Evaluation of a Pharmacist-Led Bedside Medication Delivery Service for Cardiology Patients at Hospital Discharge

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Sacramento, California
UC Davis Medical Center

• Multispecialty, university-affiliated medical center
  • 619 bed tertiary care hospital located in Sacramento, CA
  • Serves approximately six million residents in the region
  • Leapfrog group designated “Top Hospital”

• Pharmacist-led transitions of care (TOC) services
  • New service initiated in July 2013
  • Two clinical pharmacists and one pharmacy technician

Our Story

- University Hospital Consortium (UHC) Webinar and literature review of TOC services
- Patient Satisfaction
- Initiation of Delivery System Reform Incentive Program (DSRIP) in 2010
- Creation of the BEAM service
Need for Transitions of Care

• Healthcare transitions are plagued with pitfalls
  • Up to half of hospitalized patients have ≥ 1 medication discrepancies present at the time of discharge

• Pharmacist intervention can improve care coordination, resulting in:
  • Reductions in the number of medication discrepancies
  • Lower rates of preventable medication-related events
  • Improved medication adherence
  • Increased patient satisfaction

Patient Satisfaction is a Key Component

• Huge move in the emphasis from the process of care to the patient experience
• Some reimbursements now hinge on patient satisfaction despite adequately provided care
• Satisfaction scores going up as a nation, and we are graded on a curve!
• UHC webinar showed TOC services associated with marked improvement in HCAHPS scores
Financial Considerations

• Improving patient care is the top priority
• Avoiding penalties is a close second
• Improving patient satisfaction is tied for second
• Additionally, for specific patients, it can be financially sustainable for us to fill discharge prescriptions
• All of the above = $$$$$ and improved quality
Upcoming Factors

• HRRP – Hospital Readmission Reduction Program
• Changes in P4P/VBP in the clinics
• Medication reconciliation and TOC services are on the Joint Commission and DPH radars
• DSRIP – Delivery System Reform Incentive Pool
UCDMC DSRIP Initiative

• Identified ten interventions for process improvement within specific areas of the healthcare system

• Project 4 – Conduct Medication Management
  • Expanded the role of pharmacists in various care settings
  • Targeted three main high-risk disease states
  • Instituted the following medication safety strategies:
    • Optimize patient’s medications prior to discharge
    • Reconcile medications at the time of discharge
    • Provide patient education
High-risk for Readmissions Team

- One of six inpatient TOC services at the UCDMC
- Targets patients admitted with a principal diagnosis of:
  - Acute myocardial infarction (AMI)
  - COPD exacerbation
  - Pneumonia

**Admission**
- Patient flagged for inclusion to the pharmacist-led TOC service
- Medication reconciliation

**Discharge**
- Comprehensive medication and disease state education
- Assistance with medication access issues

**Home**
- Telephone encounter completed at 3 - 14 days after hospital discharge
- Only completed for patients not educated at the hospital bedside prior to discharge
Bedside Education and Access to Medications (BEAM)

- Designed to capture patients already receiving reformed discharge services from our pharmacist-led TOC team
- Conducted as a three-month pilot project
  - Targeted cardiology patients admitted for acute MI (AMI)
- All interventions were conducted in-person at the bedside
Project Objectives

• Primary Objective
  • Assess medication initiation rates for anti-platelet agents, cardio-protective antihypertensive medications, and statins

• Secondary Objectives
  • Determine 30-day post-discharge healthcare utilization
  • Evaluate the degree of patient satisfaction associated with BEAM services
  • Describe the institutional cost benefit of the BEAM service
Methodology

• Single-center, prospective, intervention study

• Three-month intervention period
  • January 1, 2014 to March 31, 2014

• Pre-intervention group
  • Patients who received standard TOC inpatient services from the High-risk for Readmissions team between October 1, 2013 to November 31, 2013
  • TOC services were conducted in-person or by telephone within 14 days of hospital discharge
Inclusion Criteria

• Age 18 years and older
• Patients admitted to the UCDMC cardiology service
Exclusion Criteria

- No clinical signs and symptoms consistent with a diagnosis of AMI, documented electrocardiographic evidence of AMI, or enzyme evidence of MI or ischemia
- Physician documentation excluding acute coronary syndrome or an acute plaque rupture
- Transfer to an SNF, rehabilitation facility, or outside hospital
- Passed away during the hospitalization
- Patient decision to leave against medical advice
Exclusion Criteria – BEAM only

- Pharmacy limitations not allowing BEAM services
- Patient discharged during BEAM non-operational hours
- Declined pharmacist-led BEAM services
Study Definition

• Medication initiation
  • Receipt of a medication prescribed at hospital discharge
  • Determined from pharmacy prescription fill data
  • Day one = the day of discharge from the hospital
Project Population

**409 patients** admitted to the cardiology service between 1/1/2014 to 3/31/2014

**386 Patients Excluded:**
- Patients without evidence of AMI (N=200)
- Documentation excluding ACS or acute plaque rupture (N= 113)
- Transfer to an SNF, rehabilitation facility, or outside hospital (N=10)
- Passed away during the hospitalization (N=2)
- Patient decision to leave against medical advice (N= 6)
- Pharmacy limitations not allowing BEAM services (N=9)
- Patient discharged during BEAM non-operational hours (N=33)
- Declined pharmacist-led BEAM services (N=13)

**23 patients** met study criteria
# Patient Demographics

<table>
<thead>
<tr>
<th></th>
<th>BEAM Group (N = 23)</th>
<th>DSRIP Group (N = 46)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Demographics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years), mean ( \pm ) SD</td>
<td>61.7 ( \pm ) 10.21</td>
<td>62.4 ( \pm ) 13.0</td>
<td>0.83</td>
</tr>
<tr>
<td>Sex (%, male)</td>
<td>73.9 %</td>
<td>67%</td>
<td>0.361</td>
</tr>
<tr>
<td>BMI (kg/m), mean ( \pm ) SD</td>
<td>28.1 ( \pm ) 5.5</td>
<td>28.9 ( \pm ) 5.6</td>
<td>0.575</td>
</tr>
<tr>
<td>Race (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>17 %</td>
<td>35 %</td>
<td>0.006</td>
</tr>
<tr>
<td>African American</td>
<td>13 %</td>
<td>13 %</td>
<td>1.0</td>
</tr>
<tr>
<td>Hispanic</td>
<td>17 %</td>
<td>11 %</td>
<td>0.308</td>
</tr>
<tr>
<td>Asian</td>
<td>9 %</td>
<td>2 %</td>
<td>0.063</td>
</tr>
<tr>
<td>Not Specified</td>
<td>43 %</td>
<td>39 %</td>
<td>0.66</td>
</tr>
<tr>
<td><strong>Past Medical History</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>39 %</td>
<td>37 %</td>
<td>0.88</td>
</tr>
<tr>
<td>Hypertension</td>
<td>78 %</td>
<td>76 %</td>
<td>0.867</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>48 %</td>
<td>56.5 %</td>
<td>0.288</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>17 %</td>
<td>6.5 %</td>
<td>0.037</td>
</tr>
<tr>
<td>Active tobacco use</td>
<td>22 %</td>
<td>30 %</td>
<td>0.259</td>
</tr>
</tbody>
</table>
# High-risk Demographics

<table>
<thead>
<tr>
<th></th>
<th>BEAM Group (N = 23)</th>
<th>DSRIP Group (N = 46)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seen by an PCP prior to hospital admission (%)</td>
<td>78 %</td>
<td>70 %</td>
<td>0.259</td>
</tr>
<tr>
<td><strong>Insurance Demographics (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicare</td>
<td>17 %</td>
<td>26 %</td>
<td>0.169</td>
</tr>
<tr>
<td>Medi-cal</td>
<td>13 %</td>
<td>2 %</td>
<td>0.007</td>
</tr>
<tr>
<td>Dual medicare and medi-cal</td>
<td>22 %</td>
<td>35 %</td>
<td>0.06</td>
</tr>
<tr>
<td>Private</td>
<td>22 %</td>
<td>24 %</td>
<td>0.867</td>
</tr>
<tr>
<td>County</td>
<td>13 %</td>
<td>7 %</td>
<td>0.239</td>
</tr>
<tr>
<td>Federal (VA, Tricare)</td>
<td>4 %</td>
<td>11 %</td>
<td>0.107</td>
</tr>
<tr>
<td>Workmen’s compensation</td>
<td>4 %</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Incomplete or lack of coverage</td>
<td>4 %</td>
<td>11 %</td>
<td>0.107</td>
</tr>
<tr>
<td>One or more hospitalizations in past year (%)</td>
<td>22 %</td>
<td>9 %</td>
<td>0.019</td>
</tr>
<tr>
<td>One of more ED visits in past year (%)</td>
<td>13 %</td>
<td>13 %</td>
<td>1.0</td>
</tr>
</tbody>
</table>
# Characteristics of Hospital Admission

<table>
<thead>
<tr>
<th></th>
<th>BEAM Group (N = 23)</th>
<th>DSRIP Group (N = 46)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of hospital stay (days), mean ± SD</td>
<td>3.2 ± 2.3</td>
<td>4.7 ± 4.4</td>
<td>0.131</td>
</tr>
<tr>
<td>Disease classification at discharge, No. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEMI</td>
<td>4 (17)</td>
<td>17 (37)</td>
<td>0.002</td>
</tr>
<tr>
<td>NSTEMI</td>
<td>18 (78)</td>
<td>28 (61)</td>
<td>0.014</td>
</tr>
<tr>
<td>Unstable Angina</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>CAD</td>
<td>1 (4)</td>
<td>1 (4)</td>
<td></td>
</tr>
<tr>
<td>ACS</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Procedural Interventions, No. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiac catheterization with stent placement</td>
<td>16 (70)</td>
<td>31 (67)</td>
<td>0.761</td>
</tr>
<tr>
<td>Cardiac catheterization without stent placement</td>
<td>3 (13)</td>
<td>6 (13)</td>
<td>1.0</td>
</tr>
<tr>
<td>Coronary artery bypass graft (CABG)</td>
<td>---</td>
<td>2 (4)</td>
<td></td>
</tr>
<tr>
<td>Aspiration thrombectomy</td>
<td>---</td>
<td>1 (2)</td>
<td></td>
</tr>
<tr>
<td>Medical Management</td>
<td>4 (17)</td>
<td>4 (9)</td>
<td>0.141</td>
</tr>
<tr>
<td>Robotic 1-vessel CABG</td>
<td>---</td>
<td>2 (4.3)</td>
<td></td>
</tr>
</tbody>
</table>
Primary Objective: Medication Initiation Rates

Medication Initiation Rate on Day 1 of Hospital Discharge

- Aspirin: 78%
- PGY12 inhibitor: 84%
- β-blocker: 82%
- RAAS inhibitor: 83%
- Statin: 87%

* p < 0.05
Primary Objective: Medication Initiation Rates

Medication Abandonment Rate on Day 1 of Hospital Discharge

- **TOC**: 20%
- **BEAM**: 4%

P = 0.001

- No medication abandoned at hospital discharge
- One or more medication(s) abandoned at hospital discharge
Secondary Objective: 30-day post-discharge Healthcare Utilization

Rate of unplanned 30-day Emergency (ED) or Hospital Readmission

- BEAM (N=23)
- TOC (N=46)
Secondary Objective:
Patient Satisfaction associated with BEAM

- Will be collected from HCAHPS hospital survey data
- Encompassed five main questions
  1. During this hospital stay, staff took my preferences and those of my family or caregiver into account in deciding what my health care needs would be when I left.
  2. When I left the hospital, I had a good understanding of the things I was responsible for in managing my health.
  3. When I left the hospital, I clearly understood the purpose for taking each of my medications.
  4. Using any number from 0 to 10, what number would you use to rate this hospital during your stay?
  5. Would you recommend this hospital to your friends and family?

- Data pending return of mailed surveyed results

HCAHPS: Hospital Consumer Assessment of Healthcare Providers and Services Survey
Secondary Objective: Projected Institutional Cost Benefit of BEAM

- Internal retail pharmacy
  - Approximately 35% of discharge prescriptions are filled at UC Davis outpatient pharmacy

- Reduction in future hospital length of stay (LOS)
  - Average hospital LOS for AMI = 4.5 days
  - Hospital-adjusted expenses per inpatient day = $2706

- Projected reduction in 30-day readmission rates of 6.6%

Potential projected cost savings of roughly $800 for each cardiology patient who received BEAM services

Sustainability of BEAM

• High potential for sustainability of the service

• Revenue generated from UCDMC outpatient prescriptions
  • May help offset associated costs of program maintenance

• Delivering medications to the bedside gives pharmacists the opportunity to provide patient-centered education
  • Improve patient health literacy and clinical outcomes
  • Increase patient satisfaction and possibly HCAHPS scores
## Barriers to conducting BEAM Services

### Healthcare Considerations
- Coordination of discharge responsibilities
- Effective communication
- Restrictions on available pharmacy services
- Delaying patient discharge

### Patient Considerations
- Patient loyalty to their usual “home” pharmacy
- Lack of funds for medication copay charges at discharge
- Delaying patient discharge
Summary

• BEAM significantly increased initiation rates for all medications prescribed for secondary prevention of CVD

• Reduction in 30-day ED or hospital readmission was seen when BEAM services were utilized by our TOC team

• Future reductions in hospital length of stay appeared to have the greatest projected institutional cost savings
  • HCAHPS patient satisfaction survey data is pending
Future Directions

• Transitioning BEAM to a consult service

• Expansion of BEAM services to other high-risk patients, specifically COPD exacerbation and pneumonia
  • Potentially expanding hospital wide depending on resources and physician demand for the discharge service

• Awarded the 2014 Cardinal E3 grant
  • Support for educational supplies and translational services
References

- UHC Benchmarking Project on Reducing Readmissions 2009. Oakbrook, IL.
- Unpublished data presented at UHC Pharmacy Council, December 2009 and personal communications.