Closing the Gaps in Care Delivery: Pharmacists Partnering with Providers to Reduce Readmissions, Lower Costs, and Improve Quality

Moderator: Robert S. London, MD, National Medical Director, Walgreens
- Katherine Heller, Pharm.D., Vice President, Clinical Solutions- Integrated Delivery Systems & Patient Services, Walgreens
- Jacquelyn Paynter, R.N., M.P.H., C.C.M., Executive Director, Care Management, DeKalb Medical
- Heather Kirkham, MPH PhD. Manager, Clinical Outcomes & Analytics, Walgreens

Agenda

- Introduction
- Learning objectives
- Pharmacist services targeting quality gaps in transitions of care
- Case study: DeKalb Medical Center
- Methodology and outcomes
- Q&A Discussion
Introduction

Moderator: Robert S. London, MD,
National Medical Director, Walgreens

Learning objectives

1. List three categories of barriers to medication adherence potentially contributing readmissions.
2. Identify medication-related gaps in care associated with hospital admissions and readmissions.
3. Learn how specific pharmacy-related components impact an integrated care transition model.
4. Discover why a community pharmacy in a hospital setting can be most effective in reducing readmissions.
Readmissions cost hospitals, payers and patients

Walgreens is far more than just your corner drugstore

- 6,000,000 consumer visits daily
- Driving innovation in wellness, chronic care, infusion, specialty and online and mobile Rx
- More than 8,500 total points of care
- More than 8,000 community pharmacies
Walgreens is far more than just your corner drugstore

- Located within 5 miles of 70% of the U.S. population
  - #1 in flu immunizations
  - #1 in health testing services
  - #1 in Drive-through pharmacies
  - #1 in 24 Hour Pharmacies
  - #1 in worksite health centers
  - #1 in health system pharmacies
- 73,000 healthcare professionals

Overview of Walgreens healthcare assets

<table>
<thead>
<tr>
<th>National Network of Retail Pharmacies</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 8,000 pharmacies employing 68,000 trusted clinicians</td>
</tr>
<tr>
<td>Located within 3 miles of ~65% of Americans = 6 M customers each day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialty Pharmacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Top 3 Specialty Pharmacy with comprehensive and customizable specialty solutions</td>
</tr>
<tr>
<td>700 HIV Centers of Excellence</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infusion Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 infusion provider in the nation with 100 sites in 38 states</td>
</tr>
<tr>
<td>1000-1500 nurses deliver infusions either at home or at our sites</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hospital System Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>140 Out Patient Pharmacies in major institutions such as Yale and Northwestern</td>
</tr>
<tr>
<td>Well Transitions – significantly reduces hospital readmits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Retail Clinics</th>
</tr>
</thead>
<tbody>
<tr>
<td>~350 Take Care Health Clinics located in Walgreens stores in 19 states + DC</td>
</tr>
<tr>
<td>~1500 NPs and 40PAs; every clinic has a collaborating physician</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employer Health Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>350+ On-site health centers at employer locations; 40+ years experience</td>
</tr>
<tr>
<td>160+ employer clients in 45 states; serving ~10 M employees at work</td>
</tr>
</tbody>
</table>
New provider paradigm to improve outcomes

- Not physician focused, but linked to physicians and patients
- Leverages certified SMEs (NPs and Pharmacists) as “trusted sources of information”
- Regional and national reach
- Focused on metrics that matter

Unequalled global access

- Alliance Boots
  - Boots international countries: UK, ROI, Thailand, Netherlands, Middle East, Sweden, Norway
  - Alphagga: UK, France, Italy, Spain, Czech republic, Germany, Netherlands, Russia
  - Wholesale countries: France, UK, Turkey, Spain, Germany, Russia, The Netherlands, Czech Republic, Norway, Egypt, Lithuania,
  - Romania, Algeria, Croatia, Bosnia, Serbia, Slovenia, China, Italy, Portugal, Switzerland

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Transforming the patient experience: Well Experience Stores

Pharmacist Services Targeting Quality Gaps in Transitions of Care

Katherine Heller, Pharm.D.,
Vice President Clinical Solutions, Walgreens
Rate of readmissions

Admissions increased by 55% between 1997 and 2007 in the United States (that’s 4.5% per year).

- Initial focus on hospitals: Quality of inpatient care and length of stay
- Community Care Transitions Program: ACOs, PCMH and Medical Neighborhood

<table>
<thead>
<tr>
<th>Condition</th>
<th>% Readmissions 2008</th>
<th>% Readmissions 2010</th>
<th>Relative Δ (%)</th>
<th>Absolute Δ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical</td>
<td>16.2</td>
<td>15.9</td>
<td>-1.7%</td>
<td>&lt; 0.5%</td>
</tr>
<tr>
<td>CHF</td>
<td>21.4</td>
<td>21.1</td>
<td>-1.4%</td>
<td>&lt; 0.5%</td>
</tr>
<tr>
<td>AMI</td>
<td>18.7</td>
<td>18.1</td>
<td>-3.2%</td>
<td>- 0.6%</td>
</tr>
<tr>
<td>PN</td>
<td>15.3</td>
<td>15.3</td>
<td>&lt;0.5%</td>
<td>&lt; 0.5%</td>
</tr>
<tr>
<td>Surgical</td>
<td>12.7</td>
<td>12.4</td>
<td>-3.0%</td>
<td>&lt; 0.5%</td>
</tr>
</tbody>
</table>


Burden of readmissions

- 20% of Medicare beneficiaries readmitted within 30 days of discharge.¹
- Readmissions were estimated to cost taxpayers $15 billion in 2004.¹
- Readmissions cost Medicare $17.5 billion in inpatient spend alone in 2012.²

Patient-specific factors
• Age, sex, socioeconomic deprivation, prior health care use, and specific conditions such as malignancy, progressive heart failure, and a range of comorbidities

Quality of in-hospital care
• General quality of hospital care experienced by the patient and patient climate

Quality of discharge planning/follow-up care
• Presence and adequacy of discharge planning, level of appropriate outpatient and community care, the degree of patient and family education, and how frequently the patient meets with their physician after discharge

Can we identify who is at risk?
Assessed the predictions made by
• Physicians
• Case managers
• Nurses

“...none of the AUC values were statistically different from chance”

Interventions to reduce readmissions

Systematic review of 43 studies identified three types of interventions:

- Pre-discharge
- Post-discharge
- Bridging


Non-adherence: nearly 1 in 3 patients don’t fill

100% Prescriptions
50% - 70% Brought to Pharmacy
48% - 60% Picked up
25% - 30% Are Taken Properly
15% - 20% First Refill

Source: IMS
Burden & barriers of medication non-adherence

**Burden**
- Clinical
  - Up to 25% of hospital admissions
- Financial
  - Estimated annual cost $290bn
- Humanistic
  - Approximately 342 Americans die every day

**Prevalence**
- 40% of patients

**Barriers**
- RAND Review (2009)
  - Patient Factors
    - Health beliefs
    - Cognition
    - Demographics
    - Disease burden
    - Medication characteristics
  - Health System
    - Cost and managed care
  - Provider
    - Trust and satisfaction
    - Communication

Impact of medication adherence

Source: Health Affairs: Medication Adherence Leads to Lower Healthcare Use and Costs Despite Increased Drug Spend
Pharmacy intervention and proven outcomes

Critical role of pharmacists in reducing unplanned readmissions

• **Reduction of 30-day post discharge hospital readmission or emergency department (ED) visit rates in high-risk elderly medical patients through delivery of a targeted care bundle.** Journal of Hospital Medicine. 2009;4(4):211-218


Care transitions across patient/caregiver experience

- Provider visits
- Ancillary health care services
- ER visits
- Hospital admissions
- Pharmacy visits
A simplified care continuum

Quality gaps in the care continuum result in poor health outcomes. Collaborative care coordination including pharmacists can result in improved outcomes.

Care transitions collaboration

Eligibility and Enrollment (WAG/HS)

Medication History (WAG)
- 12 months, scrubbed
- Clinician review

Med History Verification (HS)
- ER/ED or Observation Unit
- Inpatient

Discharge Planning Notification (HS)

Bedside Delivery (WAG)
- Fill, Alignment, and Reconciliation
- Pharmacist Consult

Post-Discharge Follow-Up (WAG/HS)
- Reinforce discharge instructions
- Comprehensive medication reviews
- Transition to Community Care
- Interventions at 48h, 7-10d, and 25d

Aligned with health system core measures
Focused on reducing preventable readmissions
Coordinated effort to drive HCAHPS scores
References


References

9. Walgreens Dekalb HCAHPS data
13. IMS data
Case Study: DeKalb Medical

Jacquelyn Paynter, R.N., M.P.H., C.C.M.,
Executive Director, Care Management,
DeKalb Medical

About DeKalb Medical

3 hospital system in Metro Atlanta Region
• 407 beds, 22,000 discharges, 65,000 ED visits, 4.6 ALOS
• 100 bed, 5,800 discharges, 58,000 ED visits, 4.18 ALOS
• 40 bed LTACH
DPHO, mostly non-employed physicians
Hospitalists – employed
Major factors impacting hospital utilization trends
• Growing Uninsured populations
• Health Care Reform PPACA Impact
• Misalignment of financial incentives among healthcare providers
• Fragmentation of health care delivery system
Medicare All Cause All Hospital Readmission Trend
FFY12 Q1 PEPPER Report – North Decatur

![Graph showing 30-day readmissions to same hospital or elsewhere.]

Medicare All Cause All Hospital Readmission Trend
FFY12 Q1 PEPPER Report - Hillandale

![Graph showing 30-day readmissions to same hospital or elsewhere.]

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Recidivism Trends: Patients with 3 or more admissions in a 6 month period represent a high portion of the overall admission volume.

<table>
<thead>
<tr>
<th></th>
<th>Jan-Jun 2012</th>
<th>Jan-Jun 2011</th>
<th>%CHG Frequent Admitters</th>
<th>%CHG Overall Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORTH DECATUR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Admissions by Frequent Admitters</td>
<td>14.1%</td>
<td>13.9%</td>
<td>1.7%</td>
<td>-1.3%</td>
</tr>
<tr>
<td>% Frequently Admitted Patients</td>
<td>4.56%</td>
<td>4.53%</td>
<td>0.7%</td>
<td>-1.6%</td>
</tr>
<tr>
<td>HILLANDALE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Admissions by Frequent Admitters</td>
<td>12.4%</td>
<td>8.6%</td>
<td>44.2%</td>
<td>78.9%</td>
</tr>
<tr>
<td>% Frequently Admitted Patients</td>
<td>3.85%</td>
<td>2.56%</td>
<td>50.2%</td>
<td>69.0%</td>
</tr>
</tbody>
</table>

Beginning October 1, 2012 (Federal Fiscal Year 2013), the Patient Protection and Affordable Care Act (PPACA) statute will penalize hospitals and integrated delivery systems with higher than expected readmission rates.

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>FFY2013</th>
<th>FFY2014</th>
<th>FFY2015</th>
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<tbody>
<tr>
<td>Targeted Conditions</td>
<td>Heart Failure, AMI, Pneumonia</td>
<td>Heart Failure, AMI, Pneumonia</td>
<td>Heart Failure, AMI, Pneumonia, COPD, CABG, PCI, Vascular Procedures</td>
</tr>
<tr>
<td>Aggregate payment withhold penalties</td>
<td>Up to 1%</td>
<td>Up to 2%</td>
<td>up to 3%</td>
</tr>
</tbody>
</table>
P4P readmission management achievement

- CMS Hospital Compare
- FFY13 Pay for Performance Period: 7/1/08-6/30/11

<table>
<thead>
<tr>
<th></th>
<th>Natl Avg Crude Rate</th>
<th>Eligible Discharges</th>
<th>Number of Readmissions</th>
<th>Predicted Risk Adjusted Hospital Rate</th>
<th>Expected Risk Adjusted National Rate</th>
<th>Excess Readmission Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North Decatur</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMI</td>
<td>19.2</td>
<td>109</td>
<td>25</td>
<td>22.1</td>
<td>21.6</td>
<td>1.0230</td>
</tr>
<tr>
<td>HF</td>
<td>24.6</td>
<td>560</td>
<td>125</td>
<td>22.7</td>
<td>23.6</td>
<td>0.9636</td>
</tr>
<tr>
<td>CAP</td>
<td>18.5</td>
<td>494</td>
<td>79</td>
<td>16.6</td>
<td>17.6</td>
<td>0.9446</td>
</tr>
<tr>
<td><strong>Hillandale</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMI</td>
<td>19.2</td>
<td>23</td>
<td>3</td>
<td>20.3</td>
<td>21.1</td>
<td>0.9612</td>
</tr>
<tr>
<td>HF</td>
<td>24.6</td>
<td>145</td>
<td>31</td>
<td>22.9</td>
<td>23.7</td>
<td>0.9645</td>
</tr>
<tr>
<td>CAP</td>
<td>18.5</td>
<td>95</td>
<td>25</td>
<td>19.0</td>
<td>16.6</td>
<td>1.1412</td>
</tr>
</tbody>
</table>

Readmission management imperatives

- Readmission rates for the key MSDRG drivers are higher for patients discharged with no services.

<table>
<thead>
<tr>
<th>Discharge Disposition</th>
<th>Digestive Disorders</th>
<th>COPD</th>
<th>Pneumonia</th>
<th>Heart Failure</th>
<th>GI Bleed</th>
<th>Renal Failure</th>
<th>CVA</th>
<th>Septicemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>GMLOS</td>
<td>2.8</td>
<td>4.7</td>
<td>5.3</td>
<td>5</td>
<td>4.9</td>
<td>5.1</td>
<td>5.3</td>
<td>5.4</td>
</tr>
<tr>
<td>Average Age</td>
<td>72</td>
<td>71</td>
<td>73</td>
<td>75</td>
<td>74</td>
<td>69</td>
<td>77</td>
<td>77</td>
</tr>
<tr>
<td>Discharge Volume</td>
<td>125</td>
<td>101</td>
<td>153</td>
<td>271</td>
<td>113</td>
<td>112</td>
<td>70</td>
<td>318</td>
</tr>
<tr>
<td>% D/C w/ no services</td>
<td>87%</td>
<td>50%</td>
<td>56%</td>
<td>48%</td>
<td>54%</td>
<td>49%</td>
<td>23%</td>
<td>23%</td>
</tr>
<tr>
<td>% Readmissions D/C no services</td>
<td>90%</td>
<td>87%</td>
<td>74%</td>
<td>67%</td>
<td>66%</td>
<td>64%</td>
<td>63%</td>
<td>30%</td>
</tr>
<tr>
<td>Overall % Readmissions</td>
<td>12%</td>
<td>16%</td>
<td>10%</td>
<td>18%</td>
<td>12%</td>
<td>18%</td>
<td>7%</td>
<td>17%</td>
</tr>
</tbody>
</table>
Implementation of 5 care transition pillars at DeKalb Medical

| ADMISSION ASSESSMENT          | Readmission Risk Assessment  
|                              | ED Case Management  
|                              | Medication Reconciliation  
| PATIENT/FAMILY EDUCATION      | Zone Education  
|                              | Walgreens Bedside Rx Delivery and 72hr f/up calls  
|                              | VNHS Preferred Home Health Provider  
| HANOVER COMMUNICATION         | Hospitalists fax discharge summary and medication reconciliation to PCP  
|                              | Walgreens Bedside Rx Delivery notified of pending discharges  
|                              | Case Management provides an electronic discharge summary to post-acute providers (HHA,SNF,Dialysis)  
| DISCHARGE PLAN               | Walgreens Bedside Rx Delivery  
|                              | Medication Reconciliation*  
|                              | Post Acute Services (HHA, DME, SNF, Dialysis, Hospice)  
| COMMUNITY CONNECTION          | VNHS Preferred Home Health Provider  
|                              | 48-72hr Post-Discharge Calls – Dekalb Call Center and Walgreens Rx  
|                              | PCP Follow-up Appointments  
|                              | Post-Discharge Transition Clinic*  

*pending implementation

Care transition focus enhanced admission assessment

Incorporated a Readmission Risk Stratification Tool into the Discharge Planning Initial Assessment
Assessments are performed within 48 hours of admission

Key Readmission Risk Elements:
- Self care motivation
- Readmission history
- Severity of illness
- Comorbidities
- High risk medications
- Polypharmacy
- Cognitive and Self Care Deficits
- Patient perception of reason for readmission
- Recommended interventions for each risk assessment element

Pilot Study – March-May 2012

Medication related causes had a high impact on readmission
Establish Admission Review (ED) Case Management to enhance revenue cycle performance and reduce inappropriate readmissions

Social Workers staffed in the ED 11:30 a.m. to 8:00 p.m. 7 days/week

**Key Functions**
- Determine appropriate level of care designation
- Screen for frequent fliers/recidivism
- Facilitate benefit counselor referral
- Arrange PCP follow-up visits for P4P Readmission population (HF, COPD)
- Facilitate PCP identification/referrals/assignment
- Provide community resources
- Provide medication assistance
- Discharge to post acute services from the ED where appropriate

**Implementation – September 2012**

The hospital spends nearly $100K/year providing medication assistance

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** Implemented ZONE Patient Education Model**

**Key Program Elements**
- Patient Education Process – Teach Back Method
- Implemented – 1st Quarter of 2010
- Provided by hospital nursing staff and Preferred Home Health Provider

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Home Health Intervention
Provides Care Transitions focused program for HF, PN, COPD
Implemented Zone Patient Education Model for consistency with hospital
Onsite Liaisons may attend Daily Unit-Based Huddles

<table>
<thead>
<tr>
<th>Metric</th>
<th>CY 2011</th>
<th>CY 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average HH referrals/month</td>
<td>192</td>
<td>244</td>
</tr>
<tr>
<td>Average HH admits/month</td>
<td>147</td>
<td>157</td>
</tr>
<tr>
<td>Hospital Median LOS</td>
<td>4.2</td>
<td>4.0</td>
</tr>
<tr>
<td>Readmission Rate</td>
<td>17%</td>
<td>15.4%</td>
</tr>
</tbody>
</table>

Implemented Post Discharge Follow-up Calls
2400/2200 (May 2011)
3200/3400 (September 2011)
Hillandale and 4200/4400/4500 (January 2012)

Key Functions
Call center places calls for all discharges 48 hours after discharge.
Scripted calls to determine change in condition, barriers to medication compliance, and barriers to PCP follow-up, disease specific questions
Script prompts for call center staff to make a 3-way call to the PCP based on defined triggers
Script prompts assistance with PCP identification and referrals
Script includes customer satisfaction prompts

Recidivist Management – call center to support scripted outreach to targeted high risk recidivist – 2013
# Care transition focus community connection

## Results: 2400 Telemetry Unit – January to June 2012

### Call Responses
- 90% call rate (n=300/month)
- 51% contact rate
- 7% fall out for no PCP follow-up appointment
- 8% fall out for not filling prescription
- 12% fall out for prescribed home health follow-up
- 21% felt they understood discharge instructions
- 86% felt ready for discharge

### Call Center Interventions

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician Assistance</td>
<td>2%</td>
</tr>
<tr>
<td>Pharmacy Assistance</td>
<td>3%</td>
</tr>
<tr>
<td>Contact with Home Health</td>
<td>2%</td>
</tr>
<tr>
<td>Appointment Scheduling</td>
<td>3%</td>
</tr>
</tbody>
</table>

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## Patient response to heart failure prompts

### “Signs you should contact a physician/HH”

<table>
<thead>
<tr>
<th>Prompt</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased shortness of breath</td>
<td>69%</td>
</tr>
<tr>
<td>Increased swelling</td>
<td>69%</td>
</tr>
<tr>
<td>Weight gain of more than 2lbs in 1 day, 5/week</td>
<td>62%</td>
</tr>
</tbody>
</table>

### “Foods to avoid”

<table>
<thead>
<tr>
<th>Prompt</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processed meat</td>
<td>64%</td>
</tr>
<tr>
<td>Junk food</td>
<td>62%</td>
</tr>
<tr>
<td>Canned vegetables</td>
<td>62%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
</tr>
</tbody>
</table>
Care transition focus discharge process

**Implemented Walgreens Bedside Rx Delivery**
North Decatur Campus (May 2011)
Hillandale Campus (January 2012)

**Key Functions**
- Ensures patient receives the medication upon discharge
- Supports patient satisfaction with discharge experience
- Pharmacy consultation provided, if needed
- Caregiver included in consult
- Reaffirms understanding of medication while patient still in healthcare system
- Immediate start of therapy on discharge
- 15-30 minute turn-around time
- Provides 30-day supply of medications
- Ability to refill at any pharmacy of patient’s choice
- Follow-up phone call from clinical pharmacist within 72 hours of discharge

DeKalb is Among Highest Volume Bedside Delivery Programs in U.S., serving about 300 inpatients and 100 outpatients monthly.

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**What we have learned**

- There is a high correlation between readmission and medications
- Accurate medical history and medication reconciliation and handover communication between care providers is paramount
- Timely post discharge follow-up by post acute providers, call center staff and pharmacists using structured patient/family education and compliance screening identifies medication related failures
- Bedside Rx Delivery reduces readmission rates and improves patient satisfaction
Methodology and Outcomes

Heather Kirkham, MPH PhD, Manager, Clinical Outcomes & Analytics, Walgreens

Methods

Study Design
• Retrospective cohort of census of all discharges
• Controls from
  • Hospital’s historic data
  • Contemporaneous matches from non-participating facility
    (i.e., Hillandale campus compared to North Decatur campus)

Statistical Analysis
• 30-day readmission calculation based on CMS SAS code, though
  – Only 2-hospital system
  – Not limited to Medicare population
• Multiple logistic regression, controlling for demographic and clinical variables

### Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Historic Hillandale</th>
<th>Contemporaneous Hillandale</th>
<th>Historic North Decatur</th>
<th>Contemporaneous North Decatur</th>
<th>Care Transition Program North Decatur</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (count of qualifying admits)</td>
<td>1516</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-day readmit (%, n)</td>
<td>5.6% 85</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOS (mean ± SD)</td>
<td>4.0 4.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>age &gt; 65 (%, n)</td>
<td>29.3% 444</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>age (mean ± SD)</td>
<td>55.7 15.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HF_case (%, n)</td>
<td>0.3% 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMI_case (%, n)</td>
<td>1.6% 24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PN_case (%, n)</td>
<td>1.72 26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicaid (%, n)</td>
<td>9.3% 141</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race: Other (%, n)</td>
<td>4.2% 64</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race: Black (%, n)</td>
<td>59.8% 907</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race: White (%, n)</td>
<td>36.0% 545</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: HF=Heart Failure; AMI=Acute Myocardial Infarction; PN=Pneumonia; LOS=Length of Stay*
### Readmission rates by age and intervention group

<table>
<thead>
<tr>
<th>Comparison Groups</th>
<th>Age &lt; 65</th>
<th>Age ≥ 65</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic Hillandale</td>
<td>9.1%</td>
<td>10.2%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Contemporaneous Hillandale</td>
<td>10.4%</td>
<td>11.6%</td>
<td>10.8%</td>
</tr>
<tr>
<td>Historic North Decatur</td>
<td>9.9%</td>
<td>11.6%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Contemporaneous North Decatur</td>
<td>10.4%</td>
<td>13.0%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Care Transition Program</td>
<td>5.8%</td>
<td>5.2%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Total</td>
<td>9.9%</td>
<td>12.0%</td>
<td>10.7%</td>
</tr>
</tbody>
</table>

### Unadjusted risk of readmission

<table>
<thead>
<tr>
<th>Independent variables and covariates</th>
<th>OR</th>
<th>95% CI LL</th>
<th>95% CI UL</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.948</td>
<td>0.891</td>
<td>1.007</td>
<td>.0849</td>
</tr>
<tr>
<td>Age 65 + *</td>
<td>1.231</td>
<td>1.159</td>
<td>1.307</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Medicaid *</td>
<td>1.346</td>
<td>1.232</td>
<td>1.47</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Race (Reference Group: White)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black *</td>
<td>1.184</td>
<td>1.103</td>
<td>1.271</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Other *</td>
<td>0.938</td>
<td>0.795</td>
<td>1.107</td>
<td>.4999</td>
</tr>
<tr>
<td>Month *</td>
<td>1.014</td>
<td>1.005</td>
<td>1.023</td>
<td>.0018</td>
</tr>
<tr>
<td>LOS *</td>
<td>1.028</td>
<td>1.024</td>
<td>1.033</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>CMS Conditions (Principal Diagnosis HF, AMI, or PN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any of three</td>
<td>0.969</td>
<td>0.858</td>
<td>1.094</td>
<td>.6085</td>
</tr>
<tr>
<td>HF *</td>
<td>1.546</td>
<td>1.263</td>
<td>1.892</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>AMI *</td>
<td>0.439</td>
<td>0.3</td>
<td>0.643</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>PN</td>
<td>0.922</td>
<td>0.784</td>
<td>1.084</td>
<td>.3233</td>
</tr>
<tr>
<td>Care Transition Program (compared to nonparticipants)</td>
<td>0.486</td>
<td>0.389</td>
<td>0.606</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Comparison groups (Reference Group: Program Participants)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Historic Hillandale *</td>
<td>1.757</td>
<td>1.38</td>
<td>2.238</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Contemporaneous Hillandale *</td>
<td>2.033</td>
<td>1.613</td>
<td>2.563</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Historic North Decatur *</td>
<td>1.995</td>
<td>1.592</td>
<td>2.5</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Contemporaneous North Decatur *</td>
<td>2.184</td>
<td>1.747</td>
<td>2.73</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

* p < .01
### Adjusted risk of readmission

<table>
<thead>
<tr>
<th>Independent variables and covariates</th>
<th>OR</th>
<th>95% CI LL</th>
<th>95% CI UL</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.954</td>
<td>0.896</td>
<td>1.014</td>
<td>.1316</td>
</tr>
<tr>
<td>Age 65 + *</td>
<td>1.302</td>
<td>1.221</td>
<td>1.389</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Medicaid *</td>
<td>1.437</td>
<td>1.31</td>
<td>1.577</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Race (Reference Group: White)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black *</td>
<td>1.243</td>
<td>1.153</td>
<td>1.339</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Other</td>
<td>0.896</td>
<td>0.757</td>
<td>1.061</td>
<td>.2019</td>
</tr>
<tr>
<td>Month *</td>
<td>1.019</td>
<td>1.01</td>
<td>1.029</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>LOS *</td>
<td>1.026</td>
<td>1.022</td>
<td>1.031</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>CMS Conditions (Reference: Without Condition)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HF *</td>
<td>1.554</td>
<td>1.267</td>
<td>1.905</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>AMI *</td>
<td>0.428</td>
<td>0.292</td>
<td>0.627</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Comparison Groups (Reference Group: Program Participants)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Historic Hillandale *</td>
<td>1.572</td>
<td>1.232</td>
<td>2.005</td>
<td>.0003</td>
</tr>
<tr>
<td>Contemporaneous Hillandale *</td>
<td>1.879</td>
<td>1.488</td>
<td>2.373</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Historic North Decatur *</td>
<td>1.828</td>
<td>1.458</td>
<td>2.293</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Contemporaneous North Decatur *</td>
<td>2.071</td>
<td>1.655</td>
<td>2.591</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

* p < .01

### Risk of readmission: adjusted vs. unadjusted

<table>
<thead>
<tr>
<th>Comparison Groups (Reference Group: Program Participants)</th>
<th>Adjusted</th>
<th>Unadjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historic Hillandale *</td>
<td>1.572</td>
<td>1.757</td>
</tr>
<tr>
<td>Contemporaneous Hillandale *</td>
<td>1.879</td>
<td>2.033</td>
</tr>
<tr>
<td>Historic North Decatur *</td>
<td>1.828</td>
<td>1.995</td>
</tr>
<tr>
<td>Care Transition program participants</td>
<td>1.000</td>
<td>1.000</td>
</tr>
</tbody>
</table>

* p < .01

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Key findings

- At both hospitals, the readmission rates are trending higher, comparing the historic period (2010) to the current period (2011 – June 2012) among patients not provided bedside delivery.
- Adjusting for gender, age, race, length of stay, month of discharge, and CMS condition, all four control groups had greater likelihood of readmission (adjusted OR = 1.6 – 1.9) compared to the cohort of patients who received bedside delivery.

Study limitations

- These preliminary results are not adjusted for comorbid conditions (secondary diagnosis and procedure codes).
- Lack of data about readmissions to other hospital systems.
- Selection bias likely in contemporaneous North Decatur cohort; therefore, it is important to consider range of impact compared across all control groups.
- Not all criteria in the CMS code could be applied (e.g., prior Medicare eligibility) and current analysis is not restricted to CMS conditions, so direct comparison to rates provided by CMS is cautioned.
Interpretation of findings

Results of current analysis suggest that bedside delivery of medications may decrease risk of 30-day readmission.

• O’Dell and Kucukarslan noted significantly lower readmissions for cardiac patient seen by a clinical pharmacist upon discharge compared to usual care (1.3% vs. 9.1%; p = 0.04), but only for patients with severe angina.
  
• In a randomized control trial, a pharmacist intervention noted reduced 30-days readmissions compared to the control group (10.0% vs. 38.1%, p= 0.04), but the difference was not significant by 60-days (30.0% vs. 42.9%, p = 0.52).
  
• The “RED” intervention noted significantly lower 30-day rates of combined of ER and hospitalization (IRR=0.695 [0.515, 0.937]) but not 30-day readmission alone (0.720 [0.445. 1.164]).


Implications for clinical care and future research

Future Research
• Improve model by adding additional variables to adjust for comorbidities and stratifying
• Consider assessing impact on readmission over longer periods (e.g., 90-day readmission)
• Develop a hospital-specific, claims-based predictive risk model (PRM)
• Evaluate and refine risk stratification tool for the DeKalb’s inpatient population

Implications for Clinical Care and Policy Change
• Increased understanding of risk of readmission risk can assist clinical staff identify highest risk patients.
• Ongoing assessment will help refine interventional components of bedside delivery program.
• Ability to show positive impact of bedside delivery program will supported expansion of program to Hillandale site.
Q&A Discussion

Any questions? Thank you!

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