



**The AIAMC National Initiative:**  
*Improving Patient Care through GME*

**PROJECT DESCRIPTION FORMS  
AND POSTERS**



**Meeting Four**  
**March 26-27, 2011**  
**St. Pete Beach, FL**

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## OVERVIEW OF THE AIAMC NATIONAL INITIATIVE

### Why a National Initiative?

Both the public and our profession acknowledge that quality and safety efforts are falling short, and many hospitals and healthcare systems are seeking rapid improvements in patient care. Those of us in academic medicine realize that residents play an important role in patient care at teaching institutions; however, residents are generally not visible in safety and quality efforts. The AIAMC recognized that resident quality improvement efforts – shared across multiple programs and systems – had the potential to improve care much more quickly and effectively.

### Role of the AIAMC

The Alliance of Independent Academic Medical Centers was founded in 1989 as a national network of large academic medical centers. Membership in the association is unique in that AIAMC members are affiliated with medical schools but are independent of medical school ownership or governance. Sixty-nine major medical centers across the United States are members, representing over 500 senior academic leaders.

### Phase One

In early 2007, the Alliance of Independent Academic Medical Centers (AIAMC) launched *Improving Patient Care through GME: A National Initiative of Independent Academic Medical Centers*. The *National Initiative* (NI) featured five meetings over the course of 18 months which served as touchstones for ongoing quality improvement in AIAMC participating organizations. These meetings, as well as the monthly collaborative calls held in-between, provided structure, discussion and networking opportunities around specific quality improvement initiatives. This 18-month “NI-Phase I” was supported by a grant from the foundation of HealthPartners Institute for Medical Education, an AIAMC member institution located in Minneapolis, Minnesota.

As a result of these efforts, AIAMC has initial findings that demonstrate the efficacy of integrating GME into patient safety and quality improvement initiatives. These findings were organized into a series of articles that were published in the December 2009 issue of *Academic Medicine*.

### Phase Two

In 2009, we launched the second phase of the National Initiative and expanded participation to 35 AIAMC-member teaching hospitals from Seattle to Maine. Each participating hospital has developed a quality improvement team led by a resident or faculty member. These

teams will meet on-site four times and participate in monthly conference calls over an 18-month period. Quality improvement projects focus upon one of the following areas: Communication, Hand Offs, Infection Control, Readmissions and Transitions of Care. The objectives of this second phase are as follows: 1) to align/integrate academic programs with quality initiatives to accelerate the efforts of quality and patient safety; 2) assist residency program directors and house staff in the teaching, learning and assessment of the core competencies focused on Practice-Based Learning and Systems Based Practice; 3) inform hospital and policy leaders about the contributions that can be made by faculty and house staff in expediting patient safety; and 4) integrate house staff into multidisciplinary team-based safety initiatives as a national priority.

***Phase Two Participating Hospitals:***

Advocate Illinois Masonic Medical Center – Chicago, IL  
Advocate Lutheran General Hospital – Park Ridge, IL  
Akron General Medical Center – Akron, OH  
Atlantic Health – Morristown, NJ  
Aurora Healthcare – Milwaukee, WI  
Baystate Medical Center – Springfield, MA  
Carolinas Healthcare – Levine Children’s Hospital – Charlotte, NC  
Christiana Care Health Services – Newark, DE  
Franklin Square Hospital Center – Baltimore, MD  
Georgetown University Hospital – Washington, DC  
Good Samaritan Hospital – Baltimore, MD  
Guthrie Robert Packer Hospital – Sayre, PA  
Harbor Hospital – Baltimore, MD  
HealthPartners Institute for Medical Education – Minneapolis, MN  
Henry Ford Health System – Detroit, MI  
Iowa Health – Des Moines – Des Moines, IA  
JPS Health Network – Fort Worth, TX  
Maine Medical Center – Portland, ME  
Monmouth Medical Center – Long Branch, NJ  
National Rehabilitation Hospital – Washington, DC  
Ochsner Health System – New Orleans, LA  
Orlando Regional Healthcare – Orlando, FL  
Reading Hospital and Medical Center – W. Reading, PA  
Riverside Methodist Hospital – Columbus, OH  
Saint Barnabas Medical Center – Livingston, NJ  
Saint Francis Hospital and Medical Center – Hartford, CT  
Spectrum Health – Grand Rapids, MI  
St. John’s Mercy Medical Center – St. Louis, MO  
Tri Health – Cincinnati, OH  
Union Memorial Hospital – Baltimore, MD  
Virginia Mason Med Center – Seattle, WA  
Washington Hospital Center – Washington, DC  
York Hospital – York, PA

***For more information on the AIAMC National Initiative, please visit our website at [www.AIAMC.org](http://www.AIAMC.org) or contact Kimberly Pierce-Boggs, Executive Director, via email [Kimberly@aiamc.org](mailto:Kimberly@aiamc.org) or phone 312.836.3712.***

Hospital: Advocate Illinois Masonic Medical Center

Team Leader: Janice Barry, RN, BSN

I. PROJECT TITLE/NAME:

"Reduction of Heart Failure 30 day Readmissions through an Enhanced Internal Medicine Curriculum"

II. BRIEF DESCRIPTION: (4-5 sentences, maximum) The current Internal Medicine Curriculum was enhanced in order to reduce 30-Day Heart Failure (HF) readmissions. The intervention began in July 2010 (with the new incoming resident class) and will conclude in June 2011. The intervention included a HF lecture series, journal article/case reviews, multidisciplinary rounds, and collaboration with HF team, cardiac rehabilitation, case managers, social workers, nursing staff and information systems. To determine the impact of our intervention a pre and post-test questionnaire to evaluate resident knowledge/attitudes about HF was evaluated. In addition, the 30-day readmission rates pre and post intervention were statistically analyzed.

III. OPPORTUNITY STATEMENT:

Reduce 30-day HF readmissions by 5 % with a stretch goal of 10 % through an enhanced Internal Medicine Residency Heart Failure Curriculum.

IV. RESEARCH QUESTION:

Will implementing an enhanced Internal Medicine Residency (HF) Curriculum reduce the HF 30-day readmission rate by 5%?

V. HYPOTHESIS:

Implementing an Internal Medicine Residency HF curriculum will reduce the HF 30-day readmission rate by 5% for our institution.

VI. MEASURES:

1. Pre and post test questionnaire for evaluation of resident knowledge/attitudes about HF.
2. Statistical analysis of 30-day HF readmissions pre and post intervention with comparison to national and state benchmarks (6 months collected/12 month pending collection).

VII. INSTRUMENTS:

Methods for implementation:

1. Pre and post questionnaire to evaluate resident knowledge/attitudes about HF.
2. Statistical analysis through MIDAS collection of HF 30 day readmission rates pre and post intervention (enhanced Internal Medicine Residency Curriculum).
3. Collaboration with cardiac rehabilitation, HF team, Nursing staff, Information systems, social work/case managers.

VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.

1. HF readmission prior to intervention (through MIDAS): Primary HF Readmissions 24.0% and all Readmissions 24.8%
2. Pre intervention questionnaire about resident attitudes and knowledge of HF.

IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted.

Describe your specific intervention, and the time period in which the intervention was conducted. Our intervention was an enhanced current Internal Medicine Heart Failure Curriculum which began with the new residents in July 2010 (the curriculum was only fully incorporated by September 2010). The intervention was for 6 months duration at the end of which a post intervention questionnaire was evaluated. We will continue the intervention for 6 additional months and conduct statistical evaluation of HF readmissions for the 12-month interval.

X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

1. 6 month HF readmission rates: Primary: 17.5% and All HF: 22.2%.
2. Post Intervention survey of resident attitudes and knowledge of HF syndrome evaluated More residents were confident about the core measures(92%), quality indicators, appropriate documentation of HF (88%). More residents were satisfied with the Internal Medicine Residency Curriculum (88%).

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

1. HF readmission rates: OR/p values calculated.
2. Comparative analysis of resident attitudes/knowledge between pre and post intervention surveys conducted.

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

1. Collaborating with Information Systems Team to develop a discharge template specifically for HF patients which highlights key elements resulting in readmissions
2. Collaboration with case worker, social work, nursing staff, HF team, Cardiac Rehabilitation has resulted with an enhanced focused on heart failure throughout the hospital
3. Overall, the Internal Medicine Residents found all the teaching to be extremely useful. Resulting in what?
4. How about data showing the number of co-morbidities as predictors of readmission
5. Collaboration with Health Information Management/Coders –importance of accurate documentation and coding of heart failure

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Resident participation/awareness.
2. Hospital wide initiative focused on heart failure 30 day readmission rate, collaboration and support across teams.
3. Availability of data.

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Multiple hospital initiatives –unable to pinpoint readmission reduction to our intervention
2. Chart reviews performed for HF readmissions indicated that a large proportion is based on documentation/coding.
3. Time constraints.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

- Collaboration is key and resources to support investigation.
- Time Management Skills/Project Management Skills
- Skilled Data Analysis as member of team

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: None
2. Negative Unintended Consequences: None

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 **8** 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 8 **9** 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

1. We are collaborating with Information Systems to work on a discharge template for the EMR to facilitate ease of transfer to the next facility (SNF, home), tools (home oxygen, medications, home health, patient and family education) for prevention of readmission and to be a final checkpoint prior to discharge.
2. We will also be continuing the enhanced Internal Medicine Heart Failure Residency Curriculum as this was found to be valuable per post intervention survey.
3. Continued collaboration with the HF team, Cardiac Rehabilitation, Nursing staff, Coders, Social work and Case managers to prevent future readmissions and promote patient safety and satisfaction.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

1. Internal Medicine Residency Curriculum has been enhanced. Residents are more able to treat patients with heart failure as primary diagnosis.
2. Importance of collaboration with all units has been stressed.
3. Awareness of HF readmission burden in all aspects.
4. Drive to improve patient safety and health care by reduction of readmissions.
5. Enhanced understanding of the cost of readmission
6. Value of partnering with patient and family to follow patient care directives  
On-going patient education

# HEART FAILURE READMISSION REDUCTION THROUGH AN ENHANCED INTERNAL MEDICINE HEART FAILURE CURRICULUM

Mercy P. Chandrasekaran MD, Janice Barry BSN, Paula Eryazici MD, Barbra G. White MHA, Nikhil A. Parikh MD, Sorin C. Danciu MD.

## BACKGROUND

Heart failure (HF) carries a significant economic burden and hospitalizations account for > 50% of the total costs of heart failure.

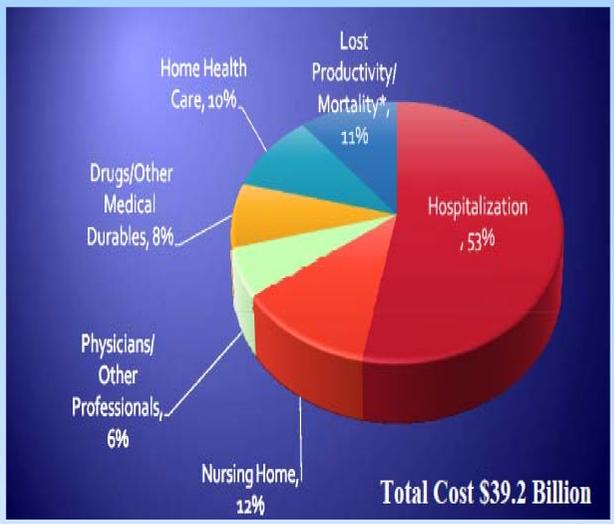


Figure I: AHA Statistical Update: Heart Disease and Stroke Statistics – 2010 Update.

Rehospitalizations are particularly costly and potentially avoidable often due to preventable complications resulting from patients' inability to adequately self-manage their condition and poorly implemented transitions to the next care setting.

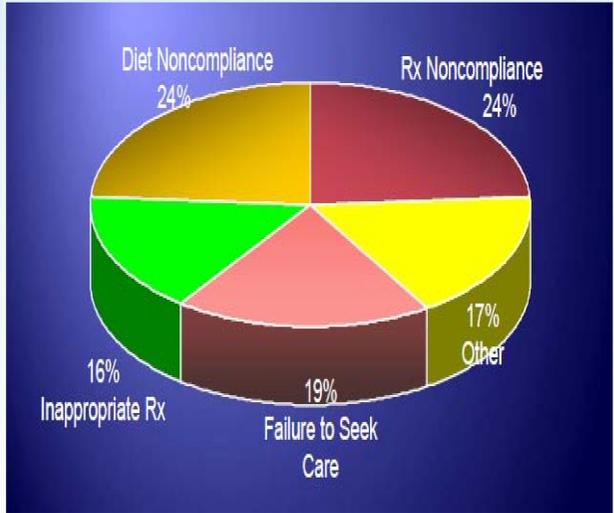


Figure II: Annals of Internal Medicine 122, 1995

As part of the National Initiative for Alliance of Independent Academic Medical Centers our initiative was to decrease the HF readmissions by 5% (stretch goal 10%) through an enhanced Internal Medicine Heart Failure Residency Curriculum

## BACKGROUND

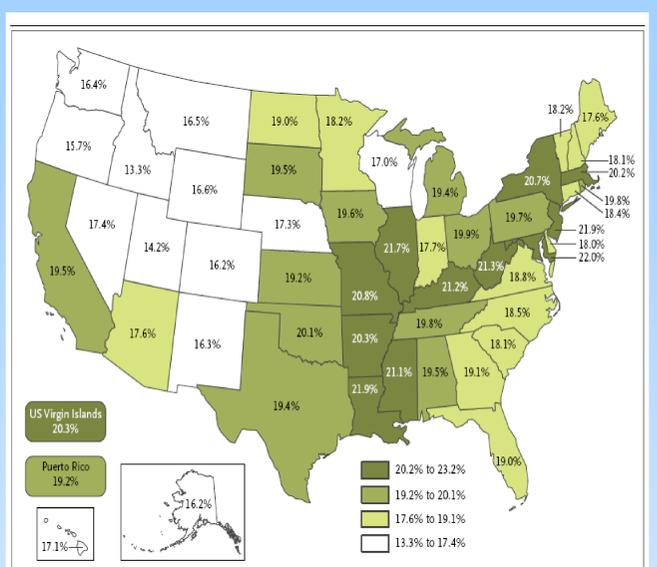


Figure III: Jencks et al. N England J Med 2009

## METHODS

### INTERVENTION:

- HF lecture series
- Multidisciplinary rounds
- Article and case reviews
- Cardiac Rehabilitation rotation
- Multidisciplinary HF Team participation
- Education by Case Managers/Social Work
- Collaboration with Nursing staff initiatives.
- Collaboration with Information Systems to implement discharge instruction template

### IMPACT of INTERVENTION:

- 30-day readmission rates pre and post intervention were statistically analyzed.
- Pre and post questionnaire about resident HF knowledge/attitudes were evaluated.

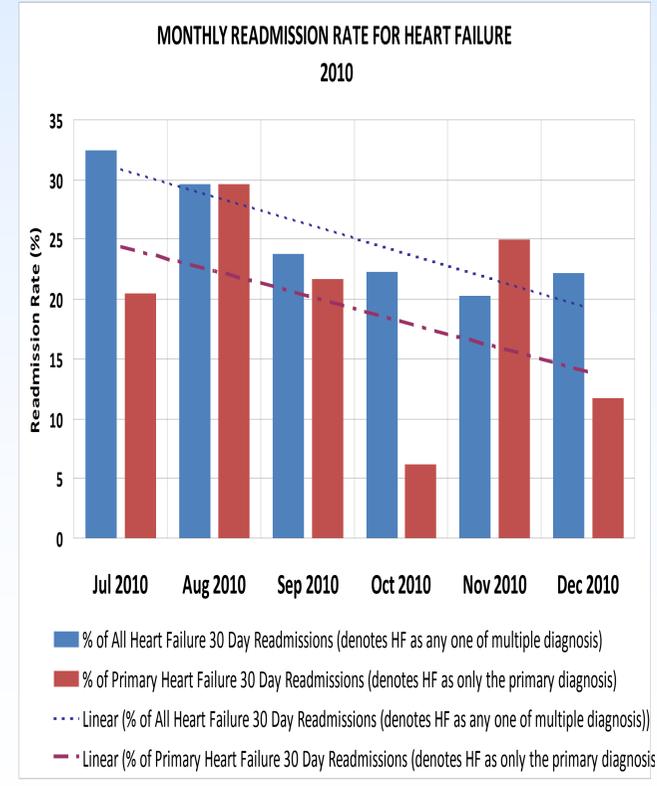
### DEFINITIONS:

- Primary HF readmissions: HF is primary admitting/readmitting diagnosis
- All HF readmissions: HF is any one of the admitting/readmitting diagnoses.

## RESULTS

	January – August 2010 (Before Intervention)	September – December 2010 (After Intervention)
All HF Admissions	1178	608
All HF Readmissions	292 (24.8 %)	135 (22.2%)
Primary HF Admissions	167	80
Primary HF Readmissions	40 (24.0%)	14 (17.5%)
Statistical comparison of All HF	p=0.242, OR:1.155 , 95% CI 0.915-1.457	
Statistical comparison of Primary HF	p=0.324, OR:1.485 95% CI 0.760-2.898	

Relative reduction of 10.5% in all HF 30 day readmission rates from 24.8% to 22.2% between 7/10-12/10 which is above stretch goal of 10%. This was calculated by % change from pre intervention rate.



## RESULTS

### PRE INTERVENTION QUESTIONNAIRE:

- 1) Residents felt more confident in treating/ counseling patients with HF (87-97%).
- 2) Residents were not as confident in identifying precipitants of readmissions (66-73% of residents identified) or applying core measures.
- 3) Most residents felt the key factors to preventing readmissions were close post-discharge follow up and patient education (67%).

### POST INTERVENTION QUESTIONNAIRE :

- 1) More residents were confident about the core measures (92%), quality indicators, appropriate documentation of HF (88%).
- 2) More residents were satisfied with the Internal Medicine Residency Curriculum (88%).

## CONCLUSION

- A 6-month resident-oriented multidisciplinary intervention improved patient care, documentation, and resident understanding of HF syndrome.
- At the 6 month interval we have reached our stretch goal of >10 % relative reduction in 30 day HF readmissions. Further improvement in outcomes should be evident at the completion of 12-month follow-up.

## REFERENCES

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- 4) Landro L. Keeping patients from landing back in the hospital. Wall street J. December 12, 2007.
- 5) Centers for Medicare and Medicaid Services. Health Care Financing Review: Medicare & Medicaid Statistical Supplement. Available at: <http://www.cms.hhs.gov/MedicareMedicaidStatSupp/AccessedAug28,2008>.
- 6) Annals of Internal Medicine 122:415-21, 1995
- 7) Jencks et al. N Engl J Med 2009;360:1418-28

Hospital: Advocate Lutheran General Hospital

Team Leader: Stephen Wielgus

I. PROJECT TITLE/NAME: Improving Discharge Summaries
II. BRIEF DESCRIPTION: (4-5 sentences, maximum)  The literature suggests that the quality and timeliness of discharge summaries may improve patient care after hospital discharge and may reduce readmission rate. The purpose of this study was to improve discharge summaries on the family medicine service. The intervention involved a lecture for the residents and a handout card to instruct residents on the specific requirements of a discharge summary. Pre- and post-intervention evaluations of discharge summaries were undertaken. The hypothesis was that the educational intervention would improve discharge summaries in both quality and timeliness.
III. OPPORTUNITY STATEMENT:  Improved discharge summaries facilitate improved patient care and may impact re-admission rates.
IV. RESEARCH QUESTION:  Does giving a specific list of criteria with monthly reminders improve discharge summaries?
V. HYPOTHESIS:  We believe that proper instructions on discharge summaries as well as monthly reminders on our inpatient service will increase decrease the time from discharge to dictation so that upon follow up a summary is available to the clinic physician.
VI. MEASURES:  1-A checklist was created based on the literature review and was peer validated. The maximum score was 28 points. An average ratio was calculated out of the maximum total point and those achieved for that chart. 2-The time between discharge date and dictation date was calculated. 3-The time between discharge date and follow-up with the primary care physician was calculated.
VII. INSTRUMENTS:  Educational slides and cards. Peer validated checklist.
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.  Forty charts were reviewed for the retrospective arm of this study.  Each discharge summary had a maximum possible number of points of 28. If a choice was "not applicable," the total possible was decreased. The average percentage of <i>present</i> items was 60% at baseline.  The average time between discharge and date of dictation was 34 days.  Dictations were on average completed 8 days after the date of follow up. For patients who had a follow-up visit, the average number of days until follow up was 27 days. Nine patients were lost to follow up.
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. A lecture and hand out was given in June before interns started, and every month during FMS discharge summaries were reviewed and the list of required parts was reviewed.  The intervention consisted of a lecture presented in June 2010 by Dr. Wielgus. This was an hour-long session. Attendance was tracked and all 1 <sup>st</sup> year residents were expected to attend.  The handouts and powerpoint used at the lecture was redistributed to residents on the FMS service at the beginning of every block (for the follow 6 months) by the rounding attending/senior

X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

The average percent of *present* items was 63% for the post-intervention group.

Time between discharge and date of dictation was 23.7 days, an improvement of 4 days, though far from goal of 0-3 days.

The dictations were on average completed 6 days before date of follow up, as opposed to 8 days AFTER the follow up appointment.

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

Study Design: Retrospective Cohort Study : the variable will be discharge summaries performed before intervention and after intervention.

Sample Size: 40 charts, pre-intervention and 43 post- intervention

Exclusion criteria: no discharge summary in chart at time of review and charts of those patients under 18.

Inclusion: Pre-intervention group: charts from all patients residing on the FMS team that have completed discharge summaries for patients discharged between May 1, 2009-November 31, 2009, patient over age 18, and stayed greater than or equal to 48 hours in the hospital will be randomly chosen by a computer randomly generated list out of the potential patient list. Post intervention: charts from all patients residing on the FMS team that have completed discharge summaries for patients discharged between May 1, 2010-November 31, 2010, patient over age 18, and stayed over 48 hours in the hospital will be randomly chosen by a computer randomly generated list out of the potential patient list . At least 40 (20 pre / 20 post) charts meeting inclusion criteria will be randomly selected via computer generated list. Exclusion: any patient who stayed less than 48 hours or does not have a discharge summary completed.

#### Sample Size and Data Analysis

Based on investigator's estimate, a five point increase on the discharge summary checklist is estimated from an average of 17 points to 22 points  $\pm$  5 (ES = 1.0), requiring at least 20 charts in both the pre and post groups for a total of 40 charts (Type of study: T-test; Requested output: Sample size; Design: Independent; alpha=0.05 power=0.8 DIFF=5 SIGMA=5 M=1; Sample size=17) (Dupont WD, Plummer WD: 'Power and Sample Size Calculations: A Review and Computer Program', Controlled Clinical Trials 1990; 11:116-28, and Design Sensitivity: Statistical Power for Experimental Research. Mark W Lipsey. Sage Publications, New York, 1990; pg. 91.).

Descriptive statistics (mean  $\pm$  SD) for continuous data and [N (%)] for categorical data will be calculated on all endpoints. The primary endpoint, discharge summary checklist score, will be compared between pre and post groups via Student's t-test. Secondary endpoints, time from discharge to primary care physician follow up and time from discharge summary write up to dictation will be compared between pre and post groups via Student's t-test or Mann-Whitney test if necessary. A one-tailed P level of 0.05 will be considered statistically significant in all analyses. Analyses will be performed with SPSS software (release 18.0, SPSS, Chicago).

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

No

XIII. SUCCESS FACTORS:

Attending and resident interest

Involvement of hospital Quality specialist/leader

System interest in developing an EMR template based on our checklist

XIV. BARRIERS:

IRB process was slow  
Lack of time as fellow

XV. LESSONS LEARNED:

We need to have more frequent interventions as well as quick turn-around of feedback to truly change old behaviors.

We learned that checklists can be interpreted in multiple ways, with some people using it as a form, and others as a reference to at least mention the topics in your summary, but not to follow in its organization.

We need to have junior and senior residents involved to ensure the continuity of the project.

WHAT CHANGES HAVE YOU OBSERVED IN YOUR PROGRAM, OR AT YOUR INSTITUTION, BASED ON YOUR PROJECT?

Residents have had some teaching regarding discharge summaries which they did not have before. They also have started to complete the summaries more frequently BEFORE the follow up which is important in the continuity of care of that patient.

# Evaluation of Resident Discharge Summaries Compared to a Specific set of Criteria Before and After Intervention with Lecture and Handout

Stephen J. Wielgus MD, Pam Hyziak PhD RN, Stuart Goldman MD, Judith Gravdal MD

## Introduction

Incomplete discharge summaries effect information transfer to physicians caring for patients post-hospitalization. Formal training about discharge summary content is lacking. The Joint Commission for Hospital Organizations (JCHO) established criteria for inclusion in discharge summaries. This study combines current literature and JCHO criteria for development of a checklist for use by residents when discharge summaries are performed.

## Statement of Problem

Discharge summaries are often incomplete. Lack of complete information limits the care provided by physicians post-hospitalization. Delays in completion of discharge summaries also affect post-hospitalization care.

## Objectives of Intervention

1. Provide a high quality checklist for use when completing discharge summaries.
2. Educate resident physicians on the reasons for complete and timely discharge summaries.
3. Determine whether use of the checklist and reinforcement methods improve the completeness and timeliness of discharge summary completeness.

## Description

### Study Design:

Retrospective cohort, Pre- and post-intervention groups

### Intervention:

Use of discharge summary checklist after resident education session. Reinforce checklist use when residents begin Family Medicine inpatient service rotation

### Population:

18+ year-old patients admitted for 48 hours or more  
May to November 2009 – Pre-intervention group (40)  
May to November 2010 – Post-intervention group (43)

### Statistics:

Students T test for group comparison

## Results / Findings to Date

When comparing the pre-intervention group to the post-intervention group, on average, the percentage of checklist items completed were 60% versus 63%, respectively. The time between patient discharge and discharge summary dictation was 27 and 23.7 days. The number of days to follow up were 27 and 28 days, respectively. In relation to the date of patient follow up, the two groups, on average, completed the discharge summaries eight days after patient follow up and six days before patient follow up. The quality measure showed minimal improvement. The timeliness data suggested improvement. There was no statistical improvement found.

## Table 1

	PRE-INTERVENTION	POST-INTERVENTION
Items on checklist completed (%)	60	63
Timely discharge summary completion (# days post-discharge)	27	23.7
Timely discharge summary completion (# days in relation to patient follow up visit)	+8	-6

## Key Lessons Learned

1. Development of habits involving checklist use and timely completion of discharge summary compete with other urgencies in residency.
2. Changing previous behaviors (old habits) is difficult.
3. Further improvement efforts require buy-in by other residents.

## Next Steps

1. Recruit a PG1 to continue the project.
2. Develop more feedback processes to inform residents of their own improvements.
3. Study a larger patient population to see if complete and timely discharge summaries are helpful in reducing hospital re-admissions.

**Hospital: Advocate Lutheran General Hospital**

**Team Leader: Jill C Tydell, MD**

I. PROJECT TITLE/NAME: The Impact of Post-Discharge Follow-Up Care on Hospital Readmissions for Adults

II. BRIEF DESCRIPTION: (4-5 sentences, maximum)

The aims of this study are to determine the effects of post-discharge follow-up on hospital readmissions to the Family Medicine Service (FMS). There are two groups in this study. The first group is a retrospective chart review, which will determine the readmission rate in patients who received usual care in the post discharge time period. The second group is a prospective intervention group. The prospective group will receive a post-discharge phone call within 72 hours and a physician home visit within 7 days. The goal is to determine if the prospective intervention group has a lower readmission rate versus the retrospective study population.

III. OPPORTUNITY STATEMENT:

This project will help investigate whether closer follow up with a health care provider is a positive influence of the patient's risk from hospital readmission for certain high risk readmissions diagnoses. The goal of the study is to provide better post-hospital care to patients and determine if this will help to prevent readmission.

IV. RESEARCH QUESTION:

Does short-term post-discharge follow-up lower the hospital readmission rate?  
Does better access to a healthcare provider post-discharge lower the 30-day readmission rate?

V. HYPOTHESIS:

Post-discharge follow-up will result in a statistically significant lower hospital readmission rate.

VI. MEASURES:

**Primary endpoint:**

30-day hospital readmission for any cause

**Secondary endpoints:**

To determine the relationship between secondary data points and readmission rates including the following:

- Hospital day of the week on discharge
- Co-morbidities: alcohol or drug use, asthma, heart failure, diabetes mellitus
- Number of days until follow-up with PCP in office
- Hospital LOS
- Number of follow up appointments recommended
- Education level
- Changes to medications
- New medications

VII. INSTRUMENTS:

**DISCHARGE FOLLOW UP PHONE CALL**

Discharge Diagnosis: \_\_\_\_\_ Date: \_\_\_\_\_

Introduction: My name is \_\_\_\_\_. I am calling from Advocate Lutheran General Hospital where you were discharged. I am doing a follow up call for the study you are enrolled in.

1. Are you feeling well? Yes\_\_\_ No\_\_\_  
If No, Comments: \_\_\_\_\_.
  
2. Are you having any concerns related to your health? Yes\_\_\_ No\_\_\_  
If Yes, Comments: \_\_\_\_\_
  
3. Have you filled your prescriptions as ordered? Yes\_\_\_ No\_\_\_  
Comments: \_\_\_\_\_
  
4. What questions do you have regarding your medications?
  
  
5. Did your discharge instructions answer all your questions and concerns? Yes\_\_\_  
No\_\_\_  
Comments: \_\_\_\_\_
  
  
6. Have you scheduled a follow up appointment? Yes\_\_\_ No\_\_\_  
Comments: \_\_\_\_\_ (with whom is the follow up appointment and when)
  
  
7. Is there anything you want us to report to your physician? Yes\_\_\_No\_\_\_
  
  
8. Have you scheduled any post-discharge hospital testing?

9. Thank you for taking the time to answer the our questions.

Attempts to Contact: Date: \_\_\_\_\_ Time: \_\_\_\_\_ Initials: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Initials: \_\_\_\_\_

Signature of RN \_\_\_\_\_, Date/Time \_\_\_\_\_

**DISCHARGE FOLLOW UP HOME VISIT**

Patient Name/ID# \_\_\_\_\_

Discharge Diagnosis: \_\_\_\_\_ Discharge Date: \_\_\_\_\_

Home Visit Date: \_\_\_\_\_ Home Visit Team Members:  
\_\_\_\_\_

1. Are you feeling well? Yes\_\_\_ No\_\_\_  
If No, Symptoms identified: \_\_\_\_\_.

Are you having any concerns related to your health or questions about your care?  
Yes\_\_\_ No\_\_\_  
If Yes, elaborate: \_\_\_\_\_

Are there any medication discrepancies between the discharge document and the current regimen?

Yes\_\_\_ No\_\_\_ Comments: \_\_\_\_\_

Any medication side effects or concerns?

Yes\_\_\_ No\_\_\_ Comments \_\_\_\_\_

3. Did your discharge instructions answer all your questions and concerns? Yes\_\_\_  
No\_\_\_  
Comments: \_\_\_\_\_

4. Have you scheduled a follow up appointment?

At Nasset? Yes\_\_\_ No\_\_\_

With a specialist? Yes\_\_\_ No\_\_\_

Comments: \_\_\_\_\_ (with whom is the follow up appointment and when)

5. Did the home visit result in any care plan changes? Yes \_\_\_ No \_\_\_

If Yes, Comments \_\_\_\_\_

Medication change \_\_\_ Other order \_\_\_\_\_

6. Was the discharge summary available at the time of the Home Visit?

Yes\_\_\_ No\_\_\_

If so, was the discharge summary useful? Yes \_\_\_ No \_\_\_

VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.

Other variables to be collected to compare groups:

- Demographic Data: Age, Sex, Race, Zip code
- Medications: total number of medications at discharge, total number of new medications
- Number of follow up appointments made
- Number of days until the intervention home visit occurs
- Insurance status
- Number of previous hospital readmissions or ER visits within past 30 days – determined on study initiation by patient interview

<b>Data Key</b>
-----------------

<b>Variable</b>	<b>Key</b>	<b>Data Source</b>
Patient sex	1= male 0 = female	from medical record
Patient age	numeric entry between 25-100	from medical record
Patient race	1= caucasian 2= hispanic 3 = african american 4 = asian 5 = other	from medical record
Patient zip code	numeric entry	from medical record
Number of days until PCP visit	numeric entry	from touchworks
Number of day until Home visit	numeric entry	from study records
New medications at discharge	1 = yes 0 = no	from medical record
Number of new medications prescribed	numeric entry	from medical record
Co-morbidities	1 = etoh use 2 = drug use 3 = asthma 4 = CHF 5 = DM	from medical record
Number of follow up appointments recommeneded	numeric entry	from medical record
Day of discharge	1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday 7 = Sunday	from medical record
Discharge diagnosis	1 = GI 2 = Respiratory 3 = ID	from medical record
Hospital LOS	numeric entry	from medical record
Insurance Status	1 = Medicare 2 = Medicaid 3 = HMO 4 = PPO 5 = Self insurance 6 = No insurance	from medical record
Self reported readmissions (to other hospitals)	1 = yes 0 = no	from patient

IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted.

**Primary intervention:**

All patients meeting in the prospective study will receive a post-discharge phone call within 2 business days followed by a physician home visit within one week of discharge.

The intervention group will be compared to the retrospective chart review receiving "usual care" post-discharge between November 2009 and approximately December 2010.

X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

We do not have any post intervention data to report at this time.

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

Descriptive statistics (mean ± SD) for continuous data and [N (%)] for categorical data will be calculated on all subject characteristics. Between groups (usual care vs.

intervention) statistical comparisons will be performed on categorical variables via Chi-square test or Fishers Exact test if necessary, odds ratios with 95% CIs will be reported. Continuous variables will be compared via Independent *t*-test. A two-tailed P level of .05 will be considered statistically significant in all analyses. Analyses will be performed with SPSS software (release 18.0, SPSS, Chicago).

We plan to use logistic regression analysis to measure the retrospective datapoints for discrete variables.

If patient numbers allow a Backward Stepwise Logistic Regression will be performed. 30-day readmission (yes/no) will be the dependent outcome. Predictors will include variables listed above as well as the study groups (usual care vs intervention).

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

We have not completed this section yet

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Continued commitment of the core team members through consistent attendance at weekly meetings
2. Support of the hospital research department in designing a statically sound study
3. Commitment by the FMS team to consent the study participants

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Coordinating the time and staffing for the home visits for the intervention group
2. Finishing the IRB proposal- numerous iterations were made so that we were capturing variables that could be neatly tracked and reportable.
3. Getting everyone on board- residents, faculty, study participants to ensure we could reach the power needed for this study.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

Start much earlier than you anticipate – getting the project off the ground took much longer than anticipated. Double your expected timeline.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: Having a more comprehensive discharge process in place and having residents be more aware of how discharge processes can affect patient health in the post-discharge environment
2. Negative Unintended Consequences: Lengthening the discharge process in terms of timeliness in order to go through each step correctly (med rec, patient education, scheduling follow-up)

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 8 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

We still need to analyze post-intervention data in order to assess whether our null hypothesis is valid before implanting practice changes.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

We are still in the process of analyzing data from this project. This is unknown at this time.

# The Impact of Post-Discharge Follow-Up Care on Hospital Readmissions for Adults

Tydell, J., Gravdal, J. Hyzek, P., Goldman, S. Advocate Lutheran General Hospital. Park Ridge, IL

## Introduction

The literature reports mixed data on whether more intensive or planned follow up reduces readmissions. Certain studies have shown that planned contact with a primary care provider reduces the risk of readmission as well as increases the time until readmission occurs, while other studies have found that early or more frequent access to care actually increased the readmission rate and shortened the time interval to readmission. Our study will mainly examine the three distinct time intervals which can influence readmission. While the prospective portion of this study aims to evaluate whether the intervention (phone call and physician home visit) is successful at lowering the readmission rate, the retrospective portion will evaluate the pre-hospitalization and hospital stay-associated factors that may affect the likelihood of readmission.

## Statement of Problem

30-day hospital readmission rates are measured commonly tracked by hospitals and also by certain insurance payer systems as a quality indicator. Several factors contribute to successful discharge from a hospital stay that can be group into three broad categories: pre-admission factors, hospital associated factors and post-discharge factors. We would like to better understand the drivers to hospital readmission.

## Objectives of Intervention

1. To lower the hospital readmission rate for high risk diagnoses categories through dedicated follow up with the patient's primary care provider
2. To provide better patient understanding of the discharge process through ongoing patient education
3. To provide an opportunity for patients to clarify questions related to their hospital stay and post-discharge care requirements

## Description

This will be a combination retrospective and prospective group study.

**Population:** All adult (age  $\geq 21$ ) English speaking Nasset Family Medicine patients admitted to the Family Medicine Service(FMS) with diagnosis of Digestive/Respiratory/Infectious Disease (as coded by discharge diagnosis) from November 2009 until approximately December 2010 for the retrospective control group and March 2011 until approximately March 2012 for the prospective intervention group who have a primary care physician at the Nasset Family Medicine Center or will be following up at the Nasset Center post- hospital discharge

**Primary endpoint:** 30-day hospital readmission for any cause

## Results / Findings to Date

Preliminary Retrospective Data based on the one month pilot study:

### Demographics:

Male	65.0%
Female	35.0%
Caucasian	85.0%
African Am.	10.0%
Other	5.0%

### Insurance Status:

Medicare:	41.2%
HMO/PPO:	58.8%

### Diagnostic Category:

Digestive:	40.0%
Infectious:	25.0%
Respiratory:	40.0%

Readmission Percent:	8.7%
Readmission in <30 days:	100.0%

## Figure 1

### Variables:

#### % of patient with new medications at discharge:

Yes:	80.0%
No:	6.7%
Unknown:	13.3%

#### % of patients with changes to existing medications:

Yes:	66.7%
No:	13.3%
Unknown:	20.0%

#### Number of new medications prescribed:

1-2:	61.5%
3 or more:	38.5%

#### Number of follow up appointments recommended:

1-2:	66.6%
3 or more:	26.7%

#### Number of consultants on case:

None:	6.3%
1-2:	81.3%
3 or more:	12.6%

#### Co-morbidities:

Alcohol or drug use:	4.3%
Asthma:	8.7%
COPD:	17.4%

## Key Lessons Learned

- Challenges of working with the IRB
- Challenges of completing a study as a resident
- Issues with continued and committed teamwork, conflicting schedules, keeping momentum going
- Concomitant hospital initiatives: hospital moving towards "PR" follow up phone call, CHF readmission prevention protocols
- Hospital readmission rate already low

## Next Steps

1. Complete the retrospective portion of the study
2. Begin the prospective portion of the study

**Hospital: Akron General Medical Center**  
**Team Leader: Cheryl Goliath, PhD**

**I. PROJECT TITLE/NAME:**

Wireless Communication as a Tool to Increase Physician Satisfaction and Decrease Length of Stay

**II. BRIEF DESCRIPTION:**

The residents on one of our inpatient general medicine rotations were provided with hospital-approved wireless phones that were used as the sole communication device to interface with participating faculty. Participating faculty were given one number to call (Senior Resident on the service) for all patient inquiries. That eliminated communication barriers such as resident duty hour restrictions, vacations, patient assignments, etc. This also required the Senior Resident to know all the patients on their team.

**III. OPPORTUNITY STATEMENT:**

Historically, this rotation has been rated poorly by the residents because the teaching faculty on this service is our community physicians and the interface with this group has been viewed as disjointed compared to the other inpatient general medicine service that is staffed by hospital-based salaried faculty. Communication has been poor. Faculty on this service has been frustrated with not knowing who is covering their patient due to restrictive resident duty hours, vacations, patient caps, etc.

**IV. RESEARCH QUESTION:**

Can the use of wireless phones by residents and teaching faculty on an inpatient medical service improve physician satisfaction and decrease length of stay?

**V. HYPOTHESIS:**

The use of real-time wireless communication will improve physician satisfaction and decrease length of stay.

**VI. MEASURES:**

Length of stay - Pre- and Post-Intervention  
 Attending physician satisfaction – Pre- and Post-Intervention  
 Resident physician satisfaction – Pre- and Post-Intervention

**VII. INSTRUMENTS:**

Two online surveys were developed for each group (resident pre- and post-intervention survey and faculty pre-and post-intervention survey). Each survey consisted of approximately twelve questions assessing current views on frequency and effectiveness of communication, availability of resident or faculty and overall satisfaction.

**VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.**

Baseline length of stay data were collected for the three month period one year prior (Mar-May 2009) to study implementation (Mar-May 2010) and for the three month period immediately prior (Nov 2009-Jan 2010) to study implementation. These data were collected and analyzed separately for attending physicians that agreed and did not agree to participate in the intervention. Attending and resident physician satisfaction baseline data were collected via online surveys prior to implementation of the intervention. The survey consisted of approximately 12 questions using Likert or modified-Likert scale response structures. Responses from resident physicians, as well as attending physicians who agreed or did not agree to participate in the intervention were collected and analyzed separately.

**IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted.**

Each resident assigned to the "General Medicine 2" rotation used a hospital-approved wireless phone to communicate with the "General Medicine 2" teaching faculty for that month. Participating teaching faculty provided a direct contact number for their wireless device that residents used for all communication regarding the care of their patients. Non-participating teaching faculty contacted residents via the resident pager number per traditional communication methods. Residents were instructed not to use the wireless device when contacting non-participating teaching faculty, but rather to continue to use hard-wired phones in the hospital as previously done.

**X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.**

Post-Intervention length of stay data were collected for the three month period during (Mar-May 2010) study implementation and will be collected for a three month period following (Nov 2010-Jan 2011) study implementation. These data were collected and analyzed separately for attending physicians that

agreed and did not agree to participate in the intervention. These data are ratio in nature. Attending and resident physician satisfaction post-intervention data were collected via online survey following implementation of the intervention. The survey consisted of approximately 12 questions using Likert or modified-Likert scale response structures. Responses from resident physicians, as well as attending physicians who agreed or did not agree to participate in the intervention were collected and analyzed separately. These data are interval in nature.

**XI. TYPE OF ANALYSIS: Based on your types of measures, what types of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)**

Analyses for this study will be mainly descriptive in nature. As such, mean and standard deviation and/or standard error of the mean will be calculated for all measures as appropriate. Trends will be reported for all measures. If appropriate, statistical comparisons between physician groups (those participating or not participating in the intervention) and/or pre- and post-intervention for length of stay and satisfaction will be performed using the Student's t test.

**XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:**

Anecdotal information was collected; however no measures other than those indicated in the proposed study were assessed.

**XIII. SUCCESS FACTORS:**

The team was pleased with the pre-intervention survey response rate (75% of the faculty and 91% of the residents responded by the deadline). Post-intervention assessment: Eventual participation (buy-in) was observed for the residents/interns. This protocol reinforced senior resident involvement and teaching role on the "General Medicine 2" teaching service. The residents requested the purchase of additional phones to use in other areas, which were approved in the 2011 budget.

**XIV. BARRIERS: (What were the 3 greatest challenges you encountered?)**

1. The residents had difficulty following the timed sequence required to turn on the phones. This resulted in reprogramming the phones, which required our IT Department to fix the phones.
2. The residents did not properly trade off the phones at the end of their shifts, and many times no one knew who had the phone.
3. The residents would not swap out the charged batteries at the beginning of their shifts and they, subsequently, carried non-working phones. This resulted in frustrated attending physicians, since their calls would go unanswered.
4. Since the study spanned several academic years, the senior residents who took the pre-intervention survey were not available to take the post-intervention survey, despite efforts to contact them by mail, phone, and email.
5. One unforeseeable barrier was the hospital's initiative to reduce patient length of stay for all physicians. Due to budgetary concerns, this initiative began in Winter 2009 and carried over into the study period. This was problematic as it affected our baseline data just prior to the intervention (prematurely lowered LOS), as well as made it difficult to discern whether any differences in length of stay during the study period were due to the intervention or the hospital initiative.
6. Other barriers or limitations to this study include small resident and attending physician samples and the short observation period. These will limit the extent to which conclusions may be drawn surrounding this intervention, but will allow this study to serve as a pilot for implementation of this intervention over a longer period of time, or utilizing a similar intervention at another institution or for another teaching service.

**XV. LESSONS LEARNED:**

The communication from the NI team to the residents regarding reasons for implementing the phone intervention needs to be improved. Several meetings were held in addition to email communications, but not all residents were available to attend the meetings. Residents were not attentive in reading their email. A more comprehensive in-service on the use of phones and the importance of resident participation would have been beneficial in terms of gaining resident buy-in. The study would have also benefited from closer daily monitoring of phone usage.

**XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.**

1. **Positive** - A re-engagement with the community-based faculty.
  - Continued and expanded use of the phones

2. **Negative-** Some issues of professionalism on the part of the residents participating in the study

**XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" completely satisfied), much of what you set out to do was your team able to accomplish?**

1 2 3 4 5 6 7 8 9 10

**XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied "10" meaning completely satisfied) how satisfied are you with what you were able to accomplish on your NI project?**

1 2 3 4 5 6 7 8 9 10

**XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.**

Upon return from Meeting 4, the team will present the study information to the residents and faculty. Additional phones were approved for purchase in 2011. In conjunction with the NI Team and the Program Director, assignments for the new phones will take place, as will an in-service on how to use the phones.

**XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?**

As a result of this project, the Department has a better awareness of and has discussed physician outliers with respect to patient length of stay trends. In addition, issues of communication detractors, which had been previously attributed to the community physicians by the residents, have been more clearly identified as issues on the part of the residents as well.

# Wireless Communication as a Tool to Increase Physician Satisfaction and Decrease Length of Stay



Linda Kiatoukaysy MD; Nairmeen Haller PhD; Cheryl Goliath PhD; Linda Izzo; Titus Sheers MD; Paul Lecat MD  
Akron General Medical Center, Akron OH



## Introduction

Communication between resident and attending physicians plays a significant role in patient care. Several studies have reported that a majority of medical errors by residents are preventable, and typically due to poor or lack of communication between resident and attending physicians. Several reasons for the communication breakdown have been reported, however, few attempts have been made to address these reasons.

## Statement of Problem

- GenMed2 rotation utilizes community attending physicians who have off-campus offices.
- Communication between resident and attending physicians is typically by phone or notes in patient charts.
- Phone communication is largely dependent on the paging system.
- Acting on attending physician orders relies greatly on clarity of attending notes in patient charts.
- Much frustration exists for resident and attending physicians due to poor and/or lack of communication during this teaching rotation.

## Objectives of Intervention

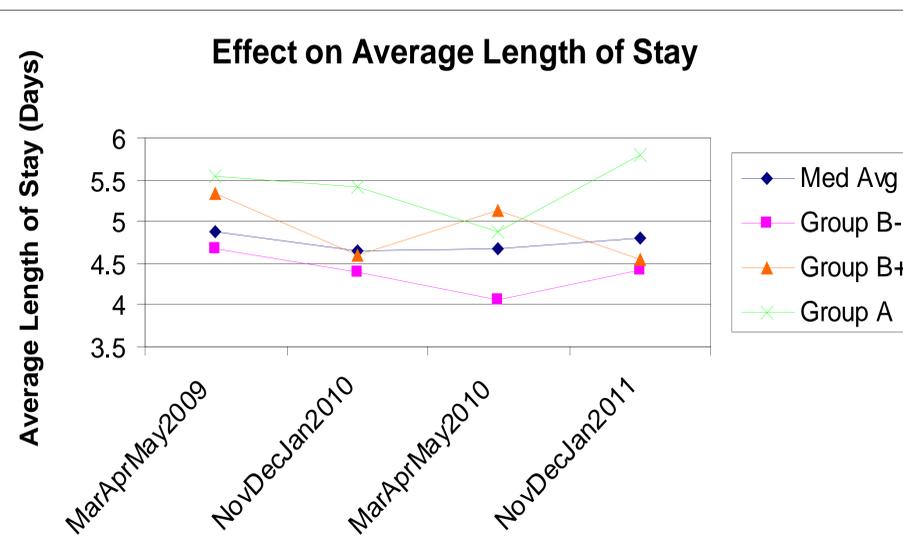
- To improve timeliness and quality of communication between resident and attending physicians on the GenMed2 rotation by using hospital approved wireless phones.
- To decrease length of patient stay by expediting communication between resident and attending physicians.
- To improve resident and attending physician satisfaction on this rotation by facilitating communication.

## Intervention

- Hospital approved wireless phones were provided for all residents on the GenMed2 rotation.
- Participating attending physicians provided personal mobile phone numbers to residents and were instructed to communicate only by way of wireless phone numbers provided, if not in person.
- Residents were educated on use of devices prior to rotating on GenMed2.
- Residents were instructed to use wireless phones exclusively for communicating with participating attending physicians only.

## Results

Figure 1. Average Length of Stay

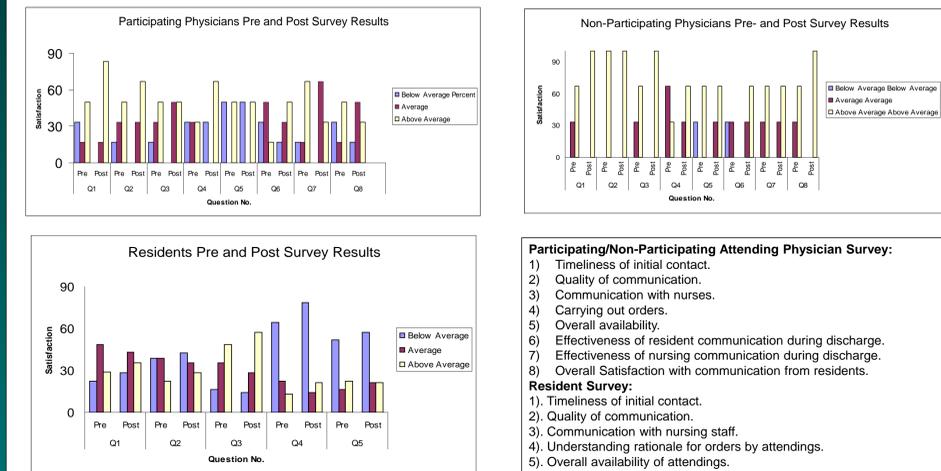


## Limitations

- Small sample size.
- Brief study period.
- Hospital initiative to reduce length of stay.
- Resident use of phones for unrelated business.

## Results cont'd

Figure 2. Pre- and Post-Intervention Survey Results



## Key Lessons Learned

- Quality of communication appears to impact overall physician satisfaction with this rotation.
- Facilitating physician communication appears to play a role in reducing patient length of stay.
- Improved communication between resident and attending physicians also appears to improve communication with nursing staff.
- Implementing a wireless phone system for resident use in communicating with off-campus teaching staff is feasible with mild "tweaking".

## Next Steps

- Improve resident education on phone use to increase buy-in.
- Encourage/mandate residents to use wireless phones exclusively.
- Encourage attending physicians to use direct phone numbers.
- Improve monitoring of compliance.
- Increase number of wireless phones available for use.
- Expand new system to include all sections of IM.

Hospital: Goryeb Children's Hospital-Atlantic Health

Team Leader: Alan Meltzer MD, Donald Casey MD

I. PROJECT TITLE/NAME: Improving Resident Turn-Over: Reduction of Potential Medication Errors
II. BRIEF DESCRIPTION: The goal of the project is to incorporate the information contained in the electronic MAR (medication administration record) generated by the computerized physician order entry program into the resident sign-out sheets. We did a pre-test assessing the accuracy of the current senior resident sign-out sheets compared with the pharmacy generated MAR, specifically looking at pain medications, utilizing a brief survey tool. The next step was to incorporate the MAR's information into the sign out sheets and then do a post test reassessing the accuracy of the sign-out sheets and the process. A final intervention of a utilizing a standardized sign out sheet for all residents was implemented and final data was collected.
III. OPPORTUNITY STATEMENT: We have the opportunity to reduce the number of medication errors that are transmitted from one team/service to another through accurate reporting of patient medications.
IV. RESEARCH QUESTION: Does incorporation of the electronic MAR information into resident sign-out reduce the number of resident turn over errors.
V. HYPOTHESIS: Incorporating the electronic MAR's information into the resident sign out sheets will make resident hand-offs more accurate and reduce the number of medication errors related to drug, dose and administration interval when residents change shift or patients change service.
VI. MEASURES: We looked at each pain medication ordered in the electronic MAR and compared the drug name, dosage, route and interval of administration and any missed medications to the data the residents had on their sign-out sheets.
VII. INSTRUMENTS: Survey tool
VIII. BASELINE DATA COLLECTED: Baseline data collected noted discrepancies between the pharmacy's MAR and the residents' sign out sheet; specifically name of drug, dosage, route of administration, frequency/interval and any missed medications not found on the resident sign out sheet Week one data revealed orders for 70 pain medications of which there were discrepancies noted in 23 of the doses, 25 pertaining to the route of administration, 23 in the ordered frequency, 28 prn vs. around the clock errors, and 14 missed medications no found on the sign out sheets with an overall error rate of 32%.
IX. INTERVENTION: Initial intervention was to train pediatric residents and nurses on current pediatric pain management. The data collection tool was designed and implemented. A process of medication reconciliation was instituted prior to morning rounds utilizing the pharmacy's electronic MAR and the resident sign out sheets. A final intervention included a new, standardized sign out tool for all pediatric residents.
X. POST-INTERVENTION DATA: After the institution of the medication reconciliation process utilizing the pharmacy's electronic MAR prior to morning rounds, the overall error rate was reduced to 17%. Implementation of a standardized sign out tool reduced the number further to 8%.
XI. TYPE OF ANALYSIS: Descriptive statistics were utilized including total potential errors, absolute numbers and percentage of errors.
XII. DID YOU COLLECT ADDITIONAL DATA? no
XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success? <ol style="list-style-type: none"><li>1. Resident champion of the process changes.</li><li>2. The cooperation of IT to generate the electronic MAR and make it available to the residents prior to morning rounds.</li><li>3. Cooperation of the pediatric pharmacy staff who joined the residents on morning rounds.</li></ol>
XIV. BARRIERS: What were the 3 greatest challenges you encountered? <ol style="list-style-type: none"><li>1. Training of residents who rotated in from other services to the process</li><li>2. Having a complete MAR which included medications that had been ordered as prn but had not been administered.</li><li>3. Implementing a single sign out tool for all residents.</li></ol>

XV. LESSONS LEARNED: A resident champion is required for success of the project.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences:
2. Negative Unintended Consequences:

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 **8** 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 **8** 9 10

XIX. NEXT STEPS: Next steps include expanding the reconciliation process to include all medications ordered and then spreading the process to our Pediatric Intensive Care Unit (PICU). Incorporate the lessons learned into the annual new resident orientation.

XX. PROJECT IMPACT: Through a collaborative effort between IT, pharmacy and the residents, a project designed to improve resident communication and championed by the residents can have significant impact on patient safety in the hospital inpatient setting.



# Improving Resident Turn-Over: Reduction of Potential Medication Errors

Sara Little, MD, Sandy Ricks, MD, Alan Meltzer, MD, Don Casey, MD, Kiley Alpert

Atlantic Health, Morristown, New Jersey

## Introduction

Resident turn-over is a ubiquitous process that occurs across all GME programs and has been cited as a potential area where improvements are needed to promote and ensure patient safety. As of 7/1/2011, ACGME has mandated that sponsoring institutions and programs must ensure and monitor effective, structured turn-over processes to facilitate both continuity of care and patient safety. The current study sought to engage pediatric residents around a critical patient safety issue: improving the accuracy of patient turn-over through pain medication reconciliation.

## Statement of Problem

At Atlantic Health hospitals, much like hospitals across the U.S., the changes to resident duty hour requirements have increased resident hand-offs. With the increase in turn-over, inaccurate sign-out processes could lead to potential harm. To address this, a process was implemented incorporating an electronic medication administration record (MAR) for pain medication reconciliation during resident turn-over.

## Objectives of Intervention

1. To improve accuracy of resident turn-over with regards to pain management.
2. To incorporate electronic medication reconciliation in conjunction with the hospital pediatric pharmacy and IT (information technology) services.
3. To standardize the turn-over tool for pediatric trainees at all levels.

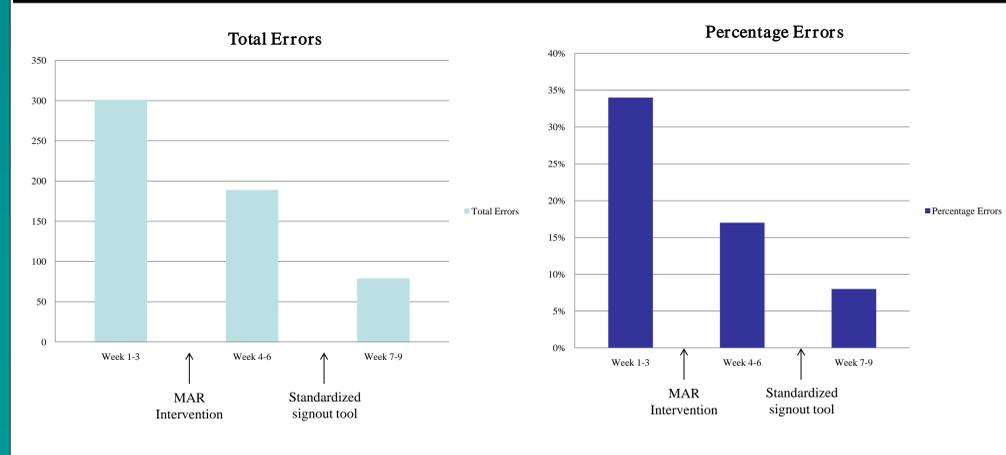
## Aim Statement

**To reduce the number of pain medication errors that are transmitted from one team/service to another through accurate reporting of patient medications**

## Interventions

1. Pharmaceutical educational session to train pediatric residents and nurses on current pain management.
2. Develop survey tool to collect data on errors during resident turn-over, targeting pain medications.
3. IT and pediatric pharmacy involvement to generate an electronic MAR to include all medications ordered (routine and prn).
4. Incorporation of electronic MAR to medication reconciliation prior to morning resident turn-over.
5. Standardize turn-over tool for all pediatric residents independent of level of training.
6. Data collection after each implemented intervention.

## Results



## Key Lessons Learned

1. The success of the project hinged on the involvement of a resident champion, program leadership, and the cooperation from IT services and pediatric pharmacy.
2. Outside trainees rotating through the pediatric program need to be in-serviced regarding the medication reconciliation process.
3. Reduction of potential pain medication errors was achieved utilizing a standardized sign-out tool incorporating an electronic medication reconciliation process.

## Next Steps

1. Expand medication reconciliation process to include all medications (i.e. antibiotics, respiratory medications, etc.).
2. Extend medication reconciliation process to Pediatric Intensive Care Unit during transition to electronic order entry system.
3. Annual education of incoming pediatric housestaff regarding necessity for accurate medication reconciliation prior to resident turn-over.



Hospital: Aurora Health Care

Team Leader: Jeff Stearns, MD

I. PROJECT TITLE/NAME:

Engaging Residents and Fellows in Quality Improvement Projects Addressing Heart Failure Readmissions: The AIAMC National Initiative Project

II. BRIEF DESCRIPTION: (4-5 sentences maximum)

In partnership with Aurora's Care Management division, Aurora UW Medical Group chose to focus on Aurora Health Care's (AHC) ongoing initiative relating to Readmissions of patients with Heart Failure (HF). Statistics at Aurora Sinai Medical Center (ASMC) show that in 2009 there were around 300 admissions for HF, and although readmission rates were not a clear problem, the hospital had not achieved top quartile in rates, as compared to national standards (which is a goal for AHC). This QI projects proposes to do a risk assessment on all patient admissions for HF, using measurement tools for in-hospital mortality risk and for risk of readmissions post discharge. Using the results of these tools, patients will be risk stratified, and various available, but underutilized interventions/resources, will be implemented. The screening and risk stratification will be accomplished by residents in Internal Medicine and by fellows in Cardiology, working on inpatient units at ASMC. At 3 month intervals, the readmission rates of these patients will be assessed, and compared, based on their risk stratification and the numbers of interventions implemented.

III. OPPORTUNITY STATEMENT:

**AIM-** to reduce heart failure readmissions at ASMC-by engaging graduate medical learners to increase care/discharge planning by using currently established risk prediction tools to determine those HF patients at increased risk for in-hospital mortality and readmission

**Rationale-**

- HF remains #1 admitting diagnosis for patients >65
- HF 30 day readmission rates are consistently reported at about 25% nationally despite significant efforts to improve this outcome
- ~50% of HF patients treated by Aurora physicians do not have an ACP on file
- Only about 11% of HF patients are referred to hospice, despite meeting criteria for end-stage disease

**Expected Outcomes-Aurora System**

- Readmission rates for HF patients involved in this project will decrease.
- Utilization of discharge resources (Teleservices, VNA, CBCM, hospice) will increase.
- Number of HF patients at the ASMC site that have been completed ACP will increase.

**Expected Outcomes-Residents and Fellows-**

- Medical Knowledge - increased knowledge of risk factors associated with readmission and use of predictive models to synthesize this information for care planning
- Interpersonal and Communication skills - how to communicate with CHF patients and fellow caregivers who work with CHF patients; how to use current medical records to track the care of CHF patients; how to discuss end of life issues (ACP); and how to coordinate the team process for HF care to achieve best outcomes
- Practice-based Learning and Improvement - how to evaluate their own processes for caring for CHF patients and ways to improve their care-giving skills
- Professionalism - how to respect patients from different cultures with CHF and consider some of the personal barriers to proper treatment that CHF patients face
- Systems-based Practice - learning how the Aurora Health Care system related to Care Management functions in terms of educating CHF patients with the goal of decreasing re-admissions for these patients; how they as physicians can take an active role in educating and caring for patients with CHF, functioning as an advocate for their CHF patients; learn about the multiple CHF teams that focus on improving strategic outcomes for HF (decreasing morbidity and mortality, decreasing readmissions, improving quality of life)

IV. RESEARCH QUESTION:

Will engaging residents and fellows in an ongoing QI project on HF readmission improve readmissions rates?

<p>V. HYPOTHESIS: Risk stratification of HF patients and subsequent increased utilization of available resources, both inpatient and outpatient will decrease subsequent readmission rates.</p>
<p>VI. MEASURES: Risk stratification; utilization of resources such as education, Teleservices, VNA, hospice; periodic assessment of readmissions rates at Aurora hospitals.</p>
<p>VII. INSTRUMENTS: Abraham, William T., et al. Predictors of In-Hospital Mortality in Patients Hospitalized for Heart Failure. Journal of American College of Cardiology 2008; 52:347-356. Philben, Edward F., et al. Prediction of Hospital Readmission for Heart Failure: Development of a Simple Risk Score based on Administrative Data. Journal of American College of Cardiology 1999; 22:1560-1566.</p>
<p>VIII. BASELINE DATA COLLECTED: At the beginning of the project we looked at the following data as baseline information: 1. Current readmission rates for HF patients. Baseline data will be obtained from Premier for the time frame June 2009-July 2010 for 30 day all cause readmission for HF patients. 2. The current utilization of outpatient services available to HF patients, including Teleservices, VNA and Community Based Case Management. We will use the January to June timeframe for our baseline. 3. Current percentage of HF patients with ACP on file for those patients managed in the Greater Milwaukee Market which includes Aurora Sinai Medical Center as well as Aurora St. Lukes Medical Center.</p>
<p>IX. INTERVENTION: Residents and fellows entered data on their HF patients into a database that calculates their risk of readmission and mortality. Residents and fellows thereby become aware of these risks so that they can act as an advocate for their patients and explain services available upon discharge. This project began 7-19-10 and continues to date. All residents and fellows were exposed to a seminar on the project, explaining the goals and process. Regular emails and one on one meetings were held to reinforce the project/process.</p>
<p>X. POST-INTERVENTION DATA We will measure 30-Day all cause readmission rate, number of In Patient hospitalizations, number of In Patient days for patients entered into our project.</p>
<p>XI. TYPE OF ANALYSIS:  The percentage of patients readmitted before the intervention will be compared to the percentage of patients readmitted after the intervention to see if there is a significant difference. We will compare individual patient's readmission rates one year prior to the intervention to one year post.</p>
<p>XII. DID YOU COLLECT ADDITIONAL DATA? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:  We provided an online learning module for residents and fellows describing specifics of caring for HF patients and resources that are available to enhance care. We would hope that the module would prepare the residents and fellows to work with HF patients especially at discharge. We have collected a list of residents and fellows who have completed the course.  We also collected data about the number of interventions provided related to Advance Care Planning. We are aware that creating an Advance Care Planning document takes time and multiple interventions and felt that documenting our interventions is an important part of the process, rather than just documenting the number of ACP that were completed.</p>
<p>XIII. SUCCESS FACTORS: 1. Strong resident/fellow champions for the project and their teaching/involving their peers 2. Linking resident/fellows to an institutional QI project (awareness/understanding) of institutional processes and also impacted the medical care of the HF patients 3. Awareness of HF risk stratification 4. By engaging Social Service in the project itself, a new, higher level of familiarity with patients was achieved 5. Awareness of importance increased emphasis on discussions on ACP with patients and families</p>
<p>XIV. BARRIERS: 1. Monthly house-staff changing of services; variable champions/house-staff engagement 2. Competition of QI project with other house-staff responsibilities/priorities 3. House-staff focus on acute patient care NOW, versus looking to continuity after discharge</p>

XV. LESSONS LEARNED:

1. House-staff engagement is a challenge; they have competing priorities
2. Multiple, strong house-staff champions is critical
3. Faculty reinforcement/engagement helps
4. Hospital/Care Management agenda often doesn't overlay with house-staff priorities
5. Early and frequent updates on data enables continuing house-staff engagement
6. Balancing project continuity over time with resident continuity (or lack thereof) is problematic
7. Translating "best care" to actual care is a continuing challenge for the entire care team
8. Our focus on the risk stratification data become the object of the process for many residents versus changing the process of HF management

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

*Positive Unintended Consequences:*

- risk analysis tool is being used at other hospitals
- house-staff recognized CHF readmission as an institutional/system challenge
- awareness of hospitalists focus on best practice care on diagnosis does not equate to the focus of the individual's primary doctor. We need to be able to leverage the personal investment of the primary physician with the evidence based best practices in order to sustain quality care.

*Negative Unintended Consequence*

- adding data entry to new interns' tasks added stress

XVII. EXPECTATIONS VS. RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish

	1	2	3	4	5	6	7	8	9	10
Votes Received:	None	None	None	None	2	3	2	None	None	None

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completed satisfied), how satisfied are you with what you were able to accomplish on your NI project?

	1	2	3	4	5	6	7	8	9	10
Votes Received:	None	None	None	1	1	5	None	None	None	None

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

- Continuing data collection through the spring, and presenting project at an institutional research day
- Decision regarding project continuation in a new academic year
- Reinforcing utility of risk assessment tools at hospitals across the system

XX. PROJECT IMPACT: What changes have you observed in your residency program or at your institution based upon this project?

- Self: Taking time to be involved in a quality project is of paramount benefits as you look into different aspects of the problem. AIAMC CHF readmission project increased my awareness of the complexity of CHF patients and multidisciplinary approach.
- I think there was definitely an increase in awareness and deep understanding of CHF as a complex and chronic entity requiring a multidisciplinary approach among the whole health care providers at Sinai including: fellows, residents, interns, and nurses.
- Residency Program: The residents, but not the majority of interns, are aware about the CHF project, risk assessment, complexity of CHF patients and use of multidisciplinary approach at time of discharge by involving social worker, VNA, etc.
- Although most of the interns and some fellows were not entering data as we wanted, I think they are more aware of the complexity of the CHF and they are more aware of the risks of readmission and mortality as well as the necessity of involving social worker and other teams in the discharge planning.
- Institution: CHF multi-disciplinary approach in effect, including CHF packet to the CHF admitted

patients, re-admission rate data....?!!!

- I felt that the CHF package provided to patient was a very useful tool and action plan that will definitely affect patient satisfaction even if not all patients are following it as I personally experienced from one of my patients who was very happy about the package and the whole team efforts.
- House staff recognized the problem of CHF readmission. They became more aware of tool to establish their prognosis and re-hospitalization rate and identify patients who need interventions. They have information about resources to use to decrease readmission by educating patients and utilizing home care/services.

# Engaging Residents and Fellows in Quality Improvement Projects Addressing Heart Failure Readmissions: The AIAMC National Initiative Project



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## Introduction

Heart Failure (HF) remains the most common admitting diagnosis nationally for patients older than 65 despite major efforts on the part of hospitals and health care systems. Readmission rates remain stubbornly high in spite of numerous approaches by care providers and systems. This is a classic chronic condition requiring the multiple parts of the health care team to work in a coordinated fashion to achieve more optimal results. This project's goal is to engage our institution's internal medicine residents and cardiology fellows in a quality improvement project addressing readmission rates for HF patients at one of our major teaching hospitals, using two risk assessment tools to affect a decrease in readmission rates.

## Statement of Problem

Aurora Health Care's Care Management division has HF teams involved in an ongoing initiative relating to readmissions of HF patients. We have not achieved the system's goal of top quartile in readmission rates, despite multiple interventions in place to improve quality of care and subsequent outcomes. In 2009, there were around 300 HF admissions at one of our two major teaching hospitals, where internal medicine residents and cardiology fellows spend considerable time on inpatient services caring for an urban, underserved population. This QI project involves having the house staff do a risk assessment on all HF admissions to stratify patients, in an effort to impact subsequent care and follow-up.

## Objectives of Intervention

1. Risk assess all HF admissions for in-hospital mortality and likelihood of readmission.
2. Utilize these results to increase the in hospital interventions, including social service consult, patient education, and discharge planning/follow-up.
3. Engage house staff in an ongoing hospital/system QI project.
4. Decrease the readmission rate for HF at one of the system's teaching hospitals.

## Description

1. A National Initiative team was formed, with support from leadership of the internal medicine residency and cardiology fellowship, including designation of a house staff champion from each program, and involvement of the GME educator and the director of the system's Care Management HF readmission team.
2. Literature review was performed and two risk assessment tools relating to HF/readmission was chosen.\*
3. Education sessions were convened, lead by the house staff champions to teach IM residents and Cardiology fellows about the project and their roles in doing risk assessment and subsequent care interventions with HF patients.
4. Risk assessments were performed on the majority of patients, social service consults were ordered and subsequent interventions in the hospital monitored and readmissions rates followed.

## Results/Findings-To-Date

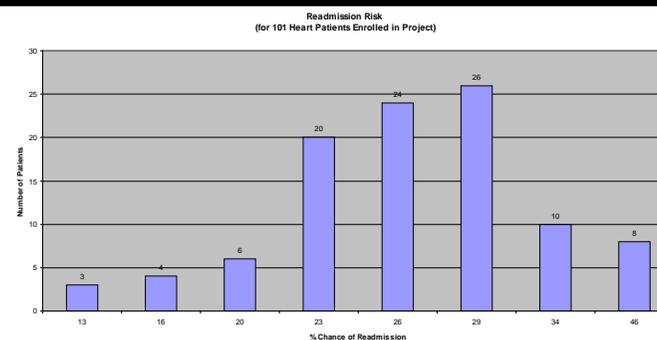
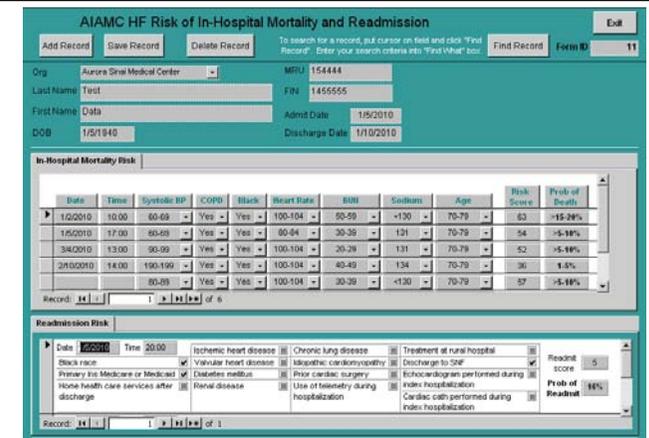


Table 1

53 HF Patients Enrolled in Project  
Acute Hospitalization Data from 1 Year Prior to Project

Emergency Room Visits	82
Inpatient Hospitalizations	83
Total Inpatient Hospital Days	593
30-Day All Cause Readmissions	15

Figure 1



## Key Lessons Learned

1. House-staff engagement in QI is a challenge; they have competing priorities.
2. Multiple, strong house-staff champions are critical and faculty support important.
3. System/hospital care management agendas often don't overlay with the teaching program priorities.
4. Early and frequent updates on project data enable improved house-staff participation.
5. House-staff recognized CHF readmissions as an institutional challenge.
6. The focus on risk stratification of patients (data) became the focus of the project for many residents, despite to goals of improved patient care/readmissions.
7. Balancing project continuity over time with resident continuity (or lack thereof) is problematic.
8. Translating "best care" to actual care is a continuing challenge for the entire care team.

## Next Steps

1. Decisions on continuing project, with new champions to carry through academic year transitions.
2. The risk analysis tools will be implemented at other hospitals, by their HF teams.

## References

- \*Abraham, William T., et al. Predictors of In-Hospital Mortality in Patients Hospitalized for Heart Failure. *Journal of American College of Cardiology* 2008; 52:347-356.
- Philben, Edward F., et al. Prediction of Hospital Readmission for Heart Failure: Development of a Simple Risk Score based on Administrative Data. *Journal of American College of Cardiology* 1999; 22:1560-1566.<sup>32</sup>

Hospital: Baystate Medical Center

Team Leader: Mihaela Stefan

I. PROJECT TITLE/NAME: Standardized Physician Discharge Encounter for Patients with HF to Increase Patients' Readiness for Discharge and Decrease Readmission Rate
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) <u>Primary Aim:</u> To determine if a standardized physician discharge checklist used during the physician-patient discharge encounter will enhance the critical knowledge needed for patients to manage their illness (assessed by Patient Discharge Knowledge Assessment Survey) <u>Secondary Aim:</u> To determine if a standardized physician discharge checklist will both decrease the rate of readmission and increase the time to readmission for patients with HF. <u>Study Design</u> Observational prospective cohort study of non-institutionalized patients over 18 years admitted with HF.
III. OPPORTUNITY STATEMENT: There is a great variability in the way physicians interact with their patients on the last day of hospitalization. The time spent on discharge with the patient is usually short and frequently the patient is a passive participant. The physician discharge encounter is non-standardized, and frequently marked with poor quality.
IV. RESEARCH QUESTION: Does a standardized physician discharge checklist provide the critical disease specific knowledge the patient needs for a safe and effective discharge?
V. HYPOTHESIS: Standardizing the physician discharge encounter will improve patient readiness for discharge and will decrease the rate of readmission for patients with HF
VI. MEASURES: Primary outcome: knowledge scores from the (Patient Discharge Knowledge Assessment Survey) -PDKAS Secondary outcomes: Whether or not a patient was readmitted within 30 days – 30 days readmission rate Time to readmission
VII. INSTRUMENTS: Patient Discharge Knowledge Assessment Survey - PDKAS (see attached). Standardized physician discharge encounter (SPDE)
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have. HF readmission rate - all cause and HF specific
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. Standardized physician discharge encounter (SPDE) (see attached). The SPDE is supposed to improve patients' critical disease specific knowledge they need for a safe and effective discharge. Information in the SPDE tool includes: knowledge of medications and how/why to use them, sick/contingency plans, weight on the day of discharge and follow up appointments. The intervention was started on 7/13/2010 and was continued until 2/10/2010. We did not achieve the adequate sample size.
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have. Primary outcome: Knowledge scores from the (Patient Discharge Knowledge Assessment Survey) –PDKAS Please see attached data set collection form Individual PDKAS items are coded as a yes/no response. As such, the scale of measurement is dichotomous. A total scale score will be computed by summing the number of items to which the patient responded "yes. The total scale score will be considered ordinal. Secondary outcomes Whether or not a patient was readmitted within 30 days – 30 days all cause readmission rate Time to readmission This variable will measure time (in days) to either readmission (the event) or censoring (no readmission within 30 days).

<p>X. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)</p> <p>For analysis of the knowledge data, we compared study groups using chi-square and Fisher's exact test for dichotomous variables and unpaired t-tests and the Wilcoxon rank-sum tests for the continuously-scaled variables. For multivariable procedures, we employed logistic regression to compare study groups, controlling for potential confounders, such as patient age and ethnicity. When the outcomes are continuous, linear regression will be used to compare study groups, adjusting for confounding. We examined whether there are differences between study groups in the proportion of readmissions within 30 days, as well as the "time to readmission". The proportion of readmissions between study groups was compared using chi-square analysis or Fisher's exact test for bivariable analysis and logistic regression for the multivariable analysis. To analyze "time to readmission", we generated Kaplan-Meier survival curves and test the difference in the survival curves using the log-rank test.</p>
<p>XI. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:</p> <p>We collect patients' comments to the questions and we might analyze those</p> <p>We administered a survey regarding the checklist which was intended to be used when discharging patients with heart failure</p>
<p>XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?</p> <ol style="list-style-type: none"> <li>1. The residents' involvement. Residents easily understood the value of using a standardized checklist for the discharge encounter. We had multiple meetings to design the Standardized Physician Discharge Encounter and Patient Discharge Knowledge Assessment Survey and to plan the study</li> <li>2. The support from the Division of Health Care Quality (DHQ) and Academic Affairs</li> <li>3. Study-dedicated research assistants – we thought initially that we will be able to do the survey ourselves. However, the complicated schedule of the residents combined with the timing that the survey need to be administered and difficulty in finding who will be discharge each day, made us realized soon that we will not be able to do it without a dedicated person. We were fortunate to have an RA who is a graduate student in epidemiology and not only administered the surveys, but also designed the data collection forms and entered the data.</li> <li>4. Support from the clinical nurse coordinator, case manager and nurses</li> </ol>
<p>XIV. BARRIERS: What were the 3 greatest challenges you encountered?</p> <ol style="list-style-type: none"> <li>1. The study design – by its nature of a quality improvement study, it was challenging to design it as a "clean" research study. We involved an epidemiologist who helped to design the study.</li> <li>2. Implementing the intervention, convincing the always busy physicians and residents to use the SPDE. Always competing interests – this is not the only QI intervention the physicians needs to apply</li> <li>3. Initial lack of funding to pay an RA. Finally the Academic Affairs and DHQ decided to step us and give us the funding</li> <li>4. RA lack of access to the EMR</li> </ol>
<p>XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?</p> <p>Assemble the team early (including statistician).</p> <p>Assign clear responsibilities to each person who wants to be part of the project.</p> <p>Assess from the beginning the need for financial support and do not start until securing it</p> <p>Pilot the intervention for a short period before starting the actual study</p> <p>Coordinate your QI intervention with other simultaneous interventions from other departments</p>
<p>XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.</p> <ol style="list-style-type: none"> <li>1. Positive Unintended Consequences: Residents involvement in the QI project. We were able to bring together a group of 8 residents who met every month to discuss ways of making the project successful. Residents learned that implementing an intervention to change physicians' behavior is extremely difficult and needs to be planned very carefully to be successful.</li> <li>2. Negative Unintended Consequences: Our intervention was one of the many interventions from the STAAR initiative (state initiative to reduce readmissions); its possible impact was diminished by the concomitant other STAAR QI interventions for all patients</li> </ol>

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 **7** 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 **8** 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

We administered a survey to assess the degree of implementation of the checklist and the barriers in implementing it. We will analyze the results and reshape our intervention accordingly.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

We have seen an increase interest in improving the d/c process among house staff and attending hospitalist. The program with the residents has a Hawthorne effect that seems to extend to other populations.



# Standardized Physician Discharge Encounter for Congestive Heart Failure to Increase Patient's Readiness for Discharge and Decrease Readmission Rate



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## Introduction

Heart failure is one of the most common diagnoses at discharge for Medicare beneficiaries and 30-day readmission rates have been estimated between 17 and 25%. Several interventions have been shown to decrease rates of readmission including: evidence-based inpatient care, improved discharge planning, pre-discharge planning, patient education and coordination between care settings.

## Statement of Problem

There is a great variability in the physicians' interaction with patients on the last day of hospitalization. The physician discharge encounter is non-standardized and frequently marked with poor quality.

## Objectives of Intervention

1. To determine if a standardized physician discharge checklist used during the discharge encounter will enhance patient's critical knowledge needed for disease management.
2. To determine if a standardized physician discharge checklist will decrease the rates of readmission and increase the time to readmission.

## Baseline Characteristics

Patient by study population	Percentage (n=111)
Intervention Group	40
Control Group	71
Mean age of study population	74
Patient demographics by ethnicity	Percentage (n=111)
White	79
Black/AA	10
Hispanic	9
Unknown	2
Patient demographics by gender	Percentage (n=111)
Male	45
Female	55

Figure 1

**Standardized Physician Discharge Encounter for Patients with Heart Failure**

**Discuss Diagnosis:** - What is the MAIN medical problem?  
 •Why was the patient hospitalized?  
 •What triggered the admission? (e.g.: noncompliance with medications/diet, MI)

**Discuss Medications:**  
 •Which medications to take at home and how to take them  
 •Reasons to take each medication  
 •Important side effects of new medications or high alert medications (insulin, Coumadin)

**Discuss Weight at discharge:** \_\_\_\_\_ lbs.

**Discuss with the patient**  
 •How to weigh themselves  
 •Do they have a scale at home?  
 •What signs and symptoms to call the doctor about (*Heart Failure Zones*)  
 •Who is the PCP?  
 •When do they need to follow up with the PCP?  
 •Do they have transportation?

## Description

Observational prospective cohort study of non-institutionalized patients, above 18 years of age, admitted for acute CHF exacerbation to a heart failure unit.

**Intervention:** Standardized physician discharge encounter (SPDE) checklist (see Figure 1). Primary teams (resident teaching teams and hospitalist teams) were assigned to the intervention or to the control for a period of 6 months. On the day on discharge patients completed a survey (PDKA) assessing patients' understanding of the critical discharge knowledge that the SPDE tool provides. The primary outcome of the study was the patients' knowledge scores from the PDKAS. Data was analyzed using Fisher's exact test for dichotomous variables and the Wilcoxon rank-sum tests for continuously-scaled variables.. Secondary outcomes were the 30-days readmission rate and time to readmission. 111 patients enrolled so far; 34% in intervention group. We did not reach the desired sample size.

## Results / Findings to Date

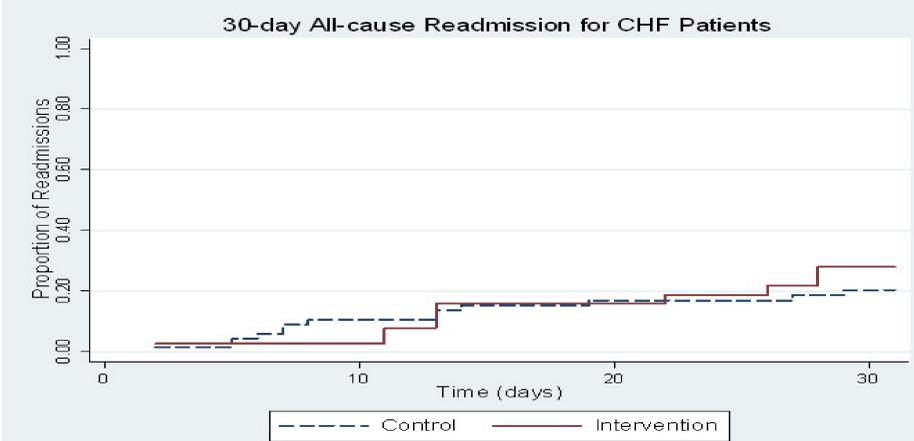
Patient Discharge Knowledge Assessment Survey

Sample Questions	Intervention Group (%)	Control Group (%)	P-Values
Know Discharge Diagnosis	74	70	0.825
Current Treatment	91	98	0.255
Reason for Treatment	98	86	0.094
Follow up Appointment	61	51	0.572
Discharge Weight	80	68	0.191

## Limitations

This intervention was one of the many from the STAAR (state action to reduce readmission) initiative- concurrent interventions may have an effect on study outcome.

## Results



## Discussion

The SPDE checklist did not demonstrate any benefit on the patients' knowledge of heart failure and their readmission rates. Preliminary data based on a physician feedback survey indicates that 48% of the intervention group did not use the checklist consistently; 95% indicated time constraint as a barrier. Key suggestions were that the discharge process should be a team-centric approach, and discharge checklists should be incorporated into discharge summaries.

## Key Lessons Learned

1. For the study
  - a) Low health literacy, many patients do not recognize the term: heart failure
  - b) Physicians have multiple competing tasks. Intervention not implemented if perceived to be of no benefit.
2. For the QI project
  - a) Assemble team early and having well defined roles throughout study
  - b) Financial support from hospital leadership
  - c) Multiple concurrent QI interventions; coordination is key

## Hospital: Levine Children's Hospital at Carolinas Medical Center

**Team Leader: Leonard Feld MD PHD MMM and Cheryl D. Courtlandt MD**

I. PROJECT TITLE/NAME: Using Teach Back in a pediatric resident continuity clinic to increase parent health literacy during well child visits during the first year of life
II. BRIEF DESCRIPTION: Limited health literacy is a significant barrier to communicating with patients which affects access to health care services, understanding health information, and decreases patients' ability to make appropriate health care decisions. Limited health literacy results in negative health outcomes: including inability to understand medication directions, improper management of chronic disease, and poor compliance. All of these factors can result in unnecessary emergency room visits and increased hospitalizations. As medical costs skyrocket in the United States, increasing the entire population's health literacy is important.
III. OPPORTUNITY STATEMENT: Residents represent the front line in medical care, and are in the ideal position to use an evidence based health literacy tool such as Teach Back to improve their patients' health outcomes. Teach Back is a technique used to determine if information is understood by having the patient or patient explain in their own words.
IV. RESEARCH QUESTION: Can a health literacy intervention utilizing the technique Teach Back be successful in a pediatric residency continuity clinic?
V. HYPOTHESIS: In a resident continuity clinic, a resident can successfully use the technique Teach Back to increase the parent health literacy during well child care visits.
VI. MEASURES: Number of well child care visits that Teach Back was utilized Number of well child visits that were rated as very satisfied by parents Number of well child visits that were rated as very satisfied by staff and providers Number of minutes in a well child care visit Number of times that Teach Back will need to be repeated
VII. INSTRUMENTS: REALM – English REALM - Spanish AHRQ Health Literacy Toolkit Teach Back Questionnaire and Provider Feedback Sheet Cycle Time Measurement Sheet Patient and Staff Satisfaction Survey Well child Care outline based on Bright futures by American Academy of Pediatrics
VIII. BASELINE DATA COLLECTED: Baseline Health literacy data using the REALM in English and Spanish for establish an appropriate level for structured teaching during well child care visits. Cycle times, which are both a process and balancing measure, were expected to increase slightly with the intervention. Baseline cycle time and patient satisfaction data was collected for the resident participating in the intervention at the outset of the project. Comparison cycle time data was also collected using residents at the same level of training level.
IX. INTERVENTION: During well child care visits in the first year of life, a standardized teaching session was performed by a second year resident. Three age appropriate topics outlined in Bright Futures from American Academy of Pediatrics were discussed. The parent was encouraged to ask questions and then asked to Teach Back to the resident the three topics discussed. A nurse or an interpreter observed the Teach Back. If Teach Back was not successful, additional teaching was done and this time was added to the cycle time. Baseline cycle time data was collected by observing several second year residents during similar visits, utilizing standardized teaching but not requesting "Teach Back". Staff and provider satisfaction data was collected by using a five point scale. Patient satisfaction was assessed using a scale to rate the visit and rating the interaction with the provider.
X. POST-INTERVENTION DATA: Initially, the project was to have a Teach Back intervention, video and patient activation materials all as part of the pilot. Subsequently it was decided to do a staged intervention, with Teach Back as the initial component. Comparing the cycle times of baseline to intervention, the cycle's times were decreased from baseline for both the resident and the comparison group. The analysis of the process of Teach Back, that repeat Teach Back decreased over time.

<p>XI. TYPE OF ANALYSIS: Control charts done Further analysis to be performed when intervention phase completed.</p>
<p>XII. DID YOU COLLECT ADDITIONAL DATA? At first appearance, Teach Back seems successful, now testing further of recall will be implemented for resident patients and comparison groups. During the spread phase, individual satisfaction data will also be collected.</p>
<p>XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?</p> <ol style="list-style-type: none"> <li>1. Team work between the provider , nurse and the interpreters</li> <li>2. Development of a structured teaching module for well child care exams in the first year of life</li> <li>3. One of our institutional goals was increasing health literacy of our patients and this meshed well with the overarching goals.</li> </ol>
<p>XIV. BARRIERS: What were the 3 greatest challenges you encountered?</p> <ol style="list-style-type: none"> <li>1. Attempting to find time to get the entire team at a meeting due constraints of the residents, attending and parents schedules.</li> <li>2. Large Spanish speaking population and need for all materials to be translated into Spanish and the need to use interpreters so heavily in the intervention.</li> <li>3. Attempted to undertake a much more extensive project initially.</li> </ol>
<p>XV. LESSONS LEARNED: The initial project had numerous steps and several layered interventions, the major advice is to simplify, simplify, simplify. Quality improvement projects have to be integrated into daily work flow in a busy clinic setting in order to be sustainable.</p>
<p>XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.</p> <ol style="list-style-type: none"> <li>1. Residents as a group are now engaged, very curious about the technique of Teach Back and how it can help then educate their patients and deliver information in a more precise manner. Having a peer as a participant in the intervention will make spread and sustainability easier.</li> </ol>
<p>XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?</p> <p style="text-align: center;">1   2   3   x   5   6   7   8   9   10</p>
<p>XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?</p> <p style="text-align: center;">1   2   3   4   5   6   7   x   9   10</p>
<p>XIX. NEXT STEPS:</p> <ul style="list-style-type: none"> <li>▪ Using the train the trainer method, the resident will train peers in the technique of Teach Back.</li> <li>▪ Train Medical staff on the tools and techniques available to improve health literacy communication.</li> <li>▪ Evaluate if the addition of patient activation materials and a video will enhance and add value to the visit for the patient and families.</li> </ul>
<p>XX. PROJECT IMPACT: Engagement of the residents in quality improvement projects, introduction of health literacy techniques that can increase the provider's use of evidence based health literacy tools.</p>

## Team Members

Meg McKane M.D.	Pediatric Resident
Cheryl Courtlandt M.D.	Team Leader
Leonard G. Feld, M.D., PhD.	Team Leader
Laura Noonan M.D.	Physician Coach
Leslie Doyle R.N.	Performance Coach
Liz Fernandez	Interpreter
Bianca Rivera	Front office staff
Leto Powell	Parent
Lisa Morelock	Staff Nurse
Suzette Caudle M.D.	Residency Program Director

## Introduction

Health literacy is the ability to read, understand and effectively use basic medical instructions and information. Low health literacy can affect anyone of any age, ethnicity, background or education level. The lack of health literacy in patients is reaching a crisis in the United States, precious healthcare dollars are wasted because patients and their parents lack understanding of their condition, cannot follow directions being given or have difficulty in navigating the medical system.

## Statement of Problem

Limited health literacy is a significant barrier to communicating with patients which affects access to health care services, understanding health information, and decreases patients' ability to make appropriate health care decisions. Limited health literacy results in negative health outcomes: including inability to understand medication directions, improper management of chronic disease, and poor compliance. All of these factors can result in unnecessary emergency room visits and increased hospitalizations. As medical costs skyrocket in the United States, increasing the entire population's health literacy is important. For patients with limited access to health care resources, addressing health literacy is crucial.

## Objectives of the Intervention

Health care providers play an important role in helping to limit the associated with low literacy by promoting practices that improve health care access, increase health knowledge, and foster behavior change. Physicians in training provide more than 50% of the health care services delivered to low income populations in the United States.

Residents represent the front line in medical care, and are in the ideal position to use an evidence based health literacy tool such as Teach Back to improve their patients' health outcomes. Teach Back is a technique used to determine if information is understood by having the patient or patient explain in their own words.

Our goals are:

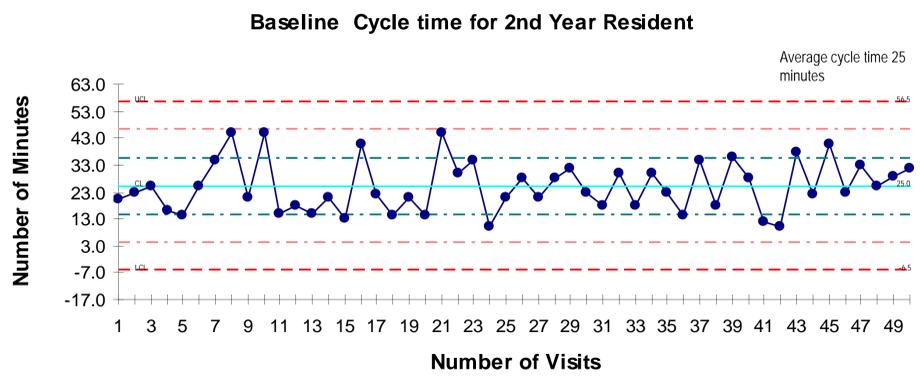
- > 90% of Well Child Visits the resident will utilize Teach Back
- > 90% of Well child Visits would be rated by staff and patient as very satisfied
- < 10% increase in cycle time for Well Child Visits
- < 10% of patient would need to have Teach Back repeated

## Description

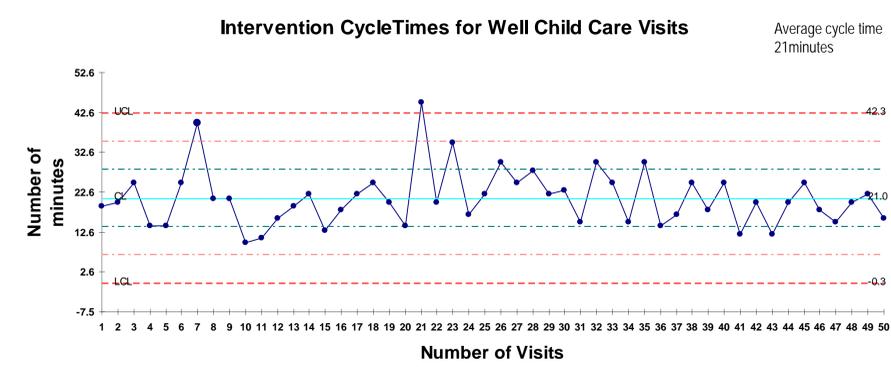
**Setting:** Myers Park Pediatric Clinic, a teaching clinic in the Department of Pediatrics, is a outpatient facility with approximately 23,000 visits per year. It serves a predominately Latino and African American community, with more than 60% of the patients speaking Spanish. The majority of the patients are insured by Medicaid or are self-pay.

**Intervention:** During well child care visits in the first year of life, a standardized teaching session was performed by a second year resident. Three age appropriate topics outlined in Bright Futures from American Academy of Pediatrics were discussed. The parent was encouraged to ask questions and then asked to Teach Back to the resident the three topics discussed. A nurse or an interpreter observed the Teach Back. If Teach Back was not successful, additional teaching was done and this time was added to the cycle time. Baseline cycle time data was collected by observing several second year residents during similar visits, utilizing standardized teaching but not requesting "Teach Back". Staff and provider satisfaction data was collected by using a five point scale. Patient satisfaction was assessed using a scale to rate the visit and rating the interaction with the provider.

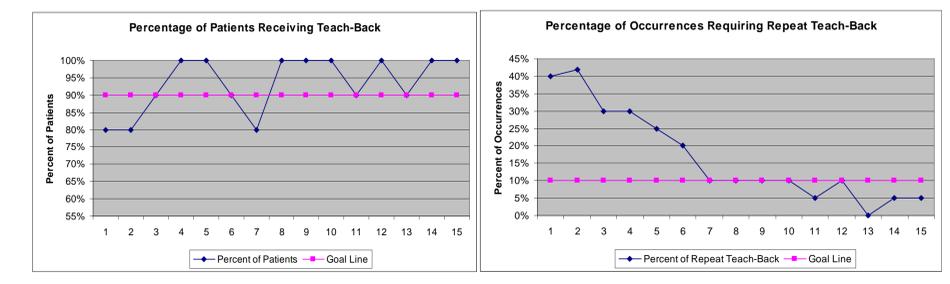
## Baseline Cycle Times



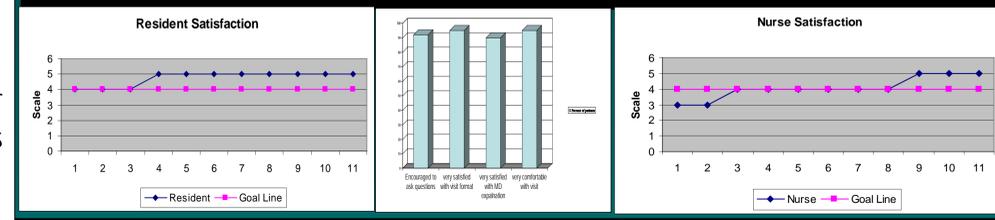
## Intervention Cycle Times



## Teach Back



## Satisfaction



## Results

Introduction of the technique of Teach Back in resident continuity clinic achieved positive feedback from staff and providers. Patient satisfaction scores rated the intervention favorably. The cycle time of the office visit was not increased and actually decreased over time as the visit became more efficient. As the resident improved their technique of Teach Back, the knowledge transfer was more effective requiring less repeating of information.

## Key Lessons Learned

- Utilization of the technique of Teach Back in the clinic setting can help improve communication and ensure that parents have the knowledge they need
- Health literacy improvements can be made in a resident clinic without adding additional time to visits.
- Time spent on development of clear realistic goals for a project will help the team stay focused and decrease the collection of unnecessary baseline data.
- Providers have a greater sense of accomplishment and job satisfaction when the information they teach is truly learned.

## Next Steps

- Using the train the trainer method, the resident will train peers in the technique of Teach Back.
- Train Medical staff on the tools and techniques available to improve health literacy communication.
- Evaluate if the addition of patient activation materials and a video will enhance and add value to the visit for the patient and families.

**Hospital:** Christiana Care Health System  
**Team Leader:** Lee Ann Riesenber, PhD, RN

I. PROJECT TITLE/NAME: Transitions of Care—Emergency Department (ED) to Outpatient: <b>Residents Improving Transitions from Emergency Department to Outpatient (RITE→O)</b>
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) The Adult Medicine Office (AMO) is a resident run outpatient center located within Wilmington Hospital that serves a low-socioeconomic, urban patient population (n = approx 4,000 patients). The population has a high rate of ED utilization for health care concerns (approximately 70% for Unison insured members). The AMO is largely unaware of their patients' ED visits, where less than 35% are known. To improve follow-up care and management of chronic conditions, the team set out to evaluate the current process of notification from ED to outpatient offices following an ED visit and identify opportunities to improve the system of notification as well as communication or transfer of pertinent clinical information to primary care practitioners.
III. OPPORTUNITY STATEMENT: Improve follow-up care and clinical outcomes for AMO patients following an ED visit, increase physician and patient satisfaction, and decrease utilization of the ED by 20% compared to historical baseline within 12 months.
IV. RESEARCH QUESTION: Does enhanced communication between Christina Care Health System (CCHS) Emergency Departments and AMO outpatient practice increase 30-day AMO follow-up after an CCHS ED visit?
V. HYPOTHESIS: Enhanced communication between ED physicians and Outpatient Primary Care Physician (PCP) following an ED visit will: 1. Increase AMO patient follow-up visits at 30 days 2. Decrease the rate of recurrent ED visits at (30, 60, & 90) days by 20% compared to historical baseline
VI. MEASURES: <ul style="list-style-type: none"><li>• ED utilization rates for AMO patients</li><li>• AMO patient follow-up visit rates at 30 days</li><li>• Percent of AMO patients accurately identifying AMO practice as their medical home</li><li>• Physician satisfaction with notification/information transfer between ED and AMO practice</li></ul>
VII. INSTRUMENTS: <ul style="list-style-type: none"><li>• Team developed survey instruments: 1) patient survey, 2) primary practice physician survey, 3) ED physician survey.</li><li>• Press Ganey physician satisfaction survey (Baseline)</li><li>• Data system reports for utilization rates</li></ul>
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.  We asked our patients, "how do you identify your primary care physician (doctor) when you are seen in the ER (emergency room)?" <ul style="list-style-type: none"><li>• 1 out of 80 patients (1.25%) identified the AMO as their primary care practice</li><li>• We asked our AMO providers, "In your estimate, out of the times that any of your patients is seen in the ED and discharged, how often you are notified by any of the methods above?" (57 physicians &amp; residents completed survey). More than 65% estimated that they are notified &lt;10% of the time.</li><li>• Our providers (AMO and ED physician staff) told us that notifying PCPs of their patients ED visits is important, but satisfaction with the current process was low. (85 physicians &amp; residents completed survey)</li><li>• Satisfaction was rated 1.76 on a scale 1-5, where 1 = Low and 5 = High.</li></ul>
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. Interventions implemented were designed to improve the patients' ability to identify the AMO as their medical home and create a notification process for the AMO primary care physicians with the ultimate goal of effecting follow-up care and potentially improving clinical outcomes. Two interventions were implemented starting February 26, 2010. Adult Medicine Office (AMO) business cards with key contact information were handed to patients during regular visits at the AMO office. Second, primary care physicians of the AMO were notified of their patients' ED visits by a notification process established by the

team. Using a data warehouse report that matched AMO patients to ED patients lists, the team entered notification notes into the office's electronic medical record (Centricity EMR).

X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

Key measures included:

1. Number of patients who identified their primary care provider as the Adult Medicine Office during an ED visit;
2. Percent of AMO providers receiving ED communication/notification of a patient's visit in the past month;
3. Physician satisfaction with the ED notification; and
4. Rate of AMO patient follow-up visits at 30 days following an ED visit.

Initial results demonstrated an absolute increase of 23% more patients registering themselves as "Adult Medicine Office" patients during an ED visit.

The percent of AMO providers receiving any ED communication during that month increased from 34.8% pre-intervention to 97.1% following notification process, and remained at 100% six months later.

Importance of ED notifications to AMO providers was ranked 4.36 on scale of 1 to 5, where 1 = not at all important and 5 = very important). Importance of being notified remained high six months later, 4.52. Provider satisfaction with ED notification increased from 1.76 to 3.29 on a scale of 1 to 5, where 1 = Low and 5 = High one month post intervention and increased to 4.32 six months post. In addition, notifications have changed care in several ways, such as, we have learned about new diagnoses of a chronic medical condition, arranged for a follow-up visit, called patients to check in, and ordered further testing as an outpatient. Most frequent actions taken as a direct result of the notification include: addressed the ED visit at next follow-up appointment (83%), looked up additional information about the ED visit (55%), educated patients about appropriate reasons to visit the ED (48%), and contacted the patient the patient directly (35%).

(4) The percent of AMO patients w/ follow-up visits within 30 days of ED visit increased from an average of 4% at baseline to 17% six months post-notification.

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

1. Number of patients who identified their primary care provider as the Adult Medicine Office during an ED visit	Pre and post intervention comparison measure (one time)
2. Percent of AMO providers receiving ED communication/notification of a patient's visit in the past month	Pre and one-month and six-month post intervention comparison measure
3. Physician satisfaction with the ED notification	Pre and one-month and six-month post intervention comparison measure
4. Rate of AMO patient follow-up visits at 30 days following an ED visit	Interrupted time series comparing the slopes of the linear regression models
5. ED utilization rates of AMO patients at (30, 60, & 90) days	Interrupted time series comparing the slopes of the linear regression models

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

Additional data analyses beyond these tests of change includes analyses of (a) ED utilization rates for AMO patients and (b) AMO patient follow-up visit rates at 30 pre and post interventions. Further analysis is needed to determine measurement of the effect on AMO patients' clinical outcomes.

In addition, medical students working with the team conducted a systematic literature review to determine patient streams with highest ED use that could be positively affected by an intervention. Eleven sub-reports have been created. The team plans to start writing a systematic review in March 2011.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Institutional support for project, including preserving protected time for residents participation in project and attending conferences
2. Interdisciplinary team with project manager/experienced team leader
3. Formalizing the electronic notification process, and sustainability of this process by engaging staff from the physician relations department

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Information Systems complexities, competing priorities
2. Departmental boundaries and silos
3. Data extraction and reporting

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

- Importance of actively involving staff in being part of the solution
- Politics of multi-departmental projects can be challenging to overcome
- Complexity of Information Systems and competing priorities
- No problem is as simple as it seems
- Interventions take more time than one thinks to implement and measure
- Great support and enthusiasm from residents and staff
- Learned that AMO patients with high ED utilization also had office visits in between ED visits

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences:
  - Residents are more aware of their patients' ED utilization
  - Expansion of electronic notification process to other practices besides the AMO office
  - Residents learned a great deal about quality improvement at a large health care setting, and the importance of involvement in quality projects
  - Identified need for better access to dental services in the system, sharing this information has led to subsequent planning for expanding dental program to meet need
2. Negative Unintended Consequences:
  - Potential loss of revenue from decreasing ED visits
  - Potential decrease in practice size due to patients breaching patient contracts and leaving practice
  - New challenge of the AMO practice site as a desirable place for improvement projects, but too many improvement projects at once creates an unintended demand on staff time and resources, had to limit active projects to a few

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 **8** 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 **8** 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

Next steps include continue handing out AMO cards to encourage patients to think the AMO is their medical home; automation of notification process with Information Systems; standardize and expand this notification process to other practices; and the development of a proposal to add a part-time nurse who

would act as a “navigator,” to help coordinate patient care needs following ED and office visits.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

The results indicate that more patients seem to be identifying the AMO as their medical home when visiting the ED, but this will need to be monitored further. AMO practitioners are happy with the Centricity notifications so far and this has positive effects on patient care. Major downside is time, and the need for AMO staffing to continue intervention.

In addition, there has been a greater focus and understanding of the AMO practice and the patient population it serves. This project raised the level of awareness and importance of GME in quality improvement. It also raised awareness about transitions of care, impact of health outcomes, and spawned additional efforts involving transitions of care across the health system.

# RITE-O (Residents Improving Transitions of Care: ED to Outpatient)

Patty Blair, RN; Loretta Consiglio-Ward, MSN, RN; Samantha DeCouto, DO; Dan Elliott, MD; Allen Friedland, MD; Elizabeth Kunkel, DO; Terri Lynn Palmer, MPA; Andrea Read, DO; Lee Ann Riesenbergh, PhD, RN; Sarah Schenck, MD; and Matthew Stofferahn, MD, Christiana Care Health System, Newark-Wilmington, Delaware

## National Initiative

### Introduction

Nationally, patients and caregivers experience significant challenges during transitions of care from one care setting to another. The Adult Medicine Office (AMO) is a resident-run outpatient health care center located within Wilmington Hospital that serves a low-socioeconomic urban patient population (n = approx 4,000 patients). The population has a high rate of Emergency Department (ED) utilization for health care concerns (approximately 70% for Unison insured members). In January 2010, AMO providers were largely unaware of their patients' ED visits, where less than 35% were known at baseline. Satisfaction with current notification process was low at 1.76 on a scale of 1-5, where 1 = Very Dissatisfied and 5 = Very Satisfied. To improve follow-up care and management of chronic conditions the team evaluated the current process of notification from ED to outpatient offices following an ED visit and identified opportunities to improve the system of notification as well as communication or transfer of pertinent clinical information to primary care practitioners. An interdisciplinary team from the Adult Medicine Office, Emergency Medicine, Internal Medicine, Med/Peds, Academic Affairs, Information Technology, the Medical Group, Physician Relations, Quality and Safety, and Christiana Center for Outcome Research worked together to improve follow-up care and clinical outcomes for AMO patients following an ED visit.

### Statement of Problem

The team's hypothesis is enhanced communication between Christiana Care Emergency Departments and the Adult Medicine Office outpatient practice will increase AMO patient follow-up visits at 30-days following an ED visit.

### Objectives of Intervention

Objectives of this quality research project were to (1) create a standard notification process for AMO primary care physicians; (2) improve provider satisfaction with being informed following their patient's ED visit; (3) reduce overall ED utilization by this population; and (4) facilitate access to follow-up care at the AMO, thus positively affecting clinical outcomes.

### Description of Interventions

Two interventions were implemented starting February 26, 2010. (1) AMO business cards with key contact information were handed to patients during regular visits at the AMO Office. (2) AMO Primary care physicians were notified of their patients' ED visits by a notification process established by the team. Using a data warehouse report that matched AMO patients to ED patient lists, notification notes were entered into the office's electronic medical record (Centricity). In addition, the team conducted a systematic literature review to determine patient streams with highest ED use that could be positively affected by an intervention.

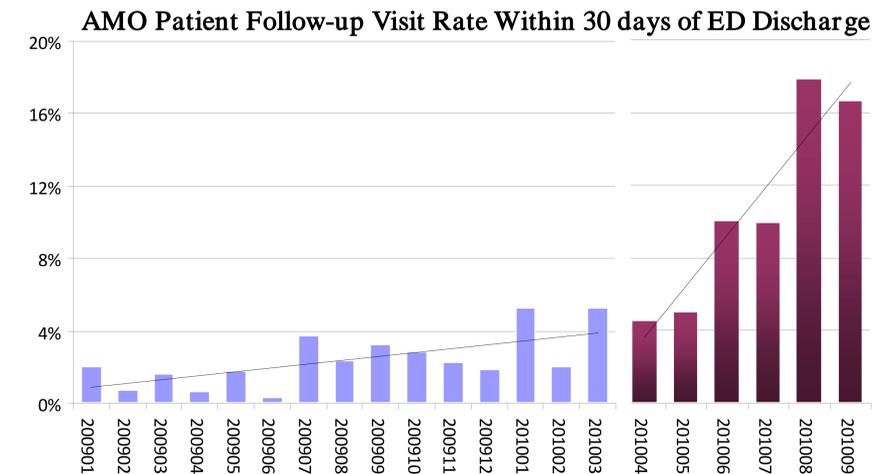
### Key Measures

Key Measures: (1) Number of patients who identified their primary care provider as AMO during an ED visit; (2) Percent of AMO providers receiving ED communication/notification of a patient's visit in the past month; (3) Physician satisfaction with the ED notification; and (4) rate of AMO patient follow-up visits at 30-days following an ED visit (Figure 1).

### Results / Findings to Date

Measure	N	Baseline	Post intervention 3 months	Post Intervention 6 months
<b>Patient survey - Awareness of PCP or Medical Home</b>				
Patients identifying AMO as their Medical Home	80	1.3%	24%	
<b>Physician Survey - Perceptions of ED Notifications</b>				
Importance of ED notifications to PCP's (scale: 1 low-5 high)	31	4.36		4.52
Percent of PCP providers receiving any ED visit notifications		35%	97%	100%
ED visit notifications are provided for < 10% of ED visits.		65%		
PCP's satisfaction of notification process (scale: 1 low-5 high)		1.76	3.29	4.32
<b>Electronic Health Record statistics</b>				
Count of ED visit notifications for AMO patients		34 (2009)	2,733 (2010)	avg 300/month
ED Utilization rate of AMO patients				
Percent of avoidable ED visits (not yet available)				
Percent of AMO patients w/follow-up visits within 30 days of ED visit		4%	9%	17%
<b>Actions taken after ED notification</b>				
Addressed the ED visit at follow-up appointment	57		83%	
conducted a more comprehensive review of patient's condition			55%	
education patient about appropriate reasons to visit the ED			48%	
Contacted the patient directly			35%	

### Figure 1



### Placeholder

PLACEHOLDER for Data from CCOR

### Key Lessons Learned

As a result of this project, a greater focus and understanding of the AMO practice and the patient population it serves has been realized. In addition, the importance of actively involving staff in being part of the solution led to more acceptance of the intervention and integration of the changes into the workflow. Politics of multi-departmental projects and the complexity of Information Systems with competing priorities can be challenging to overcome. In summary, this project raised the level of awareness and importance of GME and quality among the leaders of our health care system.

### Next Steps

Next steps include (1) continue the automated notification process; (2) standardize and expand the notification process to other practices; (3) implement a newly proposed role in the practice, nurse navigator, to coordinate patient follow-up following ED and office visits; and (4) finish data analysis and write a manuscript about this project.

Hospital: Franklin Square Hospital Center

Team Leader: Melly Goodell, MD

I. PROJECT TITLE/NAME: Creation of a Daily Goals Form for use in Resident Centered Rounding
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) We focused on the design of a Daily Goals form for improving interdisciplinary communication on an internal medicine residency inpatient service. Past use of a daily goals form in an ICU setting led to dramatic increases in team members' understanding of daily patient goals, and decreases in ICU length of stay. (Pronovost et. al., J of Critical Care, 2003). We focused on the design of a form appropriate for a general medical floor with the hopes of improving interdisciplinary communication, and understanding of team goals, and also decreasing pages and phone calls to residents.
III. OPPORTUNITY STATEMENT: Can we improve interdisciplinary communication on a resident inpatient service?
IV. RESEARCH QUESTION: Does use of a Daily Goals form during resident centered rounding improve team understanding of daily patient goals?
V. HYPOTHESIS: Regular use of a Daily Goals form on a general medical floor will improve provider and staff understanding of daily patient care goals.
VI. MEASURES: 1. understanding of patient care goals (provider, nursing, other disciplines) 2. Pages and phone calls to residents Both measures compared to a baseline measurement before implementing the form
VII. INSTRUMENTS: 1. Daily goals form 2. Survey questions assessing understanding of pt goals 3. tracking system for phone calls and pages to residents
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have. We got a preliminary IT report on pages to residents on the target teams, but it didn't fully capture what we needed. We also did some brief "pre-pilots" with the Daily Goals form to identify problems.
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. The focus of this phase was the design of the form, and we did test the form when rounding on a few patients. The intervention is the use of the form on a medical floor, with the hypothesis that an increase in all team members understanding of team goals for a patient will occur when this form is used.
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have. Post intervention data once the form is actively piloted will include collection of the phone and pager data, and the "understanding of daily goals" assessment. This will also be assessed on a control resident team that did not use the daily goals form. We developed several baseline questions related to understanding of the daily goals.
XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type) 1. Interval: for survey questions we will look for statistical significance in the degree of understanding of daily goals in the intervention group vs the control group. 2. for phone/pager data we will compare raw numbers/averages to determine a comparison (i.e. average # of daily pages/calls) between resident members of intervention group and resident members of control group.
XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it: Not at this time. We have other endpoints in mind depending on the outcome of the pilot. We will be able to analyze diagnoses, and length of stay and other factors that are on the daily goals form, but we have not specifically planned to collect them at this stage.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Effective communication and collaboration within our team, drawing on team member's various skills and experience.
2. Nearly monthly team meetings are most helpful. We are generally productive in them.
3. Monthly work group call also helpful.
4. Fluid team membership: Expansion of team to include case management and a second resident (earlier in training) to provide some future continuity has been useful.
5. Resident input after trial of form

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. General time commitments and primary responsibilities of team members.
2. Hospital move to a new building in 11/10 which changes structure of medical units and team.
3. Hospital change to a new portable phone system that added new IT challenges in collecting that data.
4. Difficulty in getting a nursing unit manager involved.
5. Departure of a team member (new job) during initiative.
6. Real view of the logistics/flow of what we were planning.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

Meetings help keep us on task. Good thing we didn't plan anything too ambitious, and glad that other team leads encouraged us to narrow the focus. Involve team members who have active IRB peer numbers at start. The process itself is part of the project.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: 1. Better than expected resident receptivity to project, exposing residents to systems issues beyond their usual pt care focus (quality, hospital admin and leadership structure, IRB, stakeholders) 2. Collegiality across disciplines of team members 3. Collegiality with team members from other programs 4. Resident talked about project during a job interview and was received with a lot of enthusiasm by prospective employer.
2. Negative Unintended Consequences: Just general work load and time management issues with adding more duties to current roles.

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 8 9 10 (eight)

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 8 9 10 (eight)

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made. 1. Assess level of ongoing commitment: from team, institution, and for this particular project. 2. Determine makeup of team going forward 3. Solve IT issues 4. Baseline measures 5. Pilot

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

Our institution did put our initiative on Hospital goals and objectives for GME which has allowed it some exposure. I think the current work is a bit behind the scenes and once we pilot it, there will be more to evaluate regarding the institution's approach to GME and quality initiatives. Residents have now seen the institution's involvement and its commitment to resident quality projects.

Final note: The institution's opening of a new 7 floor patient care tower in November 2010 caused a major delay in our project, even though we did meet our primary goal of designing the form. We knew about the tower plan from the beginning, and we did attempt to anticipate the impact, but everyone (including our hospital leadership) underestimated the various challenges that the move and new tower created. Our team estimates that we experienced a direct impact as early as September 2010 b/c all IT resources were dedicated to planning for the tower. The move itself was November, and the fall out and intense adjustments continue even today, which has affected resource allocation and support from other arenas. The makeup of floors is still changing, making the choice of a pilot area still unclear.

# Creation Of A Daily Goals Form For Use During Resident Centered Rounding

Melly Goodell, MD, Mary Gruver-Byers, Maryam Saeed, MD, Missy Garavente, MD, Alexis Davis, MD

Franklin Square Hospital Center, Baltimore, MD

## Introduction

Past use of a Daily Goals communication tool in an ICU setting led to dramatic increases in team members' understanding of daily patient goals, decreases in ICU length of stay, and decreased pages to residents (Pronovost, J Critical Care, 2003). We focused on the creation of a Daily Goals form for use on a general medical floor during resident centered team rounding with a goal of improving understanding of patient goals and interdisciplinary communication.

## Statement of Problem

The many disciplines involved in the care of medical inpatients can lead to suboptimal communication which can increase length of stay, and confuse providers, patients, and families on primary goals. In addition, poor communication can lead to complications, decreased quality of care, and even medical error. Optimizing communication may lead to decreased length of stay, increased quality of care, and improved patient safety and interdisciplinary provider satisfaction. A literature search did not reveal significant background on the use of Daily Goals forms in general inpatient settings, so our project first required the development of a template appropriate for our target population: general medical admissions on a resident service.

## Objectives of Intervention

1. Create and test a Daily Goals form appropriate for general medical admissions
2. Increase institutional awareness of and support for GME quality initiatives
3. Involve a resident substantially in an inpatient quality project
4. Obtain IRB approval for upcoming pilot

## Description

After conducting a literature search and determining very little existed on the use of a Daily Goals form outside of the ICU, our team developed a framework for our Daily Goals form. Our resident team member solicited input from other residents about key patient care areas where communication could improve. We incorporated these elements and also ensured our form aligned with current institutional initiatives such as improving patient safety, avoidable complications and fiscal responsibility. We added a case manager to our team, solicited nursing input, and worked on multiple revisions of the form. We determined our outcome measures including survey questions and pages/calls to residents. Our resident team members used the form for several patients to identify final areas for improvement. We met approximately monthly throughout this time. We received IRB approval in February 2011. We encountered multiple technical and systems issues, some of which are not yet solved.

## Results / Findings to Date

1. Form completed and ready for pilot
2. IRB approval obtained
3. GMEC interest in and general support of project
4. Current lack of reliable phone/pager data
5. Opening of new patient tower impeded progress despite planning and anticipation

## Key Lessons Learned

1. Barriers can be larger even than what you plan for
2. Set regular meetings to keep on task, and try to account for potential time constraints (night float rotations, primary jobs)
3. Resident input critical to success of project

## Figure 1

		PATIENT DAILY GOALS	
Pt Label Here		Day #	Day #
		Resident #	Resident #
SAFETY	LINES: in ___ Days		
	O2 Weaning		
	Falls		
	Skin Risk		
	Prophylaxis: DVT/PUD		
	Foley in ___ Days: DC?		
	Restraints still needed?		
<b>TODAY'S GOALS</b>			
COMMUNICATION	With P/Family		
	With RN		
	With Consultants		
	Case Management		
	Pharm/PT/OT/RT		
<b>TODAY'S GOALS</b>			
PT CARE	Critical Diagnostics		
	Pain Control: Type/Enough		
	Nutrition		
	Change Meds to PO		
	Home Meds		
<b>TODAY'S GOALS</b>			
DC PLANNING	Insurance Issues		
	Next LOC(rehab/LTC/HHC)		
	Barriers to DC		
	Cost of meds considered		
	DC Rx's on chart		
	Flu plan post DC		
	Case Management		
Heads up to OT/PT			
<b>TODAY'S GOALS</b>			
ISSUES			

## Next Steps

1. Reassess overall commitment to project
2. Solve IT/phone/pager issues
3. Baseline assessment of measures
4. Determine pilot team and start pilot

**Hospital: Georgetown University Hospital**

**Team Leader: Dana Saxton**

I. PROJECT TITLE/NAME: Does Standardized Education on Central Line Removal Favorably Impact Patient Safety as Measured by Sustainable Post Test Scores?
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) Patient safety is of the utmost importance to every employee at Georgetown. We have recently uncovered there is not a standardized educational/training approach for central line removal. Through numerous interviews we discovered the education received varies widely and could potentially result in a sentinel event. In order to prevent this from occurring, we believe that standardizing the training for everyone with responsibility for removing central lines is key.
III. OPPORTUNITY STATEMENT: Patient safety will be improved by providing standardized central line removal training to students, residents and nurses.
IV. RESEARCH QUESTION: If you standardize the training for central line removal among students, residents and nurses, will it favorably impact patient safety?
V. HYPOTHESIS: Standardized central line removal training will favorably impact patient safety as measured by sustainable post-test scores among students, residents and nurses.
VI. MEASURES: Knowledge on central line removal will be measured by pre-test prior to taking an electronic learning module. Knowledge will again be tested immediately following the module with a post-test. The post-test will again be given 6 months later to measure sustainability of post-test scores.
VII. INSTRUMENTS: A pre-test/post-test and learning module has been developed by the residents/faculty participating in the project. SiTELMS Online Learning Management System will be the instrument utilized for the tests and learning module.
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.  The baseline data collected was in regards to residents' knowledge of central venous line removal (technique/indications/clinical considerations). This information was collected via a 13-question test. Information was also collected in regards to type of resident taking the test (medicine vs. surgery) and PGY year (1-5).
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. The intervention is an electronic learning module utilizing the SiTELMS Online Learning Management System. The module goes through step by step instructions on how to safely remove central lines from various points of the body.
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.  The post-intervention data collected was a reassessment of residents' knowledge of central venous line removal. This was evaluated using the same 13-question test given before the intervention, though the questions were ordered differently. Thus, residents' scores on pre and posttests could be compared.
XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)  Descriptive statistics will be used to compare all residents' pretest vs. posttest scores, pre and posttest scores based on type of resident (medicine vs. surgery) and pre and posttest scores based on postgraduate year (PGY) (year 1-5). Hypothesis testing using Wilcoxon rank sum and Wilcoxon signed rank tests will be used to compare if there were statistically significant results in pre vs. posttest scores. Logistic regression analysis will be used to compare an association between type of residency, PGY year and test outcome.  Descriptive statistics will also be used to assess deficiencies in knowledge of central venous line removal based on which questions on the test were answered incorrectly.

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

We will re-test the participants in April 2011 (6 months after the original post-test) to determine if the post-test scores were sustained after the intervention.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Resident engagement
2. Support from hospital leadership and faculty
- 3.

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Individual schedules & level of commitment from other team members
2. Delay in obtaining IRB approval
- 3.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

Team member selection is key in taking on an initiative such as this. Looking back, it may have been a better idea to ask leadership to open up the opportunity to house staff at large to ask for volunteers and allow them to select a topic of interest (with guidance as needed).

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences:
2. Negative Unintended Consequences:

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 **8** 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 **8** 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

The team will re-test the participants in April 2011. Results of the 2<sup>nd</sup> post-test will be compared to the first post-test to assess whether or not test scores were sustained. Based on these results, we hope to roll out the learning module as a mandatory module for all surgical and internal medicine residents.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

While resident education of central lines is centered on placement, the measures to prevent air embolus may not be a mainstay of central line education. We presented an educational intervention on CVC removal technique aimed at maintaining an air embolism complication rate of zero in patients in the Departments of Medicine and Surgery at GUH. We have achieved this goal with an air embolism complication rate of zero at GUH.



# DOES STANDARDIZED EDUCATION ON CENTRAL LINE REMOVAL FAVORABLY IMPACT PATIENT SAFETY AS MEASURED BY SUSTAINABLE POST-TEST SCORES?

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## Introduction

In its 1999 paper To Err Is Human: Building a Safer Health System, the Institute of Medicine proposed between 44,000 and 98,000 people die annually in hospital secondary to medical errors. Beyond this tragic human cost, between \$17 and \$29 billion dollars are spent annually by hospitals as a result of these errors [1]. Death from air embolism is a real occurrence that is responsible for some of these deaths and can be prevented.

Quality improvement and a culture of patient safety are of utmost importance at Georgetown University Hospital (GUH). As medicine moves towards systems based improvements and protocol driven medicine, new educational methods and research must evolve to keep pace.

Central venous catheters (CVCs) are frequently inserted, maintained and removed in postgraduate medical training. Nationally, approximately 7 million CVCs are inserted annually [2]. Currently, a dearth exists in formal training for postgraduate trainees in CVC removal [3]. In one report entitled The Collaborative Education to Ensure Patient Safety, the Council on Graduate Medical Education and the National Nursing Council on Nurse Education and Practice outline educational goals for safe practice with Venous Access Devices [4].

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3. Nancy E, Donaldson, Rosemary K, Plank, et al. Reporting Clinician Adoption of Safety Practices: The USCP Venous Access Patient Safety Interdisciplinary Education Project Advances in Patient Safety: From Research to Implementation (Volume 4: Program, Tools, and Products). Agency for Healthcare Research and Quality (US); 2005 Feb.  
4. Collaborative education to ensure patient safety. A joint report of the Council on Graduate Medical Education and the National Advisory Council on Nurse Education and Practice to the Secretary of the U.S. Department of Health and Human Services. Washington, DC; 2000 Sep 13:1-14.  
5. Claus M, Muth, M.D., and Erik S. Shank, M.D. Gas Embolism. N Engl J Med 2000;342:476-82.

## Statement of Problem

Air embolism is a well-known and potentially catastrophic complication of CVC removal. Air emboli can drastically increase pulmonary arterial pressures and ultimately lead to cardiopulmonary collapse [5]. Additionally, paradoxical emboli may occur leading to end artery obstruction leading to significant morbidity and death. While resident education of central lines is centered on placement, the measures to prevent air embolus may not be a mainstay of central line education. We present an educational intervention on CVC removal technique aimed at maintaining an air embolism complication rate of zero in patients in the Departments of Medicine and Surgery at GUH.

## Objectives of Intervention

1. Assess baseline knowledge of medicine and surgery residents at GUH in regards to CVC removal indications, techniques and clinical considerations.
2. Create a standardized educational module aimed at outlining key techniques and practices in CVC removal that minimize patient harm.
3. Assess the impact of the educational model on resident's knowledge base and track how this translates in to clinical practice and improved patient safety.
4. Create a new hospital protocol via introduction of a central line removal technique checklist.

## Description

IRB exemption was obtained from Georgetown University to perform this study and all data was de-identified.

An online CVC removal educational module with accompanying test was created by GUH surgical residents with guidance from a Pulmonary and Critical Care attending. The module was created to take less than 10 minutes to complete. The test (see Figure 1) was 14 questions (with 1 question subsequently thrown out due to ambiguity).

Medicine and surgical residents at GUH were voluntarily asked to participate. Using SiTEL as the online platform for the test and the module, the residents were instructed to take the test, then complete the educational module and retake the test. The test, given pre- and post-module, had the same questions, but in a different order.

In addition, reinforcement of the educational intervention was maintained by instituting a checklist for central line removal technique (see Figure 2) in the surgical and medical intensive care units.

## Results / Findings to Date

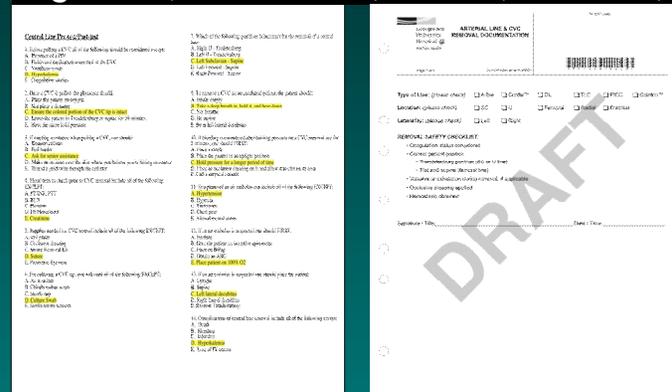
55 residents participated in the intervention (40 medicine, 15 surgery; 36 junior residents (PGY 1 and 2), 19 senior residents, PGY 3-5). For all residents, the mean pretest score was 94.8 (ranging from 85-100) and the mean posttest score was 98 (ranging from 85-100). The mean pretest score for medicine residents was 93.9 and for surgery residents 97.3. The mean posttest score for medicine residents was 97.7 and for surgery residents 99.0. The mean pretest score for junior residents was 95.0 and for senior residents was 94.4. The mean posttest score for junior and senior residents was 97.6 and 98.7, respectively.

A significant difference in pre vs. posttest scores was found when all residents were compared, favoring an improvement in scores (p=.0003). There was not a significant difference in pre vs. posttest scores when comparing medicine vs. surgery residents (p=0.28) and junior vs. senior residents (p=0.44). Pretest scores were not significantly different between medicine vs. surgery residents (p=0.06) nor between junior vs. senior residents (0.79). Similarly, posttest scores were not significantly different between medicine vs. surgery residents (p=0.33) nor between junior vs. senior residents (p=0.40).

Medicine residents were associated with a larger difference in pre vs. posttest score, though this was not significant (OR=-.55, 95% CI = .16, 1.9, p=0.35). Being a junior vs. senior resident had virtually no association with difference in pre vs. posttest score (OR=.9, 95% CI=.30, 2.80, p=0.87).

In regards to baseline knowledge of CVC removal, of all pretest questions answered incorrectly, 44% were due to question 13 in Figure 1 (the proper position to place a patient if an air embolus is suspected). Correspondingly, 25% of all residents taking the test answered this question incorrectly. 19% of pretest questions answered incorrectly were due to question 4 in Figure 1 (blood tests to check prior to CVC removal). 57% of all posttest questions answered incorrectly were also due to question 13 in Figure 1.

## Figure 1 (Pre/Posttest) and 2 (Checklist)



## Key Lessons Learned

The significant difference in pre vs. posttest scores is an important finding. While the difference cannot be directly attributed to the intervention (the educational module), it is likely that the intervention had a large influence. Thus, this proves the knowledge benefit that can result from a simple educational module.

The imperfect pretest scores of all residents indicate that knowledge of CVC removal is deficient (especially in regards to proper positioning of a patient when an air embolus is suspected). This is an area of medical and postgraduate education that should be improved upon and which can result in great improvement in patient safety.

This study illustrates that resident education can be driven by peers.

## Next Steps

1. Perform a 6-month follow up test to assess retention of knowledge of CVC removal.
2. Perform a qualitative survey to assess where, if ever, residents have received instruction on pulling CVCs; what resources were referenced, if any, when questions arose as to how to pull CVCs; and which information in the educational module was unknown previous to taking it.
3. Assess the use and clinical outcomes of the CVC removal technique checklist implemented in the surgical and medical intensive care units.

### Acknowledgements

With special thanks to Dana Saxton, Dr. Allen Roberts, & Dr. Charles Read.

Hospital: Good Samaritan Hospital of Maryland

Team Leader: R. Dobbin Chow, MD FACP

I. PROJECT TITLE/NAME: <b>Reconciling Errors and Omissions in Sign-Out: Lessons Learned</b>
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) One of the areas that have been identified for improvement by the Department of Medicine's Quality Improvement Committee has been in the area of patient hand-offs. Indeed, poor hand-offs have resulted in several adverse or suboptimal clinical outcomes over the past academic year, as identified in our Morbidity & Mortality Conferences. The medical literature also substantiates the need for seamless error-free hand-offs. Patient sign-outs at GSH anecdotally have been noted to have erroneous medication lists and even some patients have been entirely omitted from the sign-out list. It is perceived that there is an opportunity to improve the written sign-out process that exists at present on the house staff service at GSH.
III. OPPORTUNITY STATEMENT: To optimize hand-offs, we need to determine what are the common errors that occur, and how the residents reconcile these errors in real-time. To create a more optimal sign-out tool, we should try to hardwire mechanisms to prevent such errors. By evaluating how residents cope with errors on the sign-out, we can gain insight into how to create a more optimum sign-out tool and discerning what data points are absolutely essential for a seamless handoff.
IV. RESEARCH QUESTION: What are the common errors and omissions that occur on sign-outs, and how do residents reconcile these errors in real time?
V. HYPOTHESIS: Based on anecdotal data, we presume that the most common errors are incorrect medication lists and omission of patients. If this is indeed true, we need to develop mechanisms to hardwire correct medication lists and correct lists of patients.
VI. MEASURES: A. Resident perceptions of the sign-out process will be obtained. B. 100 resident sign-outs will be reviewed, and will be evaluated for listing of all patients on the service, all medications on the medication list, and the listing of the primary care provider. C. During each night float rotation, residents will evaluate the sign-outs that they received. The night float residents will note any discrepancies that they encountered, and how they reconciled these errors.
VII. INSTRUMENTS: A. A publicly available survey was administered to our residents, soliciting their opinion regarding our sign-out tool and process. B. An evaluation tool was distributed to the night float residents each evening, assessing errors and omissions that they encountered.
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have. A. We have baseline data regarding resident self-assessment of the sign-out process and sign-out tool. B. We collected baseline data regarding errors that are present on 100 resident sign-outs. C. We collected data regarding the frequency and types of errors that covering residents encounter after receiving sign-outs. D. Finally, we collected data regarding the mechanisms and approaches that covering residents undertook to reconcile and cope with sign-out errors.
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. No formal intervention was conducted. However, in the creation of a new sign-out tool, taking into account resident work flow and work-arounds, the data that we collected should be incorporated into creating new sign-out tools and hand-off processes.
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have. No post-intervention is available.

<p>XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)</p> <p>Our study was largely descriptive and observational.</p>
<p>XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:</p> <p>No</p>
<p>XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?</p> <ol style="list-style-type: none"> <li>1. Residents were cooperative with data collection and saw the merits of improving the sign-out process.</li> <li>2. The institution saw the need to improve the hand-off process. The commitment to this project was present at the senior level.</li> <li>3. Residents were committed to working on and completing the project.</li> </ol>
<p>XIV. BARRIERS: What were the 3 greatest challenges you encountered?</p> <ol style="list-style-type: none"> <li>1. There is no agreement on what constituted an optimal sign-out tool. In addition, there was no agreement regarding what common errors to expect. I naively assumed at the outset of the project that all sign-outs must have complete and accurate medication lists.</li> <li>2. The Information Technology department is not able to meet all requests or demands. Even if they agree that a change to a currently used hand-off software package may be beneficial, it may be too costly to implement.</li> <li>3. Residents are resistant to changes, especially if it increases the amount of time that they perceive will be needed to complete the task. They were trained in the culture in which they are expected to cope and deal with errors and inconsistencies. Expectations need to change.</li> </ol>
<p>XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?</p> <ol style="list-style-type: none"> <li>A. Have no assumptions about what is the optimum sign-out tool or process. There is no consensus on this topic.</li> <li>B. Residents tolerate each other's errors, and try to work around them. Indeed, coverage at night means also covering for the errors of others.</li> <li>C. We had hoped to create an intervention based on our findings. We hoped to have concrete recommendations for the IT team to redesign our sign-out tool. However, we did not know how much time, IT manpower, and finances that a redesign effort would take.</li> </ol>
<p>XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.</p> <ol style="list-style-type: none"> <li>1. Positive Unintended Consequences: The project made residents focus on eliminating errors on their sign-outs. Conducting a project in this area helped focus on hand-offs as a mechanism to improve quality.</li> <li>2. Negative Unintended Consequences: None of which we are aware.</li> </ol>
<p>XVII. EXPECTATION S VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?</p> <p style="text-align: center;">1   2   3   4   <b>5</b>   6   7   8   9   10</p>
<p>XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?</p> <p style="text-align: center;">1   2   3   4   5   <b>6</b>   7   8   9   10</p>
<p>XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.</p> <p>We plan on redesigning our sign-out tool. Also, during new intern orientation, we plan on introducing a workshop on how to conduct a proper sign-out.</p>

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

Residents have become focused on improving the accuracy of their sign-outs because they are aware that we are conducting a project on this topic. However, that is simply an opinion, and we cannot verify with data yet.

## INTRODUCTION

Like the aviation industry, the health care industry demands a zero-tolerance approach. Formal assessments regarding errors in hospitals have demonstrated that the majority of avoidable adverse events are due to lack of effective communication.[1] In fact, it has been estimated that communication errors cause twice as many deaths as clinical inadequacy.[2] The transitions of care between residents during change of service or change of shift has potential for inaccuracies, leading to breaches in patient safety. Breakdown in communication was the leading root cause of sentinel events reported by the Joint Commission in 2010 [3]. In addition, the new work hour restrictions effective July, 2011 will result in residents working shorter shifts. Consequently, the number of patient care exchanges between teams will increase, as well as the number of exchanges experienced by patients per admission. The more exchanges that occur, the more the potential errors are amplified. There is very little information regarding the absolute essential elements of an Internal Medicine sign-out, those areas most prone to errors, and strategies on how to prevent them from occurring.

## STATEMENT OF PROBLEM

Though there has been an expanding literature regarding hand-offs, little has been written regarding the analysis of errors, and how errors can be measured or categorized. In addition, it is not clear how clinicians cope with errors in sign-outs in real-time. While the science to be able to rigorously evaluate and measure the practice of hand-offs is still evolving, residents are currently asked to eliminate inaccuracies when they sign-out to another resident team and overcome errors when other teams sign-out inaccurate information to them for coverage. There is not a uniformly accepted standard format for sign-out tools, or a standard set of accepted sign-out elements, as sign-outs are perceived to be institution and service-dependent. As hospitals seek to improve their sign-out processes, an initial strategy to revise their current sign-out tools will include an analysis of the errors that are occurring with their current systems.

## OBJECTIVES OF INTERVENTION

This survey assesses the nature, type and frequency of errors on a sign-out tool in a community teaching hospital on an inpatient internal medicine resident service. More importantly, it describes what mechanisms and alternatives residents pursue when they encounter inaccuracies, omissions, and errors in real time.

## DESCRIPTION

The sign-out tool used in our hospital is computer based but not internet accessible. Residents free-text all the information, make hard-copies, and sign-out verbally to the on-call team. Azyxi is a web-based repository of patient laboratory data, radiological imaging results, vital signs, and consultation reports. Paper charts are used for daily progress notes and physician orders. Residents assigned to night-float rotation filled out a preprinted survey immediately after the end of each night float shift during a two month period in the fall of 2010. If an inconsistency is detected in the sign-out, the two members of the night float team adjudicated the error to ensure that it was a true error. One member of the team then agreed to report the event, to prevent duplication in reporting. The residents were also asked to state any specific category of information that would have been useful but was not available in our sign-out tool. "Incidents" in this study are defined as occasions when the printed sign-out was not useful in obtaining vital patient information or contained wrong or missing information.

## RESULTS

Seventy surveys were collected during the two month study period, out of a potential 120 surveys. Almost one third of the surveys (27.1%) reported errors. The two most common categories of error were inaccurate patient identifiers such as name, medical record number and room number (15.6% of incidents) and current medications (12.5%). The other errors were patients omitted from the sign-out (9.3%), outdated current problem list (9.3%), and wrong code-status (9.3%) (Fig 2). One interesting observation is that some patients were missing from the night float intern's sign-out (constituting 17.6% of total errors reported by interns) but were present on the night float resident's copy. This was due to the fact that residents during the call period may not always update the interns regarding new admissions or transfers from higher level of care. The night float interns discovered that there was an omitted patient on their sign-out when they were called about an issue regarding the patient. An independent analysis of a random 100 sign-outs in early spring of 2010 revealed that 71% of signouts had at least one medication error. The most useful sources of information for the on-call team to rectify an "incident" was Azyxi (39.4%), followed closely by the attending physician's daily note (15.7%), and the resident progress note (21%). Discussion with the nurse was helpful 7.9% of the time and notes from consultants were useful 5.2% of the time. Calling the attending physician was the last resort and was employed 10.5% of the time (Fig:3)

Fig 1 :Categorization of errors encountered in the hand-offs.

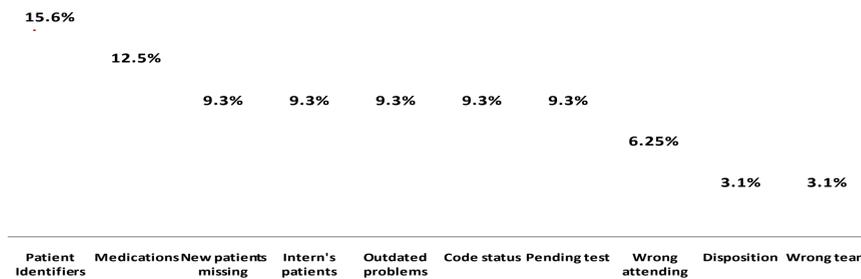
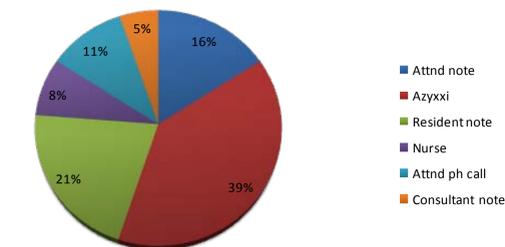
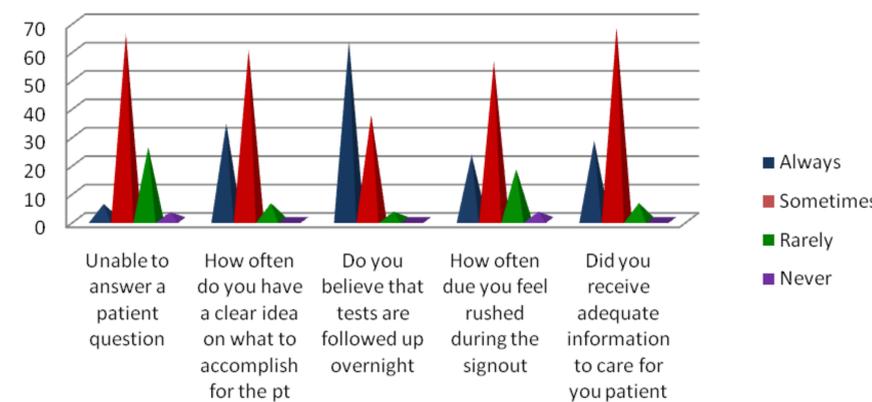


Fig 2: Data sources residents resort to adjudicate errors.



## Resident Survey on our sign-out quality



## Features residents would like to see on the new sign-out tool:

- Patient- specific interventions to be done in case of a positive test.
- Auto- populate application to fill in patient identifiers, current medications and allergies.
- Expected outcomes for each patient, especially those critically-ill, during the call period.
- Protected time for the sign-out process without interruption.
- Family's contact numbers to update change of patient's condition, obtain informed consents, and discuss code-status.

## KEY LESSONS LEARNED

- The major errors encountered in the sign-outs were human.
- Errors in patient identification and medications can be prevented by employing an auto-populate tool to the sign-out software. This hardwiring approach, however, will not prevent omitted patients or outdated current problem/diagnosis lists, both of which still need a diligent update by the team on a daily basis.
- There was variability in the quality and quantity of detail provided by different resident teams. This inconsistency can be overcome through teaching residents efficient and effective handoff methodology, preferably as a part of intern orientation.
- Evaluation and reinforcement of the handoff process by a trained faculty member will motivate residents to hone their sign-out skills and gain valuable feedback.
- Making residents accountable for their errors can further decrease errors.
- Though many errors are present in the hand-off process, they usually do not cause patients harm. Residents are usually able to intercede and adjudicate errors in real-time. Reliable and ready access to a repository of patient data is critical to that process.
- Since 71% of the sign-outs have medication errors, it would be prudent to use an auto populate feature or to eliminate the entire medication section from the sign-out so the on-call resident is forced to refer to the chart or computer for a real time medication list.

## NEXT STEPS

- ❖The Creation of a training work shop on Hand-offs for our current and incoming residents.
- ❖Designation of a protected hand-off time during day.
- ❖Faculty oversight of hand-off sessions.
- ❖Inclusion of the hand-off process as part of the resident rotation evaluation and curriculum.
- ❖Redesign of the sign-out tool, based on the results of this study.
- ❖Resurvey after implementation of the above strategies.

## REFERENCES

1. Solet DJ, et al. "Lost in translation: challenges to physician communication during patient hand-offs" *Academic Medicine* 2005; **80**: 1094-9.
2. Wilson RM, Runciman WB, Gibberd RW, Harrison BT, Hamilton JD. The Quality in Australian Health Care Study. *Med J Aust.* 1995;163:458-71.
3. The Joint Commission, "Sentinel Event Data – Root Causes by Event Type 2004-2010" slide 8, available at [http://www.jointcommission.org/assets/1/18/Root\\_Causes\\_by\\_Event\\_Type\\_2004-4Q2010.pdf](http://www.jointcommission.org/assets/1/18/Root_Causes_by_Event_Type_2004-4Q2010.pdf).

Hospital: Harbor Hospital

Team Leader: Richard B. Williams, MD

I. PROJECT TITLE/NAME: Improving the Transition of Care at Hospital Discharge Using a Simple Communication Tool
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) (4-5 sentences, maximum) We will target high volume primary care admitters to our Hospitalist Service for a pre and post intervention survey of the nature and effectiveness of communication at discharge. Intervention: at the time of discharge from our hospitalist service on the telemetry floors, the patients' discharge instruction sheet, including diagnosis, medications, consults, key procedures, and plan for follow up, will be faxed to the primary care physicians' (PCPs) offices by the unit secretaries. We will monitor the process to establish a routine and maximize adherence. Once the system has been in place successfully for six months, we will repeat the survey. At that time, we will also compare 30 day readmission rates for our hospitalist telemetry service pre and post intervention.
III. OPPORTUNITY STATEMENT: Improved communication leads to increased PCP satisfaction, increased referrals, and higher occupancy rates. Better transitions of care leads to better quality of care. Thirty day readmission rates are key quality indicators, monitored by many organizations.
IV. RESEARCH QUESTION: Can a simple, sustainable, timely intervention, faxing the patients' discharge instruction sheet to primary care physicians' offices, improve communication between our telemetry hospitalist service and referring PCPs and decrease the 30 day readmission rate.
V. HYPOTHESIS: The implementation of a system whereby the patients' discharge information sheet is consistently and reliably faxed to PCPs' offices in a timely fashion will improve satisfaction our telemetry hospitalist service and referring PCPs and decrease the 30 day readmission rate for that service.
VI. MEASURES: Assessment of key PCP satisfaction with communication from the hospitalist service pre and post intervention. Size of outside PCP list of names and fax numbers available to unit secretaries and adherence rate for faxing the patient information sheet over time. 30 day readmission rate for hospitalists' telemetry floor patients, pre and post intervention.
VII. INSTRUMENTS: Survey instrument with Likert scale pre and six months post intervention. Numbers for PCP list and rates of unit secretary faxing respectively, over time. Rates of 30 day readmissions for comparable six month periods over time, pre and post intervention, factoring in severity of illness during periods compared.
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have. Baseline survey of PCP, with Likert scale. Baseline PCP list with progress over time. Baseline faxing rate with progress over time.
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. At the time of discharge from our hospitalist service on the telemetry floors, the patients' discharge instruction sheet, including diagnosis, medications, consults, key procedures, and plan for follow up, will be faxed to the primary care physicians' (PCPs) offices by the unit secretaries.
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have. Over many months, we now have developed a robust but certainly not all inclusive outside PCP with fax # list, almost 150, with additions being made weekly. Our admitting office, case managers, medical record department, floor nurse managers, and unit secretaries are all on board, particularly in the last month. Our start date for the designated six month period for analysis will be March 1.
XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type) Our baseline PCP satisfaction survey targeted six key physicians. Numbers may be too small for statistical significance, but trends will hopefully be impressive. We will test for statistical significance, likely using the Kolmogorov-Smirnov Test. We will look at the success of faxing at different points of time as categorical data using Chi Square. The growth of the outside PCP list with time will be self evident. Once we have our six month readmission data, we will make comparisons also using Chi Square.
XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it: Certainly, we have seen

increased awareness among all key players, including out internal medicine residents and hospitalists, of the importance of communication with outside PCPs at the time of discharge, through various meetings and e mail communications from the start of our study. This is gratifying but difficult to quantitate. The "C Suite" was struck by the number of outside PCPs who have patients on our hospitalist service, and see opportunity here.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Our team is small. The three members are mutually respectful, engaged, and all have clear assignments and expectations between team meetings.
2. We met face to face at various times with the over two dozen key players needed for success in getting our intervention up and running at a meaningful level, including our C Suite, with many e mail communications in follow up. Our consistent mantra was that our primary goal was to improve patient care
3. Knowing that we had to make a progress report with our AIAMC peers by a deadline monthly.

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Developing a valid survey instrument.
2. Developing a robust and reliable list of outside PCP names and fax numbers.
3. Getting the unit secretaries to fax the patient information sheet to the PCP office at the time of discharge, ie, changing the culture.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative? Hang in there. Keep at it. Expect barriers and resistance to change. Get buy in from all key players and keep the heat on.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: We learned that we have a huge number of outside PCPs that we need to foster better communications and relationships with.
2. Negative Unintended Consequences: I can't think of any. There may be a nurse manager or case manager that hasn't embraced the project as fully as we would have liked, and we lost a key VP along the way who was assigned to help us with the project.

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 X6X 7 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 X8X 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made. Keep the heat on to be sure the PCP list continues to expand appropriately and that the faxes are occurring, then do the six month 30 day readmission comparisons and repeat the PCP satisfaction survey.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project? The key players, including nurses, administrators, residents, and hospitalist, are increasingly aware of the importance of communication to the outside PCPs at the time of discharge. Surprisingly, it appears that no one was aware of the large number and variety of PCPs who have patients admitted to our hospitalist service. There is the opportunity to improve patient care, to improve outside PCP satisfaction with Harbor Hospital, and to increase admissions as a consequence.



# Improving the Transition of Care Using a Simple Communication Tool



Richard B. Williams, M.D., F.A.C.P., Anupa Baral, M.D., Nilda L. Ledesma R.N.  
Harbor Hospital, MD

## Introduction

With the development and expansion of the hospitalist model for inpatient care comes the need for meaningful and timely communication with outpatient physicians at the time of discharge.

## Statement of Problem

- We have a busy internal medicine hospitalist service (HS) with rapid patient turnover. Our hospitalists admit over 4300 patients a year.
- For a number of reasons, communication with outpatient adult primary care physicians (PCPs) from our hospitalist service was in need of improvement.
- Our plan was to have the unit secretaries fax the patient discharge information sheet (DIS) which includes medications, diagnoses, consultations, procedures, vaccinations, and instructions for diet, activity and follow up, to PCPs at the time of discharge.

## Objectives of Intervention

1. Improve communication between our HS and PCPs.
2. Improve PCPs satisfaction with communication from our HS.
3. Improve patient outcomes as evidenced by comparing 30 day readmission rate on our telemetry floor HS pre and post intervention.

## Description

- We developed a survey instrument to evaluate PCPs satisfaction with the nature and effectiveness of HS communication at discharge among two groups of PCPs adjacent to our hospital and conducted a pre survey.
- We met with the key players, including case managers, hospitalists, telemetry floor nurse managers, and unit secretaries to get buy-in and cooperation.
- After the intervention, we conducted an audit in August 2010 and February 2011 to assess how often the DIS was being faxed by the telemetry unit secretaries to the PCPs office.

## Results / Findings to Date

- Among five physicians taking our survey at baseline, all were unsatisfied with communication at discharge from our HS.
- The great majority of telemetry HS discharges were to PCPs who were not on our hospital staff. Their names and office fax numbers were not available to our unit secretaries, hospitalists, or transcriptionists.
- As a consequence, for only one percent of patients discharged from our telemetry HS in August 2010 was the DIS faxed to the PCPs.
- As the PCP fax list grew, the percent of DIS that were faxed also improved. (See Table 1 and Figure 1)

Table 1

Month	Aug 10	Oct 10	Nov 10	Jan 11	Feb 11
Number	5	28	42	96	120*

Table: Number of PCP names on PCP fax list, by month

\* 79 of 120 PCPs have had their fax numbers verified to date

Figure 1

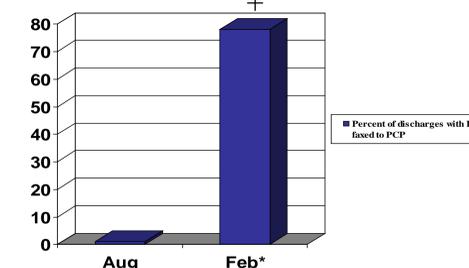


Figure: Percent of discharges with patient DIS faxed to PCP at the time of discharge

\*for the first two weeks of February

+percentage based on the list of 79 PCPs with verified fax numbers

## Key Lessons Learned

- There are a large number of outside PCPs, well over 100, whose patients are admitted to our telemetry HS.
- Most of these PCPs are not on our hospital staff, have no formal relationship with the hospital, and we had no record of their office phone or fax numbers.
- Not surprisingly, there was little or no communication at the time of discharge between our HS and these PCPs.
- Even for the two physician groups nearby the hospital, communication was unsatisfactory.

## Next Steps

- Our PCP list with verified fax numbers has grown to over 80. Among patients discharged from our two telemetry floors HS, our intervention adherence rate was 78%.
- We will continue to monitor growth of our PCP fax list and adherence. After six months (August 2011), we will repeat our PCP satisfaction survey and assess 30 day readmission rate to our telemetry HS for this period, comparing it to the same period the previous year.

Hospital: Regions Hospital, St. Paul, Minnesota

Team Leader: Kara Kim, MD & Marcella de la Torre, MA

I. PROJECT TITLE/NAME:  
**Medication Administration Timeliness in ED Patients Admitted to Inpatient Behavioral Health**

II. BRIEF DESCRIPTION:

The purpose of our study is to describe the timeliness of medications ordered for patients admitted from the emergency department to the behavioral health floor. Anecdotal reports suggest that some patients admitted to the behavior health floor have a greater than six hour delay until their medications are ordered.

Proposed QI solution for anecdotal problem:  
At present, extended stay orders (ex. patients current medication orders) are written and scheduled for psychiatric patients in the ED who plan to be admitted, but may have a delay in their transition to the floor because a bed is not available. Once a bed is available and the patient is transferred to the floor, the patient is considered "admitted" and the temporary extended stay orders are no longer valid. However, there may be a delay, at times, up to 6 hours until new orders can be written on the floor. Because orders may not be available during this time, psychiatric patients could have missed their scheduled medications. We propose that continuing the extended stay orders after admission, may decrease the number of missed medications on the behavior health floor.

III. OPPORTUNITY STATEMENT:

- To describe the types of medication usage by admitted behavioral health patients.
- To describe the timeliness of resumption of the non-psychiatric medication when patients are admitted to the behavioral health floor.

IV. RESEARCH QUESTION:

Is there a delay in resuming home medications used to treat chronic medical conditions when a patient is admitted from the emergency department to the behavioral health floor?

V. HYPOTHESIS:

Anecdotal reports suggest that some patients admitted to behavioral health miss important medications (include insulin, anti-convulsants, antihypertensive, and asthma medications) during the transition from the emergency department to the behavioral health floor. We do not know the extent of non-psychiatric medication use in admitted behavioral health patients.

Our long-term aim is to improve continuity of care by decreasing the number of missed scheduled medications for psychiatric patients that are transferred to the inpatient behavioral health floor from the emergency department.

VI. MEASURES:

- Number of medication orders placed from 6/29/10 – 10/1/10
- Type of medication ordered
- Date and time of medication ordered
- Admission Date and Time
- Calculation of Admission Time to Time of Order Placement
- Maximum time to order placement after admission
- Mean time to order placement after admission
- Average time to order placement after admission
- Number of orders placed within 1 hour, 2 hours, 3 hours, 4 hours, 5 hours, and 6 hours after admission
- Percentage of orders placed within 1 hour, 2 hours, 2 hours, 4 hours, 5 hours, and 6 hours after admission

VII. INSTRUMENTS:

VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.

**Drug Class Administered**

<b>Count of Drug Class</b>	
<b>Drug Class</b>	<b>Total</b>
Analgesics-narcotic	536
Analgesics-nonnarcotic	2742
Anorectal	2
Antacids	909
Antianginal agents	23
Antianxiety agents	3095
Antiarrhythmic	6
Antiasthmatic	740
Anticoagulants	35
Anticonvulsant	1722
Antidepressants	1540
Antidiabetic	1420
Antidiarrheals	30
Antidotes	12
Antiemetics	142
Antifungals	1
Antihistamines	1575
Antihyperlipidemic	590
Antihypertensive	846
Antineoplastics	3
Antiparkinsonian	563
Antipsychotics	3147
Anti-rheumatic	688
Antiviral	21
Assorted Classes	11
Beta blockers	1101
Calcium blockers	296
Cardiotonics	29
Cephalosporins	77
Chemicals	1
Contraceptives	29
Corticosteroids	25
Cough/Cold	26
Decongestants	204
Dermatological	285
Diagnostic products	1
Dietary products	4
Digestive aids	255
Diuretics	447
Estrogens	14
Fluoroquinolones	133
Gout	8
Hematopoietic agents	655
Hypnotics	199
Laxatives	1392
Macrolide antibiotics	18
Medical devices	3

Migraine products	16
Minerals & electrolytes	602
Misc. antiinfectives	126
Misc. endocrine	12
Misc. genitourinary products	115
Misc. gi	176
Misc. Hematological	42
Misc. psychotherapeutic	3164
Mouth & throat (local)	63
Multivitamins	1215
Nutrients	10
Ophthalmmic	99
Penicillins	48
Pharmaceutical adjuvants	46
Pressors	3
Progestins	5
Skeletal muscle relaxants	111
Stimulants	24
Tetracyclines	25
Thyroid	399
Toxoids	30
Ulcer drugs	1189
Urinary antinfectives	21
Urinary antispasmodics	91
Vaccines	28
Vitamins	608
<b>Grand Total</b>	<b>33869</b>

During the 3 month period from 6/29/10 to 10/1/10, there are a total of 34,000 records. The information in our review includes PRN medications (the time to order placement is actually decreased if PRN medication orders are removed)

**Average time from hospital admission to order placement: 1 hour, 23 minutes.**

**Median time from hospital admission to order placement: 1 hour 4 minutes.**

**Maximum time from hospital admission to order placement: 5 hours and 59 minutes.**

% orders placed >= 5 hours after admission = 2.37%

% orders placed >=4 hours after admission = 4.77%

% orders placed >=3 hours after admission = 8.26%

% orders placed >=2 hours after admission = 11.02%

% orders placed >=1 hour after admission = 25.63%

% orders placed < 1 hour after admission = 47.95%

**IX. INTERVENTION:** Describe your specific intervention, and the time period in which the intervention was conducted.

Even though anecdotal reports were that orders were being placed greater than six hours after admission to the behavior health floor, our analysis showed the majority of orders being placed by physician were

placed in the first 1 to two hours after admission. There were no orders placed greater than six hours after admission to the hospital. Thus, there was no need for a quality improvement intervention at this time to meet the six hour window initially specified.

However, it was very valuable to develop a process to study this preconceived notion by the emergency, psychiatry, and performance improvement departments. Although the data did not support this preconceived notion, there were confounders that affected the results. The psychiatry admission process was modified between the QI hypothesis and the QI data collection. Interestingly enough, the new process is what we had in mind as a possible interventions (ex. Increased communication and more effective hand-offs between departments).

X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

N/A

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

N/A

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

N/A

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

- Very dedicated Emergency Medicine staff. They worked hard on this project and were 100% reliable.
- This project has generated a lot of interest for performance improvement and future quality work.
- The Emergency Medicine department has become the model for QI within the residency programs in the organization.

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

- No dedicated organizational resources to help with the project (IRB, Data, etc.) when the project was initiated.
- Project done between two residency programs slowed down the process and made it difficult to meet in person.
- IRB process was long and not appropriate for a QI project.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

- Identify team members before attending National Initiative Meeting One.
- Identify and commit organizational resources (e.g. data/IRB research/department mentor-champion) before attending National Initiative Meeting One.
- Make sure the institution has a good IRB approval process for QI projects. If not, start conversation early on. Use other AIAMC members as a resource if need be.
- Doing a project between departments slows down process, not everybody involved at the same level.
- Team members need to find a replacement that will be dedicated if changing roles or moving to another organization.
- Make sure you discuss funding for this project before attending National Initiative Meeting One.
- If possible, identify project before attending National Initiative Meeting One.
- Ensure that at least a few team members attend the National Initiative Meetings.
- Having medical residents in the team and leading the project was the most positive and rewarding outcome of this initiative.
- The team members who persisted and worked together learned how to overcome barriers systems-wide.

- Medical residents had the opportunity to interact with our CEO and gained respect for the work they do. Residents are not invisible anymore!
- We realized who we can count on the organization. We had to change a couple of team members to ensure success of the project.
- Overall, this is a great opportunity for medical residents and faculty. It is always easy when you have done it once. It would have been helpful to have a team member who participated in NI One.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: The project has generated a lot of interest for quality improvement work in the organization. Residents are more involved and interested in general. The emergency medicine department gained more visibility.
2. Negative Unintended Consequences:

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

See confounders to our initial project. Intervention was no longer needed. However, we learned a lot as a team and how to do QI within residency programs.

1 2 3 4 **5** 6 7 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

Despite barriers, the team is pretty satisfied with the outcome.

1 2 3 4 5 6 7 **8** 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

The results will be shared with relevant departments and if intervention is needed in the future, we will provide guidance and help with implementation.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

The project has generated a lot of interest for quality improvement work in the organization. Residents are more involved and interested in general. The emergency medicine department gained more visibility and has become a leader for quality.

# Medication Administration Timeliness in Emergency Department Patients Admitted to Inpatient Behavioral Health

Team Leaders: Kara Kim, MD and Marcella de la Torre, MA – Team Members: Kelly Barringer, MD, Felix Ankel, MD, Brad Gordon, MD, MS, Puneet Narang, MD  
Regions Hospital, Saint Paul, Minnesota

## Introduction

Medication administration timeliness in emergency department (ED) patients admitted to inpatient behavioral health is crucial in providing continuity of care, ensuring excellent hand-offs, and providing best possible care to our patients. Anecdotal reports suggest that some patients admitted from the emergency department to the behavior health floor have greater than six hour delay until their medications are ordered.

## Statement of the Problem

Extended stay orders (which include the patient's current medication orders) are written and scheduled for psychiatric patients in the ED who plan to be admitted, but may have a delay in their transition to the floor due to a bed not being available. Once a bed is available and the patient is transferred to the floor, the patient is considered "admitted" and the extended stay orders are no longer valid. There may be a delay, at times, up to six hours until new orders can be written on the floor.

## Objectives of Intervention

- Describe the types of medication usage by admitted behavioral health patients.
- Describe the timeliness of resumption of the non-psychiatric medication when patients are admitted to the behavioral health floor.

## Description

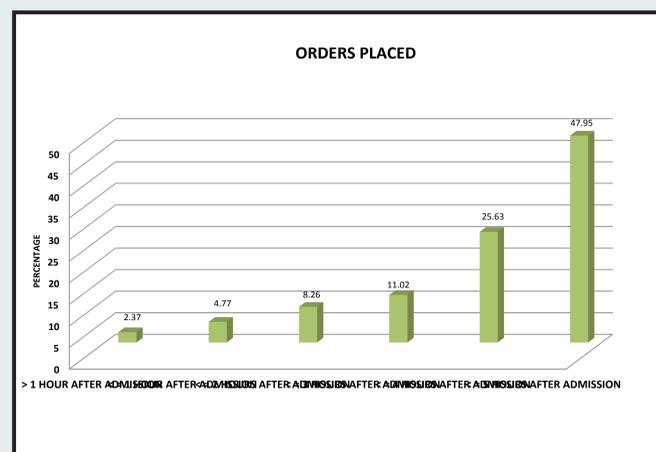
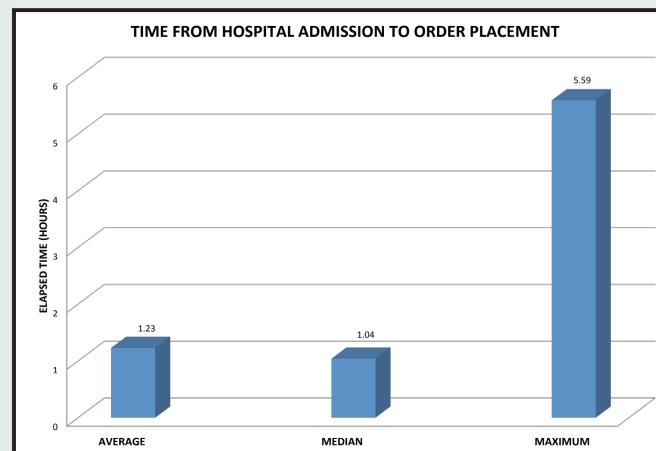
In an effort to provide continuity of care and better hand-offs for patients transferred from the emergency medicine department to inpatient behavioral health, we studied the timeliness of current medication administration. Medications in the study included insulin, anti-convulsants, anti-hypertensive, and asthma medications.

The following steps were taken:

- Describe the current system
- Identify the problem(s)
- Study extent of the problem before designing an intervention
- Share outcomes with emergency medicine and psychiatry departments

## Results and Findings to Date

Even though anecdotal reports demonstrated that orders were being placed greater than six hours after admission to the behavior health floor, our analysis showed the majority of orders were being placed by physicians in the first one to two hours after admission. There were no orders placed greater than six hours after admission to the hospital. Coincidentally, during the course of our project, the hand-off process between both departments had been significantly modified resulting in better communication between attending physicians and therefore improved hand-offs. This factor contributed to the results. Data was analyzed using different parameters and the results were still the same. This provided information regarding the extent of the problem.



## Key Lessons Learned

- Although the preconceived problem proved not to be a major factor in providing good continuity of care and good hand-offs, it was very valuable to develop a systematic process to study it.
- The psychiatry admission hand-off process was modified between the quality improvement (QI) hypothesis and the QI data collection. The new admission hand-off process was proposed as a possible intervention; increase the timeliness and quality of communication between the emergency medicine and psychiatry physicians.
- The project generated interest for future QI work within the residency programs.
- Conducting QI projects led by residents is difficult and organizational resources must be available.
- Current IRB process did not support QI projects therefore this initiative prompted change.
- Teamwork strengthened the relations with its members and the relationships with other departments. Good teamwork is essential for conducting QI work.
- Residents and team members are highly regarded as QI champions and are sought as coaches and advisors.

## Next Steps

- Finalize new IRB process for QI projects.
- Share findings with other departments and use this as an example for making sure a problem exists before implementing a change/intervention.
- Continue to encourage residents to be involved in QI work.

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**National Initiative**

**Hospital: Iowa Health - Des Moines, Iowa Methodist Medical Center**

**Team Leader: Julie Gibbons, R.N.; Emily Haines, D.O.**

I. PROJECT TITLE/NAME: Decreasing hospital associated Clostridium difficile (C-diff) infection rates by improving physician practices related to contact precautions in the adult intensive care unit.

II. BRIEF DESCRIPTION: C-diff is spread by the hands of health care workers after direct contact with infected patients or contaminated surfaces. Contact precautions, including the use of personal protective equipment (PPE), are effective in preventing C-diff transmission in hospitals. Healthcare worker (HCW) use of proper PPE, gloves, and gowns, during contact precautions is inconsistent and sub-optimal. Iowa Health – Des Moines (IH-DM) will decrease hospital associated C-diff infections by improving physician practices related to contact precautions in the adult intensive care unit. This will be accomplished by physician education, observation of practices, and providing data feedback to physicians regarding practices and C-diff infections. Improved physician practices should lead to improved practices of other health care team members.

III. OPPORTUNITY STATEMENT: IH-DM will improve the health of our community by decreasing hospital associated C–diff infections identified in the adult critical care units at Iowa Methodist Medical Center (IMMC) by 50% to 1.2 infections per 1000 patient days by June 30, 2011; this will be achieved by improving physician practices in appropriate use of personal protective equipment for contact precautions to  $\geq 95\%$  by June 30, 2011.

IV. RESEARCH QUESTION: Can improved physician use of PPE during contact precautions decrease hospital associated C-diff infection rates?

V. HYPOTHESIS: Improved physician practices with use of PPE for contact precautions will decrease hospital associated C-diff infection rates.

VI. MEASURES: Decrease hospital associated C–diff infections identified in the adult critical care units at IMMC by 50% to 1.2 per 1000 patient days (7 infections/year) by June 2011. Improve physician practices in appropriate use of PPE, specifically gloves and cleaning of stethoscopes for contact precautions to  $\geq 95\%$  in the IMMC ICU/CCU. The team focused on improving glove use and cleaning stethoscopes after a review of the literature showed glove use and hand hygiene were the most effective infection prevention measures for contact precautions. A review of our baseline observation data supported this with HCW compliance with gowns and hand hygiene being at 100% and 90%, respectively.

VII. INSTRUMENTS:

- Observation tool (attached)
- C-diff survey for residents, faculty, and nurses (attached)
- Infection prevention surveillance

VIII. BASELINE DATA COLLECTED: Our team collected direct observational data on whether or not health care providers wore PPE while interacting with patients in the adult critical care unit. Types of PPE recorded were glove usage, gown usage, stethoscopes cleaned if used, proper removal of PPE, and hand hygiene. These nominal variables were recorded as binary responses (Yes-1/No-0). In addition, the rates of c-diff infection are regularly monitored by IH-DM and we accessed these data. We also surveyed internal medicine residents, various faculty, and nursing staff about their perceptions and practices regarding contact precautions (closed-ended, categorical questions). Lastly, we conducted a brainstorming session with internal medicine residents to pinpoint their perceived barriers to utilizing contact precautions. We learned that the top three reasons that residents may not use PPE were unavailability of supplies, attending physicians not wearing PPE, and no intention of touching the patient after entering the room.

Data:

1. Observed wearing gloves during contact precautions: 68% (36 of 53)
2. Observed cleaning stethoscope if used: 14% (2 of 14)
3. Answered "Always" to statement: *I wear gloves when examining a patient with C-difficile diarrhea.*
  - Physician faculty 64% (16 of 25)
  - Internal Medicine Residents 74% (14 of 19)
  - Nursing staff 74% (25 of 34)
4. Hospital associated C- diff Rate for ICU 2.4 per 1000 patient days prior to starting our project.

#### IX. INTERVENTIONS:

At the beginning of our project, we had the contact precaution sign re-designed to simplify instructions regarding the use of PPE. The revised sign was piloted in the ICU beginning April 21, 2010. The final version was sent out July 6. We displayed posters in prominent areas of the hospital explaining the new contact precaution sign and clarifying the changes made to the signs. After our brainstorming session with residents, we had isolation carts re-designed to assure the availability of all necessary supplies and to improve ease of use. This occurred in July and August, 2010. During July, we conducted educational sessions with internal medicine and surgery residents about the use of PPE as well as holding a Grand Rounds on C-diff disease directed at the internal medicine staff physicians and residents. This was presented on June 23, 2010 by an infectious disease physician (Dr. Lisa Veach). Education on our project was included in two newsletters, one directed specifically to physicians and allied health providers while the second one was distributed to all hospital staff. We also extended our educational efforts to the nursing and respiratory therapy departments. Lastly, we updated and educated the Critical Care Committee as well as the hospital administration about this project on July 27<sup>th</sup>, 2010.

#### X. POST-INTERVENTION DATA:

Our team collected identical data elements as pre-intervention, including direct observational data on whether or not health care providers wore PPE while interacting with patients in the adult critical care units. Types of PPE recorded were: gloves usage; gown usage; stethoscope cleaned if used; proper removal of PPE; and also hand hygiene. These nominal variables were recorded as binary responses (Yes-1/No-0). In addition, the institution records of the rates of c-diff infection were ascertained and examined along with the results from the re-surveying of the nurses, residents, and staff.

Data:

1. Observed wearing gloves during contact precautions: 76% (28 of 37), baseline= 68% (36 of 53)
2. Observed cleaning stethoscope if used: 0% (0 of 2), baseline 14% (2 of 14)
3. Answered "Always" to statement: *I wear gloves when examining a patient with C-diff diarrhea.*
  - All surveyed HCWs: 71% (53 of 75), baseline 71% (55 of 78)
4. Answered "Always" to statement: *I clean my stethoscope after examining a patient in contact precautions.*
  - 37% (15 of 41 residents and faculty surveyed), baseline 36% (17 of 47)
5. Selected correct answer on the survey for: *When can isolation be discontinued for patients with C-diff?*
  - 64% (33 of 52 residents and faculty surveyed), baseline 32% (24 of 74)
6. Hospital associated C- diff rate for ICU during the three quarters prior to interventions was 2.17 per 1000 patient days( 12 infections) compared to 1.29 (7 infections) for the same time period during and post intervention (p=0.27).

#### XI. TYPE OF ANALYSIS:

Primary study analyses examined HCW pre-intervention and post-intervention glove use (Yes/No). The null hypothesis was that the pre- and post-intervention groups have the same observed proportions of appropriate glove use. The Chi-Square ( $\chi^2$ ) Test of Homogeneity with 1 degree of freedom was used on these 2X2 contingency table data, unless one or more of the cells had an expected frequency of five or less. In these situations, the Fisher's Exact Test was used.

Secondary analyses compared pre- and post-intervention c-diff rates per patient days, using the same statistical approaches as in the primary analysis and testing the null hypothesis of equality. Additional secondary analyses used study survey data. Surveys had closed-ended questions with categorical answers, which are reported in frequency tables with counts and percentages based on question responses. When applicable, related survey questions were presented with correlations and p-values using Spearman Rank Correlations (for responses treated as ordinal non-normal data), comparing internally the questions on pre-intervention surveys and also comparing internally the questions on post-intervention surveys, with an approximate Student's-*t* distribution and N-2 degrees of freedom. The null hypothesis for these analyses is that the ranks (of the responses) of one question do not covary with the ranks (of the responses) of the comparison question. Lastly, responses on pre- and post-survey questions were compared between each other using the same statistical approaches employed in the primary study analysis along with Wilcoxon nonparametric analyses for the data treated as ordinal (Likert). These analyses tested the null hypothesis of equality and comparable medians in question responses before and after the intervention. All analyses will use two-sided p-values with  $\alpha = 0.05$ , and will assume comparison groups were derived from random observational sampling.

XII. DID YOU COLLECT ADDITIONAL DATA? We assessed knowledge and behaviors within our surveys to compare the pre- and post- intervention survey results in our project summary to identify any meaningful improvement in responses.

XII. SUCCESS FACTORS:

1. Our **lead resident was very engaged** in the project. She led a brainstorming session with the internal medicine residents to identify causes of the problem, "Physicians do not wear PPE in rooms with patients with C-Difficile infection." This session was very informative and has led to several serial tests of change. Our lead resident also reported data and improvements back to residents who work in the ICU. This helped build will for this project and other project to come. She will continue with the next stage of this project, improving awareness when a patient is on contact precautions.
2. Having **a dedicated project leader** helped keep the team focused and on tract with our improvements. She will also continue with the efforts to improve HCW practices for contact precautions after the AIAIMC project is completed. This project leader is a content expert in infection prevention and a certified improvement advisor who works in the clinical quality department. She had the interest, ability, and time necessary to continually move the project forward.
3. The IH-DM **administrative structure**, included having the Senior Vice President of Medical Education & Research on the C-Suite team. This structure ensured that graduate medical education initiatives received the necessary attention and support and were included in hospital wide initiatives.

XIII. BARRIERS:

1. The data for our measure, "Improved physician practices of wearing PPE for contact precautions" was obtained by direct observations. Using this data collection method was time consuming and be at risk of a Hawthorne Effect. To help overcome this potential barrier, we worked with a local university to have pre-med students also perform observations.
2. There was a period of over two months when very few patients were on contact precautions in our ICU, resulting in the cancellation of numerous scheduled observations. Although having low numbers of contact precautions was a good barrier to have, it limited the number of observations we were able to collect.
3. When we made the isolation cart improvements, changes needed to be made to all 40 carts as the ICU obtains isolation carts from central supply. Having a few updated carts in the ICU was not possible. This was costly and has taken some time, resulting in not all cart improvements being available in the ICU during the post intervention period.

XIV. LESSONS LEARNED:

What seemed like a simple problem ended up being quite complex, and improving the problem will take time and significant effort. This effort must include an interdisciplinary approach with frontline physicians and nurses. If you do not reach your goal in the set time, it is not a "failure" but a continuous cycle of evaluating a problem and working toward a solution with Plan Do Study Act (PDSA) cycles. Education and improving availability of supplies may not be enough.

XVI. UNINTENDED CONSEQUENCES:

1. Positive Unintended Consequences: Recruiting local university students to complete observations in the ICU resulted in the strengthening of our relationships with a local university (faculty and students) and has also led to new collaborations with other local colleges.
2. Negative Unintended Consequences: We are not able to identify any unintended consequences. This is most likely due to our awareness that improving contact precautions can easily cause negative unintended consequences, so we were diligent in not implementing actions that would cause problems or harm to the patient or staff.

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 **6** 7 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 **6** 7 8 9 10

XIX. NEXT STEPS: We will continue PDSA cycles to improve glove use by improving awareness of when patients are on contact precautions. We have already initiated the spread of our initiatives to the entire organization by using the revised isolation signs in all our hospitals and we have changed the signs for droplet and airborne precautions to the same type of design. We are also finalizing the consistent stocking

of all of our isolation carts throughout the hospital.

XX. PROJECT IMPACT: Residents are very invested in this project since they were involved in pinpointing problems and offering their solutions. By involving residents in the brainstorming session and continually updating them on the project, they are focused on continued efforts for improving use of PPE and offering observations and ideas for its continued improvement.

# Decreasing hospital associated *Clostridium difficile* infection rates by improving physician practices

E Haines, J Gibbons, W Yost, D Dorner, H Smith, S Pandullo, M Purtle  
Iowa Health - Des Moines, Des Moines, Iowa

## Introduction

*Clostridium difficile* (C-diff) infections are a source of significant morbidity and mortality for patients and are costly to the healthcare system. Contact precautions are effective in preventing C-diff transmission in hospitals, though such practices can be suboptimal and inconsistent among healthcare workers (HCW).

Improving physician practices for contact precautions can help decrease hospital associated C-diff infections along with the spread of other infections (i.e., MRSA). Graduate medical education is a unique and powerful resource to improve patient care and address quality improvement.



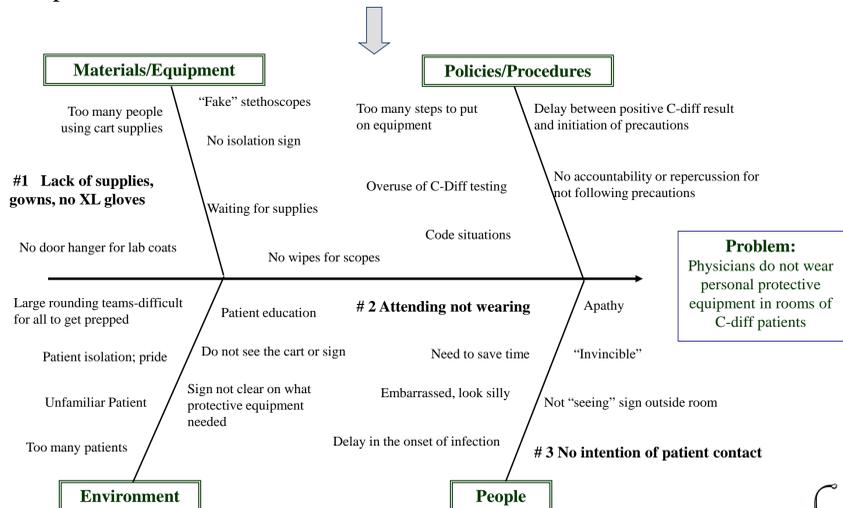
## Statement of Problem

Internal Medicine Residents recognized that contact precautions were not used consistently for patients with C-diff infection in the Intensive Care Unit (ICU). In particular, our hospital associated C-diff infections had decreased after a hospital endeavor to improved hand hygiene, however it was determined there was still room for further improvement.

## Objectives of Intervention

**Overall aim:** Decrease hospital associated C-diff infections identified in the adult intensive care units by 50% to 1.2 per 1000 patient days by improving physician practices during contact precautions to >95% for both gloves use and cleaning of stethoscopes.

To identify improvements, Internal Medicine Residents brainstormed the problem and rank ordered issues.



Three action items were specifically identified during the session:

1. Improve stocking of isolation carts
2. Make isolation signs easier to see what is needed for contact precautions
3. Educate physicians and staff on C-diff infection



## Description

After IRB approval, trained observers sat in the rooms of ICU patients on contact precautions and recorded HCW isolation practices (use of gloves, gowns and hand hygiene and if isolation sign and cart were present)

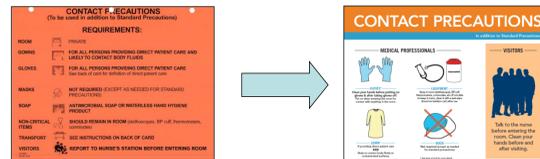
Baseline observations showed 90% and 100% compliance with hand hygiene and gown use, respectively, but glove use only 68%

↓  
Goal: To improve glove use!

A survey of knowledge, beliefs, and practices about C-diff was administered to faculty and internal medicine residents before and after our interventions. Pre-intervention surveys provided key information on physician beliefs and practices as well as identified areas for improvement.

### Interventions:

1. Presented educational sessions targeting different HCW groups;
2. Redesigned and improved re-stocking of isolation carts and; and
3. Redesigned contact precautions sign, see below:



## Results / Findings

Observations	Baseline	Post Intervention	p -value	Observations	Baseline	Post Intervention	p-value
HCW wore gloves for contact precautions	n =53 68%	n=63 71%	0.6821	Percent isolation rooms with isolation sign	n=9 78%	n=9 56%	0.6199
HCW cleaned stethoscope if used*	n=14 78%	n=4 0%	0.0114	Percent isolation rooms with isolation cart present and stocked	n=10 60%	n=9 78%	0.6285

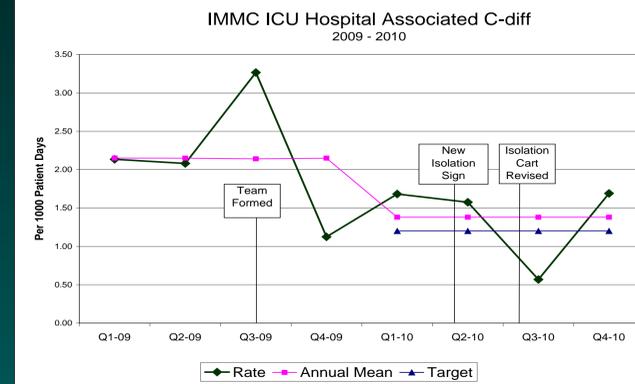
\*This decrease may be due to more people using the dedicated stethoscope in the room

### Survey: I clean my stethoscope after examining a patient in contact precautions (Faculty)

	Baseline	Post-Intervention	p-value
Always	1 (4%)	7 (25%)	0.0462 for median question responses
Most of the time	8 (32%)	6 (21%)	
Sometimes	3 (12%)	1 (4%)	
Rarely	3 (12%)	1 (4%)	
Never	0 (0%)	1 (4%)	

### Survey: I wear gloves when examining a patient with C-Diff Diarrhea (Faculty and Residents)

	Baseline	Post-Intervention	p-value
Always	30 (68%)	37 (71%)	0.9052 for median question responses
Most of the time	13 (30%)	11 (21%)	
Sometimes	1 (2%)	3 (6%)	
Rarely	0 (0%)	1 (2%)	
Never	0 (0%)	0 (0%)	



During study period a negative non-statistically significant trend (p-value 0.0841) occurred in the C-diff rates in the adult ICU.

## Discussion

- During the first National Initiative we learned that residents know where barriers to ideal patient care exist, so our lead resident on this project selected an issue and had a very active role on the team
- For two months during the study period very few patients were on contact precautions. This limited the number of observations we were able to collect
- Numerous improvements were made to the isolation cart, but after the initial pilot cart was made it took a long time to make the changes to remaining carts

## Key Lessons Learned

- If you do not reach your goal in the time set, it is not a "failure" but a continuous cycle of evaluating a problem and working toward a solution with Plan Do Study Act (PDSA) cycles
- A "simple" problem does not always equate to a quick, simple solution
- Changing HCW practices is difficult; education and improving availability of supplies may not be enough!
- Direct observation of practices requires significant training of observers.
- An interdisciplinary approach (with front line nurses) toward quality improvement is critical
- Statisticians are your friends
- Healthcare workers often do not "see" signs

## Next Steps

1. Continue PDSA cycles to improve glove use by improving awareness of when patients are on contact precautions.
2. Finalize consistent stocking of isolation carts.



## References

- Relevant references used to develop problem and interventions:
1. Clock et al. Contact precautions for multidrug-resistant organisms: Current recommendations and actual practice. Am J Infect Control 2010; 38: 105-11.
  2. Haas JP, Larson EL. Measurement of compliance with hand hygiene. J HospInfect 2007; 66: 6-14.
  3. Pittet D. Compliance with handwashing in a teaching hospital. Ann Intern Med 1999; 130: 126-130.
  4. Pittet D, Simon A et al. Hand hygiene among physicians: performance, beliefs, and perceptions. Ann Intern Med 2004; 141: 1-8.
  5. Guide to Elimination OF Clostridium difficile in Healthcare Settings, Association for Professional in Infection Control and Epidemiology., 2008

Hospital: JPS Health Network

Team Leader: Josephine Fowler, MD

I. PROJECT TITLE/NAME:  
(Transitions of care) Reduction of Visits in Emergency Services through Identification of Medical Homes for unassigned discharge patients.

II. BRIEF DESCRIPTION: (4-5 sentences, maximum)  
Emergency Room overcrowding is a major dilemma worldwide in systems that provide emergency care. In many systems, the patients presenting for emergency services have non-urgent needs and could be cared for in a well organized primary care site or less urgent environment. Recent studies suggest several factors to consider in evaluating emergency room care and crowding: scheduling of patients in clinics, available service times of primary care and ambulatory facilities, patients 50 and older needing social support, outpatient management of chronic disease, and human and fiscal resource needs based on volume and acuity of patients seen.<sup>1</sup> Additional consideration must be taken to assess potential sources of ethnic and racial disparities in patient care and system level factors<sup>2</sup> in order to address other potential reasons for frequent returns to the emergency department, appropriate triage to subspecialists, and ability to assign primary physicians (the Medical Home) in a timely fashion.<sup>3</sup> Optimization of continuity of care or an identified medical home could<sup>4</sup> serve as a partial solution to decreasing ER visits coupled with an organized patient management system that incorporates assessment of the Emergency Room Visit appropriateness using the Emergency Severity Index (ESI).

III. OPPORTUNITY STATEMENT:  
ED overcrowding can result in higher morbidity and mortality. Improved communication among care givers in a coordinated fashion should improve care and outcomes in the medical home thus decreasing return to ED for services within 7 days and 30 days respectively.

IV. RESEARCH QUESTION:  
Does the medical home (coordinated care) decrease LOS in the Emergency Department? What factors are barriers to communication between ED and the outpatient clinic service?

V. HYPOTHESIS:  
1. Identifying a distinct out patient medical home upon ED discharge will decrease ED return within 30 days by 10-20%.  
2. Identifying a systematic approach to scheduling non-emergent but urgent patients in outpatient settings will decrease urgent, non-emergent visits to the ED.  
3. Assignment of a medical home with a subsequent appointment within 7 days will decrease ED return visits within 30 days.

VI. MEASURES:  
Demographics  
Last clinic visit prior to ED visit  
No. patients given appointment before leaving ED  
No. of days until appointment on day of ED discharge  
No. who Fail to see medical home within 7 days  
No. who were not assigned an appointment prior to discharge from ED  
Time (hrs) arrival to discharge  
Time (hrs) arrival to admission  
Time (hrs) ED ALOS  
ED priority level (demographics)  
ED diagnoses  
No. of medications refilled in ED per month ( primary diagnosis)  
Average estimated cost per month for medication refills  
No. unassigned patients in the ED.  
No. assigned patients in ED.  
No. ED patient visits/ day  
No. ED patient visits admitted per day  
No. Return ED visits within 7 days  
No. Return ED visits within 30 days  
Time since last ED visit (days)  
Time since last hospitalization

<p>No. unassigned patients in the ED.  No. assigned patients in ED.  No. ED patient visits/ day  No. ED patient visits admitted per day  No. Return ED visits within 7 days  No. Return ED visits within 30 days  Time since last ED visit (days)  Time since last hospitalization  Change in return to ED after open access and initial stages of medical home implementation</p>
<p>VII. INSTRUMENTS:  Emstat database – collected by ED  Hospital service database – collected monthly  <b>Methods/ data collection:</b>  <i>Qualitative</i>  Small group discussions with key stakeholders  <i>Quantitative</i>  Secondary and primary analysis of existing data – “data warehouse”  Descriptive analyses  Case Control</p>
<p>VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.  Baseline data included demographics of the patients seeking care in the ED, descriptive analysis of the data describing metrics in ED care, and qualitative data from discussion with key stakeholders in the index departments on the process measures currently in place in the ED services and clinics.</p>
<p>IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted.  We conducted both secondary data analysis and a qualitative assessment from September 2009- January 2011 to Identify barriers to registering patients for follow-up appointments after ED discharge and correlates of more frequent ED visits; reviewed process with key stakeholders to identify means to implement a rapid cycle process to increase patients getting follow-up with primary care (medical home); and identified two primary care clinics that were earmarked to become future medical homes and implemented an open access appointment system for patients referred from the ED for Follow-up in one of those clinics.</p>
<p>X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.  Post intervention data included data comparing no. return visits to Emergency services including urgent care within 7 days and within 30 days of discharge and review of data describing the ESI priority level of care after availability of more outpatient visits.</p>
<p>XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)  Descriptive analysis; run charts, histograms, crosstabs; qualitative data, pie charts, etc.</p>
<p>XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:  We assessed behavior changes and the impact on change within the system. ( qualitative)</p>
<p>XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?  1.institutional culture change  2. team morale and support  3. stakeholder's support in providing data and information</p>
<p>XIV. BARRIERS: What were the 3 greatest challenges you encountered?  1. PDSA—too many unexpected barriers  2. slow processes in a complex environment  3. turnover of key participants and stakeholders</p>

<p>XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative? Must identify the perceived barriers vs. real barriers to the success of the project</p>
<p>XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.</p> <ol style="list-style-type: none"> <li>1. Positive Unintended Consequences: institutional trust of data and information collected; provider willingness to be educated about the process</li> <li>2. Negative Unintended Consequences: more patients need scheduling than there is available visit slots</li> </ol>
<p>XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?</p> <p style="text-align: center;">1 2 3 4 5 <b>6</b> 7 8 9 10</p>
<p>XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?</p> <p style="text-align: center;">1 2 3 4 5 6 7 <b>8</b> 9 10</p>
<p>XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.</p> <p>Continue transitions of care team for the institution</p>
<p>XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?</p> <p>Resident participation was slow throughout until end of project. However, announcement of contribution of the team raised inquiry from residents about an ongoing project. Resident volunteered on a similar project.</p>

<sup>1</sup> Carret Maria LV, Fassa Anaclaudia G, and Kawachi Ichiro. Demand for emergency health service: factors associated with inappropriate use. BMC Health Serv Res. 2007; 7: 131.

<sup>2</sup> Assessing Potential Sources of Racial and Ethnic Disparities in Care: Patient and System Level Factors. Unequal treatment: Confronting racial and ethnic Disparities in Health Care. Board on health Science policies, Institute of Medicine 2003; 125-159.

<sup>3</sup> Nelson, Alan R. Supplement: understanding disparities in cardiovascular and thoracic surgical outcomes in African-Americans. Unequal treatment: report of the institute of medicine on racial and ethnic disparities in healthcare. Ann Thorac Surg 2003; 76: S1377-S1381.

<sup>4</sup> Carret ML, Fassa AC, Domingues MR. Inappropriate use of emergency services: a systematic review of prevalence and associated factors. Cad 2009 Jan; 25(1): 7-28

# Reduction Of Visits In Emergency Services Through Identification Of Medical Homes For Unassigned Discharge Patients

J. Fowler, MD MSc, B. T. Littleton, MPH, B. Estment, MD, L. Hadley, MD, T. Sanders, RN PhD,

## Introduction

Emergency Room overcrowding is a major dilemma worldwide. In many systems, the patients presenting for emergency services have non-urgent needs and could be cared for in a well organized primary care site. Recent studies suggest that multiple factors contribute to ED overcrowding including, clinic scheduling issues, lack of available service times of ambulatory facilities, disparate distribution of social and fiscal resource, to name a few. When ED patient volume is high or patients are triaged to outpatient services inappropriately, this results in recidivism and could negatively impacts patient satisfaction and patient safety. Optimization of continuity of care or an identified medical home could serve as a partial solution to decreasing ER visits.

## Statement of Problem

From September 2009 to September 2010, a high volume tertiary county hospital Emergency Room had 88,906 visits. During this period, of 88,906 patient visits, 75% did not report an assigned primary care provider and 38% did not have a clinic home. Of the total visits, 15,578 patients were scheduled for Follow-up appointments by the ED registration staff (17.5%), the remainder were either informed to call their clinic for follow-up, instructed to see their provider for next scheduled appointment, or left without instructions. Systemic barriers to scheduling included: blocked schedules, wait times, limited number of receptionists for scheduling, availability of receptionist after 5PM, limited provider knowledge of outpatient clinic names, locations, and providers, and overuse of specialty referral post ED visit.

## Objectives of Intervention

1. Decrease volume of return emergency center visits within 30 days through assignment of medical home for unassigned patients seen in emergency center.
2. Identify barriers to patients getting follow-up appointments when being discharged from the ED.
3. Schedule follow-up visits to outpatient medical home within 7 days of ED discharge for unassigned patients.
4. Identify opportunities for patients to get urgent but non-emergent care in the community outpatient setting after ED discharge.

## Description

Beginning October 2010, a primary care site ( PC clinic A) made available open slots to schedule ED follow-up appointments regardless of pay status as a priority post ED visit. In this site, ED patients received no additional instructions but the slots were available if they were scheduled by the ED staff or they were instructed to schedule on their own. ED Providers had not been notified of the change in the scheduling availability. The clinic manager opened up to 20 slots daily for post ED visits and also allowed additional slots to be used if needed. Hospital ED data containing demographics, geographic data, number of visits, clinic appointments, return to ED in 7 days, return to ED in 30 days, and referral and follow-up appointments was followed to evaluate if this small change would impact recidivism and duration of wait for clinic appointments from October 1, 2010 to January 31, 2011.

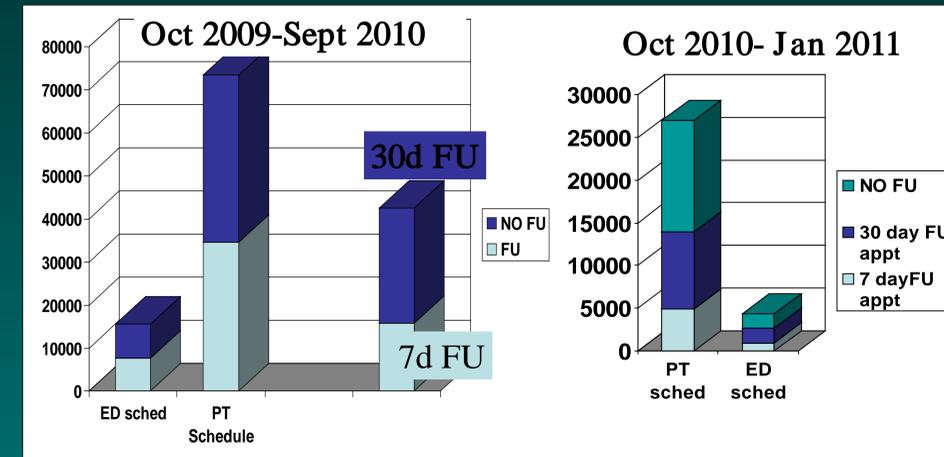
## Results / Findings to Date

- ED visits, More than 80% priority 3, 4, 5 ( less emergent )
- Patients who were given an appointment by the ED staff had a **12% higher rate** of follow-up within 30 days than patients who made there own appointments.
- Number of patients receiving specialty referral is extremely high
- Wait time to specialty care for follow-up care may contribute to increased risk for recidivism.
- ER return visits within 7 days reached (11%) and 30d return reaches (15%)
- PC Clinic A received 4 times more referrals from ED in Oct 2010-Jan 2011. When annualized, this suggests improved access to slots for patients.

Table 1

	Oct 2009-Sept 2010	7d FU	30d FU	Oct 2010-Jan 2011
ERM return	26%	11%	15%	28.2%
PC clinic A FU	683	369	314	677
Other PC FU	1204	449	755	--

Figure 1



## Key Lessons Learned

1. Scheduling is more complex than placing appointment in system.
2. Triage efficiency and effectiveness is major in preventing overcrowding.
3. Physician-patient communication is key in avoidance of returns to ED.

## Next Steps

1. Assignment of patients to a PCP and Medical Home in the geographic location where they live or work.
2. Notify PCP within 24 hours of ED visit so that a follow-up appointment can be made
3. Open Access scheduling in community clinics.
4. Educate ED providers on clinic providers, locations, services.
5. Consider alternative means to identify those needing only medication refills.
6. Address factors associated with ED visit for medication refills.

Hospital:     Maine Medical Center    

Team Leader:     Joel Botler    

I. PROJECT TITLE/NAME: The Adult Inpatient Medicine ( AIM) Care-Coordination and Readmission Project
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) (4-5 sentences, maximum) Maine Medical Center's AIM Service has a goal to reduce readmission rates, and to that end has initiated a pilot program to improve the quality and timeliness of discharge summaries; improve communication between the discharging team and PCP; and use a dedicated RN at the primary care office (hereafter referred to as the care transition nurse) to help achieve that goal. A pilot intervention is already underway at a large primary care practice for the past 4 months where the care transition nurse after receiving faxed discharge instructions, med lists and med reconciliation forms calls patient within 24-48 hours to reconcile meds, arrange follow-up visits and laboratory testing. Our goal is to extend this pilot to one other large primary care sites.
III. OPPORTUNITY STATEMENT: The early transfer of information and responsibility of the care of the hospitalized patient when discharged to the primary care physician will reduce medication errors, improve outpatient test follow-up and reduce readmissions.
IV. RESEARCH QUESTION: Do specific interventions to improving discharge care-coordination on the AIM service result in: 1. Reduction in readmission from baseline. 2. Improved satisfaction by patients, primary care providers (PCPs), and outpatient office staff members. 3. Timely capture and correction of medication discrepancies after discharge. 4. Reduced ER utilization post discharge 5. Reduce time to first office visit following discharge from the hospital
V. HYPOTHESIS: We suspect that improvements in care-coordination at discharge will result in statistically significant reductions in readmissions to the AIM service over a 6 month period, reduced ER utilization post discharge, increased provider and patient satisfaction, the opportunity to correct medication discrepancies, reduced time to the first outpatient follow-up visit.
VI. MEASURES: Our specific measures include pre- and post-intervention 30 day readmission rate; physician surveys, ER utilization, medication discrepancies corrected by the care transitions nurse, and time to first PCP visit. We additionally document the intensity of the nurse intervention with regard to minutes spent per patient.
VII. INSTRUMENTS: Physician surveys (developed internally), readmission rates calculated from hospital data, data collection tool for the care transitions nurse, Med Discrepancy tool.
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have. 1. Baseline Readmission rates for preceding year 2. Physician Satisfaction Survey
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. The intervention involves a post discharge phone call from an embedded care transitions nurse in the primary care practice (which has 5 geographic sites). As part of the call there is medication reconciliation, scheduling of PCP and specialty follow-up visits, assessment of patient status and ordering of post discharge labs.
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.  Readmission Rate : 10.2% for year prior to intervention and 8.4% for 6 months after intervention. Total time spent by care transitions nurse- 26 minutes( includes time researching medical records, calling patients, updating chart) Medication discrepancies were identified and corrected prior to the patient's first visit with the primary care provider in 42% (106/253) of patients. The most common reason for discrepancy according to the patient was conflicting information from multiple providers. Average time to first follow-up visit less than 7 days.

11 of 12 respondents reported that the addition of the Care Transitions Nurse improved the process of transitioning care a moderate or significant amount.

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

We used the chi-square test to compare baseline and follow-up readmission rates. We will use regression techniques to model the effect of the coordination effect (embedded RN in the primary care office) on readmission when we have completed data collection (12 months of intervention).

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

As noted above, we will continue to collect data on readmissions for a full year after our intervention, for purposes of comparing one year of pre-intervention readmissions to one year after. Regression techniques will be used when we have the full dataset.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Dedication of care transitions nurse
2. Excellent data collection and resources allocated to this
3. Institutional Support

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Lack of consistency of residents adhering to completion of discharge summaries within 24 hours
2. Workflow of getting appropriate discharge information to care transitions nurse.
3. Some patients declined to work with the nurse, or declined to be seen in follow up within 7 days.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

We would advise others to focus on key parts of discharge process that need improvement, such as information transfer. Frequent meetings, a strong champion, resident involvement (for teaching hospitals) and a team approach facilitate successful interventions.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: Overall spread of concept to entire community
2. Negative Unintended Consequences: Nursing unit workflow deteriorated with less information sent to primary care office.

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish? **8**

1 2 3 4 5 6 7 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project? **8**

1 2 3 4 5 6 7 8 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

We plan to spread this intervention to involve the residency clinic training site, as well as surgical patients and patients discharged to skilled nursing facilities

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

This project has resulted in improvement in discharge summary completion rates, improved content of discharge summaries, improvement in med reconciliation, and a reduced rate of readmission (at 6 months), though this was not statistically significant. It also allowed our group to form a cohesive team, with involvement of residents, our program director from internal medicine, and other key leaders from our hospital and Department of Medicine.



# Improving Discharge Care and Reducing Readmissions: A Care Transitions Nurse Intervention



Botler, J, Palminteri, J, Delaney, E, Gearan, T, Medd, D, Roy, M, Salvador, D, McGill, D, Fairfield, K,  
Maine Medical Center, Portland, ME



## Introduction

Medical readmissions can be a marker of poor transitions of care; efforts to avoid unnecessary readmissions are critical. We sought to determine whether adding a care transitions nurse (CTN) in an outpatient practice would reduce readmissions and improve care among adult general medicine patients discharged home from the hospital.

## Statement of Problem

The transition from hospital to home is associated with a significant number of medical errors and poor patient outcomes. Problem areas include medication discrepancies, lack of timely follow-up with the PCP, outstanding labs and tests at time of discharge, poor communication between the hospital and PCP, and lack of patient education related to medications, red flags, and the discharge diagnosis.

An unfortunate result of poor transitions of care is a high rate of hospital for readmission.

## Objectives of Intervention

1. Rapid correction of medication discrepancies after discharge
2. Improve timeliness of PCP follow-up
3. Increase physician satisfaction with the transition process
4. Reduce readmissions

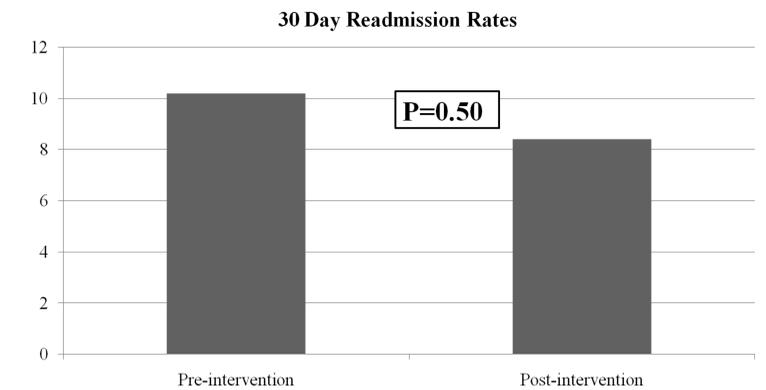
## Description/ Intervention

- This project has a pre-/post- design of patients admitted to the medical service of a single large (606 bed) hospital and discharged to home.
- The intervention is an embedded CTN with EMR access in a large practice comprised of internal medicine and family practice.
- The CTN calls patients within 48 hours post discharge to:
- identify and correct medication discrepancies in the EMR
- arrange follow up visits with primary care (within 7 days) and with specialists
- The CTN completes a medication discrepancy check at the time of the post-discharge phone call to capture the number of medications that the patient:
- should be taking but is NOT
- should not be taking but in fact IS taking.

## Results / Findings to Date

- We report on 253 admissions for the first 6 months of our intervention.
- The Figure shows the proportion of patients readmitted to the hospital within 30 days of discharge
- The care transitions nurse spent (means given):
- 7 minutes on the phone with patients (range 1-33)
- 26 minutes total (range 3-56)
- Total time included: researching patient discharge information, contact time via telephone, updating the medication list, and other documentation
- Medication discrepancies were identified and corrected prior to the patient's visit with primary care
  - 42% (106/253) of patients
  - 1.7 new medications added (range 0-5)
  - 0.6 medications discontinued (range 0-4).
  - The most common reason for discrepancy according to the patient was conflicting information from multiple providers
- 11/12 Physicians surveyed believed there was at least a moderate improvement in the transition from hospital to home because of the CTN.

## Figure



## Key Lessons Learned

- We report that a CTN embedded in a large primary care practice modestly decreased readmission rates for adult medical inpatients, though this finding was not statistically significant.
- The CTN identified and corrected medication discrepancies before the first office visit, and arrange timely follow up.
- This intervention is resource-intensive and may not be feasible for smaller practices.

## Next Steps

1. Expand to include all medical patients discharged from our medical center.
2. Include selected surgical patients.
3. Include patients discharged from another small community hospital to the practices.
4. Include discharges from Skilled Nursing Facilities.

Hospital:                     Maine Medical Center Team Two                    

Team Leader:                     James Whiting                    

I. PROJECT TITLE/NAME: Patient Safety and Communication: Challenge in the Hierarchy
II. BRIEF DESCRIPTION: The AIAMC project is a subset of a larger initiative aimed at developing communication skills for bridging hospital subcultures and moving through the hospital hierarchy in order to improve patient safety. Small groups will be trained in the 2-challenge rule and structured language throughout the department of surgery. An OSCE will be developed to measure the effectiveness of the training.
III. OPPORTUNITY STATEMENT:
IV. RESEARCH QUESTION: Can overt training of communication skills improve patient safety.
V. HYPOTHESIS: Communication skills can be taught and learned facilitating patient safety
VI. MEASURES: Performance in an objective structured clinical (communication) exam using standardized attendings and nurses instead of standardized patients.
VII. INSTRUMENTS: We developed a checklist of behaviors for evaluation of performance in the exam
VIII. BASELINE DATA COLLECTED: We used either a 4 point Likert Scale or Yes/No to score multiple different behaviors. For example, we evaluated The tone of the videotaped interaction on a 4 point Likert Scale: 1=Angry, 2=Expressed Frustration, 3=Respectful, 4=Metacognition (verbalized use of the pathway)
IX. INTERVENTION: Three weeks after collection of the baseline data, all residents went thru a teaching session on the challenge pathway. There was an opening presentation on the importance of communication by an outside speaker, then a short didactic session followed by a "fishbowl" roleplay, followed by roleplay in small groups as practice.
X. POST-INTERVENTION DATA: We followed up our baseline simulation and our teaching rollout with a second set of simulations. The structure of the second set was similar, but not identical to the first set of scenarios. Both the standardized attending and nurses as well as two blinded observers reviewed videos of all the simulations and scored them based on a standardized set of behaviors. Pre teaching and post teaching scores were then compared.
XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures?  We compared domain scores and individual item scores pre and post interventions with simple t-test. We used correlation matrixes to compare demographic variables with domain scores.
XII. DID YOU COLLECT ADDITIONAL DATA? We also collected individual learner reflections on the simulation which we will use for additional refinement of the scenarios as we go forward.
XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?  1. Strong groundwork in studying the underlying problem before taking action 2. Support of department chair, simulation staff etc 3. A group of residents willing to undertake a test of change
XIV. BARRIERS: What were the 3 greatest challenges you encountered?  1. There was a certain amount of inventing the wheel- not a standard course to follow 2. Time constraints, and competing priorities 3. Maintaining focus on a long term project over a couple of years.
XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative? Make sure that you have budgeted adequate time and have appropriate expertise/help available

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: Became familiar with new Sim Center staff and capabilities

2. Negative Unintended Consequences: None

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 **8** 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 **8** 9 10

XIX. NEXT STEPS: We are planning on making the teaching and maybe the simulations part of our orientation, we are also looking to roll out the teaching to the different nursing units.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

We have started (but only just started) to see a greater willingness for residents to speak up and challenge up the hierarchy. This is mostly confined to anecdotes, but it is, we hope, the beginning of a culture change.



# Patient Safety and Communication: Challenge in the Hierarchy



J Chaney, S Curtis, M Riehle, A Andrus, D Salvador, B Cushing, JF Whiting,

Maine Medical Center, Portland, ME

## Introduction

The hierarchal nature of hospital medicine and particularly residency programs can act to deter the communication of concerns up the hierarchy. Communication deficiencies are at the root of as many as 70% of sentinel events. The “two challenge rule” is a form of structured communication designed to allow for any team member to safely voice a patient safety concern and intervene as necessary

## Statement of Problem

Two different questionnaires addressing attitudes around patient safety administered in our institution identified problems with voicing patient safety concerns in the surgical residency. We addressed these issues by initiating residency wide public discussions followed by confidential focus groups. Analysis of focus group transcripts identified a reluctance to voice concerns up the hierarchy as well as a lack of adequate communication tools with which to do this in a clear manner, respectful of authority, yet still putting patient safety at the forefront. Working groups identified the “two challenge rule” as a potential mechanism for addressing this deficiency.

## Objectives of Intervention

1. Foster a culture where there is a responsibility to voice patient safety concerns
2. Teach a system of structured language to allow communication through the hierarchy of a surgical residency

## Description

The two challenge rule was taught to all surgical residents through a combination of didactic session, fish bowl role play and role play practice. Simulated encounters where the residents either had to challenge an attending, or where the residents were the objects of a challenge by a nurse were developed and scripted. Evaluation tools were developed for scoring the encounters. Residents first were put through the simulations before teaching of the rule, and then again, with similar but not identical encounters, 4 months later.

## Results / Findings to Date

- Residents maintained respectful communication equally well, when being challenged, or when challenging
- Before training, residents rarely resorted to collaboration when challenging up the hierarchy (< 18% of the time)
- Before training, residents were resistant to suggestions of collaboration to resolve issues when they were being challenged, only accepting a suggestion of collaboration 70% of the time, often after repeated suggestions, and never suggesting collaboration themselves.

**Table 1**

Before and after training data to be presented				

## Figure 1

Before and After Training Data to be Presented

## Key Lessons Learned

Simulated encounters can be used to teach the two challenge rule.

## Next Steps

1. Continue to reinforce use of two challenge rule in day to day practice
2. Incorporate teaching of two challenge rule in the orientation of new interns
3. Role out teaching of two challenge rule to nursing units

Hospital: Monmouth Medical Center

Team Leader: Joseph Jaeger

I. PROJECT TITLE/NAME: <b>Hospitalization of Low Risk Patients with Community-Acquired Pneumonia (CAP)</b>
II. BRIEF DESCRIPTION: (4-5 sentences, maximum)  We reviewed the charts of all CAP patients for a one-year time period (2009) to assess the admission rate of patients with low 30-day mortality. A total of 540 charts were reviewed out of which 69 admissions met our inclusion criteria. Complications of hospitalization, length of the stay and treatment cost were measured. An intervention and assessment process was developed to educate and then guide emergency medicine physicians. The admission, complication rates and cost involved will be re-assessed.
III. OPPORTUNITY STATEMENT:  We have the opportunity to reduce the admission rate of low-risk mortality patients, who should be treated in an outpatient setting, by 20%.
IV. RESEARCH QUESTION:  Will education and a revised decision tree reduce low-risk admissions?
V. HYPOTHESIS: That the intervention will reduce unwarranted admissions and reduce low-risk patients' risk for nosocomial complications.
VI. MEASURES: Pre & post: 1) Admission rate of low mortality risk patients 2) Complication / mortality rates of low mortality risk patients 3) Cost effectiveness of the intervention
VII. INSTRUMENTS:  Community-Acquired Pneumonia Severity Index (PSI) for Adults: Takes demographics, comorbidities, physical exam findings, and lab and radiography findings into account. Scores between 0 and 90 indicate low risk for mortality (less than 1.0%).
VIII. BASELINE DATA COLLECTED:  PSI - Preliminary baseline data indicate 87% of the 69 patients were in low-risk Pneumonia Severity Index categories (I, II, or III).  LOS - 68% of patients had a length of stay between 2 – 6 days, indicating that low-risk patients may be staying longer than necessary, and potentially being exposed to nosocomial infections or other complications along with increased cost of treatment.  COST – Data is still being collected to be analyzed.
IX. INTERVENTION :  CME - Our intervention is an educational module, presented live, for emergency department physicians (as well as residents), explaining the PSI and how it may be applied clinically to reduce unnecessary hospitalizations.
X. POST-INTERVENTION DATA:  We will examine PSI, cost involved and LOS of patients admitted, as above.
XI. TYPE OF ANALYSIS:  T-test and chi-square analysis, with 95% confidence intervals, comparing pre- and post-intervention PSI.
XII. DID YOU COLLECT ADDITIONAL DATA?  We have collected patient demographics and related clinical information, to assess for confounding variables.

**XIII. SUCCESS FACTORS:**

Enthusiasm of the team members, and support from a research associate, has been key.

**XIV. BARRIERS :**

Incomplete and missing data from few charts; time for intervention competing with other demands.

**XV. LESSONS LEARNED:**

Project not yet completed, post intervention data is still needs to be collected and analyzed. Keeping the physician champions / groups involved from start to finish is very important.

**XVI. UNINTENDED CONSEQUENCES:** Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: No complications occurred in the admitted patients.
2. Negative Unintended Consequences: Increased hospitalization cost.

**XVII. EXPECTATIONS VERSUS RESULTS:** On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 **5** 6 7 8 9 10

**XVIII. SATISFACTION:** On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 **5** 6 7 8 9 10

**XIX. NEXT STEPS:** Describe next steps for your project, including plans for sustaining and spreading the changes made.

Costs involved in inpatient management including special procedures and tests are being gathered for analysis. This will also be taken into consideration during post-intervention assessment of the data.

**XX. PROJECT IMPACT:** What changes have you observed in your residency program, or at your institution, based upon this project?

There is already an awareness of the issue of admission of low-risk patients, obvious even before the intervention. House staff are now actively implementing the PSI score in evaluating patients with community acquired pneumonia and incorporating it into their decision to admit (or not).

# HOSPITALIZATION OF LOW-RISK PATIENTS WITH COMMUNITY-ACQUIRED PNEUMONIA

R Vydyula MD, S Laxmi MD, S Imran MBBS,  
J Jaeger MPH, A Mathur MD



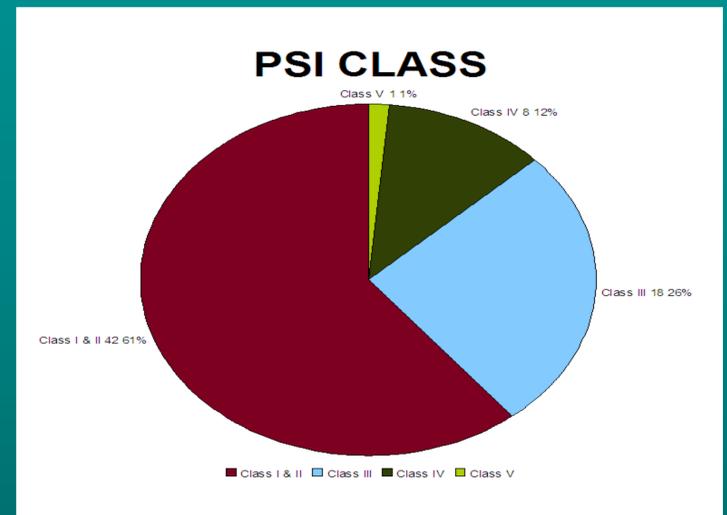
## Introduction

Community acquired pneumonia (CAP) is a disease in which individuals develop an infection of the lungs. Determination of whether a patient with CAP can safely be treated as an outpatient or inpatient is essential before selecting an antibiotic regimen. The two most commonly used prediction rules are the Pneumonia Severity Index (PSI) and CURB-65 making this determination

## Description

Total of 545 charts from 2008 were reviewed; 69 met the inclusion criteria. PSI score, data regarding antibiotic use, length of stay, inpatient complications, cost of hospitalization was collected. Patients were categorized as PSI class I, II, III, IV, V as per the score. Data were shared with the house staff and ED physicians as part of an educational lecture about PSI and its use in decision-making in admitting pneumonia patients with an intention to reduce low-risk pneumonia admissions by 10-20%. Post intervention data are being reviewed and compared with the pre-intervention data.

## Figure 1



## Statement of Problem

Patients with less severe pneumonia and low risk for mortality are being admitted to the hospital, unnecessarily increasing their risk for hospital-acquired complications and the cost of care.

## Results / Findings to Date

- 87% of patients belonged to PSI class I, II or III
- Mean length of stay was 5.25 days
- There were no hospital-acquired complications in these patients
- Costs are approximately \$2500 – 3000/day , exact number is yet to be determined.

## Key Lessons Learned

- No apparent risk in hospitalization of patients with low severity pneumonia
- Cost of hospitalization can be greatly reduced with avoidance of unwarranted admissions
- Education of house staff played a major role

## Objectives of Intervention

1. Assess the admission rate of patients with low 30-day mortality
2. Measure complication / mortality rates of low mortality risk patients
3. Estimate potential cost savings
4. Reduce low severity pneumonia admissions by 20%

Table 1

n	PSI	LOS (days)
19	I	4.1
23	II	5.0
18	III	5.4
8	IV	8.6
1	V	6.0

## Next Steps

1. Re-asses the admission rates of low severity pneumonia patients.
2. Analyze the total cost of hospitalization
3. Re-asses complication rates in patients admitted post-intervention
4. Share information with the house staff & ED
5. Discuss and devise necessary interventions based on results

**Hospital:** \_\_\_\_\_ **National Rehabilitation Hospital**

**Team Leader:** \_\_\_\_\_ **Curtis L. Whitehair, M.D.**

**I. PROJECT TITLE/NAME:**

Adding LIFE to Hand-offs: A Pilot Patient Safety Initiative at An Acute Inpatient Rehabilitation Hospital

**II. BRIEF DESCRIPTION:** (4-5 sentences, maximum)

To develop and implement a novel program improvement initiative, "The LIFE Cycle", to improve and standardize the weekend hand-off system (resident-resident, resident-attending) in an acute inpatient rehabilitation hospital. A newly developed hand-off template, with a color-coded system to prioritize patients during weekend call, will be utilized for a period of 4 months to reduce communication errors and preserve patient safety. Outcome measures include pre- and post-intervention: resident satisfaction and efficiency; number of patient related rapid responses; code blue; emergent transfers to acute care and average length of stay.

**III. OPPORTUNITY STATEMENT:**

Effective hand-off communication among clinicians has been shown to decrease medical error. There is mounting evidence that poor hand-offs may result in morbidity and mortality in patients. Our primary institution has no standardized hand-off template that prioritizes patients to be seen in order of severity.

**IV. RESEARCH QUESTION:**

Will the use of "The LIFE Cycle", a program initiative to improve and standardize the weekend hand-offs utilizing a color-coded hand-off system to prioritize patients, improve residents' satisfaction and efficiency in patient assessment; improve quality of patient care by decreasing the amount of rapid responses, code blues, emergent transfers to acute care, and length of stay in an acute inpatient rehabilitation hospital?

**V. HYPOTHESIS:**

Within 4 months of implementing "The LIFE Cycle" and utilizing a new and standardized color-coded system to prioritize patients during weekend call, we will improve residents' satisfaction and efficiency as measured by a revised version of a previously utilized sign-out survey (Fox. Et al) and decrease the amount of rapid responses, code blue, emergent transfers to acute care, and length of stay of patients in an acute inpatient rehabilitation hospital.

**VI. MEASURES:**

Outcome measures include: resident satisfaction and efficiency pre-and post paired intervention survey; number of patient related rapid responses, code blue, emergent transfers to acute care, and average length of stay. Outcome measures are matched between the pre-post intervention group by patients, age, sex, diagnosis and unit of inpatient hospital (2E, 2W, 3E).

**VII. INSTRUMENTS:**

- 1) Sign-out Survey
- 2) Chart review for number of patient rapid responses, codes, emergent discharges, and average length of stay

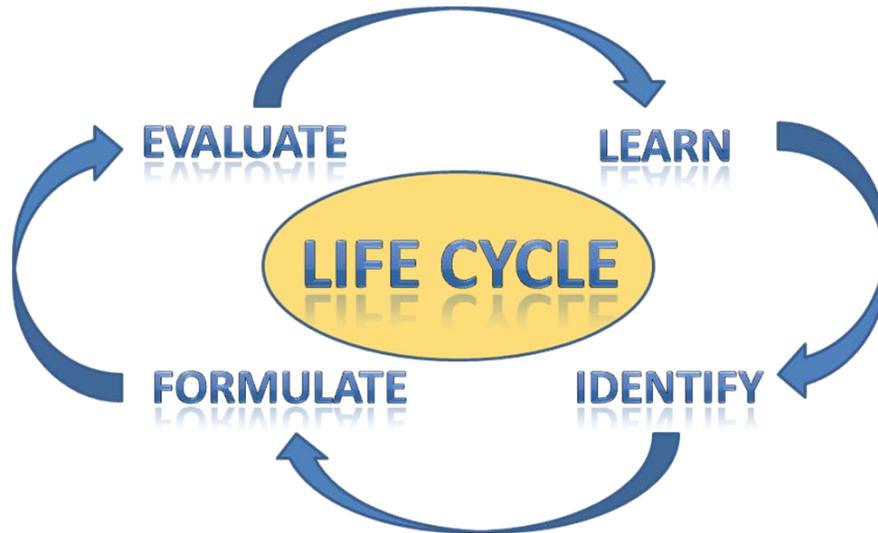
**VIII. BASELINE DATA COLLECTED:** What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.

- 1) Sign-out Survey from residents (Pre-intervention)
- 2) Descriptive Stats for clinical outcomes, including: number of rapid responses, codes, emergent

discharges, and average length of stay per inpatient unit over a 4 month period adjusted for age, sex, diagnosis, and inpatient ward of hospital (Pre-intervention)

IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted.

The purpose of this study is to utilize a novel program improvement model, "The LIFE Cycle," to improve the current hand-off system in our institution, maintain continuity of care across transitions, reduce communication errors and preserve patient safety.



**L**-Learn and highlight the basic tasks associated with patient handoffs that occurs among residents by conducting a thorough evaluation of the ongoing handoff process

- a. Conduct a literature search on "Hand-offs"- (*done over 1 month and continually updated*)
- b. Collect baseline data with current hand-off system- (*collected over 4 months*)
- c. Pre-survey residents' satisfaction and efficiency with current hand offs using a previously utilized sign-out survey (Fox et. al)

**I**-Identify opportunities for miscommunication and perform a root cause analysis as participants share their handoff experiences through focus groups

- a. Conduct a focus group with residents to prioritize the patient list using a color coded format to identify high risk patients which should be assessed first while on call
- b. Conduct an educational workshop for residents on hand-offs which will include didactic lectures and role playing exercises
- c. Discuss color coding to prioritize patients (red, yellow, green)
  1. RED – Critical Lab Values (i.e. INR); Acutely-ill patients
  2. YELLOW- Routine Labs and Radiologic Tests
  3. GREEN- General Medical Check

**F**- Formulate and implement a standardized approach to handoffs using a color coding system to prioritize the urgency of patients to be seen on call

**E**-Evaluate and monitor the initiative for optimum effectiveness

- a. Focus group for residents to assess ongoing hand-off process (*4 months post intervention*)
- b. Post survey residents' satisfaction and efficiency with the new handoff system of prioritizing patients on the weekend hand-off , to be paired with pre-survey (*4 months post intervention*)
- c. Compare the outcome measures for quality improvement in patient care:  
(*9/2009-12/2009 vs 9/2010-12/2010*)
  - a. Number of patient related rapid responses
  - b. Number of patient related code blues (cardiac arrest, seizure activity)

- c. Number of emergent patient transfers to acute care
- d. Average length of stay
- e. Paired pre-post resident satisfaction survey

X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

- 1) Sign-out Survey from residents- paired pre/post study design  
Statistically significant improvement were noted in these categories: (1) Residents overnight: having a clear idea of what they need to accomplish; (2) issues no longer arising that are directly attributable to an inadequate sign-out ( $p=0.05$ , Stuart Maxwell-Test). There was a slight improvement in the residents' perception of the new hand-off system as being efficient and complete ( $p=0.06$ , Stuart Maxwell Test).
- 2) Analysis of pre-intervention data (9/2009-12/2009) and post-intervention data (9/2010-12/2010), stratified per inpatient hospital unit (2E, 2W, 3E), and patient demographics (age, sex and rehabilitation diagnosis):
  - a. Overall, there was no statistically significant difference in number of acute care transfers. However, in one unit (2W), there was a statistically significant decrease in acute care transfers ( $p=0.05$ , Pearson Chi Square).
  - b. There was a statistically significant decrease in rapid response rates ( $p=0.05$ , Fisher's exact test).
  - c. There was no significant decrease in number of codes and length of stay.

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

- 1) Sign-out Survey from residents- paired pre/post study design:  
A symmetry test (Stuart-Maxwell Marginal homogeneity test)
- 2) Patient rapid response rate by year adjusting for unit and age:  
Fisher's exact test; Mantel-Haenzel test of homogeneity of repeated tests of independence was used to test the association between the rapid response rate and the study year adjusting for age and the unit of the hospital.
- 3) Descriptive statistics for number of patient codes by year and each unit:  
Fisher's exact test; Mantel-Haenzel test of homogeneity of repeated tests of independence was used to test the association between the code rate and the study year adjusting for age and the unit of the hospital.
- 3) Acute patient transfer rate by year for each unit:  
Mantel-Haenzel test of homogeneity of repeated tests of independence was used to test the association between the acute transfer rate and the study year adjusting for age and the unit of the hospital
- 4) Descriptive statistics for length of stay (LOS) of a patient
  - a. ANOVA test
  - b. Two sample T-test comparison

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it: N/A

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Cohesive Team
2. Resident participation and enthusiasm for improvement
3. C Suite Support

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Narrowing the scope of the project
2. Educating rotating residents of our intervention
3. Attending physician compliance with new hand-off color stratified template

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

To narrow the scope of the project early on in the process

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: N/A
2. Negative Unintended Consequences: N/A

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 8 9 10

8, we were unable to sustain 100% participation among the attending physicians when they did not have a resident on their service to take the initiative of using the new color stratified hand-off.

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 8 9 10

8, very satisfied. Resident involvement improved dramatically after the first focus group and didactic session when the residents were given the opportunity to add what they felt was important to the newly developed hand-offs. C-Suite support enabled a platform for us to present our project to the attendings at a staff meeting.

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

To continue the LIFE cycle.

- L**-Learn and highlight the basic tasks associated with patient handoffs that occurs among residents by conducting a thorough evaluation of the ongoing handoff process for each new incoming resident
- I**-Identify opportunities for miscommunication and perform a root cause analysis as participants share their handoff experiences through focus groups quarterly.
- F**- Formulate and implement revisions to the handoffs by assessing the residents experience with the tool.
- E**-Evaluate and monitor the initiative for optimum effectiveness

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

1. Efficiency of residents identifying high risk patients to be seen on call
2. Increased resident involvement in this project after they had been involved in formulating the color stratified hand-off template

## Sign-Out Survey

**The purpose of this survey is to assess the current perception of the resident sign-out system and obtain suggestions/information as to how the sign-out process can be improved. Your answers will be kept confidential. Please do not write your name on this survey.**

Please check the appropriate boxes below.

Question	Always	Sometimes	Rarely	Never
Do you believe that the current sign-out process is efficient?				
Do you believe that the current sign-out process is complete?				
Do you believe that you receive enough information during sign-out to adequately care for patients overnight?				
How often do you feel rushed during sign-out?				
Do you believe that tests/labs/studies are followed-up on at night?				
How often do you have a clear idea of what you need to accomplish for the patients overnight?				
How often does a question arise about a patient that you are unable to answer, due to inadequate sign-out?				

Question	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
The patient list has an adequate amount of patient information.					
The patient list could be improved.					
Issues arise overnight (e.g., missed lab/study results, change in patient's status, etc.) that are directly attributable to inadequate sign out.					

### COMMENTS

What features would you like to see on the patient list?

How could the sign out process be improved?

# Prioritizing:

## RED

- INR
  - Indicate goal INR range
  - holding parameters
  - Recent change in coumadin
- Critical lab
- Follow up on an acutely ill patient

## YELLOW

- Routine Labs: CBC, CMP, U/A
- Radiology Follow up
  - Indicate reason for ordering study, what previous/baseline image had shown if available

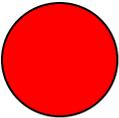
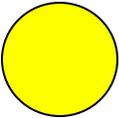
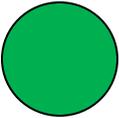
## GREEN

- General medical checks
- Friday admissions that have to be seen by attending/resident

# SIGN OUT

Date: \_\_\_\_\_ Pending Admissions -

Service/Unit: \_\_\_\_\_ -

COLOR	Patient STICKER	Diagnosis	Active Issues/ TO DO LIST:
			Sat
			Sun
			Sat
			Sun
			Sat
			Sun
			Sat
			Sun
			Sat
			Sun

# Adding LIFE to Hand-offs: A Pilot Patient Safety Initiative at an Acute Inpatient Rehabilitation Hospital

Fariba Emamhosseini, M.D., Cynthia G. Pineda M.D., Curtis L. Whitehair M.D.

National Rehabilitation Hospital, Washington, DC

## Introduction

The GUH-NRH PM&R Residency Training Program strives to fulfill the NRH's mission of Adding Life to Years®, enhancing the quality of life of persons with injuries and disabling illness so that they can achieve the highest possible level of independence and function. "Adding LIFE to Hand-offs" is a pilot patient safety initiative that seeks to bridge education, scholarship, teaching and technology to improve patient care through innovations in graduate medical education.

## Statement of Problem

Effective hand-off communication among clinicians has been shown to decrease medical error. There is mounting evidence that poor hand-offs may result in morbidity and mortality in patients. Our primary institution has no standardized hand-off template that prioritizes patients to be seen in order of severity.

## Objectives of Intervention

To develop and implement a novel quality improvement initiative, the "LIFE CYCLE," to improve and standardize the weekend hand-off system using a color-coded hand-off template to prioritize patients (Figure 1).

Figure 1

**SIGN OUT**

Date: \_\_\_\_\_ Pending Admissions: \_\_\_\_\_  
Service Unit: \_\_\_\_\_

COLOR	Patient STICKER	Diagnosis	Active Issues / TO DO LIST:
Red			Sat Sun
Yellow			Sat Sun
Green			Sat Sun
			Sat Sun
			Sat Sun

**RED**

- INR
  - Indicate goal INR range
  - holding parameters
  - Recent change in Coumadin
- Critical lab
- Follow up on an acutely ill patient

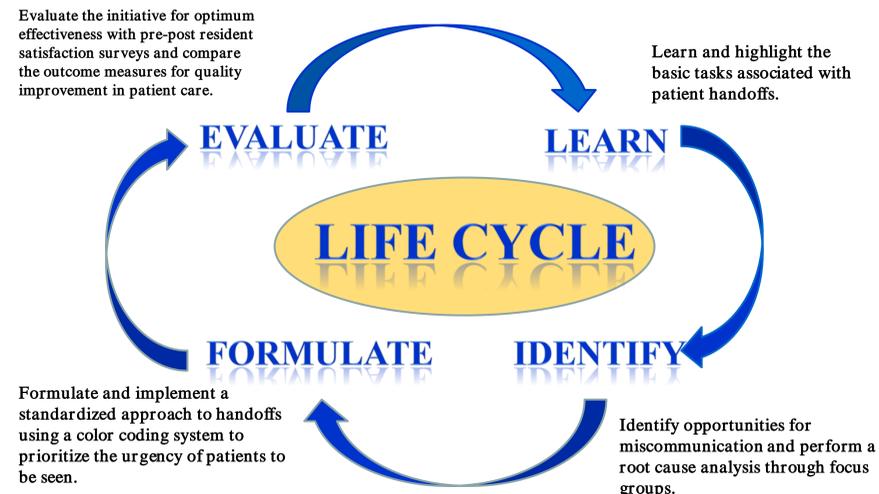
**YELLOW**

- Routine Labs: CBC, CMP, U/A
- Radiology Follow up
  - Indicate reason for ordering study, what previous/baseline image had shown if available

**GREEN**

- General medical checks
- Friday admissions that have to be seen by attending/resident

## Description



## Results / Findings to Date

Paired pre-post sign out survey was utilized. Statistically significant improvement were noted in these categories: (1) Residents overnight: having a clear idea of what they need to accomplish; (2) issues no longer arising that are directly attributable to an inadequate sign-out ( $p=0.05$ , Stuart Maxwell-Test). There was a slight improvement in the residents' perception of the new hand-off system being efficient and complete ( $p=0.06$ ). Analysis of pre-intervention data (9/2009-12/2009) and post-intervention data (9/2010-12/2010), stratified per inpatient hospital unit (2E, 2W, 3E), and patient demographics; age, sex and rehabilitation diagnosis (Table 1). Overall, there was no statistically significant difference in number of acute care transfers. However, in one unit (2W), there was a statistically significant decrease in acute care transfers ( $p=0.05$ , Pearson Chi Square) (Figure 2). There was a statistically significant decrease in rapid response rates ( $p=0.05$ , Fisher's exact test) (Figure 3). There was no significant decrease in number of codes and length of stay.

Table 1

	2009	2010
Mean Age	61	59
Standard Deviation (Age)	16	16
Length of Stay 2E (# days)	15	14
Standard Deviation 2E	8	8
Length of Stay 2W (# days)	14	16
Standard Deviation 2W	9	16
Length of Stay 3E (# days)	22	20
Standard Deviation 3E	21	17

Figure 2

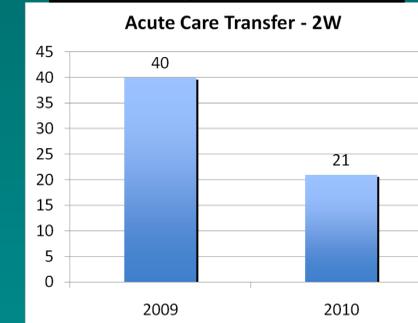
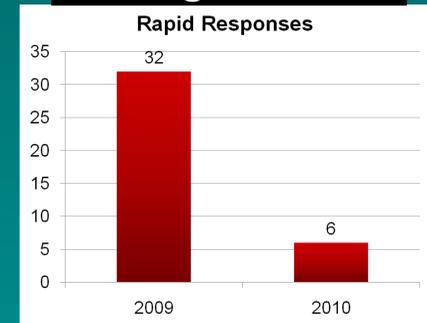


Figure 3



## Key Lessons Learned

- To narrow the scope of a quality improvement project early
- Organize a focus group to listen and adjust project to include what is important to each participant, this will improve overall participation and enthusiasm in the project

## Next Steps

Incorporate color-coding prioritization of patients in electronic format to facilitate hand-offs and evaluate the outcomes over a longer period of time

Hospital: Ochsner Health System (OHS)/Ochsner Medical Center (OMC)

Team Leader: Ronald Amedee, M.D.

**I. PROJECT TITLE/NAME:** Improving the transition of care in patients transferred through the Ochsner Medical Center Transfer Center.

**II. BRIEF DESCRIPTION:** Patient transfers from other hospitals within the OHS to our main campus (Ochsner Medical Center) are currently coordinated utilizing a Transfer Center which was established in the fall of 2009. Annual transfers in 2010 handled by the Transfer Center numbered 3,116 as compared with 2008 data prior to utilization of the transfer center which reflected 1,040 transfers. In addition to the eight hospitals within our healthcare system, on an average month in 2010, the transfer center was accepting transfers from greater than 30 institutions in the region. Laboratory and imaging studies needed to provide continuity or initiate specialty care are frequently obtained upon arrival to the main campus, sometimes equating to lengthy delays in obtaining results which may also result in delayed treatment. Many of these studies could/should be obtained at the facility initiating the transfer. The current process for transfers to the main campus facility as coordinated by the Transfer Center will be analyzed in detail as we look for distinct opportunities to enhance the overall transition of patient care. This study was conducted with the approval of the Ochsner Clinic Foundation Institutional Review Board (No. 2010.168.A).

**III. OPPORTUNITY STATEMENT:** Improve the transition of care in patient transfers arranged through the OMC Transfer Center by March 2011.

**IV. RESEARCH QUESTION:**

1. Does standardization of incoming data (labs, x-rays, etc...) from hospitals (ED's) within the Ochsner Health System which are arranged through the Transfer Center lead to a more efficient/timely/safe transition of care?

2. Is it possible to eliminate the number of hand-offs involved in such transitions of care?

**V. HYPOTHESIS:**

1. Standardization of incoming data regarding the patient transfers from hospitals within the Ochsner Health System leads to a more efficient/timely/safe transition of care as compared to current practice.

**VI. MEASURES:** Since beginning operations about eighteen months ago, our Transfer Center has been utilizing a worksheet in an effort to coordinate transitions of care to our main campus facility. This document is rather basic and contains standard information regarding patient demographics, transferring hospital, referring physician/specialty, accepting physician at our institution, the primary and co-morbid medical diagnoses, patient special-needs, and finally the mode of transportation. We have attempted to review these worksheets retrospectively in light of the fact that in many instances the status of the patient accepted versus the status of the patient that arrives at our facility are far different. This problem is secondary to numerous factors. However, it appears that the most pertinent of these involves a delay from the time of acceptance to the time of arrival at our facility. Unfortunately, there is no current mechanism to update a patient's status while in the process of transfer. This has resulted in a less than efficient transition of care and it appears that the brunt of the patient issues have been borne primarily by our nocturnalist and the internal medicine residents on call. Although we have over 700 physicians at our main campus, we have only 2 of these specialists that have been interviewed regarding specific instances where inefficiencies in transfer have occurred. Retrospectively, the old worksheets for these patients have also been pulled and reviewed. As a result, a new Transfer Center worksheet was created which offered expanded information regarding the specific clinical situation. This process included an opportunity for updating of patient's status at 2 hour intervals and just prior to transfer to our facility. This worksheet became operational in January of 2011. Prospectively, we assessed the impact that this additional information had on the transition of care to this facility.

**VII. INSTRUMENTS:** As detailed above, we are comparing an existing but inadequate transfer worksheet to a new one that was implemented in January 2011. It is hopeful that the new information contained in this instrument will lead to a more efficient/timely/safe transition of care to this facility. A literature search was been conducted in an effort to identify existing survey instruments which have been validated. Unfortunately, none have been found making the validation of our new survey instrument all the more important.

**VIII. BASELINE DATA COLLECTED:** A questionnaire was created with the assistance of our institutional statistician which was forwarded to our two nocturnalists and residents assigned to their hospital service with the expectation that they would be completed for every new patient received on service for the prior

24 hours as arranged through the institution's Transfer Center. This Faculty/Resident questionnaire included five questions which assess the following:

1. Was the patient information provided in anticipation of receiving a new patient via the Transfer Center allowing me to be better prepared to take care of them?
2. Was the patient information provided in anticipation of receiving a new patient via the Transfer Center satisfactory/useful to me?
3. Was the patient information provided in anticipation of receiving a new patient via the Transfer Center allowing for a more efficient transfer of care?
4. Was the patient information provided in anticipation of receiving a new patient via the Transfer Center allowing for a safe transition of care to the service/institution?
5. Was the patient information provided in anticipation of receiving a new patient via the Transfer Center reflecting an accurate assessment of the patient once they arrived on service/at this institution?

Each question was graded on a five point scale with a 1 representing disagreement, a number 3 representing a neutral position, and a number 5 representing a strong agreement. A comments box was also included in this questionnaire which allowed for the physician to comment on how the current transfer process might be improved to enhance the transition of care along with an assessment of the quality of safety of care provided. Twenty of these completed questionnaires were forwarded to our statistician for analysis to first assess the statistical validity of the questionnaire and to identify emerging trends. These emerging trends were incorporated as part of our baseline data which largely reflected a lack of detailed, accurate, and timely updates of patient information which impeded a safe transition of care. This was in large part due to the fact that the current Transfer Center document incorporates rather basic and standard information regarding patient demographics, transferring hospital, referring physician/specialty, accepting physician at our institution, the primary and co-morbid medical diagnoses, patient special needs, and finally the mode of transportation. An additional large portion of negative responses to this questionnaire highlighted the fact that many hospital to hospital transfers are occurring between 7pm and 12 midnight on Fridays. All of these transfers had physically taken place on average prior to noon on Friday. Again, we noted a delay from the time of acceptance to the time of arrival at our facility which was further impacted by the fact that Friday evenings tend to be the busiest time for the Transfer Center and our ED. This latter point actually required no further analysis and is currently in the process of being addressed by the accepting physicians, the transferring institutions, and the Transfer Center. During the NI II Minneapolis meeting, a more comprehensive document was created which we began to utilize in January 2011. During February 2011, additional questionnaires were collected from our providers regarding the transfer of care as arranged by our transfer center and while utilizing this document.

**IX. INTERVENTION:** Describe your specific intervention, and the time period in which the intervention was conducted.

The Faculty/Resident questionnaire was implemented in mid-May of 2010 to July 1, 2010. This represented our baseline data. The baseline data represented a few 3 scores (neutral position) on the faculty/resident questionnaire, while the majority of the responses were (1-2) representing disagreement with an efficient/timely/safe transition of care.

As a result of these findings, the team met with the leaders and staff of the Transfer Center in an attempt to problem solve and introduce a new Transfer Center worksheet that would incorporate more meaningful data. At the same time, the institution recognized the growing presence of the transfer center and attempted to seize an opportunity for improving the efficiency/safety of healthcare delivery. To this end, a three-day kaizen event was held and attended by multiple stakeholders in our health care system, ranging from nursing personnel in the Transfer Center to nursing leadership from the c-suite.

Initially, there was no intent to involve physician participation in this process. However, representation from the NI II physician team was invited to participate, which helped to facilitate better understanding of potential interventions on physician workflow. A new process was created for transfers to OMC being coordinated through the Transfer Center. The most important of these was the creation of a four-way call at the time a transfer is initiated which includes the outside transferring physician, the admitting staff physician at Ochsner, the resident on-call, and the nurse in the transfer center. These calls are recorded to ensure our compliance with EMTALA. During these calls, the resident physician is also allowed to ask the transferring physician for additional clinical information in an effort to create a body of information

that can be included on the Transfer Center worksheet and discussed during the resident hand-off process.

Information gathered by the resident on the call facilitates the creation of a transition order set which is delivered to the floor within one hour of patient arrival. The transition order set was a critical part of the kaizen event outcome for the institution, while the remainder of the process overlapped with the specific needs of our study. Therefore, complimentary goals were recognized which otherwise may not have been achieved individually.

**X. POST-INTERVENTION DATA:** What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

The principal group affected was Internal Medicine Residents and Nocturnalists who were receiving patient transfers as coordinated by the Transfer Center. This group was resurveyed using the 5 item questionnaire and the results were compared to baseline data previously collected as reflected in IX above. As these questionnaires were collected, subjectively it was the impression of the NI II team at Ochsner that a positive change in the process was certainly going to be reflected in the results of the post-intervention questionnaires. Even though a Transfer Center worksheet was not completely executed in every transfer, the objective scores primarily reflected a positive trend based upon resident involvement at the time of the transfer call. In other words, the residents were receiving real time data regarding the status of the patients being considered for transfer. This afforded them an opportunity to better prioritize patient needs at the time of arrival, consider new/updated laboratory and imaging studies, resulting in a time savings of on an average two to six hours per patient. As a result of the time savings clinical decision-making was expedited.

**XI. TYPE OF ANALYSIS:** Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

The overall outcome score was defined as the average of questions one through five on the questionnaire. The two groups, pre- and post-intervention, were independent.

The following were found:

Group	N	Average Score	Standard Dev	Min	Max
Pre	22	1.8	.46	1	1.2
Post	23	3.7	1.01	2.8	5.0

A t-test was done to determine that there was a significant difference in the average scores between the pre group and the post group ( $p < .0001$ ).

**XII. DID YOU COLLECT ADDITIONAL DATA?** For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

As a result of the data collected in this study, the internal medicine department including hospitalists, nocturnists, and residents participated in a continuous improvement project whose results have yielded a template for how transitions of care can best be handled through the transfer center system-wide.

**XIII. SUCCESS FACTORS:** What were the 3 greatest factors that led to your project's success?

1. As learned through the kaizen event, institutional goals were discovered to be parallel to the goals of the NI II project.
2. By including residents in the transfer calls, data was collected which facilitated fewer and higher quality hand-offs.
3. Increased awareness of the value of resident participation in institutional quality improvement projects, not only as a spokesperson for their peers, but also from a staff physician perspective, as being essential to providing quality patient care that is safe, timely, and realistic.

**XIV. BARRIERS:** What were the 3 greatest challenges you encountered?

1. Inability to standardize incoming data as evidenced by frequently incomplete data transmission on the Transfer Center worksheet.

2. Lack of communication following the kaizen event resulting in a delay in initiation of the intervention.
3. Inability to collect in a timely fashion completed faculty/resident questionnaires.

**XV. LESSONS LEARNED:** What single most important piece of advice would you give to another leader embarking on a similar initiative?

The single most important piece of advice would be to involve at the outset of the project more participation throughout various levels of the organization. Additionally, in this particular project, a nurse or practitioner champion in the Transfer Center at the outset of this project would have ensured more complete data collection.

**XVI. UNINTENDED CONSEQUENCES:** Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: Real-time information being transmitted to the principles involved in transitions of care arranged by the Transfer Center which also resulted in less hand-offs having improved quality. Additionally, as a result of completing the transition order set, more timely laboratory results are available for initial patient evaluation where previous delays of care existed.
2. Negative Unintended Consequences: There were no negative patient outcomes in this process.

**XVII. EXPECTATIONS VERSUS RESULTS:** On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 (3) 4 5 6 7 8 9 10

**XVIII. SATISFACTION:** On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 (8) 9 10

**XIX. NEXT STEPS:** Describe next steps for your project, including plans for sustaining and spreading the changes made. To utilize what was learned in NI II at Ochsner to assess: 1. Patient outcomes; 2. The need for higher levels of care upon arrival to the institution; 3. The amount of time involved to complete transfers; 4. Patient, staff physician, and resident satisfaction scores as a result of the new process; 5. Determining if patient safety was actually improved.

**XX. PROJECT IMPACT:** What changes have you observed in your residency program, or at your institution, based upon this project?

Opening of the Transfer Center created a great deal of stress among members of the internal medicine residency at Ochsner. These stresses were best exemplified by the frequent arrival of unstable patients, the transmission of poor information regarding patient status, and lack of communication within the team as to next steps in the evaluation and treatment of patients who arrived via the Transfer Center. Often the exact reason for a transfer to the main campus facility was not readily evident. Residents frequently assumed the care of patients that they were not comfortable in treating. These specific issues frequently led to treatment delays due to lack of the ability to adequately prioritize the patients being received.

At the completion of the NI II project at Ochsner, resident morale has been observed to be much improved. The residents are now recognized for their importance as a participant in the transfer of patients to the facility. As a result of being involved in the transfer call, residents are more comfortable in helping to assume the care of these patients upon arrival.



# IMPROVING THE TRANSITION OF CARE IN PATIENTS TRANSFERRED THROUGH THE OCHSNER MEDICAL CENTER TRANSFER CENTER



Genevieve Maronge, MD, Ronald G. Amedee, MD, William W. Pinsky, MD,  
Ochsner Health System/The University of Queensland School of Medicine, Ochsner Clinical School,  
New Orleans, Louisiana and Brisbane, Australia

## Introduction

Patient transfers from other hospitals within the OHS to our main campus (Ochsner Medical Center) are currently coordinated utilizing a Transfer Center which was established in the fall of 2009. Annual transfers in 2010 handled by the Transfer Center numbered 3,116 as compared with 2008 data prior to utilization of the Transfer Center which reflected 1,040 transfers. In addition to the eight hospitals within our healthcare system, on an average month in 2010, the transfer center was accepting transfers from greater than 30 institutions in the region.

## Statement of Problem

Laboratory and imaging studies needed to provide continuity or initiate specialty care are frequently obtained upon arrival to the main campus, sometimes equating to lengthy delays in obtaining results which may also result in delayed treatment. Many of these studies could/should be obtained at the facility initiating the transfer. The current process for transfers to the main campus facility as coordinated by the Transfer Center will be analyzed in detail as we look for distinct opportunities to enhance the overall transition of patient care. This study was conducted with the approval of the Ochsner Clinic Foundation Institutional Review Board (No. 2010.168.A).

## Objective of Intervention

1. Does standardization of incoming data (labs, x-rays, etc...) from hospitals within the Ochsner Health System which are arranged through the Transfer Center lead to a more efficient/timely/safe transition of care?
2. Is it possible to eliminate the number of hand-offs involved in such transitions of care.

## Description

The primary group affected by transfers was identified as IM residents and nocturnists. The group was surveyed on satisfaction of transfers for safety, efficiency, and usefulness of information provided. A Transfer Center worksheet to be filled out by the nurse on every accepted patient was used. The transfer process changed when an accepting resident was included on the call at the time of the initial contact. A kaizen event occurred where complimentary goals for the institution and members of the NI II team were recognized. The group affected was resurveyed to evaluate improvement in the process.

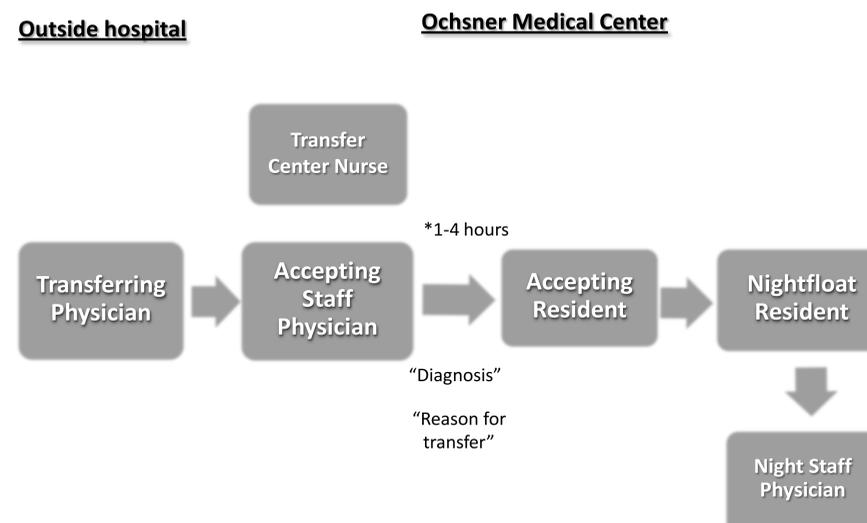
## Results / Findings to Date

The overall outcome score was defined as the average of questions one through five on the questionnaire. The two groups, pre- and post-intervention, were independent. The following were found:

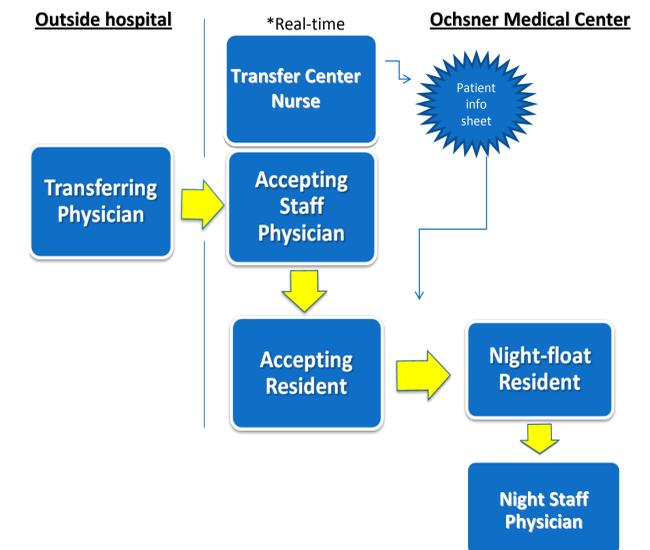
Pre	22	1.8	.46	1	1.2
Post	23	3.7	1.01	2.8	5.0

A t-test was done to determine that there was a significant difference in the average scores between the pre group and the post group (p<.0001)

## Figure 1 – Pre-intervention



## Figure 2 – Post-intervention



## Key Lessons Learned

1. As learned through the kaizen event, institutional goals were discovered to be parallel to the goals of the NI II project.
2. By including residents in the transfer calls, data was collected which facilitated fewer and higher quality hand-offs performed in less time.
3. There was an increased awareness of the value of resident participation in institutional quality improvement projects, not only as a spokesperson for their peers, but also from a staff physician perspective, as being essential to providing quality patient care that is safe, timely, and realistic.

## Next Steps

Use what we learned in NI II to assess patient outcomes/satisfaction, and effect on transfer times.

**Hospital: Reading Hospital and Medical Center**

**Team Leader: Anup Subedee MD (PGY3)**

I. PROJECT TITLE/NAME: Early IV to PO Conversion of Azithromycin Therapy in Community Acquired Pneumonia
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) Many patients admitted with community acquired pneumonia (CAP) continue to receive IV antibiotics longer than necessary. Earlier conversion from IV to PO route increases patient safety and comfort, reduces cost, and facilitates earlier discharge
III. OPPORTUNITY STATEMENT: The organization recently implemented an antibiotic stewardship program as well as a multidisciplinary committee to optimize care of pneumonia patients. In addition, the organization recently purchased a software product allowing collection of real time inpatient pharmacy and laboratory data. Utilization of this software has not yet been incorporated into standard surveillance practice within pharmacy. The current QI project can support the antibiotic stewardship team, pneumonia committee and pharmacy in their efforts to streamline care of the pneumonia patient.
IV. RESEARCH QUESTION: Can a system be created to speed identification of inpatients receiving intravenous azithromycin for community acquired pneumonia and speed conversion to the oral route for the medication?
V. HYPOTHESIS: 1. A system of identification and pharmacy directed antibiotic conversion will reduce time from IV to PO conversion for patients hospitalized with CAP. 2. When added to similar processes to streamline the care of CAP patients, LOS and cost will be reduced without impact on quality of patient care.
VI. MEASURES: <u>Process measures:</u> -IV to PO azithromycin conversion time; ie., time from IV to PO order for azithromycin on community acquired pneumonia (CAP) order set in physician order entry system -Length of stay for patients with community acquired pneumonia (CAP) where CAP order set was used. <u>Balance measures:</u> -Transfer to higher level of care -Death or 30 day readmission -Return to IV antibiotic therapy or broadening of antibiotic coverage
VII. INSTRUMENTS: 1. Senti-7 and Hospital Decision Support software to identify population and rapidly identify patients meeting criteria for IV to PO conversion 2. Modification in the CAP order set which gives the attending physician the option of authorizing pharmacist to automatically convert intravenous azithromycin to oral route once pre-defined criteria are met
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have. <u>Focus group meeting by resident with pharmacists to understand the flow of work in their typical work-day and their perceived gaps in the previous process of IV to PO conversion</u> <u>Estimated number of patients and baseline length of stay and time from IV to PO azithromycin conversion</u> -Average number of patients admitted with Community Acquired Pneumonia order set: 175 / 6 months = 29.16/month -Average length of stay: 5.2 days (arithmetic); 4.2 days (geometric)
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. 1. Pharmacy incorporated use of Senti7 software into their process to identify all patients with CAP receiving IV azithromycin. 2. "Radio buttons" added to CAP physician order set to allow pharmacy to automatically convert to po azithromycin for non-ICU adult patients receiving other oral medication and diet. (PO diet/enteral nutrition and/or other PO medications) 3. Tracking and individual education of admitting physicians regarding equivalence of IV and oral azithromycin and other potential barriers to conversion.

X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

Data were collected for each biweekly period after the intervention was made.

1. Number of patients admitted under the hospitalist service and internal medicine residency teaching service for whom CAP order set was used and who are receiving IV azithromycin – approximately 50/month
2. Among patients in #1, number of patients for whom the physician pre-authorized pharmacist to make automatic conversion from iv to po azithromycin - 71% converted by pharmacist from IV to PO azithromycin
3. In patients in #2,
  - time from first iv azithromycin order to first po azithromycin order (or DC IV) – reduction >50 to 36 hrs
  - length of stay
  - percentage of patients who needed to be transferred to a higher level of care after iv to po conversion of azithromycin was made – chart review pending
  - percentage of patients who died or were readmitted within 30 days - none
  - percentage of patients who required return to intravenous antibiotic therapy or broadening of antibiotic coverage patients in #2 as a percentage of patients in #1 – chart review ending

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

We conducted run chart analysis of biweekly data collected as explained above.

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

We are still in the process of collecting more data. We are attempting to collect more data for cost analysis including cost of hospital stay per day, cost of azithromycin iv formulation and oral pills, cost of iv tubing, nursing time per hour and average cost and average reimbursement for patients with community acquired pneumonia. We plan to collect more data later regarding the eligibility of patients with CAP for discharge and the percentage of those eligible patients who are discharged within 12 hours of meeting the criteria for discharge, as well as data regarding patients who are on different iv antibiotic regimens / combinations for CAP and are felt by physicians to be requiring transition to po antibiotics other than azithromycin.

Information is also being collected on resident understanding of the QI processes including how to write an Aim statement, define appropriate Change activities and Measures for change, as well as the concept of PDSA cycles. In addition, residents' leadership skills are also being evaluated using standardized check lists.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Commitment of pharmacy, QI, and IT stakeholders
2. Large enough resident team to continue the project when some were away or on challenging rotations.
3. Ensuring support and approval from the hospital leadership and the different committees overseeing patient care policies such as the pneumonia committee, clinical improvement group, etc.

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. presence of and use of different data extraction tools and electronic systems, that are often incompatible with each other, by different stakeholders (pharmacy / QI / IT) for the same purpose, that resulted in delay and a lot of manual work in ascertaining that data collected through different methods are compatible with each other
2. the prevalent fear in different strata of the healthcare community, among physicians and people in various committees, that pharmacists may not be appropriately equipped with the knowledge and

skills needed to determine the appropriate time or the choice of antibiotic to convert iv antibiotics to oral route, and patients might therefore inappropriately and prematurely be converted to po azithromycin

3. the complexity of issues surrounding the choice of IV and PO antibiotic regimens for patients with CAP, the wide variability of the regimens available and physicians' preferences and comfort levels with particular regimens

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

1. Ensuring early support from different stakeholders and the leadership is important for a QI project to succeed.
2. Designing the project from early on in such a way that manual data retrieval is avoided as much as possible ensures that residents are more open and active in a resident-run QI project

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences:
2. Negative Unintended Consequences:
  - discovery of inconsistent measures collected from different software systems within the organization
  - because there were several upper year residents involved in the project, there were sometimes issues deciding who was in charge at any given time

We are still in the process of collecting data after our first intervention, and have not yet noticed significant positive or negative unintended consequences so far. We hope that if our project is successful, we will get more support across the system in our hospital for the antibiotic stewardship program that is being rolled out in a few months as well as for early pharmacy-driven iv to po conversion of medications other than antibiotics. Also, there will be more confidence in the use of Sentri-7 to implement changes in the system by obtaining real time data from it.

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 **6** 7 8 9 10

Our project is still underway. Based on the run chart analysis of data available so far, we are achieving what we had hoped to accomplish at the beginning by now.

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 **7** 8 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

1. Continue collecting data to understand if our first intervention is making a sustained impact, and how it can be made more effective
2. Reach a broad consensus with different stakeholders' in the hospital regarding the eligibility criteria for discharge from the hospital for CAP patients and how to facilitate physicians earlier discharge in those patients who meet such criteria
3. Reach a consensus with different stakeholders groups regarding switch therapy to other oral antibiotic regimens for subgroups of patients with CAP, who have a medical history that would favor an antibiotic with a broader antimicrobial spectrum.
4. Identify other areas/illnesses within the antibiotic stewardship process where a similar approach can be utilized

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

More willingness to work together with the QI team in implementing new changes because what is asked of other residents (not involved in this project) is minimal, e.g. they were not asked to fill up huge questionnaires or go out of their way in their day-to-day practice in order to help our QI project



# EARLY IV TO PO CONVERSION OF AZITHROMYCIN THERAPY IN COMMUNITY ACQUIRED PNEUMONIA



Anup Subedee MD, Archana Chaudhary MD, Rebecca Cofsky, Andrew Crocker DO, Julian Diaz Fraga MD, Renee Dutt, Gurav Gulati MD, Shuchi Gulati MD, Paula Heisler, Diane Hertzog, Lori Kunkel, Joan Mege, David George MD

## Introduction

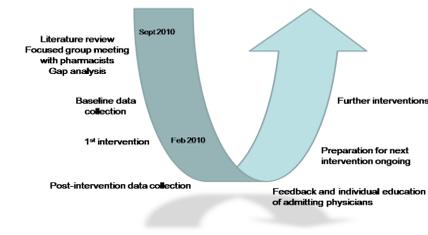
- Many patients admitted with community-acquired pneumonia (CAP) continue to receive IV antibiotics longer than necessary.
- Early and effective conversion from IV to PO route increases patient safety and comfort, reduces cost, and facilitates earlier discharge without compromising medical care.

Kuti et al *Am J Health Syst Pharm* 2002; 59(22):2209-15  
Fischer et al *Arch Intern Med* 2003 Nov; 163(21):2585-9

## Measures

- Process measures:
- IV to PO azithromycin conversion time
  - Length of stay for patients with CAP
- Balance measures:
- Transfer to higher level of care
  - Death or readmission within 30 days
  - Return to IV antibiotic therapy or broadening of antibiotic coverage after IV to PO conversion

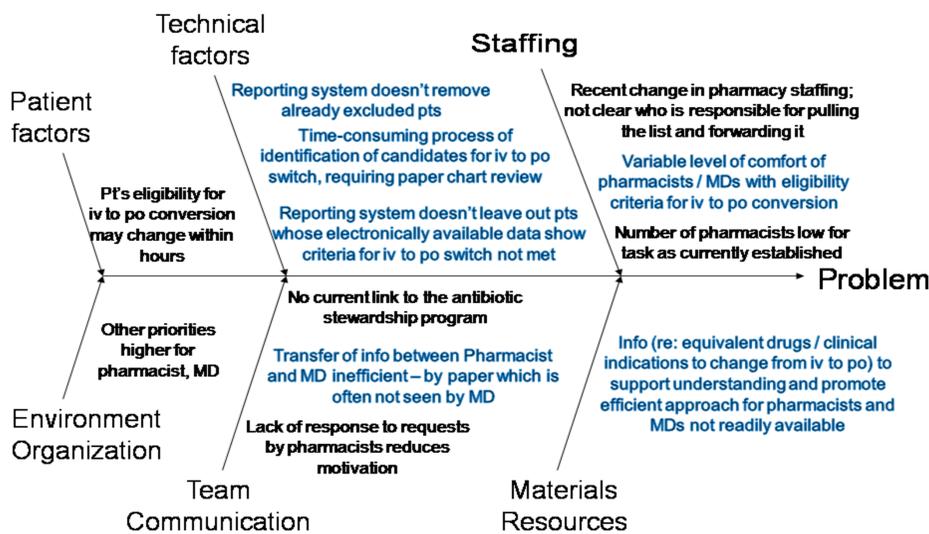
## PDSA Cycles



## Key Lessons Learned

- Pharmacy can apply real time software to efficiently identify CAP patients eligible for IV to PO azithromycin conversion
- Admitting physicians readily accept CAP order set modification, allowing pharmacist to make conversion
- The process created appears to reduce time from IV to PO conversion and may be used as a model for other projects
- Support from stakeholders critical for QI project success (Pneumonia Committee and Antibiotic Stewardship Program)
- Minimizing manual data collection improves resident perception of QI process

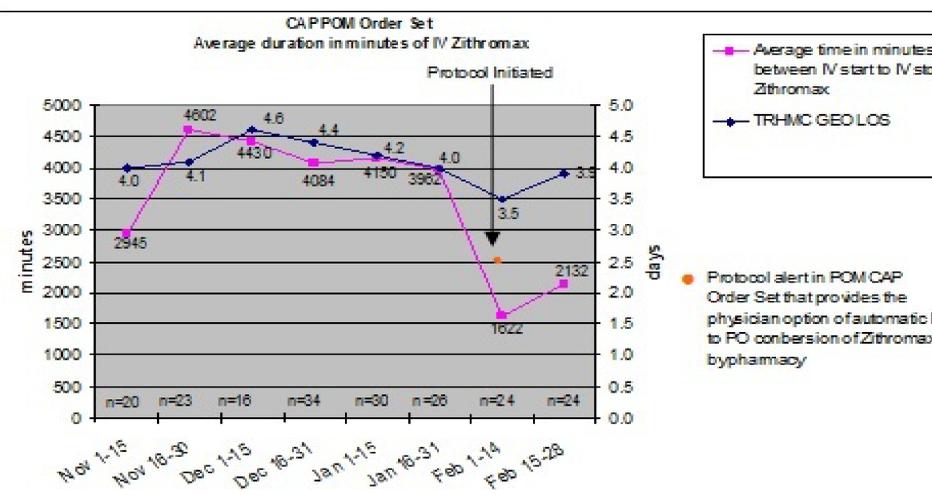
## Fishbone Analysis



## Intervention

- Pharmacy incorporated use of Sentry 7 software into their process to identify all patients with CAP receiving IV azithromycin
- “Radio buttons” added to electronic CAP physician order set to allow pharmacy to automatically convert to po azithromycin for non-ICU adult patients receiving other oral medications and diet
- Tracking and individual education of admitting physicians regarding equivalence of IV and oral azithromycin and other potential barriers to conversion

## Run Chart



## Aim Statement

To decrease the time from IV to PO conversion of azithromycin therapy for the treatment of CAP in hospitalized patients by 20% over a 3-month period

## Next Steps

- Follow measures for IV to PO azithromycin conversion over next 3 months to refine process
- Focus group meeting of residents, hospitalists and ID to address “switch” therapy and “stability for discharger” standards
- PDSA cycles defining methodology to support “switch” and “stability for discharge”
- Extension of current process to COPD Order Set
- Identify other areas within antibiotic stewardship program where similar approach can be utilized

**Hospital:** Riverside Methodist Hospital

**Team Leader:** Sheila Faryman MD

I. PROJECT TITLE/NAME: Improving Communication and Transition Between Acute Care and Long term Care
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) This study will evaluate if a discharge communication tool will decrease the rate of readmission and impact patient satisfaction and care, reduce medical errors, and improve admitting physician satisfaction with the process. A communication tool will be developed by the study team based upon surveys and face to face interviews with long term care facility (LTCF) medical directors and directors of nursing. This tool will be used by the Riverside Methodist Hospital Clinical Medicine and Family Practice inpatient teams when discharging patients to LTCFs over a year's time. Readmission occurrences will be monitored and compared to readmission occurrences and rates in recent years. A follow up survey will also be done with the LTCFs medical directors and directors of nursing. Results that would support the hypothesis would be a decrease in readmission rates or occurrences and increased satisfaction amongst patients, patients' families, and LTCF faculty and staff as based upon a follow up survey.
III. OPPORTUNITY STATEMENT: We propose to improve the discharge documentation tool currently in use in our hospital.
IV. RESEARCH QUESTION: Will better communication between the physicians in the acute care setting and the physicians and staff in the long term care setting improve patient satisfaction, long term care staff satisfaction and decrease the re-admission rate?
V. HYPOTHESIS: Improved written and verbal communication between the hospital and long term care facilities will improve satisfaction of patients, LTC facility staff and result in a significant reduction of re-admissions of the patients.
VI. MEASURES: 1-Administer a satisfaction survey to long term care medical directors and directors of nursing before instituting the revised discharge communication tool. 2-After utilizing the tool for 12 months, re-administer the satisfaction tool to the same directors. 3-Compare the readmission rate during the 12 months usage of the revised discharge tool to the 12 months before institution of the new tool to see if a significant reduction in re-admissions can be demonstrated. The surveys were developed from scratch by our team.
VII. INSTRUMENTS: Satisfaction survey (attached); re-admission tracking log
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.  Data collected from May 2009 to October 2009 included admission diagnoses, facility the patient was discharged to, whether they were re-admitted to Riverside within 31 days after discharge and significant co-morbidities
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted.  Incorporate into the electronic discharge instructions the information requested by the Medical Directors and Directors of Nursing from the long term care facilities. Information included code status, dietary recommendations, need for foley and whether it could be removed; other data was also included at their request. We also requested a direct RN to RN verbal checkout from the hospital to the facility nurse; previously this was a paper process and did not allow for questions to be addressed real time. This requested information was included in discharge communication instructions from May 2010 to October 2010.
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.  Data collected from May 2010 to October 2010 includes admission diagnoses, Facility the patient was discharged to, whether they were re-admitted to Riverside within 31 days after discharge and significant co-morbidities

<p>XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type) Interval (interpretation of the change in satisfaction using a Likert scale) and Ratio (change in re-admission rate compared to previous 6 month period year prior)</p>
<p>XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:</p> <p>We are tracing the impact of direct RN to RN handoff (via phone conversation) to see if there was any change to process in the units work load as well as satisfaction by the receiving facility.</p>
<p>XIII. SUCCESS FACTORS: It is hard to pinpoint success factors since we did not obtain our original goals. The AIAMC and participating institutions were helpful in giving us ideas to rectify our problems.</p>
<p>XIV. BARRIERS: The three greatest challenges that we encountered were getting resident involvement, obtaining accurate pre-intervention data, and data collection itself.</p>
<p>XV. LESSONS LEARNED: We needed to cross our t's and dot our i's. We should have been more diligent about resident education and collecting the data. Gentle reminders would have been useful in reminding the residents about study. Had we attempted to collect pre-intervention prior to starting this study we might have chosen a different project all together (as we would have realized the pre-intervention data was not accurately collected).</p> <p>Our study seemed to show that the medical directors' requested information did not reduce the readmission rates. We also learned that resident compliance should not be taken for granted. Readmission measurement at our hospital needs improvement.</p>
<p>XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.</p> <p>1. Positive Unintended Consequences: We have discovered a need for better tracking of hospitalizations for patients admitted to the teaching services at our hospital. The information that we gained from our study was presented to hospital executives in order to move forward with the tracking.</p> <p>2. Negative Unintended Consequences: Our tool did not seem to reduce readmission rates as compared to the national average.</p>
<p>XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish? 1 2 3 4 5 6 7 8 9 10</p> <p>At best we give ourselves a 5. The reason is that we were unable to collect pre-intervention data correctly. This means that half of our needed data was not accurate.</p>
<p>XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project? 1 2 3 4 5 6 7 8 9 10</p> <p>Our satisfaction is a 7. We were able to use this study to help rectify a problem with patient hospitalization tracking which is very important to the hospital system as a whole.</p>
<p>XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made. We will continue to include the discharge instruction information requested by the nursing facilities. Even though it did not seem to impact the re-admission rate, it was felt to be information that was important to pass on to the receiving physicians and nurses at the LTCF.</p>

WHAT CHANGES HAVE YOU OBSERVED IN YOUR PROGRAM, OR AT YOUR INSTITUTION, BASED ON YOUR PROJECT? There have not been any changes in the residency programs specifically. However, system changes will likely take place. Specifically, the reporting of readmissions at our hospital is not accurate. Quality Control will need to be involved going forward.

# Improving Communication and Transition Between Acute Care and Long Term Care

Sheila Faryman, MD and Mark Taylor, MD  
Riverside Methodist Hospital  
Columbus, Ohio

## Introduction

Unnecessary readmissions to the acute care setting create an undue burden on the health care system by consuming resources and causing frustration to patients, families, and medical care providers. Some of the challenges include the complexity of medical conditions and the high number of comorbid conditions that exist. Inadequate communication between the hospital and receiving facility has been demonstrated by prior studies to contribute to this readmission phenomenon.

## Statement of Problem

Prior studies (Murtaugh, et al.) have demonstrated that a sizeable number of elderly patients (up to 23%) that are discharged to a long term care facility had subsequent health care usage (i.e. readmitted to the acute setting within 31 days). Inadequate communication between the hospital and receiving facility has been demonstrated by prior studies to contribute to this readmission phenomenon. A study by McNabney, Anderson, and Bennett (2002) showed that hospital readmission and unexpected death were less likely when the transition plan was reviewed and revised within the first 2 days after admission.

## Objectives of Intervention

1. Decrease the readmission rate of patient discharged from the teaching medicine services at our institution to skilled nursing facilities.
2. Improve the communication between our hospital teaching medicine services and the nursing home physicians and nursing staff by utilizing a standardized communication tool.
3. Reduce medical errors.
4. Improve the satisfaction of those patients being discharged to skilled nursing facilities.
5. Improve the satisfaction of the nursing facilities' physicians and nursing staff.

## Description

We surveyed the medical directors and nursing directors of the local long term nursing facilities that received a majority of the discharges from the teaching services in the prior calendar year. Based upon face to face or phone surveys, we formed a consensus template for discharge instructions. The standardized discharge communication tool would include information such as code status; specific diet; a summary of consultants and what specific issues the consultants were addressing; whether a foley catheter was present and why it was necessary; as well as warfarin dosing and INR values during the previous 5 days. The medical and nursing directors of the facilities noted that the added information would improve their knowledge of the patient's medical issues and their hospital course. Pocket cards were developed that were given to the Internal Medicine and Family Medicine residents. They were given instruction about the study and asked to include all of the information requested. The senior residents kept logs of the patients discharged to long term care facilities. We then calculated the 31 day readmission rates of those patients discharged from May of 2010 through October of 2010. The 31 day readmission rate of that time period was then compared to the readmission rate during the same time period for 2009.

## Results / Findings to Date

There were 147 patients discharged to long term care facilities from the three teaching services at our hospital over the 6 month study period. Of those patients discharged, only 36/147 had the discharge instructions completed with all of the required information. Of those 36 done correctly, 11 patients were readmitted within 31 days. That equates to a 30.6% readmission rate. There were 40 discharges that only had one item missing from the required information. The item missing was usually the consultant information or the order for hospital nursing to call with check out to the receiving nurse at the LTC facility. The 31 day readmission rate for the discharges with one deficiency was 14/40 or 35%. The combined 31 day readmission rate for no or one deficiencies was 25/76 or 32.9%.

The pre-intervention data was unable to be used in this study. Attempts to capture accurate data of patients admitted from May 2009-October 2009 resulted in lists generated by hospital admissions, informational technologies, and the study team. There was found to be a large discrepancy in the three lists and the pre-intervention data was not able to be analyzed.

Comparing our post-intervention 31 day readmission rate to the national average of 23% (Murtaugh, et al.), it was concluded that including the medical and nursing directors' requests for changes in the discharge instructions did not reduce the readmission rate. This data does not take into account patient co morbidities or the fact that they could have been readmitted to a different hospital.

Resident involvement lacked consistency based on the incomplete discharges. A survey showed 65% of the involved residents knew that the study was being performed. 62% stated that they received education about the study. However, all of the residents did receive education during formal gatherings at the beginning of each month and a pocket card outlining the required information was provided to all residents. 85% of residents stated that they received a pocket card which described the required information. 58% believed that they included all of the required information most or all of the time when, in fact, only 24% of the discharges (36/147) included all of the required information.

## Key Lessons Learned

It was determined that including the medical and nursing directors' requests for changes in the discharge instructions did not reduce the 31 day readmission rate for patients discharged from our hospital's medicine teaching services. We also learned that resident participation should not be taken for granted. Weekly reminders would have been useful to reiterate the need for compliance.

## Next Steps

Pocket card for residents

### D/C Diagnosis

1. New diagnosis
2. Past history
3. Foley diagnosis
4. Code status

### Procedures

Important or relevant studies

### Diet

Be specific – do not write "resume home Diet"

### Allergies

### Medications

Remember script for controlled substances

### Follow Up (Physicians)

PCP info – Not necessary to write for follow up with PCP - facility will arrange that at time of DC from SNF  
Specify name of specialist, what type of specialist it is, why follow up is needed, instruct to "call for an appt in x weeks"

### Additional Information

Important labs.  
Last 5 INR's and Coumadin doses  
Foley catheter care.  
Consult information  
Wound care  
Brief hospital course (<500 words – may copy & paste from electronic discharge summary)

### Instructions

### Follow up Care

Social work and PT/OT complete as usual

**BE SURE TO WRITE AN ORDER FOR NURSING TO GIVE NURSE TO NURSE CHECK OUT WITH THE FACILITY!**

## Table 1

### Audit of 2010 Discharge Instructions

Item	Number of charts	Percentage of charts
Code status included	98/147	67%
Foley catheter status	60/72	83%
Consultant information	44/120	37%
Diet instructions	138/147	94%
Hospital course	111/147	76%
Coumadin management	12/22	55%
Order for nursing to give checkout	73/147	50%
All necessary components included	36/147	24%

## Next Steps

1. Review the charts of the patients included in our study to determine what interventions could have prevented a readmission to our hospital within 31 days.
2. We will work with the hospital and systems administrators to improve the admission and discharge reporting process.

Hospital:                     Saint Barnabas Medical Center                    

Team Leader:                     Ashish D. Parikh, MD                    

I. PROJECT TITLE/NAME: Improving Patient Safety Through a Standardized Handoff Communication Tool among House Staff Teams
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) The number of patient handoffs between residents has increased dramatically since implementation of duty hour limitations. Although this may reduce errors through reduction in resident fatigue, transition of care may also lead to medical errors if the appropriate information is not properly relayed between caregivers.
III. OPPORTUNITY STATEMENT: To develop a standardized handoff tool (and process) that will lead to improved communications, better information transfer, and reduced medical errors
IV. RESEARCH QUESTION: Can the implementation of a standardized handoff tool (written sign-out) and process (verbal sign-out) improve patient care and reduce medical errors?
V. HYPOTHESIS: If residents are given a simple process and tool to use for sign-out that includes all vital information pertaining to their patients' care, this will lead to fewer omission of information and less miscommunication, leading to reduced medical errors.
VI. MEASURES: (1) Resident satisfaction with the hand-off process. (2) Resident confidence in giving/receiving proper handoffs. (3) Critical events that could have been avoided if appropriate information was exchanged during the hand-off.
VII. INSTRUMENTS: (1) Resident Surveys (2) Data on critical events before and after intervention
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have. (1) Resident Surveys: (a) Over all quality of communication during sign-out (b) efficiency of sign-outs (c) effectiveness of the sign-outs (d) affect of sign-out on patient safety (e) Ease of use of current sign-out template, (f) quality of data on current sign-out template, (g) risk of error/omissions with current sign-out template. (h) Over all quality of sign-outs given by you (i) Over all quality of sign-outs received by you  See the post intervention data for comparison to pre-intervention survey data.  (2) Data collected by night floats on critical events that occurred due to poor sign out and/or could have been avoided by better sign-out. Only one critical event noted over 3 month period. Thus data not useful for comparison.
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. A hand-off taskforce comprised of 4 residents and a faculty member improved our educational curriculum and handoff template, and implemented these for the 2010-11 academic year. We modified the I-SWITCH curriculum (Henry Ford) that includes OSCE-style exercises (we participated in the trial of this and in the formal workshop presentation at the recent APDIM meeting). During the exercise, interns were provided feedback on both their written and verbal handoffs by faculty and peers. Subsequently, faculty observed directly actual handoffs for several weeks to assess the effectiveness of our interventions.
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have. Post intervention resident surveys (n = 29) found the new template ease of use, quality of information, and ability to reduce errors/omissions better (p < 0.0003); educational sessions useful and enjoyable (p < 0.0003); and thought both together led to improved quality of communication, effectiveness of sign-outs, and better patient safety and quality of care (p < 0.0003); 81% of resident responses affirmed positive change (p < 0.0001).
XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)  T-tests used for most of statistical analyses of survey data.

<p>XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it: No</p>
<p>XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?</p> <ol style="list-style-type: none"> <li>1. Resident recognition that hand-offs standardization would improve patient care</li> <li>2. Faculty buy-in and participation</li> <li>3. Curriculum that was shared with us by Henry Ford Health System</li> </ol>
<p>XIV. BARRIERS: What were the 3 greatest challenges you encountered?</p> <ol style="list-style-type: none"> <li>1. No EHR in the hospital and no electronic sign out tool</li> <li>2. Limited time to reinforce the curriculum with the interns</li> <li>3. Budget and manpower limitations</li> </ol>
<p>XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative? Buy-in at all levels (administration, faculty, residents) is essential from the beginning to ensure success of your project.</p>
<p>XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.</p> <ol style="list-style-type: none"> <li>1. Positive Unintended Consequences: Residents more willing to give each other feedback on the quality of their handoffs. Awareness of the importance of standardized handoffs.</li> <li>2. Negative Unintended Consequences: Some residents use sign-out template too literally and do not add the subtle information that may be helpful (which they may have added in a free text sign-out). Disappointing that we did not have the staffing or time to see the project completely through and gather more robust data.</li> </ol>
<p>XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?</p> <p style="text-align: center;">1   2   3   4   5   6   <input checked="" type="checkbox"/> 7   8   9   10</p>
<p>XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?</p> <p style="text-align: center;">1   2   3   4   <input checked="" type="checkbox"/> 5   6   7   8   9   10</p>
<p>XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made. We will continue our handoff curriculum and standardized sign-out template, but we will be collecting only limited data for now.</p>
<p>XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?</p> <ol style="list-style-type: none"> <li>1. Standardized sign out template.</li> <li>2. Established curriculum to teach proper handoffs.</li> <li>3. Validation of the benefits of the intervention as perceived by the residents (no objective patient outcome data).</li> </ol>

**Hospital: Saint Francis Hospital and Medical Center, Hartford, CT**

**Team Leader: Phillip Roland, MD, Gyn Oncologist**

I. PROJECT TITLE/NAME: A Key Resident Role in Quality: Improving the Home Medication Reconciliation Process in Transitions of Care
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) Our project focuses on medication reconciliation in the gynecologic oncology surgical population. There are 4 phases to our project: <ol style="list-style-type: none"><li>1. A Medication Reconciliation Education Module for the residents</li><li>2. The development of a new Transfer Reconciliation Tool (TRT)</li><li>3. Pilot testing of the Transfer Reconciliation Tool</li><li>4. Presenting study results to residents and eliciting their feedback as to next steps and ways to make the tool and the process more successful.</li></ol>
III. OPPORTUNITY STATEMENT: In the first iteration of this program, we will reduce home medication discrepancies by 25% from baseline.
IV. RESEARCH QUESTION: <ol style="list-style-type: none"><li>1) Does a Medication Reconciliation Education Module, taught by a pharmacist, increase resident knowledge of the medication reconciliation process?</li><li>2) Does a new Transfer Reconciliation Tool, designed with resident input, increase compliance with home medication reconciliation at four critical transitions:<ol style="list-style-type: none"><li>a) Pre-surgical visit in physician office</li><li>b) Pre-operative holding area in the hospital</li><li>c) Operating Room Debriefing in OR Suite (Transition to Post-Op Floor)</li><li>d) During the discharge transition</li></ol></li><li>3) Does the education module along with piloting a new Transfer Reconciliation Tool decrease home medication discrepancies from baseline?</li></ol>
V. HYPOTHESIS: A resident focused Medication Reconciliation Education Module, taught by a pharmacist, and the use of a Transfer Reconciliation Tool, designed with resident input, reduces home medication discrepancies from admission to discharge in patients receiving surgery for gynecologic cancer.
VI. MEASURES: <u>Primary</u> <ol style="list-style-type: none"><li>1) Mean score (pre- and post-test) after education module on medication reconciliation taught by a pharmacist</li><li>2) Compliance with Transfer Reconciliation Tool at each phase</li><li>3) Number of patients with completed medication reconciliation forms</li><li>4) Number of home medication discrepancies per chart</li></ol> <u>Secondary</u> <ol style="list-style-type: none"><li>5) Assigned "Harm Level" of those medications left unreconciled</li><li>6) Patient knowledge of their medications during the office visit</li></ol>
VII. INSTRUMENTS: <ol style="list-style-type: none"><li>1) Pre- and post-test</li><li>2) Transfer Reconciliation Tool</li><li>3) Data collection form for chart abstraction to assess compliance with TRT and home medication discrepancies from admission to discharge.</li></ol>
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have. Our baseline data included the following: <ol style="list-style-type: none"><li>1) Focused chart review to ascertain baseline rate of home medication discrepancies per chart in gynecologic oncology surgery population</li><li>2) Pre-test of residents to assess medication reconciliation knowledge prior to being introduced to an educational module taught by a pharmacist</li></ol>
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. A mandatory Medication Reconciliation Education Module, taught by our Medication Safety Pharmacist,

was introduced to the 16 OBGYN residents in July 2010. A pre-test was administered prior to the module. After the module, a post-test was conducted.

The new Transfer Reconciliation Tool was designed to capture transitions in patient care, including 1) the OR suite to the post-op floor and 2) post-op unit to home. The Tool serves as a checklist to ensure that home medications are incorporated into post-op care and discharge instructions.

Official enrollment of patients into the pilot study testing the Transfer Reconciliation Tool began on August 4, 2010 and concluded on January 31, 2011. Charts were abstracted concurrently for compliance with the TRT at the 4 transitions and home medication discrepancies.

A resident feedback session was held on February 11, 2011 to elicit success factors, barriers, and lessons learned during the project phase.

X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

- 1) Mean resident score on a post-test after educational module on medication reconciliation (Interval)
- 2) Compliance with new medication reconciliation process, as evidenced by compliance with usage of Transfer Reconciliation Tool at each of 4 transitions (Nominal)
- 3) Medication discrepancies per chart (Ratio)

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

- 1) Mean score calculated – paired t-test to determine statistical significance
- 2) Percent Improvement – baseline compared to post-intervention data for medication discrepancies per chart

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

We collected data in the physician office to assess the following research question:

Do pre-surgical patients know their medications and are they able to accurately relay their medications to a nurse during the pre-operative physician office visit?

\*\*The data we collected relevant to this research question is not available yet and is in the process of being analyzed.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Project implementation made residents and attendings focus more attention on the medication reconciliation process
2. Because the Transfer Reconciliation Tool was filled out in the physician office, it was often more accurate than other home medication lists found in the chart. The nurses in the physician office, as opposed to those assessing the patient immediately pre-operatively, were more likely to research home medications by interviewing the patient thoroughly, making calls to the patient's pharmacy, and talking with family members.
3. The session that we facilitated with the residents to review results, highlight successes, identify barriers, and discuss lessons learned allowed us to hear directly from the residents how they perceived the project was executed, what improvements could be made, and the next steps that should be taken.

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Transfer Reconciliation Tool conflicted with an already established hospital form. This existing form was often filled out in addition to TRT, causing there to be 2 home medication lists in the chart.
2. The Transfer Reconciliation Tool is handwritten and often illegible.
3. The Transfer Reconciliation Tool is not a recognizable form and was only used for a small subset of patients – this caused the form to get lost within the chart, making it difficult to locate.
4. The physician office involved in the project transitioned to an EMR during the study, making the paper form difficult to insert into new, electronic workflow.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

Adding new processes and forms to the existing infrastructure requires considerable planning, effective communication, and time.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: Although this study was focused on just gynecologic oncology patients, the lessons learned will be applied to our efforts to revise our hospital-wide medication reconciliation process.
2. Negative Unintended Consequences: None

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 **7** 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 **5** 6 7 8 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

1. Analyze data regarding patient knowledge of the medications in the physician office prior to surgery.
2. Develop "Potential for Harm" scale to further characterize home medication reconciliation discrepancies.
3. Incorporate lessons learned from this paper-based Transfer Reconciliation Tool into future generations of our hospital's electronic medical record.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

The residents and attendings have taken a more active approach to the medication reconciliation process and acknowledge the importance of obtaining an accurate home medication history for purposes of reconciling at transitions in care and at discharge.

# A Key Resident Role in Quality: Improving the Home Medication Reconciliation Process

K Zaluski, MD; L Tiberio, MPH; D Chapron, RPh, MS; P Roland, MD; G Makoul, PhD  
Saint Francis Hospital and Medical Center, Hartford, CT

## Introduction

Medication Reconciliation is defined by The Joint Commission as the process of comparing a patient's medication orders in the hospital to all of the medications that the patient has been taking at home. This process should be done at every transition. It has proven to be a powerful strategy for preventing medication errors, including duplications, omissions, dosage errors, and drug interactions.

Hospitals have struggled to implement efficient and effective medication reconciliation processes at admission, discharge, and transitions in level-of-care. Within our own OB/GYN residency program, the process of ascertaining a list of home medications and then reconciling those medications throughout the the hospital course needed improvement. We also recognized that the hospital's current medication reconciliation process underutilized a key factor in the care of the patient: the resident.

We selected gynecologic oncology surgery patients to focus our efforts on improving home medication reconciliation.

## Statement of Problem

Obtaining the initial home medication list is performed quickly and immediately pre-operatively, leaving little time to double-check or talk with family if the patient is unsure or can't remember medications.

The hospital's current form for Medication Reconciliation does not have space to document medications during transitions in care, specifically from the OR to the floor and from the floor to home.

Baseline data revealed that there were approximately 2 home-medication discrepancies per chart at the time of discharge in our gynecologic oncology elective-surgery population.

## Objectives of Intervention

Fully engage residents in quality improvement initiatives and highlight the intersection of graduate medical education, quality, and patient safety.

- Evaluate resident knowledge of medication reconciliation before and after a pharmacist-taught Medication Reconciliation Education Module.
- Design a new form, a Transfer Reconciliation Tool to facilitate proper home medication reconciliation through the hospital stay and discharge.
- Pilot test usage of the Transfer Reconciliation Tool for our gynecologic oncology patients.

## Description

### Medication Reconciliation Education Module

1 hour mandatory lecture for 16 OB-GYN Residents

Taught by Medication Safety Pharmacist

Pre-test and post-test to gauge impact of educational module

### Transfer Reconciliation Tool

Newly designed medication reconciliation form at Saint Francis

Captures transitions in patient care: (1) OR suite to post-op unit; (2) post-op unit to home

Serves as a checklist to ensure that home medications are incorporated into post-op care and discharge instructions

## Results – Med Rec Education Module

Resident mean test scores before and after Medication Reconciliation Education Module were calculated. A significant improvement in knowledge was demonstrated.

• Pre-test = 14.6 and Post-test = 16.27

• p = 0.001

## Results – Transfer Reconciliation Tool

### Baseline Data (pre-study)

• 1.96 Medication Reconciliation Discrepancies per chart

### Study Results

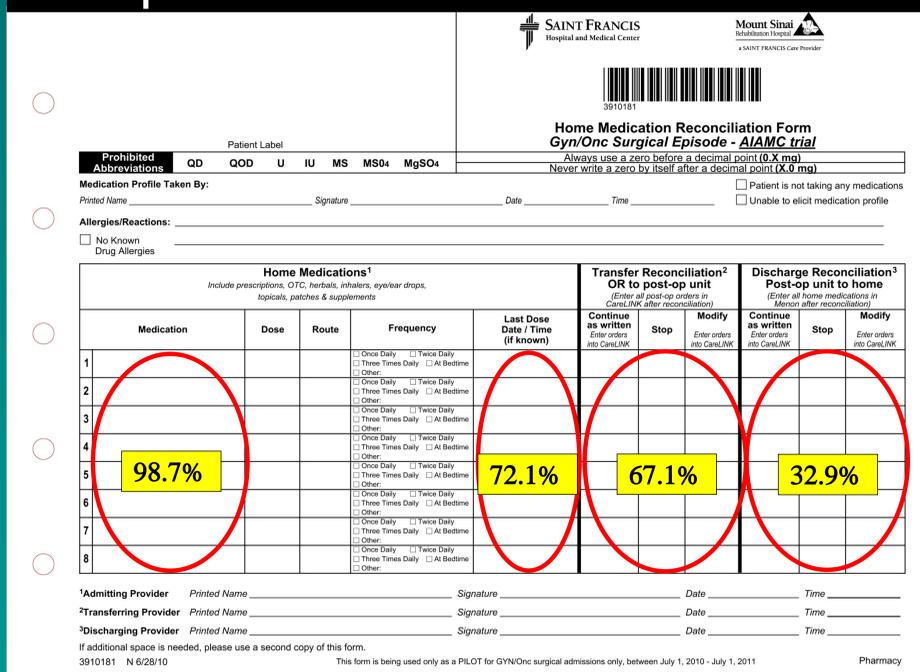
• 97 patients prospectively enrolled in study

• 79 charts available with complete data for review

• Total of 68 home medication discrepancies (68 / 79) → 0.86 Med Discrepancies per chart

Before @ 1.96 → After @ 0.86 represents a 56% reduction in home medication reconciliation discrepancies as a result of this intervention.

## Compliance - Transfer Reconciliation Tool



Home Medications <sup>1</sup>				Transfer Reconciliation <sup>2</sup>			Discharge Reconciliation <sup>3</sup>		
Medication	Dose	Route	Frequency	Continue as written	Stop	Modify	Continue as written	Stop	Modify
1									
2									
3									
4									
5									
6									
7									
8									

98.7%      72.1%      67.1%      32.9%

## Closing the Loop

We facilitated a session with the 16 OBGYN residents to review results, highlight successes, identify barriers, and discuss lessons learned.

## Key Lessons Learned

- Adding new processes and forms to the existing infrastructure requires considerable planning, effective communication, and time.
  - Initially, the existing form was often filled out in addition to the new form.
- The support and leadership of a physician faculty champion with close ties to the residency program is critical.
- CEO support and senior leadership engagement is a fundamental key to success.
- There is value in thoughtfully deconstructing a process and reconstructing in a new and different way.

## Next Steps

- Analyze data regarding patient knowledge of home medications
- Develop "Potential for Harm" scale to further characterize home medication reconciliation discrepancies
- Incorporate lessons learned from this paper-based Transfer Reconciliation Tool into future generations of our hospital's electronic medical record

Use of the Transfer Reconciliation Tool decayed with each phase.

**Hospital:** Spectrum Health Team 1

**Team Leader:** Dr. Russell Jelsema

I. PROJECT TITLE/NAME: Improving resident physician and nursing communication on Labor and Delivery.
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) Implement changes and communication tools to improve communication between residents and nursing staff on our labor and delivery service, evaluating by pretest and posttest. To evaluate the effect Computer Physician Order Entry (CPOE) had on communication.
III. OPPORTUNITY STATEMENT: Decrease the risk of error and improve patient care by improving communication among staff on Labor and Delivery.
IV. RESEARCH QUESTION: Is communication optimal on our labor and delivery service? If not, can implementing new communication tools improve it?
V. HYPOTHESIS: Communication between residents and nurses on our labor and delivery unit is not optimal.
VI. MEASURES: Pre and post communication survey of resident and nursing staff.
VII. INSTRUMENTS: Surveys. Communication tools: communication accountability box, addition to charts identifying the resident caring for each patient, weekly schedules, utilize OBTV RN box.
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.  Pre-surveys from residents, nurses and attending physicians.  Ex. Question: I feel treatment plans are clearly communicated to nurses. 1. Strongly agree- Nurses: 0%, Residents: 3% 2. Agree- Nurses: 21%, Residents: 59% 3. Neutral- Nurses: 38%, Residents: 24% 4. Disagree- Nurses: 36%, Residents: 14% 5. Strongly Disagree- Nurses: 4%, Residents: 0%
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. A pre-survey was distributed to nurses, residents and attending at the beginning of August 2010. The new communication tools were implemented starting in January. A survey regarding communication following the start of CPOE will be distributed by April 1 <sup>st</sup> . A post-survey following up on the effect the communication tools had will be distributed 6 months after initiation (June 2010).
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.  Have not collected yet secondary to lack of time since implementation of changes. Plan for resurvey in April and June of 2011.
XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:  No.
XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?  1. Getting the nurse managers involved 2. Continual reminder to residents and nurses 3. Research leaders being on Labor and Delivery during initiation of changes

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Need further resident and nursing education regarding new communication tools.
2. Lack of desire by staff to change previous ways.
3. CPOE commenced during the project had an different effect on communication.
4. Time frame needed to implement changes on Labor and Delivery AND time frame needed to assess efficacy of changes.
5. Poor response rate from attendings.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative

Attempt to educated nurses and residents at the same time (one meeting). Be prepared for staff to need continual reminders during the period of change.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: Nursing management has become more aware of communication barriers and is attempting to educate nurses/secretaries.
2. Negative Unintended Consequences: None.

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

3- Has taken more time than we intended

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

5- We are still working towards our goal, however there is still work to do.

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

Need continual education regarding of labor and delivery staff regarding the new communication tools and reminders to use them (meetings, memos, etc.)

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

Not much yet. But it has shed light on the fact that there is a lack in communication between nurses and residents and some staff are interested in trying to help change that.

Hospital: Spectrum Health/GRMERC-Saint Mary's Team

Team Leader: John vanSchagen, MD

I. PROJECT TITLE/NAME: Can a resident-driven electronic education and reminder system reduce hospital readmissions for CHF?
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) The Family Medicine Service (FMS) plans to conduct a project on congestive heart failure (CHF) for residents, in an effort to reduce 30-day readmission rates for this diagnosis. This project will include mandatory education of CHF guidelines and an electronic reminder system for all residents. Readmission rates will be measured before and after the intervention, and compared with readmission rates for internal medicine service with resident inpatient coverage and a hospitalist service without resident inpatient coverage.
III. OPPORTUNITY STATEMENT: CHF readmission rates caused by inconsistent compliance with discharge guidelines can be lowered by mandatory education and regular reminders for resident physicians on an inpatient family medicine service.
IV. RESEARCH QUESTION: Can a resident-driven electronic education and reminder system reduce hospital readmissions for CHF?
V. HYPOTHESIS: A mandatory educational session for all residents, followed by regular peer-to-peer electronic reminder messages to residents assigned to the FMS, will decrease 30-day readmission rates for CHF caused by inconsistent compliance with discharge guidelines.
VI. MEASURES: We will be measuring the 30-day readmission rate for CHF for the attending group with FMS resident coverage pre- and post-intervention. These readmission rates will also be compared to attending groups without resident coverage during the same measurement periods.
VII. INSTRUMENTS: We will use the Crimson™ physician management data analysis platform. This proprietary software generates detailed physician profiles that encompass quality performance, adherence to pre-defined order sets and resource utilization, and compares performance levels to severity-adjusted peers. For more information, go to: <a href="http://www.crimsonservices.com/index.html">http://www.crimsonservices.com/index.html</a>
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have. 1. Baseline 30-day readmission rate for CHF diagnosis for <b>FM</b> resident service (Jan-Dec 2009; based on same MDC): 5/28 (17.86%) vs. 11.23% for system (ratio) 2. Baseline 30-day readmission rate for CHF diagnosis for <b>IM</b> resident service (Jan-Dec 2009; based on same MDC): 8/58 (13.79%) vs. 11.23% for system (ratio) 3. Baseline 30-day readmission rate for CHF diagnosis for <b>hospitalist</b> service (Jan- Dec 2009; based on same MDC): 12/89 (13.48%) vs. 11.23% for system (ratio)
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted. Family Medicine (FM) residents were given an educational inservice by the resident co-leader on January 4, 2010, involving information and recommendations for CHF discharge instructions and protocols. This has been followed by regular peer-to-peer electronic (e-mail, text message) reminders to residents on the Family Medicine Service (FMS). This intervention did not involve Internal Medicine (IM) residents or any hospitalist attendings.
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have. 1. 30-day readmission rate for CHF diagnosis for <b>FM</b> resident service (Jan-Sep 2010; based on same MDC): 1/19 (5.26%) vs. 10.92% for system (ratio) 2. 30-day readmission rate for CHF diagnosis for <b>IM</b> resident service (Jan-Sep 2010; based on same MDC): 5/45 (11.11%) vs. 10.92% for system (ratio) 3. 30-day readmission rate for CHF diagnosis for <b>hospitalist</b> service (Jan-Sep 2010; based on same MDC): 5/57 (8.77%) vs. 10.92% for system (ratio)

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

Given the small numbers of CHF patients and 30-day readmissions for the same diagnosis, we used Fisher's exact analysis for the FM resident service to calculate a  $p=0.38$ . For IM resident service and hospitalist services, the numbers were greater, so routine chi square analysis was possible. For IM resident service,  $p=0.73$  and for the hospitalist service,  $p=0.39$ . Thus, while no individual service reached statistical significance, the FM resident service did show a 3-fold improvement in decreased readmissions for CHF, which was much greater than the other two services, and showed the greatest improvement compared to the system average. This would suggest that the intervention provided additional impact over the control groups, since all groups were affected by parallel hospital-driven initiatives (confounding variables).

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it: We will include data on resident satisfaction with the electronic reminder system and its impact on their awareness and compliance with CHF discharge protocols.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. We have been pleased with the participation and ownership of this project by the resident team. The use of "prizes" for participation in the electronic reminder system has improved acceptance of the project, and has enhanced the learning opportunities for CHF management skills.
2. The availability of the Crimson™ physician management data analysis platform was instrumental in our ability to collect baseline data and follow severity-adjusted CHF readmission rates over time.
3. We were happy to have chosen a project that was very focused in its scope and which had easily measurable outcomes with available comparison groups.

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. We have had some concerns that the data from Crimson will be inaccurate or skewed by the other projects occurring concurrently at our facility. These include other CHF and readmission initiatives instituted by the C-suite, along with our own re-design of the family medicine service structure (confounding variables).
2. Resident participation in the electronic reminder process was at times inconsistent and required additional influence from project leader.
3. The timing of this project overlapped with our annual residency recruitment process, which distracted team members and residents from the quality improvement work.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative? The timing for implementation of this project coincided with a number of other changes and interventions in our academic and clinical environments, so the data will need to be viewed with some recognition of this. The timing was out of our control, however, and we are trying to limit the impact of these outside changes on our process.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: Our resident project leader was able to expand his investigation of the impact of residents on hospital quality initiatives, and will be using this information for a grand rounds presentation and an additional scholarly poster for medical education research.
2. Negative Unintended Consequences: We wonder if residents may have experienced some degree of "information fatigue" as a consequence of our frequent electronic reminders and cajoling.

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 **8** 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 8 **9** 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made. We would hope to choose a new rising PGY-2 resident interested in inpatient quality improvement to choose and lead another resident-driven project on a different measure of inpatient quality such as early institution of antibiotics in suspected sepsis, or medication reconciliation.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project? Residents and faculty, as well as our sponsoring institution, are more aware of the importance of resident involvement in quality improvement initiatives in general. Overall, there is an increased sense of the ability of house staff to positively impact quality outcomes through resident-led education initiatives.

# Can a resident-driven electronic education and reminder system reduce hospital readmissions for CHF?

Paul Gillard, MD; John vanSchagen, MD

## Introduction

Congestive heart failure (CHF) hospital admissions are common and costly, and readmission rates have historically remained suboptimal despite technical and pharmacological advances. Recent attempts to reduce rates seem promising and include a greater role for medical residents. Not only do residents require a curriculum that includes “quality improvement” projects but it can be coupled with improving CHF patient care.

## Statement of Problem

CHF patients experience high rates of hospital readmission and poor outcomes. The aim of this study was to determine if CHF readmission rates caused by inconsistent compliance with discharge guidelines can be lowered by resident-driven education and regular reminders for house staff on an inpatient family medicine service compared to other services.

## Objectives of Intervention

1. Formal orientation every 6 months to educate residents about CHF discharge quality measures
2. Monthly electronic reminders to residents about CHF discharge quality measures
3. The monthly reminders included questions with periodic prizes to reward and encourage resident involvement
4. Interventions were intended to be as simple as possible to encourage continued adherence

## Description

The Family Medicine Service (AFMS) conducted a project on CHF in an effort to reduce 30-day readmission rates for this diagnosis. Interventions included resident-driven mandatory education on CHF guidelines and an electronic reminder system for all residents. Readmission rates were measured at baseline and 12 months, and compared with those for an internal medicine service with resident coverage but without intervention, and a hospitalist service without residents or intervention. Comparative data was collected using a physician management data analysis platform which compares performance levels to severity-adjusted peers.

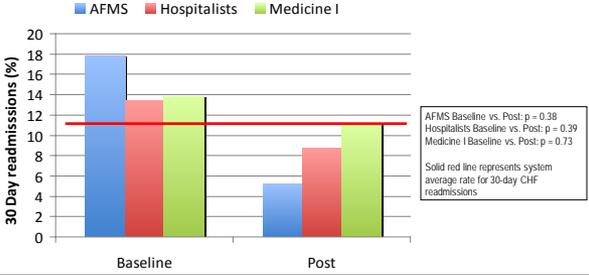
## Results / Findings to Date

At baseline, the overall system average 30-day readmission rate for CHF was 11.23%. After the 12-month intervention period, the FMS showed a 3-fold decrease in readmission rate (17.86% down to 5.26%;  $p=0.38$ ). The hospitalist service (no residents, no intervention) went from 13.48% to 8.77% ( $p=0.39$ ). The Internal Medicine resident service (non-intervention) went from 13.79% to 11.11% ( $p=0.73$ ).

**Table 1: Pre- vs Post-Intervention Rate**

SERVICE	PRE (raw)	PRE (rate)	POST (raw)	POST (rate)	P-value
AFMS	5/28	17.86%	1/19	5.26%	0.38
Hospitalist	12/89	13.48%	5/57	8.77%	0.39
Medicine I	8/58	13.79%	5/45	11.11%	0.73

**Figure 1: Comparison to System Avg.**



## Key Lessons Learned

Based on the results of this study, it appears that a resident-driven electronic education and reminder system can have a significant impact on lowering CHF readmission rates. Because of the relatively small numbers of CHF cases included in this study, statistical significance was not reached, but trends were remarkable in comparison to two control groups. Since parallel hospital-driven readmission initiatives were ongoing, our resident-driven intervention seems to have provided additional impact over the control groups in this study.

## Next Steps

1. Feedback from residents regarding the intervention and the project’s learning value
2. Present results to GMEC for potentially expanded implementation
3. Further studies to assess sustainability of the effects of this type of intervention over time

Hospital: St. John's Mercy Medical Center

Team Leader: Treena Sturgeon, DO

I. PROJECT TITLE/NAME: Resident Hand off communication team
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) Our current hand off communication tool is in paper format, frequently inaccurate, and time consuming for residents to update. Complaints related to missing "to do" items, critical test and culture results have given rise to an opportunity to revise the current content. We have just gone live in an electronic health record so this allows us opportunities to increase the accuracy of the form.
III. OPPORTUNITY STATEMENT: By developing an accurate, concise hand off communication tool that will allow residents to respond to patient challenges using a more proactive approach. We will decrease the frequency of emergent calls and increase resident satisfaction.
IV. RESEARCH QUESTION: What information is useful on a hand off communication tool to improve the effectiveness and accuracy of the tool.
V. HYPOTHESIS: Creating a standardized hand – off in EHR will improve the accuracy of the hand off tool and increase the satisfaction of the residents in the hand off process.
VI. MEASURES: see attached graphs.
VII. INSTRUMENTS: Visual observation, evaluation form, and data abstraction from charts.
VIII. BASELINE DATA COLLECTED: Confirmed when the hand off paper form was updated last by monitoring the Critical Care Physician, Patient's Diagnosis, Code Status, Pending Cultures, Accurate Medication list, Allergies, Family / Emergency Contact, and "to do". We also surveyed the residents asking if there were any incidents during their shift that was caused due to poor handoff and what they require in an adequate hand off tool.
IX. INTERVENTION: Developed a hand off tool in our EHR for easy access to updated patient information. It is updated automatically with the patient's medications, code status, allergies, and next of kin. The residence enter history / summary, "important information" and to do list. The tool is used during all hand offs.
X. POST-INTERVENTION DATA: Emergency contact information, if the form was updated prior to hand off, accuracy of the "to do" list, and documentation of code status.
XI. TYPE OF ANALYSIS: Descriptive statistics.
XII. DID YOU COLLECT ADDITIONAL DATA? Performed surveys of the residents to determine what they thought should be included in the tool, if they felt the current tool needed changing, if there were any incidents during their shift that they felt could have been avoided with a "different" hand off tool or more information. Due to the constant changing of the residents these indicators have all remained fairly flat. Most of the residents did not use both tools so we feel that we will be unable to use this data.
XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success? <ol style="list-style-type: none"><li>1. Executive support as evidenced by assisting in removing barriers to meeting goals.</li><li>2. Patient safety recognized as a high priority.</li><li>3. Changed the hand off tool to a mandatory requirement for all residents and all services in the hospital.</li></ol>
XIV. BARRIERS: What were the 3 greatest challenges you encountered? <ol style="list-style-type: none"><li>1. All changes / builds in the EHR had to be approved at a system wide level. So to achieve this we had to design a tool that would meet the needs of all physician's in all hospitals and areas of practice.</li><li>2. Allowing the residents to maintain control of how they utilized the tool.</li><li>3. Time and conflicting schedules for team members.</li></ol>
XV. LESSONS LEARNED: Need to have committed team members and committed time to work on the project.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: established through out the hospital

2. Negative Unintended Consequences:

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 **X** 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 **X** 6 7 8 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

Improve the continuum of care by developing tool to be utilized by next point of care, i.e. SNF, Rehab ect. Scheduling conference for the residents for education defining the extended hand-off project.

XX. PROJECT IMPACT: The "to do list" has been made easier to update and easier to see resulting in tasks being performed and communicated on a consistent base.

# Improving Patient Handoffs

Treena Sturgeon DO, Rebecca Eller RN,  
Joan Shaffer MD, Kathryn Nelson

St. John's Mercy Medical Center, St. Louis, Missouri

## Introduction

A handoff is defined as the transfer of role and responsibility of patient care from one person to another. The Joint Commission has identified poor communication as the number 1 contributing factor of all medical errors. At least 50% of these communication breakdowns occurred during handoffs.

For this reason, handoff of patient care is a National Patient Safety Goal developed by the Joint Commission.

## Statement of Problem

Our current handoff tool is in paper format and frequently underused and inaccurate. It is also very time consuming for the residents to fill out and therefore, rarely updated. 63% of residents were dissatisfied with the current handoff tool and felt that it could be improved.

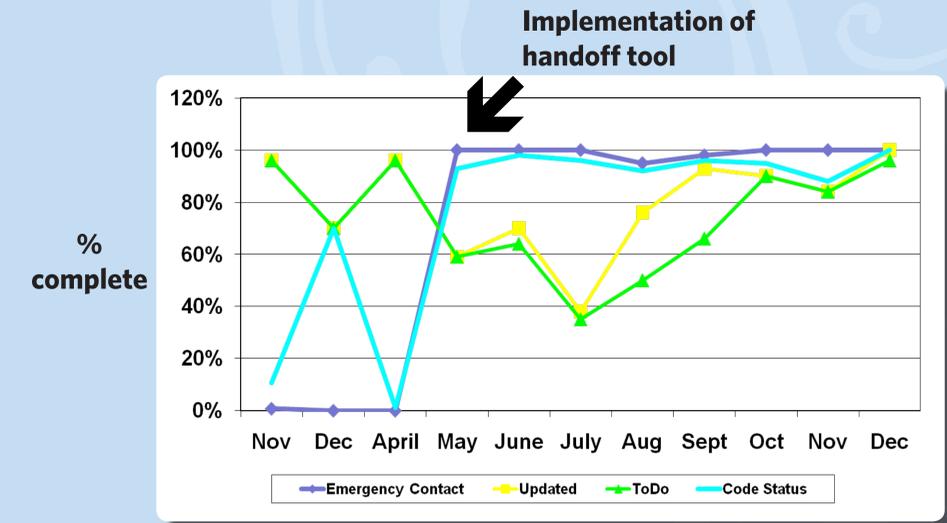
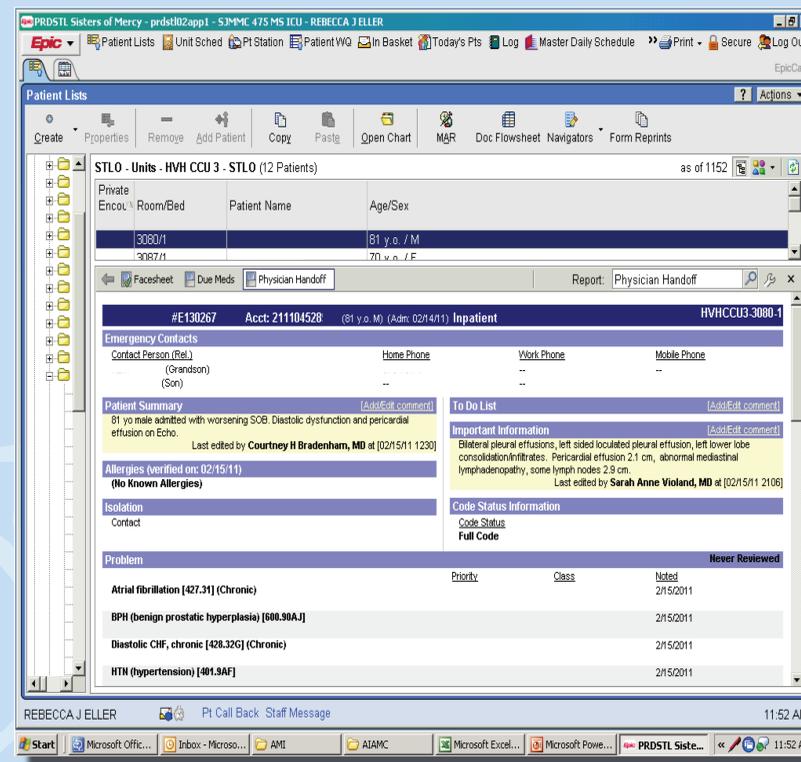
## Objectives of Intervention

1. Create an accurate, concise handoff tool
2. Create a tool that is easy to use
3. Improve resident satisfaction with the new handoff tool

## Description

Our hospital recently went live with an electronic medical record allowing us to use this opportunity to create a handoff tool within the EMR.

The handoff tool is automatically populated with the patient's family contacts, medications, allergies, IV access, recent vital signs, code status, and problem list. There are minimal spaces that must be filled in by the resident. These include a brief history, a to do list, and an area for other important information.



## Key Lessons Learned

- EMR handoff more accurate, standardized
- Handoff tool improved satisfaction among the residents
- Need not only a good tool, but also education on what a good handoff is in general

## Next Steps

- Encouraging correct use of the new hand off tool hospital wide
- Expanding the use to other areas of care such as SNF
- Formal education about hand off procedure

Hospital: TriHealth

Team Leader: Richard Welling MD

I. PROJECT TITLE/NAME: Chronic Disease Management of the Patient with Diabetes: Evaluation of the Effectiveness of a Residency-Led Intervention to Improve Care and Clinical Outcomes															
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) We investigated physician compliance with a Chronic Diabetes Management treatment protocol and patient outcomes on 3 clinical measures for diabetes. We compared three TriHealth Physician Practice (TPP) offices, including (1) the office in which the Family Medicine residents work, (2) an office which employs physicians who act as preceptors to Family Medicine residents, and (3) an office which employs physicians who are not involved in Graduate Medical Education. In addition to this between groups comparison we investigated changes in physician compliance and patient outcomes that might be evident over time based on pre- and post-implementation of electronic medical record-keeping.															
III. OPPORTUNITY STATEMENT: This project afforded the opportunity to assess the effectiveness of a Family Medicine residency-led initiative to (1) increase the appropriate use of evidence-based protocols for the treatment of patients with diabetes (process outcome), and (2) improve patient outcomes with respect to 3 clinical measures of quality for care of the diabetic patient.															
IV. RESEARCH QUESTION: Does involvement in healthcare by resident physicians lead to quality improvement in the care of the adult diabetic patient?															
V. HYPOTHESIS: <ul style="list-style-type: none"><li>• Adult diabetic patients who have resident physicians involved in their care will have better outcomes with respect to 3 clinical measures of quality for care of the diabetic patient, including: HgB A1c levels &lt; 7%, systolic blood pressure &lt; 130, and LDL &lt; 100.</li><li>• Patients of residents and/or physicians who are more compliant with the Chronic Disease Management Protocol for Adult Diabetic Patients will have better outcomes than patients of residents and/or physicians who are less compliant with the Protocol.</li></ul>															
VI. MEASURES: We measured 3 clinical measures of quality for care of the diabetic patient, including: HgB A1c levels < 7%, systolic blood pressure < 130, and LDL < 100.															
VII. INSTRUMENTS: For gathering data from paper charts of patients in the office in which the Family Medicine residents work we used a data sheet constructed from an Excel spreadsheet, transposed for ease of recording patient information (see attached copy).															
VIII. BASELINE DATA COLLECTED: We collected HgB A1c, LDL and systolic BP for patients in each physician practice. A baseline example for one patient is: <table border="1"><thead><tr><th><b>HbA1c_Qtr1_Value_2009</b></th><th><b>LDL_Qtr1_Value_2009</b></th><th><b>BP_Systolic_Qtr1_Value_2009</b></th></tr></thead><tbody><tr><td>5.4</td><td>174</td><td>150</td></tr><tr><td>Measures &amp; level:</td><td></td><td></td></tr><tr><td>Blood glucose test</td><td>Fasting lipids test</td><td>Sphygmomanometer reading</td></tr><tr><td>Ratio</td><td>Ratio</td><td>Ratio</td></tr></tbody></table>	<b>HbA1c_Qtr1_Value_2009</b>	<b>LDL_Qtr1_Value_2009</b>	<b>BP_Systolic_Qtr1_Value_2009</b>	5.4	174	150	Measures & level:			Blood glucose test	Fasting lipids test	Sphygmomanometer reading	Ratio	Ratio	Ratio
<b>HbA1c_Qtr1_Value_2009</b>	<b>LDL_Qtr1_Value_2009</b>	<b>BP_Systolic_Qtr1_Value_2009</b>													
5.4	174	150													
Measures & level:															
Blood glucose test	Fasting lipids test	Sphygmomanometer reading													
Ratio	Ratio	Ratio													
IX. INTERVENTION: Our original intervention, in early 2009, was the implementation of an evidence based treatment protocol for treatment of the diabetic patient, which was developed by a PGY-3 Family Medicine resident. This treatment protocol was presented to the TriHealth Physician Practice (TPP) Quality Assurance Board and subsequently was adopted at all TPP offices. An additional intervention, specific to the TPP office in which the Family Medicine residents work, entailed an instructional lecture by Dr Ryan Pettit (PGY-3) to Family Medicine residents in August 2010. This lecture consisted of an overview of the AIAMC NI-2 project as well as details of the diabetes treatment protocol and the biometric measures that are evaluated to determine whether a patient is compliant with the goals set forth.															

X. POST-INTERVENTION DATA:

Post-intervention data example for two patients:

HbA1c_Qtr3_Value_2010	LDL_Qtr3_Value_2010	BP_Systolic_Qtr_3_Value_2010
4.8	108	111
5.1	51	104
Blood glucose test Ratio	Fasting lipids test Ratio	Sphygmomanometer reading Ratio

XI. TYPE OF ANALYSIS:

We had planned to use mixed model repeated measures ANOVA to analyze data. However, because we ultimately used data from TriHealth’s Clinical Data Warehouse, which is populated from the EMR, the sample sizes comprising patients who had values in each measurement period were widely variable and too low to produce meaningful results. Consequently we will rely on Student’s *t*-test to obtain *p*-values for differences demonstrated graphically to be significantly different.

XII. DID YOU COLLECT ADDITIONAL DATA?

The data sets we received from our IT department also contained gender, race and marital status information. Consequently we can add those layers to our analysis. In addition we requested and have received ZIP Code and Payor data for patients. For ZIP code, in conjunction with U.S. Census data regarding median income, it will be possible to evaluate results with respect to socioeconomic status. Data on Payor can give us an idea about the proportion of patients who have private insurance vs. self pay vs. Medicare/Medicaid.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project’s success?

1. We benefitted greatly from having a team leader and a project manager. Both individuals have specific strengths, which kept the project on track.
2. Having regular team meetings, particularly toward the beginning of the project, enabled us to progress steadily.
3. For Dr Pettit, the resident on the project, having protected time was very important.

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. We struggled with time constraints.
2. Obtaining data from IT at different times (i.e., mid 2010 for 2009 and beginning of 2011 for 2010) led to difficulty in matching data sets due to differing Patient ID numbers in 2009 and 2010 files.
3. Dealing with the transition from paper to EMR in data collection necessitated a lot of manual sifting through data sheets to ensure data integrity.

XV. LESSONS LEARNED:

Once you have formulated your idea, schedule regular meetings, regular deadlines for tasks, AND KEEP THEM. In a long term project like this it’s way too easy to procrastinate. If you keep the momentum going you’ll never have to feel you’re behind the 8-ball.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: This project has inspired Dr Pettit to pursue quality projects and research when he graduates and goes on to private practice.
2. Negative Unintended Consequences: It seems that the current version of TriHealth’s EMR may not be optimized to afford proactive follow-up with patients.

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with “1” meaning nothing and “10” meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with “1” meaning not at all satisfied and “10” meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 8 9 10

XIX. NEXT STEPS:

We are currently in the process of reviewing results and drafting a manuscript for publication. With respect to enhancing resident effectiveness in caring for diabetic patients it seems wise to conduct periodic educational interventions to raise awareness and focus attention on the measures studied here as well as others in the Diabetes Treatment Protocol. It also seems wise, considering the relatively small sample sizes in our data set available for repeated

measures ANOVA, to be more vigilant for diabetics coming in quarterly to monitor their blood sugar and other biometric readings.

**XX. PROJECT IMPACT:**

We mentioned before that our organization is expressing much more interest in involving GME in quality projects, including establishing funding, and we're already seeing an increase. Specifically, TriHealth conducts Quality and Patient Safety Days, which typically involves projects by nursing and other departments. This year, five resident projects were among the presentations and that number is expected to increase for next year.

Data Sheet

<b>Section 1</b>		
	Scorecard Date	mmddyy
	TPP office	1=Blue Ash / 2=Norwood / 3=White Oak
	TPP physician or resident	1=resident / 2=faculty physician / 3=non-faculty physician
	TPP physician or resident name	
	HgB A1C levels < 7%	0=No, 1=Yes
	Blood pressure < 130/80	0=No, 1=Yes
	Annual fasting lipids test	0=No, 1=Yes
	LDL < 100	0=No, 1=Yes
	Physician or resident physician compliance with chronic disease management protocol	1=compliant with 1-3 scorecard items 2= compliant with 4-6 scorecard items 3= compliant with 7-9 scorecard items 4= compliant with 10-12 scorecard items



# Chronic Disease Management of the Patient with Diabetes: Evaluation of the Effectiveness of a Residency-Led Intervention to Improve Care and Clinical Outcomes



Ryan Pettit MD, Angela N Fellner PhD, Lorraine Stephens MD, Jonathan Sorscher MD  
Betsy Drake MD, Richard Welling MD  
TriHealth, Cincinnati, Ohio

## Introduction

- Bethesda Family Medicine is a community-based family medicine residency program operating under TriHealth, a non-profit health system in the greater Cincinnati, Ohio area
- TriHealth strives to bring a uniform, evidence-based approach to all of its outpatient primary care practices
- Evidence-based protocols developed by physicians and other healthcare providers under the structure of quality committees and educational resources afford patients best care
- Current GME literature advocates integration of quality processes and resident education
- Linking GME and quality provides many opportunities for:
  - Improved outcomes in patient care
  - Teaching resident physicians about the quality process

## Statement of Problem

- Chronic diseases require an evidence-based approach to ensure all patients receive care based on the best standards available in the medical community
- An opportunity for education and care improvement was identified for diabetes mellitus
- Introduction of EMR to the outpatient setting of TriHealth increased feasibility of tracking outcomes
- Protocol development would fulfill GME learning requirement and improve competency of residents

## Objectives of Intervention

- Chronic Disease Management Protocol for Adult Diabetic Patients developed by a family medicine resident
- Protocol implemented in all TriHealth outpatient primary care practices
- Reduce variability in outcomes for diabetic patients
- Monitor physician compliance with best practice guidelines
- Demonstrate how resident involvement in healthcare leads to quality improvement

## Description

### Participants

- Adult diabetic patients, 18-75, who have been seen by a TPP physician or resident during 2009-2010
- Excluded pregnant women, dialysis patients

### Design

- Retrospective study evaluating patient outcomes over 2 years
- Three diabetes measures (HbA1c, LDL, Systolic BP)
- Three TPP offices (residents, faculty physician, non-faculty physician)
- Comparison of outcomes over time with respect to treatment protocol implementation

## Results / Findings to Date

- HbA1c: Levels dropped significantly after baseline for residents reflecting improved care following protocol implementation; this continued through period 4 (Fig.1)
- LDL: Non-faculty physician significantly lower at baseline and while trending upward over time still below 100 target; residents and faculty physician patients varied over time but in general kept below 106 (Fig. 2)
- Systolic BP: No significant difference between groups at baseline and period 2; residents trended upward over period 3 & 4 leading to a significant difference, although still below 135 (Fig. 3)

Figure 1: HbA1c

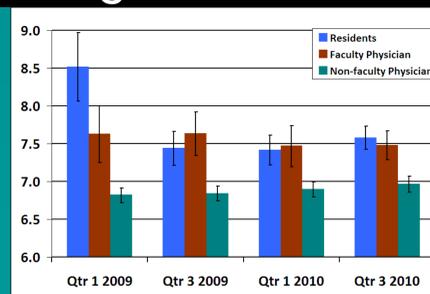


Figure 2: LDL

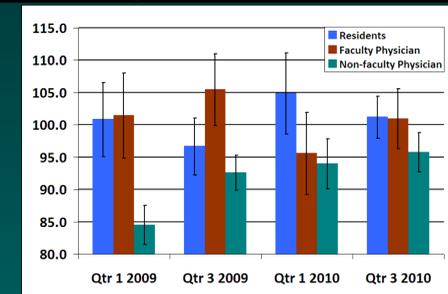
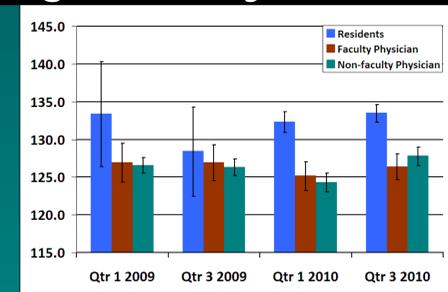


Figure 3: Systolic BP



## Key Lessons Learned

- Long term projects require regular meetings, regular tasks, regular deadlines
- Draw on unique strengths of individuals on team to accomplish shared goals
- Data analysis always takes longer than you expect

## Next Steps

- Complete manuscript for publication
- Conduct periodic educational intervention for residents to raise awareness and focus attention on diabetes management
- Develop proactive strategy for encouraging diabetic patients to come in quarterly for biometric monitoring

Hospital: Union Memorial Hospital

Team Leader: Stephanie Detterline, M.D.

I. PROJECT TITLE/NAME: The Effects of Attending Physician Modeling and Disclosure of Hand Hygiene Compliance on Resident Hand Hygiene Behavior
II. BRIEF DESCRIPTION: (4-5 sentences, maximum)  In the United States (US), an estimated 5% of patients develop healthcare associated infections (HCAI), at a cost of 4.5 billion USD per year. Although hand hygiene has long been regarded as the most effective preventive measure (Teare 1999), numerous studies over the past few years have demonstrated that compliance with hand hygiene recommendations is poor and interventions are not effective long term.  Our study intends to improve the hand hygiene compliance of internal medicine residents and attendings by modeling from attendings and audit with feedback at regular intervals
III. OPPORTUNITY STATEMENT:  To improve the hand hygiene compliance of internal medicine residents and attendings by 25% by using two interventions.
IV. RESEARCH QUESTION:  How can we improve hand hygiene compliance among internal medicine residents in a simple and cost-effective manner?
V. HYPOTHESIS:  Hand hygiene compliance rates of internal medicine residents will improve through the use of both attending physician modeling and regular audit and feedback
VI. MEASURES:  Number of incidences of observed hand hygiene behavior upon entering and exiting a patient room. Survey of hand hygiene protocol understanding.
VII. INSTRUMENTS:  Direct observation by research volunteers Google document spreadsheet Letter to attendings requesting participation in the study Letter to students requesting participation in the study Educational powerpoint presentation Survey of hand hygiene protocol understanding
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.  The baseline data collected consisted of documentation of hand hygiene behavior on entry and exit to each patient room by each attending and resident rotating on inpatient medicine.  For example:  Dr. Detterline room 304-2 entry=yes exit=no Intern 1 room 304-2 entry=no exit=no Intern 2 room 304-2 entry=yes exit-not observed Resident did not enter patient room  Observed by: student FH
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted.  Phase II, Attending Physician Modeling, July-November, 2010. A letter was sent to each attending physician who would be supervising a resident team. They were encouraged to make walk-rounds with

the team on each patient each day and demonstrate obvious hand hygiene behavior.

Phase III, Education and Feedback, November 2010-February 2011. At a monthly meeting, the residents were educated about our hospital hand hygiene policies and given their current compliance percentage in a confidential manner.

X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

After each intervention, we continued to collect similar data.

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

We used the chi-squared test to compare observation counts between the different phases.

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

Yes, we assessed knowledge with a survey that was administered to the house staff just prior to our second intervention (Phase III).

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Willingness of volunteer observers
2. Involvement of all members of the team
3. Seeing the plan put into action, starting data collection
4. Giving the residents their own 'job' as liaisons to the student observers
5. Involving a non-resident research assistant in the process

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. The surprising number of attendings who do not see patients with the team
2. The dual role of students as learners and our observers; they were often overwhelmed and not able to collect data for the day
3. General feeling that wearing gloves can replace hand hygiene behavior
4. General feeling that not touching anything in the room exempts one from hand hygiene

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

Be patient with the process. Observers need to be guided and take time to learn the process and a lot of education is needed before outcomes will be seen.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: Recognizing the need for education regarding hand hygiene despite glove wearing
2. Negative Unintended Consequences: Extra burden placed up medical student observers

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 X 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 X 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

We intend to continue to collect data and study how often the education needs to be repeated in order to

sustain a high level of hand hygiene compliance.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

Changes most notable are in those of us involved in the study, including team members and direct observers. We are all more cognizant of our behaviors and are developing excellent hand hygiene habits. Our residency as a whole is a lot more aware of the need and importance of appropriate hand hygiene techniques and we really feel our work has impacted behavior in a positive way.

# Hand Hygiene Compliance: A House Staff Study

Stephanie Detterline MD, Eskandar Yazaji MD, Sameer W. Ahmed MD, Neha Kalaria MD, Mansoor Mozayan MD

Union Memorial Hospital, Baltimore, MD

## Introduction

In the United States, an estimated 5% of patients develop healthcare associated infections (HCAI) at a cost of 4.5 billion USD per year. These infections result in substantial morbidity, mortality, and prolonged hospital stay. Infection control experts everywhere are working to identify and correct factors that contribute to these rates. It is widely agreed that proper hand hygiene remains the single most effective means of prevention of HCAI. The CDC recommends hand washing with either soap and water, or an alcohol-based hand rub.

## Statement of the Problem

Although hand hygiene has long been regarded as the most effective measure to prevent HCAI, numerous studies over the past few years have demonstrated that compliance with hand hygiene recommendations is poor and interventions are not effective long term. Further, there is a lack of well-designed studies to address this issue and provide recommendations for the most effective interventions.

We reviewed the data from our hospital system and found that there was a great opportunity for improvement in the hand hygiene behaviors of house staff physicians (resident physicians in training at all levels).

## Objectives of Intervention

Our study intended to monitor and improve the hand hygiene compliance of internal medicine house staff at Union Memorial Hospital by:

- Observation of attending and house staff baseline compliance
- Modeling of hand hygiene behavior by attending physicians
- Monthly house staff education and individual feedback

## Description

We performed a prospective observational study in which the hand hygiene compliance of attending and resident physicians was observed by non-physician members of the medical team. The observations were made during daily walking rounds on the inpatient medicine services. Compliance was defined by the use of soap and water or antibacterial gel upon entry to and exit from a patient room.

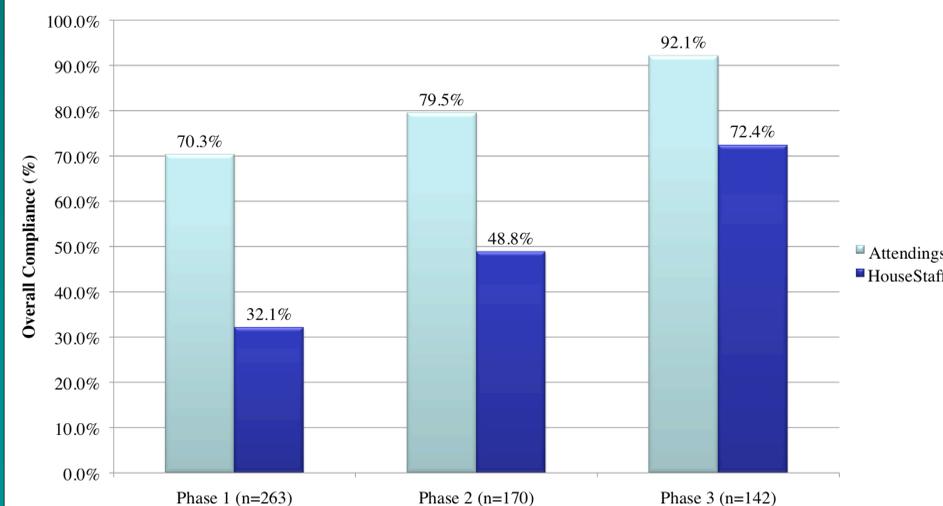
Phase I reflects baseline data where all subjects were unaware of the observations. The attendings were then informed of the study and instructed to model proper hand hygiene behavior (Phase II). During Phase III, house staff were given formal hand hygiene education and received confidential feedback about their compliance on a monthly basis.

## Results

Phase 1 hand hygiene compliance was calculated from 263 observations made over a 4.5 month period and yielded an attending compliance (AC) of 70.3% and house staff compliance (HC) of 32%. Phase II compliance was based on 170 observations over 3 months and yielded an AC of 79.5% and HC of 48.8%. Phase III compliance was based on 140 observations over 4 months and yielded an AC of 92.1% and an HC of 72.4%.

Behavior modeling by attendings yielded an improvement in house staff compliance of 16.7% and education/feedback returned an additional 23.6% increase in house staff compliance. In combination, house staff compliance improved 40 percentage points, over 100%, from baseline.

## Hospital Compliance



## Hand Hygiene Compliance Detail

	Phase 1		Phase 2		Phase 3	
	Entrance	Exit	Entrance	Exit	Entrance	Exit
Attendings	62.7%	77.7%	77.7%	81.2%	94.0%	90.3%
House Staff	31.0%	33.2%	48.8%	48.8%	72.5%	72.2%

## Key Lessons Learned

- Hand hygiene education with periodic reinforcement was needed to improve physician compliance..
- Individual understanding of hand hygiene compliance varied widely and required clarification.
- The combination of modeling, education & confidential feedback yielded dramatic improvements in hand hygiene compliance.

## Next Steps

- Review current hospital hand hygiene protocols for timeliness, uniformity, and clarity.
- Consider routine hand hygiene reorientation for all staff.
- Study whether continued periodic observation and feedback is necessary to sustain compliance. If so, how often?

Hospital: Virginia Mason Medical Center, Seattle WA

Team Leader: Drs. Brian Owens / Michael Mulroy / Justin Siegal

I. PROJECT TITLE/NAME: Teamwork in the Operating Room: Role of the Checklist
II. BRIEF DESCRIPTION: The group is evaluating the degree of participation in the WHO pre-procedural checklist to assess the degree of participation and sense of empowerment that it provides to all the team members, over and above its role as a mechanical check of equipment. A preliminary assessment of the degree of participation will be followed by a review of the components of the checklist and a formal simulation of ideal participation. Follow-up observation will then assess impact of intervention.
III. OPPORTUNITY STATEMENT: The goal is enhanced participation of all team members, including residents, technicians, and nurses in addition to professional medical staff.
IV. RESEARCH QUESTION: Will re-structuring of the Checklist and education lead to greater participation and empowerment?
V. HYPOTHESIS: Re-structuring of the Checklist and education will lead to greater participation and empowerment.
VI. MEASURES: Degree to which each member of the team participates in the checklist and speaks their name and concerns, measured before and after revision and intervention. Pre & post measure of culture of safety (AHRQ questions/staff survey) Staff satisfaction survey in quality improvement project.
VII. INSTRUMENTS: The WHO checklist itself, and a "scorecard" documenting the degree to which each team member contributes to the completion of the checklist. Agency for Healthcare Research & Quality Culture of Safety Survey Hospital tool.
VIII. BASELINE DATA COLLECTED: Baseline data consisted of "blinded" observation of performance of the WHO checklist in 31 operating rooms by non-involved anesthesia technicians. The frequency with which the surgeon, circulating nurse, surgical tech, and anesthesia provider spoke their names and contributed information to the discussion was recorded, as well as how often each member stopped all activity. Across all groups, names were spoken less than 50% of the time, and no new information was volunteered beyond the surgeon's description of the intended procedure.
IX. INTERVENTION: The group changed the format (not the content) of the current pause (based on a task force consisting of representatives of each group participating in the pause) to create a "forcing function" for each team member, requiring each group (circulating nurse, scrub technician, anesthesia provider, surgeon) to state their full name and attest to specific portions of the pause that fall within their purview. To facilitate participation, a new "Attestation Checklist" [see attached] was printed in large format on laminated posters and placed in each operating room so that the participants would have a "visual cue" for their respective parts. Following a formal didactic presentation at a Surgical Forum, a two month "orientation" was initiated, with members of the development team coaching the operating room staff on the use of the new checklist.
X. POST-INTERVENTION DATA: <u>Interval findings/impressions after first 4 weeks of "training"</u> <ul style="list-style-type: none"><li>o <i>Incomplete introductions by/about all in room – especially Interns/Residents @ ~ 50%</i></li><li>o <i>Missing full names by all members (tend to share only first name) @ ~ 80%</i></li><li>o <i>More members are stopping &amp; are ready (participating) in the timeout @ ~ 70-90%</i></li><li>o <i>Content still seems excessive (i.e. implants &amp; vendors)</i></li><li>o <i>Occasionally new information is being shared @ ~ 10%</i></li><li>o <i>Solicit response from others @ ~ 30%</i></li><li>o <i>Surgeons incomplete with historic information - anecdotal</i></li><li>o <i>Anesthesia most consistent &amp; sharing complete information - anecdotal</i></li></ul> Based on those observations, the checklist posters were modified to include the need for the surgical resident or Physicians' Assistant to also speak their names, and training was continued to emphasize the other elements. Contemporaneous tracking of the performance during the two month "intervention" period showed steady increases in degree of participation and contributions of new knowledge to the pause.

<p>XI. TYPE OF ANALYSIS: Frequency of participation, stopping all activity, and offering new information will be compared by frequency distribution testing.</p>
<p>XII. DID YOU COLLECT ADDITIONAL DATA? The ultimate goal of the project was enhancement of teamwork. A standard biannual institutional "Culture of Safety" survey was performed coincidentally during the second month of the intervention. Teamwork attitudes in this survey were above the 60% level, consistent with previous data. Further analysis of subsequent surveys over the ensuing years will be used to assess any further improvement in teamwork measures.</p>
<p>XIII. SUCCESS FACTORS:</p> <ol style="list-style-type: none"> <li>1. Promote engagement for team work, communication, and patient safety</li> <li>2. Ensure "Right's": 1) patient, 2) procedure, 3)site, 4)equipment, 5) medication / blood, &amp; 6) plan / anticipatory alternatives.</li> <li>3. Create atmosphere of mindfulness &amp; speaking-up - checking self &amp; successively by others in room / team</li> </ol>
<p>XIV. BARRIERS:</p> <ol style="list-style-type: none"> <li>1. Regulatory requirements frame the content of checklist – limited ability to simplify / modify.</li> <li>2. That the residents and PAs are most frequently slighted in the current process (not introduced / encouraged to speak-up); "paste-on" visual cue in the Surgeon part to include the resident and PA at the introduction.</li> <li>3. "Packaging" self introduction of full name in conjunction with content of attestation</li> </ol>
<p>XV. LESSONS LEARNED:</p> <ul style="list-style-type: none"> <li>o Changing format can change behavior</li> <li>o Staff are more likely to support changes that they participated in creating</li> <li>o When staff are required to participate, they are more likely to comply with stopping <ul style="list-style-type: none"> <li>▪ And more information is exchanged</li> </ul> </li> <li>o Junior staff (residents and PA s are more likely to be ignored); participation needs encouragement</li> <li>o Positive input from circulators and scrub tech, stating that they like attesting to what they know and feel that they have the opportunity to contribute or stop the line in cases of problems</li> </ul>
<p>XVI. UNINTENDED CONSEQUENCES:</p> <ol style="list-style-type: none"> <li>1) Positive Unintended Consequences: Translation - spread of our project concepts to other procedural units, specifically: 1) Bronchoscopy, 2) Cardiology (Cath Lab), 3) GI/Endoscopy, and 4) Interventional Radiology .</li> <li>2) Negative Unintended Consequences: NONE</li> </ol>
<p>XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?</p> <p style="text-align: center;">1   2   3   4   5   6   7   8   <b>9</b>   10</p>
<p>XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?</p> <p style="text-align: center;">1   2   3   4   5   6   7   <b>8</b>   9   10</p>
<p>XIX. NEXT STEPS:</p> <ol style="list-style-type: none"> <li>1) Next AHRQ Culture of Safety Survey planned for April 2011.</li> <li>2) Review / analyze morbidity and surgical complication data (rates for intra/post-op mortality and complications very low – did not see change in short project period).</li> </ol>
<p>XX. PROJECT IMPACT:</p> <ul style="list-style-type: none"> <li>• Recognition of "best practices" – by internal customers / peers.</li> <li>• Checklist and role expectations spread to: 1) Bronchoscopy, 2) Cardiology (Cath Lab), 3) GI/Endoscopy, and 4) Interventional Radiology procedural areas, as well as off main campus / satellite ambulatory surgery centers.</li> <li>• American Society Anesthesiologists accepted VM Anesthesia Resident presentation (A1897) for October 2010 conference; "Simply Introducing a Preoperative Checklist Does Not Produce Teamwork Behaviors" was also selected as one that may be of interest to the lay press.</li> </ul>



# Teamwork in the Operating Room: Role of the Checklist

Drs. Richard Koehler, Michael Mulroy, Jon Narimasu, & Allison Porter,  
Virginia Mason Medical Center, Seattle WA



## Introduction

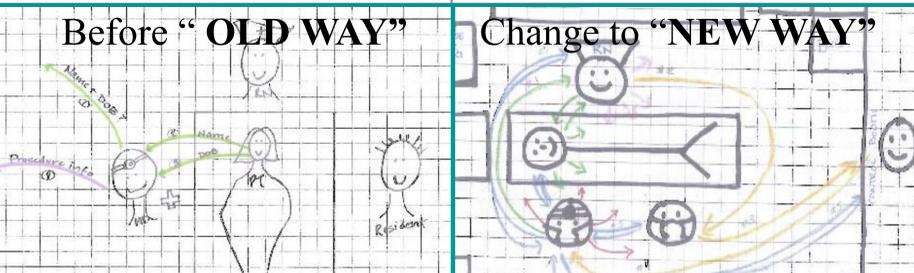
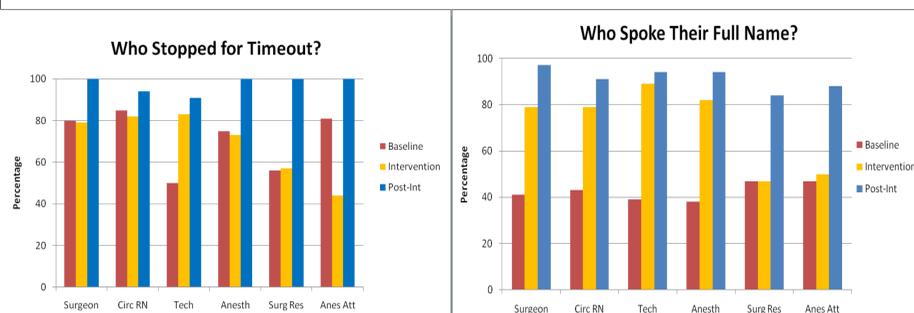
Virginia Mason Medical Center is a non-profit integrated healthcare system that includes an independent academic medical education program, a multi-specialty group practice of more than 480 physicians, a regional network of primary & specialty clinics, Benaroya Research Institute, Bailey-Boushay AIDS Hospice, and an acute care hospital licensed for 336 beds.

## Statement of Problem

In January 2009, Virginia Mason Medical Center adopted a version of the World Health Organization (WHO) SafeSurgery checklist, modifying it to include additional local and national surgical quality improvement program elements. In subsequent audits of performance, perioperative leaders became concerned that the pre-procedural pause performed immediately before incision failed to encourage participation, enhance teamwork, or empower communication in the operating room. Specifically, in our surgeon-lead process, not all members of the team stopped their work, nor did they say their name, let alone speaking-up to offer observations. Finally, we needed to build a standard process that would integrate three groups of surgical practices (Virginia Mason, Group Health & Pacific Medical).

## Objectives of Intervention

Re-structuring of the WHO Pre-procedure Checklist and education will lead to greater participation and empowerment.



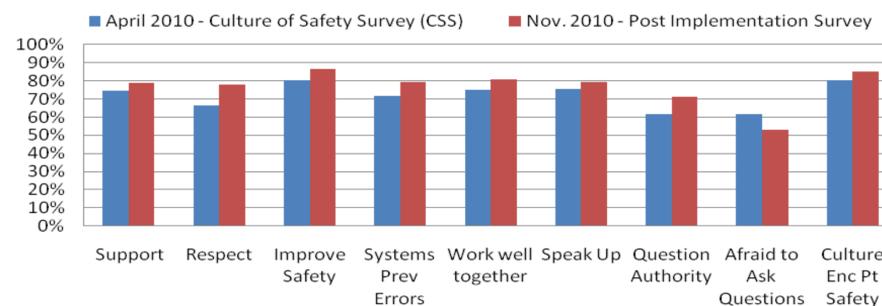
## Description

A Surgical Attestation Timeout Team developed and implemented an improved timeout process engaging all team members in a robust information exchange - requiring each member (circulating nurse, scrub technician, anesthesia provider, and surgeon) to state their full name and attest to specific portions of the procedure that fall within their role. To facilitate participation, the team modified the World Health Organization surgical checklist, re-printing the tool as a large laminated poster and placed it in each operating room so that the participants would have a "visual cue" for their respective parts.

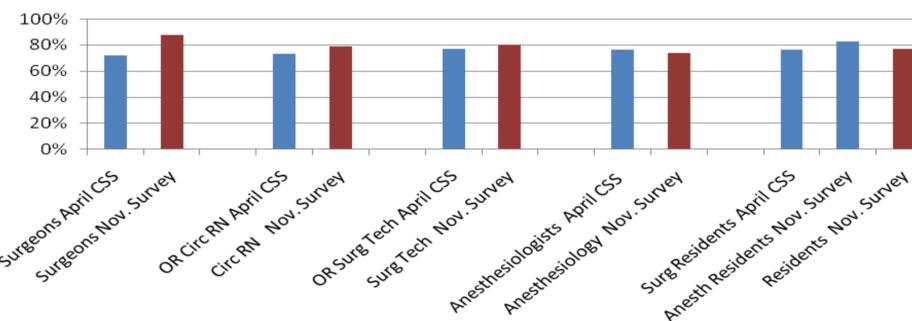
## Results / Findings to Date

The result was a 2 minute process which demonstrated 100% of the checklist being completed, compared to 54% prior; 98% of the staff stopping to participate compared to 71% prior; additional information being offered 22% of the time (speaking-up for safety) an increase from 9%; and measurable improvements in teamwork scores using the AHRQ culture of safety survey.

### Project's Impact on Culture of Safety



### Staff more likely to "speak up if they see something that may negatively affect pt. care"



## Room Poster

Member	Standard Presentation Attestation - what you know for sure
Attending Surgeon or Primary Surg Resident	<input type="checkbox"/> Call for Time out <input type="checkbox"/> Solicit Report from Circ RN
Circulating RN	<input type="checkbox"/> Identify self / guest (PRN) - full name & role <input type="checkbox"/> Identify patient 1: State Full Name <input type="checkbox"/> Identify patient 2: State Date of Birth <input type="checkbox"/> Consent signed for (state site & procedure.) <input type="checkbox"/> Foley - inserted / NA <input type="checkbox"/> SCDS - in place / turned On / NA <input type="checkbox"/> Heating Blanket - in place / turned ON / NA <input type="checkbox"/> Rainbow sheet documentation accountability <input type="checkbox"/> White board updated <input type="checkbox"/> Solicit Report from Scrub Tech
Surgical Scrub Tech	<input type="checkbox"/> Identify self / guest (PRN) - full name & role <input type="checkbox"/> Specific instrumentation available and ready to start case <input type="checkbox"/> Specialty Implants / Equipment present for consented surgery <input type="checkbox"/> Need for Vendor/Trainer with new equipment <input type="checkbox"/> Confirms "YES" is visible in prepped field <input type="checkbox"/> Drugs AND Solutions are all Labeled <input type="checkbox"/> Preliminary Counts were performed / Done <input type="checkbox"/> Solicit Report from Anesthesia
Anesthesiology	<input type="checkbox"/> Identify self / guest (PRN) - full name & role <input type="checkbox"/> State significant Drug Allergies <input type="checkbox"/> Antibiotics - ordered / administered / re-dosing plan <input type="checkbox"/> State Blood &/or Blood Products Ordered / NA <input type="checkbox"/> Amount Blood &/or Blood Products Availability / NA <input type="checkbox"/> Cell saver plan / NA <input type="checkbox"/> Concerns, Co-morbidities and Hemodynamics <input type="checkbox"/> BetaBlocker plan / NA <input type="checkbox"/> Diabetes or Glucose plan / NA <input type="checkbox"/> Plan for Post-op Pain Management <input type="checkbox"/> Solicit Report from Surgeon
Surgeon	<input type="checkbox"/> Identify self / guest (PRN) - full name & role <input type="checkbox"/> State Name of Procedure, Site, Fields, Time Needed <input type="checkbox"/> State Relevant Patient Clinical History <input type="checkbox"/> Verify Imaging Matches Patient/Site/Sidedness <input type="checkbox"/> State Anticipated Difficulties / significant Co-morbidities <input type="checkbox"/> State Anticipated Blood loss <input type="checkbox"/> Post-op Plan - disposition/ special bed? <input type="checkbox"/> Solicit any others in room to identify self & role <input type="checkbox"/> State Additional Information <input type="checkbox"/> Encourage - any Additional Input or Safety Concerns

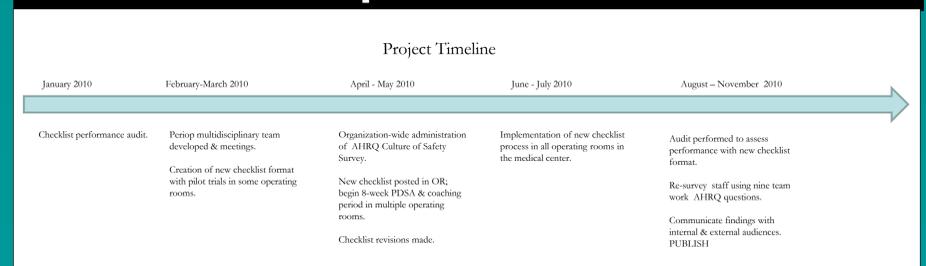
## Checklist

BEFORE THE INCISION>>
<b>Attending Surgeon or Primary Surgery Resident</b> <input type="checkbox"/> Call for Time out <input type="checkbox"/> Solicit Report from Circ RN
<b>Circulating RN</b> <input type="checkbox"/> Identify self / guest (PRN) - full name & role <input type="checkbox"/> Identify patient 1: State Full Name <input type="checkbox"/> Identify patient 2: State Date of Birth <input type="checkbox"/> Consent signed for (state site & procedure.) <input type="checkbox"/> Foley - inserted / NA <input type="checkbox"/> SCDS - in place / turned On / NA <input type="checkbox"/> Heating Blanket - in place / turned ON / NA <input type="checkbox"/> Rainbow sheet documentation accountability <input type="checkbox"/> White board updated <input type="checkbox"/> Solicit Report from Scrub Tech
<b>Surgical Scrub Tech</b> <input type="checkbox"/> Identify self / guest (PRN) - full name & role <input type="checkbox"/> Specific instrumentation available and ready to start case <input type="checkbox"/> Specialty implants / Equipment present for consented surgery <input type="checkbox"/> Need for Vendor/Trainer with new equipment <input type="checkbox"/> Confirms "YES" is visible in prepped field <input type="checkbox"/> Drugs AND Solutions are all Labeled <input type="checkbox"/> Preliminary Counts were performed / Done <input type="checkbox"/> Solicit Report from Anesthesia
<b>Anesthesiology</b> <input type="checkbox"/> Identify self / guest (PRN) - full name & role <input type="checkbox"/> State significant Drug Allergies <input type="checkbox"/> Antibiotics - ordered / administered / re-dosing plan <input type="checkbox"/> State Blood &/or Blood Products Ordered / NA <input type="checkbox"/> Amount Blood &/or Blood Products Availability / NA <input type="checkbox"/> Cell saver plan / NA <input type="checkbox"/> Concerns, Co-morbidities and Hemodynamics <input type="checkbox"/> BetaBlocker plan / NA <input type="checkbox"/> Diabetes or Glucose plan / NA <input type="checkbox"/> Plan for Post-op Pain Management <input type="checkbox"/> Solicit Report from Surgeon
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## Key Lessons Learned

- Changing format can change behavior
- Staff are more likely to support changes that they participated in creating
- When staff are required to participate, they are more likely to comply with stopping
  - And more information is exchanged
- Junior staff (residents and PA s are more likely to be ignored); participation needs encouragement
- Positive input from circulators and scrub tech, stating that they like attesting to what they know and feel that they have the opportunity to contribute or stop the line in cases of problems.

## Steps - Timeline



**Hospital: Washington Hospital Center**  
**Team Leader: Dr. Frederick Finelli**

I. Project Name: PrOTeCT A Quality Improvement Resident Project to increase Nursing Communication
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) Surgery, Medical ICU, and Cardiac Care Units use checklists to ensure patient safety for procedures and to improve communication between the healthcare team. Extending the checklist idea through the PrOTeCT mnemonic at all patient care floors of Washington Hospital Center (WHC), WHC will increase nursing communication and thereby reduce the length of stay of patients, decrease complications related to Central lines, foley catheters, pressure ulcers, and hospital to home medicine regimes. Using research and Joint Commission Guidelines the mnemonic is as follows: <b>P</b> ressure ulcer prevention, <b>O</b> ral med transition, <b>T</b> elemetry utilization, <b>E</b> liminate <b>C</b> atheters (central and foley), <b>T</b> ell the nurse!
III. OPPORTUNITY STATEMENT: By focusing on improving physician to nurse communication WHC has the opportunity to improve its rate of Catheter related infection, Foley related UTIs, pressure ulcers, length of stay and complications.
IV. RESEARCH QUESTION: Can a checklist supported by an education campaign created and used by residents improve staff relations.
V. HYPOTHESIS: A surgery style checklist supported by a staff educational campaign will improve physician to nurse communication and thereby increase patient quality of care.
VI. MEASURES: Will physician to nurse communication improve? A questionnaire based on resident to nurse communication was handed out to nursing staff pre/post implementation. Will the new diagnosis of pressure ulcers decrease after implementation? We will use the number of newly diagnosed pressure ulcers pre/post implementation. Will the rate of UTIs or Central line catheter infections decrease after implementation? We will use the number of UTIs/ Central line infections pre/post implementation. Does the average length of telemetry utilization decrease? We will use average length of telemetry utilization pre/post utilization. Does the average length of IV antibiotics decrease after implementation? We are still currently working on how to identify accurately the length of IV antibiotics and when it is switched to oral medication.
VII. INSTRUMENTS: Data collection was based on per unit services that are designated as resident run vs non-resident run units. We handed out nursing staff questionnaires to each designated unit. We collected telemetry utilization information, pressure ulcer data, central line data, and number of IV and PO medication doses given.
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.  Using a Likard scale questionnaire we polled nurses pre/post implementation asking specific questions about resident/nursing staff communication. For secondary results we gathered daily telemetry utilization per unit, monthly new diagnosis for pressure ulcers and central line related infection, and total number of IV doses of metoprolol, labetalol, and phenytoin given on a daily basis.
IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted.  An educational powerpoint presentation was given to the Internal Medicine residents and the General Surgery residents in September 2010. Following the presentation a pocket card was handed out to each resident. The residents were then encouraged to review the pocket card on a daily basis for a total of 3 months. Throughout the 3 months the residents were periodically reminded about the PROTECT project.
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.  All data was collected for a total of a 6 month time period of June-December 2010. The baseline data was considered to be June-August 2010 time period. We then reviewed all data from September-December 2010 for the post-intervention data.

Data Collected:

Nursing questionnaire was collected in June 2010 and then December 2010.

Daily telemetry utilization was collected from June-December 2010.

Newly diagnosed monthly rate of central line infection rates collected June-December 2010.

Newly diagnosed monthly rate of pressure ulcers collected June-December 2010.

Number of IV doses of labetalol, metoprolol, and phenytoin given during each month from June-December 2010 along with number of PO doses of labetalol, metoprolol, and phenytoin given in that time period also.

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

The nursing questionnaire was analyzed using a t-test.

The secondary measures were analyzed using a mid p exact test for rate comparison.

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

We did not directly collect other data however we did notice the communication on the floors did appear to improve as we reached statistical significance for half of our secondary measures.

The pocket card has not yet spread to other departments however it will in the future.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Resident enthusiasm
2. Nursing staff willingness to participate with this project.
3. Encouragement from GME.

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Data Collection. We found there is no standardization of data collection throughout the institution. This made it extremely hard to collect and compare the data.
2. It was difficult to find the correct person within our institution that controlled the data we were seeking.
- 3.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

Prior to starting a project discuss with the residents. We have found that many of the residents had wonderful ideas and gave terrific advice of how to improve our project.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences:  
We have found that other residents are extremely interested in starting QI projects after witnessing the success of this project.

2. Negative Unintended Consequences:  
We rolled our project out to the Internal Medicine residents and General Surgery residents only. I noted when handing out the nursing survey on the surgical floors that the nurses were not happy that the surgical subspecialties were not included in the study. Many nurses commented they felt the subspecialties were most in need of education on communication.

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 **8** 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 **8** 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

We plan to formalize the pocket card and continue to hand it out to the residents annually. We also to plan to include formalized teaching of the residents annually. All residents will be included this time and not just General Surgery and Internal Medicine.

We also need to talk to the institution about standardizing data collect. We have found that every department collects data very differently and some departments do not even have electronic data collection yet. This made collecting the scope of data that we needed for our secondary goals difficult.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

Other residents have requested to be a part of future QI projects.

Nursing staff is more willing to approach residents with suggestions. After the second survey was collected I had multiple nurses comment about how encouraged they were to know the residents really value them as being an integral portion of the team. I would like to see the nurse-physician communication to continue to grow and improve.



# PrOTeCT:

A Quality Improvement Resident Project to increase Nursing Communication  
 Fredrick Finelli, MD, Richard A Johnson, DO, Patricia Wehner, MD, Tina Emrich, RN, Washington Hospital Center, Washington D.C.



## Introduction

Surgery, Medical ICU, and Cardiac Care Units use checklists to ensure patient safety for procedures and to improve communication between the healthcare team. While these checklists are a series of questions about a given procedure, we hypothesize that to apply the checklist to the general wards a different style of checklist is needed. To our knowledge the checklist idea has never been applied as a pocket card with reference material. To enable the use of a simple checklist that could be used in everyday ward activities, we developed the PROTECT mnemonic (**P**ressure ulcer prevention, **O**ral med transition, **T**elemetry utilization, **E**liminate **C**atheters (central and Foley), **T**alk with the nurse!). Through the use of this PROTECT pocket card we will increase nurse-resident communication thereby improving patient care.

## Statement of Problem

Patient care suffers when physician to nurse communication is suboptimal.

## Objectives of Intervention

Primary Endpoint of the project:

- Improve the communication between nurses and residents.

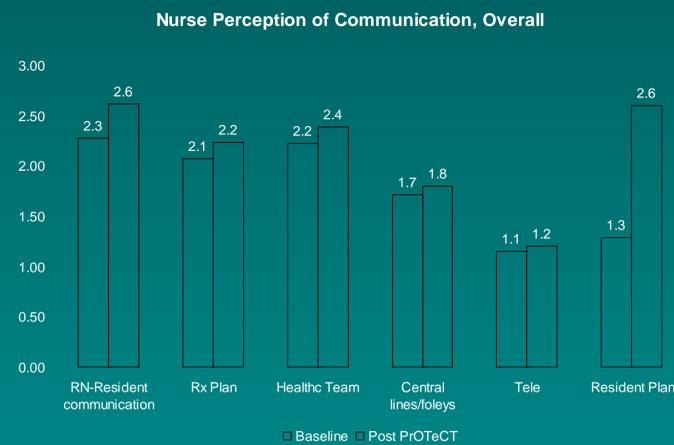
Secondary Endpoint of the project

- Reduce the rates of telemetry usage
- Reduce the rates of line infections
- Reduce the rates of development of pressure ulcers
- Reduce the time to Oral medicine transition

## Description

The PrOTeCT pocket card was distributed amongst the General Surgery and Internal Medicine Residents. A six-item survey was given to the nursing staff on 2 medicine floors and 2 surgery floors pre and post pocketcard distribution.

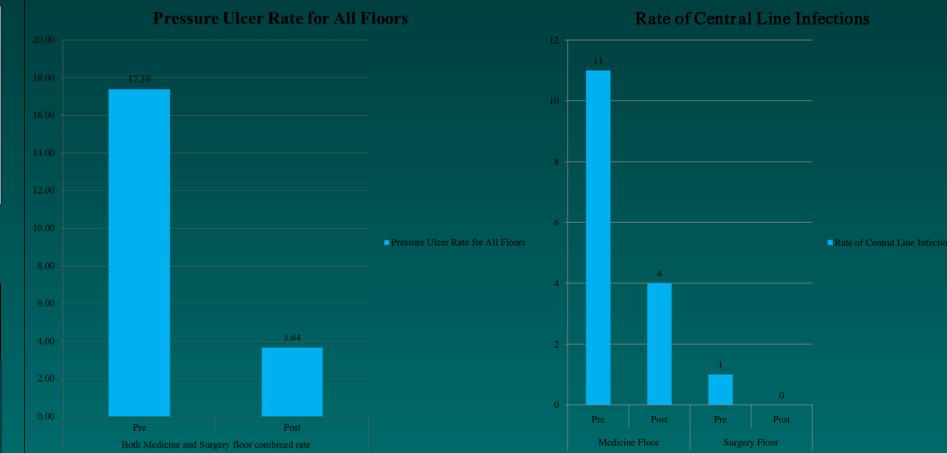
## Results / Findings to Date



## Table 1

	Questions											
	1		2		3		4		5		6	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Average	2.28	2.62	2.07	2.23	2.22	2.38	1.72	1.80	1.15	1.20	1.28	2.60
Median	2	3	2	2	2	2	2	2	1	1	1	3
Mode	2	2	2	2	2	2	2	2	1	1	2	3
Range	1 to 4	1 to 4	1 to 3	1 to 4	1 to 3	1 to 4	1 to 4	0 to 4	0 to 2	0 to 3	0 to 4	1 to 4
P-Value		0.005		0.155		0.185		0.576		0.711		1.66E-16
September Questionnaire N= 54	0 = Never, 1= Almost Never, 2= Sometimes, 3= Frequently, 4= Always											
December Questionnaire N= 60	P values represent two tailed non paired T-test levels of significance											

## Figure 1



## Key Lessons Learned

- Pocket Checklists can influence Resident/Nurse interaction
- A simple pocket card can make a tangible difference in secondary endpoints
- Residents can create a successful quality improvement project

## Next Steps

- Repeat the distribution of the pocket card with full formal educational session and repeat measures to determine true effect
- Compare the effect across performance quarters to account for learning and seasonal variation effects
- Standardize hospital data collection in easily reportable electronic formats

**Hospital:** York Hospital Team 1

**Team Leader:** Ronald Benenson MD

I. PROJECT TITLE/NAME: Crew Resource Management (CRM) in the Trauma Room
II. BRIEF DESCRIPTION: (4-5 sentences, maximum)  An objective of the WellSpan Health (WSH) Operating Plan for 2009-2010 was to enhance WSH's culture of safety by expanding CRM training to additional clinical divisions and departments. Safety, quality and efficiency of patient care in the Trauma Room can be affected by communication of team members. A modified version of CRM was created and initiated in the Trauma Room to improve communication and teamwork.
III. OPPORTUNITY STATEMENT:  The original opportunity statement: Increase the Trauma Team participants' average score on the Human Factors Attitude Survey by 1 point after initiation of CRM. Increase efficiency of communication leading up to ATLS protocol initiation. As we project has evolved, the opportunity statement has changed. A more appropriate statement would be to: Improve the Trauma Communication Survey results with the majority of responses being positive, and to improve communication throughout the entire trauma as measured by the CATS Assessment Instrument.
IV. RESEARCH QUESTION:  Will the use of CRM in the Trauma room improve communication, quality and safety in the Trauma Room?
V. HYPOTHESIS:  Initiation of CRM in the Trauma Room will improve communication and satisfaction of team members as measured by the CATS Assessment Instrument and the Trauma Communication Survey.
VI. MEASURES:  Survey-based data collection to measure subjective participant attitudes towards quality, safety and efficiency of communication in the Trauma Room. Direct observation of trauma resuscitations to score communication and teamwork skills.
VII. INSTRUMENTS:  Trauma Communication Survey: a 25 question Likert scale survey, with additional fields for a one-adjective descriptor of trauma room communication and two comment fields. Communication and Teamwork Skills (CATS) Assessment Instrument; a 21 item instrument for rating communication skills. Categories include: coordination, situational awareness, cooperation and communication. Both instruments will be administered pre- and post-intervention.
VIII. BASELINE DATA COLLECTED: What specific baseline data did you collect? Provide one to three examples of your actual baseline data. For each, indicate what type of measures you have.  Two measures of baseline data were obtained. 1) All providers who work in the Trauma Room were surveyed on their opinions of communication in the Trauma Room (Trauma Communication Survey). 160 providers responded to the survey. Example: The team leader identifies him/herself to team members. strongly agree 6 (3.75%) agree 31 (19.38%) no opinion 28 (17.5%) disagree 71 (44.38%) strongly disagree 20 (12.5%) 2) A trained observer used a Communication and Teamwork Skills (CATS) Assessment Instrument to rate Trauma Team resuscitations. 25 resuscitations were observed and rated. Sample items: Were roles assigned prior to arrival of the trauma? observed and good 1 (4%),

variation in quality 5 (20%),  
 Expected but not observed 19 (76%).

Was an appropriate briefing held before the patient arrived?

observed and good 10 (40%),  
 variation in quality 14 (56%),  
 expected but not observed 1 (4%).

IX. INTERVENTION: Describe your specific intervention, and the time period in which the intervention was conducted.

A Trauma CRM curriculum was developed by a multidisciplinary team. The OR CRM was modified for the trauma resuscitation process. Input from the medical literature, team member expertise, the trauma surgeons and the pre-intervention surveys contributed to the design of the course. The course was delivered in 10 sessions over a 10-week period. The intervention is a training program, Crew Resource Management for the Trauma Room. Each session consisted of a 2-3 hour session attended by all caregivers that respond to the Trauma Room. This includes ED nurses and unit secretaries, ED residents and attending physicians, surgical residents, trauma physicians, Trauma-Surg ICU nurses, respiratory therapists, laboratory personnel, radiology technicians, pre-hospital providers, etc. The sessions included video versions of good and bad communication in the Trauma Room. The course was modified based on feedback from participants. 324 staff members attended the Trauma CRM training sessions.

X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.

Pre-CRM training, the Trauma Communication Survey was completed by 160 personnel. 25 trauma resuscitations were observed and scored by a single observer with the CATS Assessment Instrument. 324 staff completed the 3-hour CRM course.

Post-CRM training, 118 Trauma Communication Surveys and 18 CATS Assessment Instruments have been completed to date.

Trauma Communication Survey:

Survey Question	Pre-CRM Agreement	Post-CRM Agreement	P-Value
Team Leader (TL) identifies self to team members	28.9%	80.0%	<0.001
TL assigns roles for team members	37.4%	74.5%	<0.001
Accurate information is obtained from EMS during team transfer	88.9%	100%	0.003
TL communicates plan before patient arrives	27.0%	74.0%	<0.001
Pre-arrival briefing is important	91.7%	98.0%	0.04
Staff will speak up if they see something that may negatively effect patient care	63.7%	83.5%	<0.001

CATS Assessment Instrument

<b>Observation Metric</b>	<b>PRE</b>	<b>POST</b>	<b>P-value</b>
Briefing	40%	94%	0.001
Verbalize plan of care	44%	89%	0.006
Establish team leader	12%	72%	<0.001
Assign roles	4%	89%	<0.001
Verbalize adjustments in plan	4%	25%	<0.001
Cross monitoring	16%	78%	<0.001
Verbal update -thinks aloud	28%	44%	0.021

Pre- & Post-CRM Communication Description

Post CRM Training - One Word Comments	% change	CI	P-value
Positive Responses Increased	22%	8.4-35.2	0.0012
Negative Responses Decreased	24%	9.6-37.4	0.001

XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)

For the Trauma Communication Survey, question results will be assigned a 1 to 5 score and data will be analyzed using Chi-Squares and a paired-Sample t-test. For the CATS Assessment Instrument, descriptive statistics and Chi-Squares will be used.

XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:

A video camera is being installed in the Trauma Room for peer-review of trauma resuscitations. This will enable further review of communication skills.

XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?

1. Support from administration, C-suite, Board of Directors, Department Chairs and head of Trauma Surgery.
2. Well functioning multidisciplinary team with representation from key clinical players that understood the process, QM Six Sigma leader that advised on methodology.
3. Prior experience with suboptimal completion of a similar project led to a better understanding of what was needed to complete Trauma CRM properly.

XIV. BARRIERS: What were the 3 greatest challenges you encountered?

1. Training over 300 personnel was difficult to arrange. With advent of EHR, CPOE and other initiatives, it was difficult to obtain time and "funding" to get people to attend a 2-3 hour session. This delayed completion of the training by 2-3 months.
2. As we progressed through different versions of our training program, there was some negative feedback about differences between the sessions.
3. Initially Trauma Surgery was only interested in a limited version of CRM. This impeded development of the program. But as the project progressed, the surgeons supported the entire CRM process in the Trauma Room and became the main educators and champions of the process.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative.

This can be done with proper idea (limited scope), teamwork, expertise and support.

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences: As a byproduct of our project, pre-hospital reporting to the ED, and ED reporting of trauma information to the Trauma Room has improved significantly.
2. Negative Unintended Consequences:

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 8 **9** 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 8 **9** 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

Monitor process for sustainability.

Develop strategies to improve specific metrics: verbal assertion, receptiveness to assertion & ideas.

Develop metrics to measure patient safety.

Abstract submitted to the American Association for the Surgery of Trauma. Manuscript in process.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

The Board of Directors has mandated CRM in all procedure-based areas of the hospital. Our project & team members will assist in development for other departments.

Quality Management is now working with the Director of Medical Education to develop PI/QI initiatives and training for residents.

ED personnel are starting to use the CRM briefing for procedures, resuscitations, etc.

Pre-hospital ALS and BLS have asked for training sessions. This will include a brief version of CRM principles. There will be an additional focus on what information is needed for all trauma patients and review of criteria for Trauma Room patients. Scheduled for April 2011.

## Introduction

Crew Resource Management (CRM) has been implemented successfully in the Operating Rooms at York Hospital.

A CRM program specific to trauma resuscitation was identified as a means to improve team function, communication, and patient safety.

## Statement of Problem

An objective of the WellSpan Health (WSH) Operating Plan for 2009-2010 was to enhance the WSH culture of safety by expanding CRM training to additional clinical areas.

Safety and quality of patient care in the Trauma Room can be affected by communication of team members.

A modified version of CRM was created and initiated in the Trauma Room to improve communication and teamwork.

## Objectives of Intervention

- To improve communication in the Trauma Room through CRM training
- To identify and standardize key areas of communication
- To achieve an environment of open communication through use of a shared mental model, situational awareness, appropriate assertiveness and cross monitoring.

## Description

A multidisciplinary team was created to develop a CRM training program.

PI tools used included: cause & effect analysis, current and future state flow charting, rapid-cycle PDSAs for visual management cues and Trauma Room communication /scripting, and implementation of standard work processes measured by the observation metrics.

A trauma-specific CRM program was developed and presented to Trauma Room personnel.

Pre-and post-CRM implementation: Personnel were surveyed with the Trauma Communication Survey, a 25 question Likert scale survey with an additional field for a one-adjective descriptor of Trauma Room communication. Independent observations were performed using the Communication and Teamwork Skills (CATS) Assessment Instrument, a 21- item instrument for rating communication skills.

## Results / Finding To Date

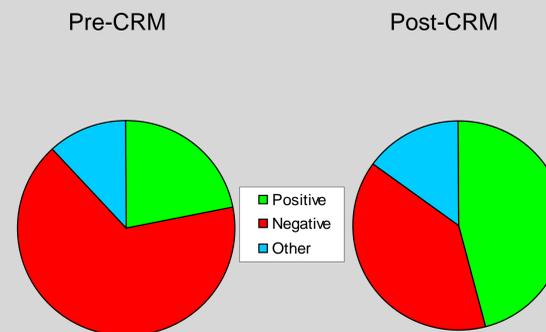
Pre-CRM training: Trauma Communication Survey was completed by 160 personnel. 25 trauma resuscitations were observed and scored by a single observer with the CATS Assessment Instrument.

324 staff completed the 3-hour CRM course.

Post-CRM training: 118 Trauma Communication Surveys and 18 CATS Assessment Instruments have been completed to date.

## Results / Finding To Date

### Pre- & Post-CRM Communication Description



Post CRM Training - One Word Comments	% change	CI	P-value
Positive Responses Increased	22%	8.4-35.2	0.0012
Negative Responses Decreased	24%	9.6-37.4	0.001

### Trauma Communication Survey

Survey Question	Pre-CRM Agreement	Post-CRM Agreement	P-Value
Team Leader (TL) identifies self to team members	28.9%	80.0%	<0.001
TL assigns roles for team members	37.4%	74.5%	<0.001
Accurate information is obtained from EMS during team transfer	88.9%	100%	0.003
TL communicates plan before patient arrives	27.0%	74.0%	<0.001
Pre-arrival briefing is important	91.7%	98.0%	0.04
Staff will speak up if they see something that may negatively affect patient care	63.7%	83.5%	<0.001

## Results / Findings To Date

### CATS Assessment Instrument

Observation Metric	PRE	POST	P-value
Briefing	40%	94%	0.001
Verbalize plan of care	44%	89%	0.006
Establish team leader	12%	72%	<0.001
Assign roles	4%	89%	<0.001
Verbalize adjustments in plan	4%	25%	<0.001
Cross monitoring	16%	78%	<0.001
Verbal update -thinks aloud	28%	44%	0.021

## Key Lessons

A multidisciplinary team with clinical champions aids success in planning & implementing a major culture change.

Limit interventions to important process steps. Avoid scope creep.

Standardize key work processes to assure quality, safety and sustainability.

Use of visual management and asynchronous communication helps avoid waste & error associated with verbal repetition.

## Next Steps

- Monitor process for sustainability.
- Develop strategies to improve specific metrics: verbal assertion, receptiveness to assertion & ideas.
- Develop metrics to measure patient safety.
- Abstract submitted to the American Association for the Surgery of Trauma. Manuscript in process.

Hospital: York Hospital, team 2

Team Leader: Brian Pollak, MD

I. PROJECT TITLE/NAME: Improving resident preparedness in cross-cover overnight patient care
II. BRIEF DESCRIPTION: (4-5 sentences, maximum) Cross-cover care is necessary in residency training. Simple changes to the current electronic cross cover tool can improve resident comfort in delivering cross-cover care.
III. OPPORTUNITY STATEMENT: Elements that make residents feel ill-prepared for cross-cover care can be identified, categorized, and addressed by changing the current sign-out tool.
IV. RESEARCH QUESTION: Will simple changes to an electronic sign-out tool improve resident preparedness when delivering cross-cover care?
V. HYPOTHESIS: Simple changes to an electronic sign-out tool will improve resident preparedness in delivering cross-cover care.
VI. MEASURES: Likert scale of over-all feeling of preparedness
VII. INSTRUMENTS: Resident survey to assess over-all preparedness (ordinal), types of missing information (nominal), and places where missing information can be found (nominal).
VIII. BASELINE DATA COLLECTED: Over-all quality of sign-out: poor = 0, marginal = 0, fair = 6, good = 14, excellent = 1. Could missing information have been anticipated at the time of sign-out: no = 12%, yes = 88%.
IX. INTERVENTION: Develop survey (April, 2010). Survey the FM & IM residents (May, June). Compile and review survey results (July). Develop prototype changes (August-December). Finalize preferred prototype (January, 2011). Discuss changes with IT (February). Repeat survey of FM & IM residents (March).
X. POST-INTERVENTION DATA: What specific post-intervention data did you collect? Provide one to three examples of your post intervention data. You should be able to compare your baseline data with your post-intervention data. For each, indicate what type of measures you have.
XI. TYPE OF ANALYSIS: Based on your types of measures, what type of statistical analysis will you utilize to compare your baseline data to your post-intervention measures? (List for each type)
XII. DID YOU COLLECT ADDITIONAL DATA? For example, did you assess knowledge, skills or behaviors? Process changes? Impact on learning? Spread to other programs? Please list other types of data that you may be able to use in your project summary, and how you might analyze it:
XIII. SUCCESS FACTORS: What were the 3 greatest factors that led to your project's success?  1. 2. 3.
XIV. BARRIERS: What were the 3 greatest challenges you encountered?  1. Finding common meeting times. 2. Meeting deadlines 3.

XV. LESSONS LEARNED: What single most important piece of advice would you give to another leader embarking on a similar initiative?

XVI. UNINTENDED CONSEQUENCES: Please describe any unintended consequences from your project.

1. Positive Unintended Consequences:
2. Negative Unintended Consequences:

XVII. EXPECTATIONS VERSUS RESULTS: On a scale of 1 to 10 (with "1" meaning nothing and "10" meaning everything), how much of what you set out to do was your team able to accomplish?

1 2 3 4 5 6 7 8 9 10

XVIII. SATISFACTION: On a scale of 1 to 10 (with "1" meaning not at all satisfied and "10" meaning completely satisfied), how satisfied are you with what you were able to accomplish on your NI project?

1 2 3 4 5 6 7 8 9 10

XIX. NEXT STEPS: Describe next steps for your project, including plans for sustaining and spreading the changes made.

XX. PROJECT IMPACT: What changes have you observed in your residency program, or at your institution, based upon this project?

# Improving Resident Preparedness in Cross-cover Overnight Patient Care

Kara Choi, MD; Ken Stone, MD; Brian Pollak, MD  
Department of Family Medicine, Department of Medicine



## Problem Statement

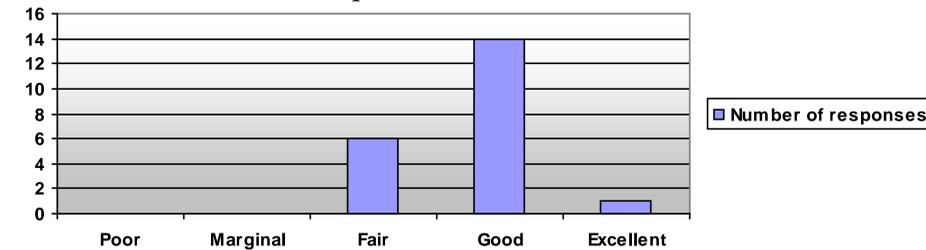
Cross-cover care is necessary in residency training. Elements that make residents feel ill-prepared for cross-cover care can be identified, categorized, and addressed by changing the current electronic sign-out tool.

## Understanding the Problem

Literature search guided our survey development. We surveyed Family Medicine and Internal Medicine residents about their perceived preparedness for overnight cross-cover care. We asked what information would have improved their feeling of preparedness.

## Over-all Quality of Sign-out

POOR	Unfocused, missed key issues
MARGINAL	Many minor, 1 potential major error
FAIR	1-2 minor errors that were clinically relevant
GOOD	1-2 minor errors that were clinically irrelevant
EXCELLENT	Adequate to address all issues

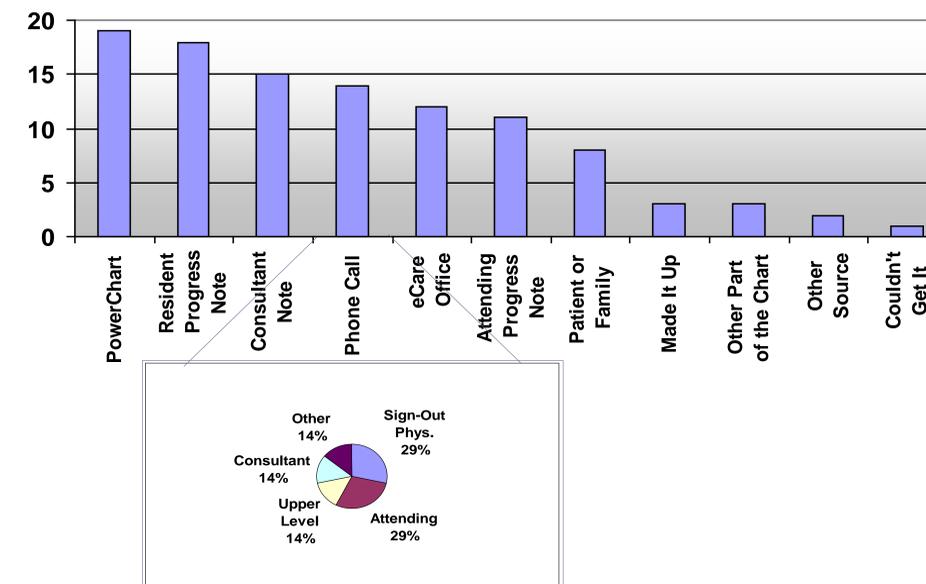


Residents felt that 88% of difficult situations could have been anticipated.

## What Information Would Help?

- Anticipated problems and suggested management
- Medication list from EMR
- General conditions and current acute problems
- Management issues that were discussed during the day
- Rationale behind medication changes
- Last admission
- Consultants' names

## Where Did Residents Find Helpful Information?



## Action Plan

Using the survey results, we developed several mock-ups of what the revised sign-out tool might look like. After the first few mock-ups evolved, we informally asked residents to give feedback on the proposed changes, then made final changes. We presented this final mock-up to the IT person who programmed the current sign-out tool.

## Proposed changes:

1. Re-label four textboxes to provide more resident guidance when completing the sign-out information:
  - Presentation (CC, HPI, PMHx)
  - Studies & Consultants
  - Active problems, changes w/ rationale, anticipated complications with suggested management
  - To Do (tonight or before discharge)
2. Auto-populate information that is in the EMR (e.g., code status, recent vitals, recent labs with time of lab draw, allergies, and weight) into the sign-out tool.
3. Change the time-out process to avoid losing information.

## Results

Some changes will be easier to make than others, not all changes will be made at once. Our requests are being prioritized by IT. The next steps are:

- Educate residents on better sign-out behaviors and describe how the changes to the sign-out tool will support better sign-out;
- Approach residency program directors about faculty development and other ways to sustain the changes in sign-out behaviors;
- Choose a go-live date for the initial changes (likely in late March 2011);
- Re-survey the residents after using the revised sign-out tool to see if perceived quality improves.

## Lessons Learned

- Mock-ups allow fast evolution rather than making sequential changes to the final product.
- It is hard to please everyone when balancing brevity and thoroughness.
- Proper education needs to accompany new tools.

Resident Sign-Out Survey

We are conducting a short survey to better understand our current sign-out process. Please answer the following questions based on a difficult call night; if none stand out use your most recent call night.

Service Team:  Family Medicine  Internal Medicine

PGY:  1  2  3

1. If there were information that would have been useful during sign-out, please describe what would have helped.

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2. When information was missing during sign-out, how did you get that information? (Check all that apply)

The chart:  Resident progress note  Attending physician note  
 Consultant note  Other: \_\_\_\_\_

The computer:  PowerChart  eCare Office  Other

Made it up as it best fit clinically  
 I couldn't get it  
 Asked patient and/or patient's family  
 Other source not listed here, please describe \_\_\_\_\_

Made a phone call to:  An attending physician  Consultant  
 Upper level resident  Person who signed-out to you  
 Someone else, please describe \_\_\_\_\_

3. Should this situation have been anticipated and discussed during sign-out?  
 No  Yes

4. Overall, how would you rate the sign-out you received at the beginning of your call?

1	2	3	4	5
POOR Unfocused, missed key issues	MARGINAL Many minor, 1 potential major error	FAIR 1-2 minor errors that were clinically relevant	GOOD 1-2 minor errors that were clinically irrelevant	EXCELLENT Adequate to address all issues

5. On the back, please write any comments or suggestions for improving SignOutPlus.