Patient Safety Across the Continuum

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Partners Healthcare

Disclosures: I am a Board member of CRICO (the Harvard malpractice insurer) and the NPSF Board of Governors.

Learning Objectives

- Describe the main safety risks during transitions of care and in ambulatory care
- Discuss possible interventions to improve patient safety and reduce risk
- Describe key elements of an ambulatory patient safety program
Transitions of Care

• Handoffs and transitions are particularly high risk for adverse events
• Adverse events after discharge
  —20% of patients
    ➢ Adverse drug events most common 66%
    ➢ Procedure related 17%

  *Forster et al, Ann Int Med 2003*

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Transitions of Care

• Medication reconciliation is a big issue
  —Need to ensure correct medication list at all times
• One study found that half of all medication errors occurred at interfaces of care
  (Resar, Luther Middlefort Hospital)
• Recent study shows over half of patients with a medication discrepancy at time of hospital admission
  (Cornish, Arch Int Med 2005)
Medication Reconciliation

- RCT performed 2002-2003 at BWH
- Prior to discharge pharmacist noted:
  - 37% of discharge medication lists were missing a medication should have been prescribed at discharge
  - 49% of discharge medication orders had one or more unaccounted for discrepancies
- Phone follow-up 3-5 days later found:
  - 29% of patients NOT taking a medication on their discharge list, taking a different dose or frequency, or taking an additional medication
  - 23% of patients not adhering to their discharge medications

Tests Pending

- 41% of patients had test results return after discharge
- Of these, 9% potentially actionable
- MDs unaware of 2/3 of these results
  - 12% required urgent action
  - 37% required some action


Unresolved Medical Issues

- 28% of discharges have recommendations for outpatient workups post discharge
  - E.g. procedures (endoscopy), tests (CT), referrals
  - Half not documented in the discharge summary
- Within 6 months of discharge, 36% were not completed
  - Increasing time to the initial postdischarge visit decreased likelihood
  - Documentation of the workup in the discharge summary increased the likelihood

Discharge summary is a poor communication tool

- Only 25% of discharge summaries mentioned pending test results
- Only 12% of discharge summaries available to PCP during follow up clinic visits

Strategies to error-proof high-risk transitions

- Improve handoffs in care
  - Standard templates for transitions
  - Improved discharge processes/reduce readmissions
- Medication reconciliation
  - Should be done inpatient and outpatient
    - Requires accurate medication lists

Partners Transitions Efforts

- Multi-year effort to improve both the content and timeliness of discharge documentation
  - Created key elements to be present in d/c summary
  - All or nothing scoring
  - Created strict timelines, often in conflict with existing by-laws

The 9 Elements for Defect-Free Documentation:
- Must have all elements to be defect-free:
  1. Pre-admission Medication List
  2. Allergies
  3. Follow-up Plans
  4. Condition at Discharge
  5. Discharge Medication Instructions
  6. Advanced Care Plan if applicable
  7. Studies Pending if applicable
  8. 24/7 Contact Information
  9. Warfarin Information if applicable

The Timeliness Criteria:
- Discharge must be transcribed or typed:
  - Within 24 hours after discharge and no more than 2 days before discharge if patient is going home;
  - On the same calendar day of discharge and no more than 2 days before discharge if patient is going to a facility.

Progress in Improving Timeliness & Completeness of D/C Info
April 17, 2011
Dear Dr. HOSPITALIST, M.D.:

DISCHARGED PATIENT (BWH# 12345678), for whom you were the attending of record, was discharged from Brigham and Women’s Hospital on 03/27/2011. Some tests from this hospitalization were still pending at the time of discharge. We have listed below 1) tests whose results have been finalized after discharge, and 2) tests whose results are still pending. Chemistry and Hematology test types are included in this service. Radiology, Pathology, and Microbiology test types are available in separate notifications.

The patient’s PCP, NON-NETWORK PROVIDER, did not receive this notification because s/he does not have a Partners email address listed.

This is a new service we are piloting that we hope you will find to be helpful. Note: Any corrections or changes made after tests are finalized are not captured by this service but are reported per current lab protocol.

Inpatient Attending: HOSPITALIST, M.D. Work Phone: 111-111-1111
Primary Care Physician: NON-NETWORK PROVIDER, M.D. Work Phone: 222-222-2222

Microbiology Results FINALIZED

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Test</th>
<th>Result</th>
<th>Date Collected</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1052020</td>
<td>BLOOD CULTURE</td>
<td>NO GROWTH</td>
<td>04/10/2011</td>
<td>04/16/2011</td>
</tr>
<tr>
<td>B1052021</td>
<td>BLOOD CULTURE</td>
<td>NO GROWTH</td>
<td>04/10/2011</td>
<td>04/16/2011</td>
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<tr>
<td>B1052164</td>
<td>BLOOD CULTURE</td>
<td>KLEBSIELLA PNEUMONIAE</td>
<td>04/09/2011</td>
<td>04/15/2011</td>
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<tr>
<td>B1052165</td>
<td>BLOOD CULTURE</td>
<td>KLEBSIELLA PNEUMONIAE</td>
<td>04/09/2011</td>
<td>04/15/2011</td>
</tr>
</tbody>
</table>

Please email the BWH Post-Discharge Results Notification Service for any questions, comments, and concerns related to this alert.

Awareness of any Pending Result(s) by Inpatient Attending

<table>
<thead>
<tr>
<th>Awareness</th>
<th>Intervention</th>
<th>Control</th>
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<tbody>
<tr>
<td>% (No.) Aware*</td>
<td>72% (47/65)</td>
<td>34% (31/90)</td>
</tr>
<tr>
<td>% (No.) Not Aware</td>
<td>28% (18/65)</td>
<td>66% (59/90)</td>
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</tbody>
</table>

Crude OR: 4.97 (2.48, 9.97), p < 0.0001
Adjusted OR (clustered analysis): 6.06 (2.59, 14.2), p < 0.0001
There were 28 distinct intervention and 30 distinct control physician respondents, and we received 155 responses from 258 surveys sent (Response Rate 60%).

Dalal, A [unpub data]
Medication Reconciliation

• Designed a tool to display patients home meds electronically, pulled from EMR, prior discharge summaries
• Residents use that to create Pre-admission medication list and subsequent admission orders

PAML Builder: Action on Admission
Discharge Medication Ordering Screen

1 Medication(s) to be Reconciled

| Patient Discharge Medication Education |

Your Discharge Medication List

Medications that are new:
- PENICILLIN V POTASSIUM 500 MG by mouth 4 times a day
- COLACE 100 MG by mouth 2 times a day
- NICOTINE 14 MG/DAY on top of skin 1 time a day

Medications that have changed:
- FLUTICASONE PROPIONATE/SALMETEROL 100-50 PUFF inhaled 2 times a day

Medications that stay the same:
- DRUGIN 0.25 MG by mouth 2 times a day
- MULTIVITAMIN 1 TAB by mouth 1 time a day

STOP taking the following medications:
- LISPANPROL 10 MG by mouth 1 time a day
- COPOSIT 1 DROP in both eyes 2 times a day
Medication Reconciliation

• Demonstrated 55% reduction in medication discrepancies with potential for harm
  Schnipper, J. Arch Intern Med 2009

• Similar application built for post-discharge medication reconciliation
  —Displays hospital discharge meds side by side with EMR meds
  —Impact being studied
  Schnipper, J. [unpub data]
Partners Readmissions Discharge Bundle

**Review of Literature and Expert Input**

**Prioritization by Steering Committee**

**Vet proposed bundle**

**Refinement and further prioritization**

### Medication reconciliation completed by Pharmacist within 24 hours of admission.

### Warm handoff for patients discharged to a facility (not home).

### Clinician or clinician supervised follow up phone calls made within 48 hours of discharge.

### Follow up appointment made prior to discharge with patient involvement. Appointment to take place within 7 days of discharge.

### Attending physician or delegate on discharge team to be accessible for questions by telephone for the first 72 hours after discharge.

**Phase 1:**

**Patients with a primary diagnosis of HF, AMI and PNE**

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**Improve Readmissions Risk Assessment**

<table>
<thead>
<tr>
<th>Strategy Overview</th>
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<tbody>
<tr>
<td><strong>Overall Objective</strong></td>
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<td><strong>Leadership &amp; Resourcing</strong></td>
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<td><strong>Primary Tactics</strong></td>
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<td><strong>Progress to Date</strong></td>
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Current Challenges & Barriers:
- Implementing/operationalizing the use of this score/integration into existing clinical systems
- Ensuring the risk score is actionable
Provider-Provider Communication: Email Notifications

- Goal: facilitate communication to primary care doctor (PCP)
- Automatic e-mails to PCPs when
  - Patient seen in emergency room
  - Patient scheduled for surgery/has surgery
  - Patient admitted or readmitted to hospital
  - Patient discharged (with full discharge summary);
    approx 55,000 e-mails/year
- Now adding automatic emails to discharging attendings when patients readmitted

Patient Portals

- Patient portals can be used to communicate a wide array of information bi-directionally
  - Appointments
  - Med lists/prob. lists
  - Labs
  - Discharge summaries
  - Health care proxy
  - Health maintenance reminders
  - Medication issues
Patient Gateway

[Image of Patient Gateway interface]

Discrepancy
Details
In Conclusion

- Numerous challenges to accomplish safe transitions of care
- Need seamless flow of medication information between settings
- Targeted interventions in the discharge process and post-discharge period have great potential

What is Different About Ambulatory Care?

- Long feedback loops
- Episodic (from provider perspective)
- Signal to noise ratio is low
- Widely distributed
- Limited resources, redundancy
- Patients and providers have many degrees of freedom
The Primary Care Encounter

• Average encounter 12 minutes
• Average time to first interruption--18 seconds
• 75% of patients leave with unanswered questions
• Little time to do all that needs to be done

Patient Perceptions of Mistakes in Ambulatory Care

• 15% of primary care patients reported that a physician has made a mistake
• 13% reported a wrong diagnosis
• 13% reported a wrong treatment
• 14% changed physicians because of a mistake

Kistler C. Arch Intern Med 2010
What do we know about ambulatory safety?

- Medication safety
- Missed and delayed diagnosis
  - Test result follow-up
  - Referrals management

Just the tip of the iceberg…

High Risk Areas

- **Medication safety**
- Missed and delayed diagnosis
Adverse Drug Events

- 25% (162/661) primary care patients had an adverse drug event (ADE)
  - 13% (24) serious
  - 11% (20) preventable
  - 28% (51) ameliorable
  - 6% (n=13) both serious and preventable or ameliorable

Gandhi TK, et al. NEJM April 2003

Outpatient Prescribing Errors

- 1879 prescriptions reviewed from 4 academic practices
  - Med error rate ~8%
  - More advanced computer prescribing checks with decision support would have prevented 95% of potential ADEs
  - Majority of prevention from complete prescriptions, drug-dose, and drug-frequency checking

Gandhi et al. JGIM 2005

- Study of community practices found error rate of 37%
  - Legibility issues very common

Abramson et al. JAMIA 2012
E-prescribing Impact

• One study of 15 providers before and after implementation of e-prescribing
  — Error rates reduced from 42/100 prescriptions to 6/100 prescriptions
    Kaushal, R. et al. JGIM 2010

• Another pre-post study
  — Prescription errors decreased from 18% to 8%
    Devine, E et al. JAMIA 2010

In Summary

• Electronic prescribing with decision support has high potential for reducing serious medication errors
• Need to improve current decision support
  — Streamlined knowledge bases and tiered alerting have higher acceptance rates
  — What is our ideal acceptance rate?? Sensitivity/specificity? Best way to display?
• More work needs to be done to maximize the clinical benefits
Adherence

- Non-adherence is an important issue
- One study found that of 195,000 newly prescribed e-prescriptions, only 72% were filled
  - Medication class was strongest predictor of adherence
  - Non-adherence was common for medications for chronic conditions like HTN, DM, hyperlipidemia

Fischer, M. et al. JGIM 2010

Adherence

- Much work needs to be done to determine best strategies for improving adherence
  - Pharmacist interventions
  - Patient portals
  - Automated phone calls
  - Feedback of adherence to ordering MD
High Risk Areas

- Medication safety
- Transitions of care
- **Missed and delayed diagnosis**
  - Test result follow-up
  - Referrals management

Missed and Delayed Diagnosis

- Most frequent outpatient malpractice claims are diagnosis-related, mainly cancer
- 85% of errors occurred in physician’s offices
  - Primary care providers most commonly involved (42%)
  - Not surprising given time constraints, variety of complaints, low signal to noise
- Median duration of delay was 303 days
Diagnostic Process of Care in Ambulatory Setting

Patient notes problem and seeks care

Physician performs history / physical

Ordering of diagnostic / lab tests

Performance of tests

Interpretation of tests

Receipt / transmittal of test results

Follow-up plan & referral (if indicated)

Patient adherence with plan

Diagnostic Process of Care in Ambulatory Setting

Patient notes problem and seeks care 9%

Physician performs history / physical 42%

Ordering of diagnostic / lab tests 55%

Performance of tests 9%

Interpretation of tests 37%

Receipt / transmittal of test results 13%

Follow-up plan & referral (if indicated) 45%

Patient adherence with plan 17%
## Contributing Factors

<table>
<thead>
<tr>
<th>Cognitive Factors</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judgment</td>
<td>79%</td>
</tr>
<tr>
<td>Vigilance</td>
<td>59%</td>
</tr>
<tr>
<td>Knowledge</td>
<td>48%</td>
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</table>

<table>
<thead>
<tr>
<th>Communication Factors</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handoffs</td>
<td>20%</td>
</tr>
<tr>
<td>Clear Lines of Responsibility</td>
<td>9%</td>
</tr>
<tr>
<td>Another Failure of Communication</td>
<td>9%</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Patient Related Factors</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-adherence</td>
<td>22%</td>
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<tr>
<td>Atypical Presentation</td>
<td>15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Systems Factors</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervision</td>
<td>8%</td>
</tr>
<tr>
<td>Technology-Related</td>
<td>3%</td>
</tr>
<tr>
<td>Workload</td>
<td>7%</td>
</tr>
<tr>
<td>Interruptions</td>
<td>3%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>1%</td>
</tr>
</tbody>
</table>

## Complex Etiology

<table>
<thead>
<tr>
<th></th>
<th>Average Number per Case</th>
<th>Percentage with &gt; 1 per case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Breakdowns</td>
<td>3</td>
<td>80%</td>
</tr>
<tr>
<td>Contributing Factors</td>
<td>3</td>
<td>85%</td>
</tr>
<tr>
<td>Clinicians</td>
<td>1.6</td>
<td>43%</td>
</tr>
</tbody>
</table>

Only 34/181 (19%) had a single breakdown failure.
**Common Cognitive Pitfalls**

- **Oversimplification of causality**: application of past events leads to underestimation of future consequences
- **Availability bias**: the tendency to assume when judging possibilities or predicting outcomes—tha the first possibility is selected as the most likely possibility—acts as a cognitive "short cut" in the setting of a complex situation
- **Confirmation bias**: the tendency to focus on evidence that supports a working hypothesis without looking for further information that may refute the original hypothesis
- **Overconfidence bias**: the tendency to believe we know more than we do
- **Order effects**: the tendency to remember the beginning or end of information, but not all the information required during information transfer

*Croskerry, P., "The Importance of Cognitive Errors and Strategies to Minimize Them"*

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**Preventing Cognitive Errors**

*Possible Systems Solutions*

- **Effective Practices/Interventions for consideration**:
  - Reduce reliance on memory
    - Chart audits for certain complaints
  - Forcing consideration of alternative diagnostic plans or second opinions
  - Clinical decision support systems
    - Make sure guidelines are available at point of care, within workflow
    - Automatic rather than optional
High Risk Areas

- Medication safety
- Missed and delayed diagnosis
  — **Test result follow-up**
  — Referrals management

Failure to Follow-Up

- Critical ambulatory safety issue
  - 75% of physicians did not notify patients of normal results
  - 33% of physicians did not even notify of abnormal results (Boohaker et al, Archives 1996)
  - Approximately 1/3 of women with abnormal mammograms or pap smears do not receive appropriate follow-up care
Breakdowns in Follow-Up

- Delays in reviewing test results
  - Many physicians not satisfied with how they manage test results (Poon, Archives)
  - A typical PCP reviews 800 chem-hem, 40 rad and 12 path reports per week (Poon, J Biomed Info 2003)
  - Results in outpatient setting often take a long time to return so easier to forget about them
  - Paper based charts subject to errors
  - No easy way to keep track of ordered tests

Breakdowns in Follow-Up

- Unclear definitions of adequate follow up
  - Little agreement among pathologists and clinicians about what is a critical value and what is urgent (Pereira, Am J Cl Path)
  - Lack of standard communication strategies
  - Lack of failsafe mechanisms
  - Diffused Responsibilities
  - Especially when multiple providers
  - E.g. Polyp biopsied on colonoscopy is to be follow up by (a) Gastroenterologist, (b) Pathologist, (c) PCP?
Recommendations: Testing

• Need to develop fail-safe mechanisms of communication and explicit criteria for communication
  — Testing areas (Radiology, Cardiology, Laboratory) should create explicit definitions of which results are considered abnormal and need direct communication.
  — Devise ways to document this explicit direct communication
  — Clear escalation strategies (if pages aren’t answered)

Recommendations: Role of ordering physician

• Ordering physician needs to document reason underlying ordered test and their contact information
• Ordering physician needs back-up systems to follow up if they are unavailable
• Ordering physicians should have mechanisms to track results ordered and ensure results are reviewed in a timely way
Improving Result Management Systems

- A tool that allows focus on truly abnormal test results
- A tool that warns physicians if patients have missed tests
- Use of standardized features, such as “ticklers”
- Standardized procedures rather than every physician doing it his/her own way

Test Result Communication Summary

- Reliable communication of test results is a major ambulatory safety issue
- Need for these cases to get reported via safety reporting (ensures appropriate follow-up with depts such as path or radiology)
  —Critical for learning/designing improvements
- No magic bullets, but lots of ongoing work in this area
High Risk Areas

- Medication safety
- Transitions of care
- Missed and delayed diagnosis
  - Test result follow-up
  - Referrals management

Background

- Poor referral communication issues often cited as a factor in outpatient missed/delayed diagnosis claims
- 65% of PCP’s and 35% of specialists are dissatisfied with referral process
- Source of dissatisfaction is communications
  - Lack of timeliness
  - Lack of clarity
  - Time required to create notes

Gandhi et al. JGIM 1999
Background

• Specialists report no prior communication from PCP 69% of time
  —38% report it would have been helpful
• Four weeks after the referral, 25% of PCPs had not received information from the specialist

Referrals Mgr in EMR

• Electronic referral communication tool to facilitate information from PCP to specialist
• Studied at 2 sites
• Intervention site
  — Specialists more likely to receive communication (62% vs. 12%)
  — PCPs more often received return communication (69% vs. 50%)
  — Patients were more likely to report that the specialist had seen information before the visit (70% vs. 43%)


• Need to optimize use of these kinds of systems
Outpatient Safety Concepts

• Important to focus on bigger picture as well as specific risk areas
• Many principles in place in inpatient settings
  —Culture change
  —Event identification and analysis
  —Proactive assessment
  —Projects in high risk areas
• Need to transfer these to outpatient settings

Culture

• Creating a culture of safety is essential
  —Must have a non-punitive environment
  —Leadership support is essential
  —Most errors are from good people working in bad systems (‘not bad apples’)
• Strategies include WalkRounds, culture surveys, educational efforts, feedback of improvements
Event Identification and Analysis

- Need methods to capture errors that occur
  - Reporting systems
  - Case reviews - primary care M&M

- Need methods to analyze errors
  - Systems approach to error using human factors
  - Focus on standardization, simplification, and high reliability to achieve perfect care
  - Robust RCA process
Event Identification and Analysis

- Need better metrics/measurement
  - Ambulatory void...
- Need accountability and resources to ensure that changes actually occur

Proactive Assessment

- Joint Commission National Patient Safety Goals
  - Key area of current focus
    - Medication reconciliation
    - Communication of test results
    - Universal protocol for procedures
    - Hand hygiene
    - Medication labeling
    - Anticoagulation
- Practice assessments (e.g. RMF Office practice evaluation)
Take Home Points

- Starting to know more about ambulatory risk areas
  - Transitions
  - Medications
  - Missed and delayed diagnosis
- Also need to focus on developing ambulatory culture and infrastructure
- Focus on systems and process redesign
  - IT is a powerful tool, but much can be done with paper processes
- Now is the time to move beyond inpatient to ambulatory!