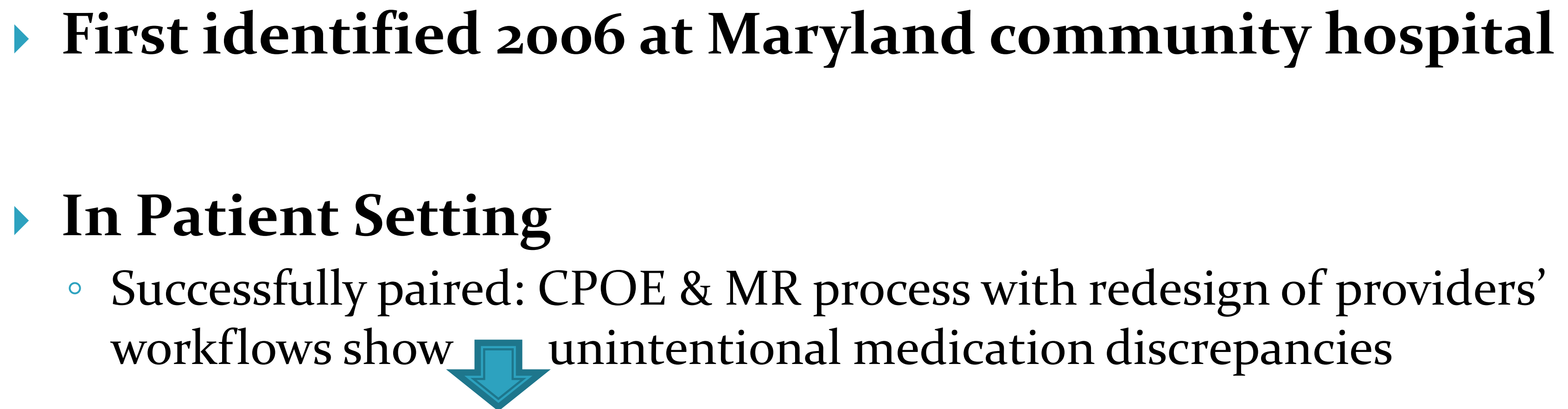
- IOM Recognized Technologies (low adoption rates)
  - eRx (26%)
  - CPOE (5-17%)
  - BCMA (5-29%)
  - Provider EHR (8-17%)
  - Patient PHR (7%)
  - **Pt-Provider Email** (7%)

Background

- Department of Health & Human Services
  - $27B+ for technology
- Meaningful Use
  - Information blueprint for improved quality care & health outcomes
- Medication Reconciliation (MR) & Secure Email
  - Stage I 2011 & Stage II 20~~13~~14 (proposed)

Practice Problem

Lack of evidence-based recommendations for integrating HIT into *outpatient settings* to improve medication reconciliation & patient safety



- **First identified 2006 at Maryland community hospital**
- **In Patient Setting**
  - Successfully paired: CPOE & MR process with redesign of providers' workflows show ↓ unintentional medication discrepancies

Practice Problem

- **The Challenge**
  - **HIT and MR Process – Provider-Centric**
  - **Out Patient Setting – Partnership Pivotal**
    - COST:
      - $177B→ drug-related illness and death
      - $887M→ preventable drug-related injuries
      - SAFE CARE
  - **Increasing use of HIT**
      - wellness reminders & secure email communication
      - PHRs = self-management
      - coordinating care in provider-patient workflow

Purpose Of Study

- **The purpose of this study was to evaluate the effectiveness of sending secure email reminders to Veterans via PHR prior to their scheduled appointment in a Veterans Administration outpatient clinic.**

- **How it worked (3-step MR process)**:
  - **Verify**: secure email asked Vets to view, print, update list in PHR with home medications & bring to next scheduled clinic visit
  - **Clarify**: Providers used patients' modified lists to compare medications listed in EHR during the MR process at the visits
  - **Reconcile**: changes documented in EHR with new copy to patient

Research Questions

1. Did Vet receive MR secure email reminder?
2. Did Vet bring printed med list to visit?
3. Did Vet bring list because of the reminder?
4. Was MR documented by the provider and did it vary by those who brought a list and those who did not after alert?
5. Were meds changed and did it vary by those who brought a list and those who did not after alert?
6. What were the common reasons for medication change in Vets complying with secure email reminder?

Study Goals

- **Goal 1:** facilitate electronic view of medication lists for both patient and provider
- **Goal 2:** increase number of patient-generated home medication lists brought to routine clinic visits
- **Goal 3:** coordinate communication, both electronic and face-to-face, between the patient and provider to confirm the accuracy and completeness of the medication list

Significance of Project

- **Contributes to nursing knowledge**
  - *Inform VHA* about Veterans' and providers' compliance with & use of secure email alerts
  - (*Identify* changes made to VA EHR medication list)
  - (*Categorize & analyze* discrepancies in Veterans' medication lists)

Theory

- **Roger's Diffusion of Innovation Model**

  Well known: >5,000 studies since 1953

Diffusion defined: process allowing *communication* about *innovations* to travel through certain *channels* over *time* among members of a *social system.* [5 foundation *concepts*]

Organization's decisions *differ* in time & social structure

Individuals may not be able to adopt new idea until organization does

Roger's DOI Model Operationalized

I. Initiation Phase------------> | II. Implementation Phase-------------------------->

Agenda-Setting	Matching	Redefining-Restructuring	Clarifying	Routinizing
Reduce medication discrepancies through a modified MR process adding HIT used by Veterans and healthcare providers at a VA outpatient clinic	Send secure email reminder to Veterans to review PHR med list with home meds and to bring the printed modified med list to routine clinic visit	Describe no. of Veterans and & type of med discrepancies after Veterans bring home med list & coordinate with provider EHR med list during clinic MR process creating an accurate and complete med list	Analyze results and disseminate to VA organization with consideration of broader diffusion if majority of Veterans brought their med lists to coordinate w/ clinic MR process	Organizational diffusion of secure email reminders sent routinely as medication list reminders w/ Veterans as partners in MR process

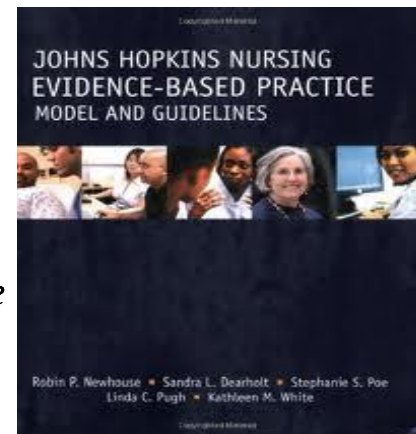
Out of Scope

VA Decision to Adopt

Review of the Literature - MR

- 15 articles
- Study Designs (strength & quality)
  - 1 systematic review (IVA)
  - 1 literature review (IVA)
  - 11 quality improvement (10 IIIC 1 VC)
  - 2 quasi-experimental (IIB IIC)
- Ratings generally moderate strength & quality ranging high, good, low*
- Mostly non-generalizable QI studies

* *Johns Hopkins Evidence Rating Scale*



Literature Review

- **3 Main Topics - MR**
- **1st Concepts Defined**
  - **MEDICATION RECONCILIATION:** three-step process to create most accurate and complete list of all medications patient is taking, naming the drug, dose, frequency and route
    - *Verify* – collect med history
    - *Clarify* – assure meds & doses appropriate
    - *Reconcile* – document change
  - **MEDICATION DISCREPANCY**: difference between what the patient is actually taking (home meds + PHR list) compared to the provider's EHR list

Literature Review

- **Medication Discrepancies (reasons for medication changes)**
- Omission – drug should be on list – recently ordered
- Comission - drug should be off list - recently discontinued
- Wrong Drug Name
- Wrong Drug Dose
- Wrong Drug Route
- Wrong Drug Frequency
- Drug-Drug Interaction
- Drug-Allergy Interaction
- Wrong Drug – for diagnoses
- Duplicate Drug Orders – two or more similar drugs ordered and contraindicated
- Intentional drug non-adherence – provider directed
- Intentional drug non-adherence – patient directed
- Patient Information Error – patient knowledge deficit of medicine regime
- Clinical change made – new treatment regimen warranted
- No Change Made

Literature Review

- **Medication Discrepancies Categorized**

1. **Omission** – drug should be on list – recently ordered

2. **Comission** – drug should be off list – recently discontinued, duplicate, or contraindicated-drug drug, drug disease, drug allergy, adverse drug reaction

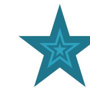
3. **Provider Generated Discrepancy** – patient advised by provider to take drug differently—should be corrected but can't due to pharmacy package

4. **Patient Generated Discrepancy** – patient intentionally taking drug differently either due to choice or misunderstanding or forgetting

Literature Review

- **Topic 1: MR across the Continuum of Care**
- **6 Studies**
  - Average age 60-75 years, male & female, CVD, COPD, DM, GI
  - Discrepancies (whether)
    - 1-7 days post d/c **home**, 1-3 days at **hospital admission**
  - Discrepancies not labeled standard way
    - omission, comission, patient information error, drug frequency & dose error
    - patient or provider intentional non-adherence (new)

Most **Helpful in MR process:**



med lists from PCPs

education/skill in med history taking

Literature Review

- **Topic 2: HIT adjunct to outpatient MR process**
- **7 Studies**:
  - EHRs increasingly used mid-2000 with paper records
  - Interdisciplinary teams add value (pharmacists)
  - Patients as partners introduced
- **VA study 2004** – pharmacists' interviews - before national PHR
  - Average age 74 years Male (98%) n=493
  - Omissions 25% Comissions 13%
  - EHR no. meds per pt = 10
  - no. meds per pt = 12
  - Pt lists 100% congruent with EHR = 5%

Literature Review

- **Topic 3: EHRs & patient reminders (engagement)**
- **2 Studies: Mayo Clinic**
- Varkey 2007
  - Bring paper med lists
    - 5% - 52%
  - No. discrepancies decreased
    - 5.2 -0 2.5

Nassaralla 2009

Bring med bottles or med lists

12 - 29% (p<.001)

Completeness b/w med lists

20 - 50% (p<.001)

Literature Review - VHA Focused

2007 VHA Survey: Vets already using PHRs →

Who are they & what do they do?

Male (91%)

Age 19-50 (16%)
51-70 (68%)
71+ (16%)

Access from home (96%)

Use weekly (25%)

Use monthly (49%)

Request Rx refills (75%)

Access medicine history (24%)

Nazi, K. (2010). Veterans voices: Use of the American Customer Satisfaction Index (ACSI) to identify MyHealthеVet personal health record users' characteristics, needs, and preferences. *JAMIA*, 17(2), 203-211. doi:10.1136/jamia.2009.000240

Methods

Ethical Considerations

- UMB Institutional Review Board (IRB) approved
  - August 11 (expedited)
  - HIPAA waiver (consent)
- VA Office of Research & Development approved
  - August 23

Methods

- Inclusion Criteria: Veterans
  - Use MyHealth***e***Vet & Secure email (IPAs)
  - Scheduled clinic visits (Sept-October 2011)
  - Take medications
  - Received alert
  - Cognizant

Methods

- Design: non-experimental Descriptive
- Population: N = 237 (Vets opt-in to secure email-IPAs)
- Sample: n = 62 (Sept-Oct Vets w/clinic visits)
- Setting: Loch Raven & Baltimore → 2 VA outpatient clinics
- Procedures: Provider-Pt. workflow redesign
  Provider in-services
  Secure email alerts/ reminders
  MR intervention
  Retrospective chart review

Timeline: Procedures/Data Collection

Date 2011	Activity
June 15 – August 11	UMB IRB submitted & approved
August 23	VA ORD approved
June 7 & 21; August 23	EHR MR template approved & modified
July 13, 21; August 5, 12; September 8	In-service trainings to 90 VA clinic staff with Call Center
August 24	Study invitation sent to Veterans in secure email
September 1– October 31 October 10 – October 31	Secure email alerts distributed to Veterans & conducted site visits for staff support Retrospective Chart Review
September 1– October 31	Capstone medication reconciliation – provider intervention with participants
October – November	Analyzed, synthesized, evaluated Prepared Capstone Project Report
November December 8	Prepared final report & journal publication Defend Capstone Project

Secure Email

See handout

- **Keeping Me Healthy and SAFE**
- My Medication List
- Is it Right or Wrong?
- **My CHECKLIST**
- ***Preparing for my***
- ***2011 VA clinic visit in September or October***
-
- **To help your Loch Raven or Baltimore Primary Care Provider update your medication list, you:**
- **Are getting *this electronic* message reminder just prior to your September or October clinic visit, *then***
- **Review & print your medication list from MyHealth*e*Vet, and correct this paper list based on your home medications, *then***
- **Bring this corrected paper medication list to your (September or October) scheduled visit giving to your provider for a face-to-face discussion about your medications.**
-
- **END RESULT**: My NEW accurate and complete medication list.
- If any questions, please contact us through the VA main call center at 410-605-7333 or 1-800-463-6295 *extension* 7333 to reach the **Loch Raven** or **Baltimore Outpatient Clinics** .

VA MR e-Template

- Approved modification

LR & BT Providers <u>ONLY</u> UMB-VA Med Recon STUDY

Sept/Oct 2011

Did you receive a Medication Reconciliation *secure message alert*? Yes No

Did you bring your *corrected* home medicine list printed from your MyHealth<u>e</u>Vet? Yes No

Did you bring your corrected home medicine list *because* of the secure message alert? Yes No

VistA CPRS in use by: Jaramogi,Cynthia (vista.baltimore.med.va.gov)

File Edit View Action Options Tools Help

ZZINFORMATICS,TEST NINE 000-00-1120 Jun 11,1920 (90) | BCI Dec 09,10 14:25 Provider: JARAMOGI,CYNTHIA | Primary Care Team Unassigned | Flag | VistaWeb Remote Data | Postings CWAD

Last 200 Signed Notes | AMBULATORY/OUTPATIENT CARE NOTE May 23,2011@15:01 Vst: 12/09/10 BR CLINICAL INFORMA | Jaramog | Change...

New Note in Progress
May 23,11 AMBULATORY
All unsigned notes for JARAMOG
May 04,11 SPEECH CLINI
Feb 23,11 WEIGHT MANA
All signed notes
May 02,11 MEDICAL DAILY
May 02,11 ANESTHESIA F
Apr 20,11 PDI/CDI NOTE, C
Mar 22,11 NURSING ADMI
Mar 22,11 NURSING ADMI
Mar 21,11 NURSING NOTE
Mar 21,11 GENERAL SUR
Mar 01,11 CASE MANAGE
Feb 18,11 NURSING NOTE
Feb 18,11 PATIENT TEAC
Feb 15,11 MEDICAL DAILY
Feb 15,11 MEDICAL DAILY
Feb 10,11 PRIMARY CARE
Feb 10,11 INJECTION NOT
Feb 10,11 PNEUMOVAX N
Feb 01,11 MEDICAL DAILY
Dec 30,10 MEDICAL DAILY
Dec 09,10 PATIENT TEAC
Nov 10,10 MEDICAL DAILY
Oct 12,10 NURSING NOTE
Oct 06,10 PRIMARY CARE
Sep 29,10 COMMUNITY H
Sep 28,10 PDI/CDI NOTE, I
Sep 16,10 NURSING ADMI
Sep 16,10 NURSING NOTE
Sep 14,10 MENTAL HEAL
Sep 14,10 MENTAL HEAL
Sep 10,10 TELEPHONE C
Sep 01,10 AMBULATORY/

Reminder Dialog Template: Medication Reconciliation

```
"Medication Reconciliation" is the process that maintains a complete and accurate patient medication profile
 throughout the continuum of care. At the VA, the process focuses on ensuring that the medication lists held in
 CPRS continuously reflect what the patient is actually taking.  With few exceptions:
  -- Outpatient visit where medications have not been changed
  -- Outpatient diagnostic/procedural visit where medications have not
       been given
  -- For the Surgical patient, during the Operating Room or PACU episode
       of care

Otherwise, Medication Reconciliation must be performed at each outpatient visit, as well as when inpatients are
 admitted, going on a pass, transferred or discharged.

Before you begin this template, please enter the medication orders that reflect today's visit, admission or
 acceptance in transfer.  This will ensure that this template imports up-to-date information from CPRS, thereby
 facilitating your medication review. To write these orders, you must unfortunately EXIT this template.  Please
 reinitiate the template after you are done.

OUTpatient

 Click here if you wish to include the outpatient medication list in your note. (Optional)

 Here is the list of your patient's Active and non-VA medications as they are currently held in CPRS (FYI, the
  list also includes recently expired medications, in case they lapsed unintentionally)

 Active and Recently Expired Outpatient Medications (including Supplies):

      Active Non-VA Medications                              Status
 =========================================================================
 1)   Non-VA ENALAPRIL 10MG TAB 5MG    TWICE A DAY           ACTIVE

 No Active Remote Medications for this patient
```

Visit Info | Finish | Cancel

```
OUTpatient
  I have compared the patient's current medications with those listed in
  CPRS.
```

Health Factors: MEDREC OUTPATIENT

* Indicates a Required Field

Cover Sheet | Problems | Meds | Ord

start | 3:01 PM

VA Clinic MR Workflow ▪ *Redesign*

Information gathered at front desk (usual care)

- ***IF Veteran brought printed med list - advised to give to provider during exam***

Providers engage patient in MR process during exam (usual care)

- ***Provider asks Vet & documents in EHR:***
  - ***Did you receive MR alert?***
  - ***Did you bring home med list - because of the alert?***
  - ***Reasons for medication changes.***
  - Printed med list copy given (usual care).

Data Collection Tool

Veteran EHR #____________Pseudo #:____________Date collected:_____________Abstractor__SBB______		
Variables	**Coding**	**Data Collected**
sex	1=male 2=female	
age	in years	
clinic	1=LochRaven 2=Baltimore	
clinician	1=MD 2=NP	
primary provider	1=JLu 2=ME 3=AK 4=DS…. 27=AH 28=MG 29=BR 30=CSh	
patient received secure message reminder	1=yes 2=no	
patient brings medication list to appointment	1=yes 2=no	
patient brings medication list to appointment because of reminder	1=yes 2=no	
medication reconciliation documented	1=yes 2=no	
changes in medications documented	1=yes 2=no	
Reasons for medication change (+count)	1=omission 2=comission 3=wrong drug name 4= wrong drug dose 5=wrong drug route 6=wrong drug frequency 7=drug-drug interaction 8=drug-allergy interaction 9=wrong drug 10=duplicate drug order 1=nonadherence drug doctor directed 12=nonadherence drug patient directed 13=patient information error 14=clinical change made 15=no change	

Data Analysis

- Microsoft Office Excel 2007
- 62 Veterans sent 2nd secure email
  - 19 no shows or cancelations
  - 14 non-PCP exams
- n=29
  - 5 records showed PCP documentation in MR e=Template (asking Vet research questions)
    - 2 Vets received secure email
    - 3 Vets did not

Data Results

n=29

Male 90%
Average age 61 (SD=13.6, range 37 – 87 years)
Average active problems 14 (SD= 6.0, range 4-28)
Average no. meds 11 (SD=7.8, range 2-36)
No. meds changed 28
No. meds refilled 11
Average days b/w email alert-visit 5 (SD=2, range 0-9)
Provider types by unique encounters: 23 MDs / 6 NPs

Discussion

- Back to the Literature: secure email adoption inertia
- Interview VA staff in other regions: 1st Pilot Study
- Review, identify and evaluate barriers/gaps in project preparation/intervention and VA systems readiness
- Develop strategies and recommendations to overcome adoption (MU) inertia

Discussion

Lessons Learned - Barriers

- Resistance to change based on VHA Organizational
  - Strategy
  - Structure
  - Technical / Workforce Resources
  - Culture

Recommendations

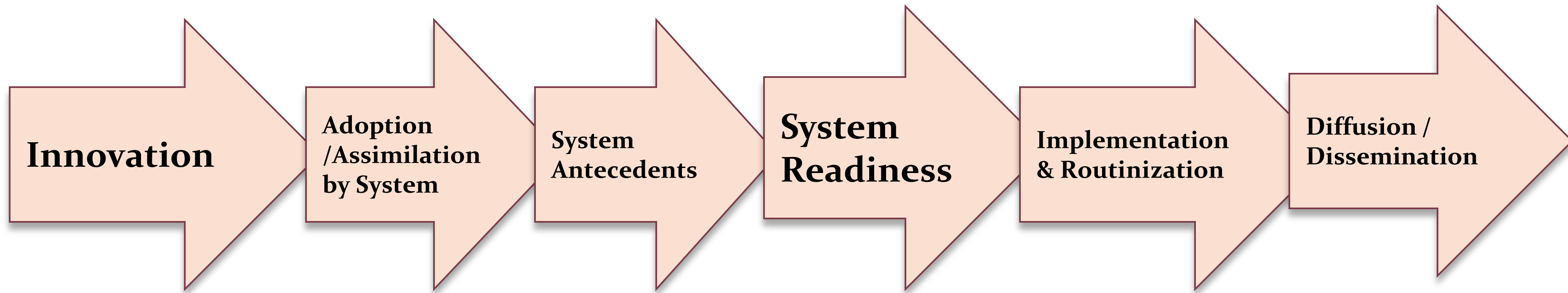
Lessons Learned - Barriers

- Resistance to change based on VHA Organizational
  - Strategy
  - Structure
  - Technical / Workforce Resources
  - Culture

Limitations

- Convenience, small sample size & low response rate
- VA System *non*-readiness & interdependence
- Provider-user resistance
- Non-generalizable beyond 2 VA clinics

Translation into Practice



- ***Relative Advantage*** "what's in it for me"
- ***Compatible*** *with own values*
- ***Observable*** *benefits for "me"*
- **not *Complex*** or broken into easy steps
- improves ***Task Performance***

- ***Context-specific Psychological Antecedents (motivation)***
- ***Meaning***
- ***Adoption Decision***

- ***Decentalization***
- ***Functional Differentiation Specialization***
- ***Technical Capacity***
- ***Formalization***
- ***Internal Communication***

- ***Tension for Change***
- ***Innovation-System fit***
- ***Support and Advocacy***
- ***Dedicated Time & Resources***
- ***Assess implications***

- ***Organization Structure***
- ***Leadership***
- ***Resources***
- ***Feedback***
- ***Adaptation***
- ***Reinvention***
- ***Routine***

- ***Network Structure***
- ***Opinion Leaders***
- ***Champions***
- ***Boundary Spanners***
- ***Formal Dissemination Programs***

Greenhalgh et al. 2004

Translated into Practice

- **VA secure email pilot Sept – Nov 2011**
  - Obtained Leadership approval - 1st specialty clinic pilot
  - Registered 50/200 Veterans to MHV/IPA within 4-6 weeks
  - Redesigned Workflow+
    - e-Templates assessing trauma-induced headaches via Secure Email
    - Report mechanisms - vertically & horizontally
  - HANDed-OFF to NP and Triage Team

Summary

- Literature supports
  - Medication errors are serious practice problem
  - MR is a practice standard relevant to patient safety
  - TJC new release of med management July 2011
  - HHS funding for Meaningful Use
  - Patient partnerships: 1 key solution to health reform
  - TIMING premature in VA setting
    - Patient-Aligned Care Teams stability
    - Adoption inertia per locality (VISN)

Dissemination of Results

- Manuscript Publication
  - CIN – July 2012
- Speaking engagements:
  - MD Nursing Association 108th Convention October 13th, 2011
  - UMB 22nd Annual SINI Conference July 19th, 2012
  - DNP 5th National Conference September 19th, 2012

Q & A

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