Reducing Readmissions: Harnessing the Power of Predictive Analytics

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Carolinas HealthCare System
Journey to Reduce Avoidable Readmissions

*Updated 7/14/2015
Carolinas HealthCare System is one of the leading healthcare organizations in the Southeastern United States and one of the largest public not-for-profit systems in the nation

- 60,000 Team Members
- 7,400 Licensed Beds
- 900 Care Locations
- 10 Million Patient Encounters
- HEN / LEAPT Contractor
- Dixon Advanced Analytics Group
COPD Readmissions Trend

Readmissions (Observed)

- **21.86%**
- **19.40%**
- **16.50%**

**Process Change 1:**
May 2011 - COPD MD Revised Order Set

**Process Change 2:**
July 2011 - Dedicated COPD Inpatient RT

**Process Change 3:**
Jan 2012 - COPD Readmission Team

**Process Change 4:**
Jan 2012 - Dedicated RT in ECC

**Process Change 5:**
March 2012 - Dedicated COPD Inpatient CCC

**Process Change 6:**
April 2012 - Pilot for COPD Wordless Instructions

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MS-DRG: 190: Chronic obstructive pulm disease w/MCC, 191: Chronic obstructive pulm disease w/CC, 192: Chronic obstructive pulm disease w/oCC/MCC
Nationally, 3 years of penalties, 3 years of pain

• FY 2016, 2,620 facilities are being penalized.
• The highest penalty for a single facility is over $3.6M.
• 49 hospitals are being penalized at least $1M in FY 2015.
• 38 hospitals are receiving the maximum 3% penalty
Readmissions will cut Medicare payments to some Charlotte hospitals

By Karen Garloch and Jordan Rau
Kaiser Health News
Posted: Sunday, Oct. 05, 2014

Some Charlotte-area hospitals will receive reduced payments from Medicare next year, the third year of a federal program that penalizes hospitals for having too many patients readmitted for additional treatment within 30 days of their last hospital stay.

Since 2012, the federal Medicare program for seniors has penalized hospitals that have higher-than-expected readmission rates among patients treated for three medical conditions:

<table>
<thead>
<tr>
<th>Hospital</th>
<th>FY 2014</th>
<th>FY 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMC-Pineville</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Novant Health Presbyterian</td>
<td>0.18</td>
<td>0.30</td>
</tr>
<tr>
<td>Medical Center</td>
<td>percent</td>
<td>percent</td>
</tr>
<tr>
<td>Novant Health Huntersville</td>
<td>0.08</td>
<td>0.10</td>
</tr>
</tbody>
</table>
Do the Math

Base Operating DRG Payment Amount:
[[case mix index × ((labor share × wage index) + (nonlabor share x COLA))] + new technology payments, if applicable] × total Medicare cases
[[1.3656 × ((3,804.40 × 1.0537) + (1,661.69 x 1))] + 0] × 5,433 = 41,852,953

To estimate a hospital’s total readmission penalty, the Medicare case-mix index can be used in place of the DRG weights for each case

Readmissions Payment Adjustment Amount:
(base operating DRG amount for all admissions × readmissions adjustment factor) – base operating DRG amount for all admissions
(41,852,953 × .9765) – 41,852,953 = (983,544)
If readmission penalties are appropriate for healthcare, why not for other groups?
“Skyrocketing costs have rendered the current U.S. healthcare system ‘unsustainable,’ market forces are calling for a performance-based system, analytics are crucial to this paradigm shift from ‘volume’ to ‘value,’ and the transformation is inevitable.”

*Healthcare: the quiet reform* by Peter Horner
Analytics Magazine, Jan/Feb 2012

Source: Gartner March 2014
Analyst(s): Zafar Chaudry, M.D. | Steve High
Challenges in Deploying Predictive Analytics

“Despite the buzz, the percentage of organizations that have implemented predictive analytics has remained surprisingly flat.”

Wayne Eckerson, Principal Consultant
Eckerson Group
PROJECT VISION
Patient-Centered, Point of Care Clinical Decision Support
Project Vision

“We will analyze health and consumer data for insights into individuals’ clinical risks and through the CHS Learning Collaborative…

…enable the best intervention and treatment decisions at the point-of-care…

…that optimize quality and cost-effective health services.”
Analytically-driven, personalized care delivers value

Leverage our information infrastructure

Build highly predictive model

Within & out of hospital:
- Improve care quality
- Increase coordination
- Target resources on high risk patients

EHR
Clinical Expertise
Vendors
Lab
Patient Profile
Analytics
Interventions
Applications
Addressing The Readmissions Challenge

Project Goal: Our Problem

Identify patients at risk of readmitting before they leave the hospital and enable care providers to intervene

Project Goal: Your Problem

This goal is important to CHS, but it is important to every other hospital that faces penalties related to preventable readmissions

2 Years of Discharges

9 Hospitals

100,000 discharges
Analytics: Risk Models Attributes

• Risk models predict a patient’s individual risk for
  - 30-day, unplanned readmission
  Defined using CMS methodology

• Used 2 years of historical data from 9 Metro hospitals to build the model.

• The primary data source is the EMR (EDW)
  – Pulling over 70 predictive fields hourly, from the first hour admission, through the last hour of the stay
  – Continuously updated as the patient’s condition changes.
The risk score changes throughout the stay

Admission on Monday

![Image of patient in hospital bed]

Diagnosis: Stroke

High Risk
20%

Complication on Tuesday

![Image of chest X-ray]

Aspiration Pneumonia

Very High Risk
50%
Key Predictors of Readmission Risk

Demographics
- Age
- Race Code
- Insurance
- Hospital Name
- Service Provided
- Admission Type
- Transfer Type

Primary Diagnosis
- Any Malignancy
- Cerebrovascular Disease
- Charlson Comorbidity Score
- Chronic Pulmonary Disease
- >9 Meds and >9 Problems
- End Stage Renal Disease
- Cancer Cohort
- Myocardial Infarction
- Number of diagnoses in the problem list
- Number of orders
- Pulmonary Disorder
- Solid Tumor without Metastasis

Co-morbidities

Psychosocial
- Clinical Nutrition Consult
- Living Situation
- Need Transportation
- Assistance
- Physical Therapy Consult

Utilization
- Days since last discharge (w/in 6 months)
- Number of Inpatient visits in the last 6 months
- Number of ED visits in the last 6 months
- Number of Transfers
- Discharged to home in the last 30 days

Continued…
Building the model

• Variables were gleaned from the literature and from clinicians
• Variables were analyzed for their impact either
  – as a continuous variable,
  – or a categorical variable
• The model was then tested in a variety of ways to assure its functionality
  – Build versus test cohorts
  – Bootstrap methods
Analytics: Risk Model Accuracy

- Model Accuracy: C-stat = 0.77
- PCS Readmission model is better than any other predictive models in published literature
- C-stat is the area under the red curve. Accuracy increases as the curve moves towards the upper left corner away from the orange line, which represents a random guess (e.g., coin flip).
Validation of Readmission Risk Model

Predicted Risk

- Very High
- High
- Medium
- Low

Actual Readmission Rate
Industry Interventions

- Case managers can target high risk patients and apply standard care plans (interventions)
- Create ability to measure and track the effectiveness of the intervention (continuous feedback cycle)

<table>
<thead>
<tr>
<th>INTERVENTION TYPE</th>
<th>INTERVENTION DESCRIPTION</th>
<th>EFFICACY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Based</td>
<td>Dietary Consult</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Smoking Cessation</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Diabetic Teaching</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Pharmacy Consult</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Palliative Care</td>
<td>30%</td>
</tr>
<tr>
<td>Telehealth</td>
<td>Telehealth</td>
<td>60%</td>
</tr>
<tr>
<td>SNF</td>
<td>Skilled Nursing Facility</td>
<td></td>
</tr>
<tr>
<td>Acute Inpatient Rehab</td>
<td>Acute Rehab</td>
<td></td>
</tr>
<tr>
<td>LTC Hospital</td>
<td>Long Term Acute Care Facility</td>
<td></td>
</tr>
<tr>
<td>Hospice- Facility</td>
<td>Hospice Facility</td>
<td>40%</td>
</tr>
<tr>
<td>Home Care</td>
<td>Home Care- Skilled Need</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Home Visit RN Med Mgt/SW</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Home Infusion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Home Equipment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Home Oxygen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Telemonitoring</td>
<td>14-80%</td>
</tr>
</tbody>
</table>
Patent-Pending MLSM Provides Value in Model Creation & Deployment

- Speed to value
- Portable analytic workflow
- Easy to embed
- Easy to update

MODEL CREATION

DATA

Build
Shape
Combine

Visualize
Compare
Collaborate

RUNTIME

REAL-TIME OR BATCH DATA

RESULTS

THE LAST MILE OF ANALYTICS

Java
NET
## Patient Centric Solution

### READMISSION RISK BANDS

<table>
<thead>
<tr>
<th>Percent of Total</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
</tr>
</tbody>
</table>

### LOS RISK BANDS

<table>
<thead>
<tr>
<th>Percent of Total</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25.1%</td>
<td>24.9%</td>
<td>25.0%</td>
<td>25.1%</td>
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</table>

### Risk Bands Table

<table>
<thead>
<tr>
<th>Unit</th>
<th>Patient ID</th>
<th>Account</th>
<th>Patient Name</th>
<th>Readmission</th>
<th>LOS</th>
<th>Risk Band</th>
<th>Intervention Modifier</th>
<th>Intervention</th>
</tr>
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<tbody>
<tr>
<td>PX Unit-D-07</td>
<td>10500</td>
<td></td>
<td>Patient PX-10...</td>
<td>Low</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-B-06</td>
<td>11000</td>
<td></td>
<td>Patient PX-11...</td>
<td>Very High</td>
<td>High</td>
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<td></td>
<td></td>
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<tr>
<td>PX Unit-B-06</td>
<td>11500</td>
<td></td>
<td>Patient PX-11...</td>
<td>Medium</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-D-06</td>
<td>12000</td>
<td></td>
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<td>PX Unit-D-06</td>
<td>12500</td>
<td></td>
<td>Patient PX-12...</td>
<td>Medium</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-B-06</td>
<td>13000</td>
<td></td>
<td>Patient PX-13...</td>
<td>High</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-A-02</td>
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<td></td>
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</tr>
<tr>
<td>PX Unit-D-06</td>
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<td></td>
<td>Patient PX-14...</td>
<td>Low</td>
<td>Very High</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>PX Unit-D-06</td>
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</tr>
<tr>
<td>PX Unit-B-06</td>
<td>15000</td>
<td></td>
<td>Patient PX-15...</td>
<td>Medium</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-A-02</td>
<td>15500</td>
<td></td>
<td>Patient PX-15...</td>
<td>High</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-B-06</td>
<td>16000</td>
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<td>Patient PX-16...</td>
<td>Low</td>
<td>Medium</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>PX Unit-G-06</td>
<td>16500</td>
<td></td>
<td>Patient PX-16...</td>
<td>Very High</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-G-05</td>
<td>17000</td>
<td></td>
<td>Patient PX-17...</td>
<td>Medium</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-D-06</td>
<td>17500</td>
<td></td>
<td>Patient PX-17...</td>
<td>Low</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-B-06</td>
<td>18000</td>
<td></td>
<td>Patient PX-18...</td>
<td>Very High</td>
<td>Medium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-G-06</td>
<td>18500</td>
<td></td>
<td>Patient PX-18...</td>
<td>High</td>
<td>Very High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-A-01</td>
<td>19000</td>
<td></td>
<td>Patient PX-19...</td>
<td>High</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-E-01</td>
<td>19500</td>
<td></td>
<td>Patient PX-19...</td>
<td>Medium</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PX Unit-B-06</td>
<td>20000</td>
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<td>Patient PX-20...</td>
<td>High</td>
<td>Very High</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How do my patients look compared to others?
Where are they located?
What is driving their risk?
Individual Patient View

What is driving the risk?

<table>
<thead>
<tr>
<th>Readmission Probability Indicators</th>
<th>LOS Probability Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Orders: Very High (&gt;= 1087)</td>
<td>RADIOMETRY COUNT: 2±2</td>
</tr>
<tr>
<td>Gastrointestinal Normal: No</td>
<td>Recorded/Transf Meds: 8±5</td>
</tr>
<tr>
<td>Cancer Patient: Yes</td>
<td>ER COUNT LAST 6 M0: 1±2</td>
</tr>
<tr>
<td>Age: Very Low (&lt; 39)</td>
<td>SYSTOLIC BP: 127±21</td>
</tr>
<tr>
<td>Musculoskeletal Normal: No</td>
<td>RACE: Other</td>
</tr>
<tr>
<td>Race: Other</td>
<td></td>
</tr>
</tbody>
</table>

Intervention lifecycle and tracking
What am I going to do about it?
Patient Risk Assessment

**Then**

- **Done After EMR and Patient Review**
  Care managers need to review the patient’s chart and examine the patient prior to assessing risk

- **Limited Capability**
  Care managers assign risk based on a few simple criteria that group patients into two buckets: low risk and high risk

- **Case Manager Variation**
  Care manager ability to find and assess risk factors varies

- **Done at Admission**
  Care managers only have capacity to assess patient risk at admission

**Now**

- **Done Prior to Seeing Patient**
  Allows care managers to work more effectively by prioritizing their workflow and more efficiently through automating the risk assessment.

- **Risk Assessed from Predictive Model**
  Patient risk for readmission is predicted, automatically, from over 40 key variables pulled from Cerner

- **Automation Decreases Variation**
  Patient risk is automatically calculated for the care managers

- **Updated Hourly**
  A patient’s condition and likelihood for readmission can change throughout a hospital stay; our tool captures these changes hourly as clinical data change
Care Interventions

Then

Difficult to Hardwire
Care managers required to recognize a certain patient type and remember what interventions are to be assigned to the patient

Difficult to Measure Interventions
Current care management tools do not allow for evaluation of intervention efficacy; limits our ability to leverage our System

Now

Recommendations Assigned Automatically
Patients automatically assigned interventions based on their personal characteristics

Measure Efficacy Interventions
Capture of interventions and data around outcomes will allow us to measure the efficacy of interventions and determine patients who optimally benefit
Additional Benefits

- Potential to improved the productivity of nurses and case managers
  - Instead of basing rounds on room number, time of discharge or other information, a reliable method of working the list of patients can be developed.
  - Case Managers can now be deployed based upon the complexity of the patients and their likelihood of readmission
- Ability to better predict work loads across floors and units
- Risk stratification for Transition of Care calls
- Communication of risk to post acute care providers
Triage of Risk for Transitional Care

- VERY HIGH RISK
- HIGH RISK
- VERY HIGH RISK
- HIGH RISK

Telehealth Call Center
Transitional Care Call

Transitional Care Clinic
Time to Deploy Models

• Our 3 year experience in building and deploying models now shortens the adoption curve for every organization that follow in our path.

• A recent deployment in rural North Carolina, took only 5 days to get the model validated, the Case Managers trained, and the model into their hands.

• By Friday, cases were being managed differently.
Potential to deploy visualization across devices

Portable Web Applications

Interactive Mobile Apps

Dashboard Integration

Embedded CRM

Embedded IoT

Solution Accelerator
Improving care for patients with COPD by using predictive analytics at the point of care

A collaboratory between the COPD Foundation, Carolinas HealthCare System, Predixion Software, and Glaxo Smith Kline
Patient-Centered, Point of Care COPD Learning Collaboratory
Key Predictors of Readmission Risk

Demographics
- Age
- Race Code
- Insurance
- Hospital Name
- Service Provided
- Admission Type
- Transfer

Primary Diagnosis
- Any Malignancy
- Cerebrovascular Disease
- Charlson Comorbidity Score
- Chronic Pulmonary Disease
- >9 Meds and >9 Problems
- End Stage Renal Disease

Co-morbidities

Psychosocial
- Clinical Nutrition Consult
- Living Situation
- Need
- Transportation Assistance
- Physical Therapy Consult

Utilization
- Days since last discharge (w/in 6 months)
- Number of Inpatient visits in the last 6 months
- Number of ED visits in the last 6 months
- Number of Transfers
- Discharged to home in the last 30 days

Built from our experience with Readmission 1.0 & 2.0

Continued...
### Key Predictors of Readmission Risk

#### Labs/Vitals/Meds

<table>
<thead>
<tr>
<th>Recorded/Home Meds</th>
<th>O2 saturation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meds in the last 24 Hrs</td>
<td>Proton Pump Inhibitor</td>
</tr>
<tr>
<td>Albumin Level</td>
<td>Orientation</td>
</tr>
<tr>
<td>Ammonia level</td>
<td>Oxygen Flow Rate</td>
</tr>
<tr>
<td>Arterial Lactate</td>
<td>Oxygen Improved Status</td>
</tr>
<tr>
<td>Blood Transfusion</td>
<td>Oxygen Therapy Type</td>
</tr>
</tbody>
</table>

#### Built from the literature and experts in COPD care

- Gastrointestinal Normal
- Glomerular Filtration Rate
- Feeding Tube
- Hemoglobin
- HGB A1C
- Inability to Verbalize Needs
- Musculoskeletal Normal
- Neurological Normal
- Nutrition Braden Score
- Scooting
- Sit to Stand
- Sit to Supine
- Skin Description
- Systolic BP
- Toilet Use Mobility
- Tracheal Post Treatment
- Venous Lactate
COPD Readmission Risk Model

Built on nearly 8000 discharges with a CMS defined COPD or Asthma Diagnosis
Actionable insights by comparing odds ratios
### CHF Combination of Conditions

Severity of Top 20 combinations (accounts for 75% of COPD+CHF patients)

<table>
<thead>
<tr>
<th>Comorbidity combination</th>
<th>Count</th>
<th>Proportion</th>
<th>Readmission Rate</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>10010001</td>
<td>55</td>
<td>1.9%</td>
<td>12.7%</td>
<td>CHF + OP + Anxiety</td>
</tr>
<tr>
<td>10001001</td>
<td>97</td>
<td>3.4%</td>
<td>12.4%</td>
<td>CHF + OA + Anxiety</td>
</tr>
<tr>
<td>11000000</td>
<td>228</td>
<td>7.9%</td>
<td>14.0%</td>
<td>CHF + HTNDis</td>
</tr>
<tr>
<td>10000000</td>
<td>372</td>
<td>12.9%</td>
<td>15.9%</td>
<td>CHF only</td>
</tr>
<tr>
<td>10001000</td>
<td>81</td>
<td>2.8%</td>
<td>16.0%</td>
<td>CHF + OA</td>
</tr>
<tr>
<td>10000001</td>
<td>221</td>
<td>7.6%</td>
<td>18.1%</td>
<td>CHF + Anxiety</td>
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<tr>
<td>10000100</td>
<td>138</td>
<td>4.8%</td>
<td>18.1%</td>
<td>CHF + DM</td>
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<tr>
<td>10001100</td>
<td>38</td>
<td>1.3%</td>
<td>18.4%</td>
<td>CHF + OA + DM</td>
</tr>
<tr>
<td>11100100</td>
<td>38</td>
<td>1.3%</td>
<td>18.4%</td>
<td>CHF + HTNDis + Anemia + DM</td>
</tr>
<tr>
<td>11001101</td>
<td>69</td>
<td>2.4%</td>
<td>18.8%</td>
<td>CHF + HTNDis + OA + DM + Anxiety</td>
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<td>11001100</td>
<td>57</td>
<td>2.0%</td>
<td>19.3%</td>
<td>CHF + HTNDis + OA + DM</td>
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<td>2.9%</td>
<td>20.0%</td>
<td>CHF + HTNDis + Anxiety</td>
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<td>10011001</td>
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<td>22.0%</td>
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<td>10000101</td>
<td>125</td>
<td>4.3%</td>
<td>24.8%</td>
<td>CHF + DM + Anxiety</td>
</tr>
<tr>
<td>10001101</td>
<td>71</td>
<td>2.5%</td>
<td>26.8%</td>
<td>CHF + OA + DM + Anxiety</td>
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Visualize the Relationships of COPD with Comorbidities
COPD prevalence varies across the country
Insights from our recent Design Session for Predictive Personalized Medicine Interface

Involved end-users for designing the interface

- Case Managers
- Hospitalists
- Primary Care Physicians
- Pulmonologists
- Respiratory Therapists
- Pulm Rehab Team
We start off each day with a morning huddle to discuss goals that need to be met and patient status.

- [Video Re-enactment](http://sendvid.com/5kq3a1l5?secret=653da4fa-450d-4af9-af36-b924614d39e8)
Trend across the country is down
Trend across US is downward and Charlotte has outperformed rest of country (and better than this same graph previous year).
What does improving your O/E mean?

• Using just a percentage doesn’t reflect the case mix of your organization.
  – The Cardiothoracic program was moved from one hospital to another. The Case Mix radically changed at both.

• Using a percentage doesn’t reflect the changes in care, and how they impact subsequent admissions and readmissions
  – As you get better at readmissions, you get better at Admissions, and the patient population changes in your hospital

• As your O/E improves, you demonstrate that your organization is pulling away from similar hospitals with similar patients.
Improving Observed to Expected Ratios

Hypothetical Hospital
10,000 discharges a year

Number of readmissions **expected**
1800 readmissions a year

Number of readmissions **observed**
1800 readmissions a year

If the number of readmissions = the number expected: \( \frac{0}{E} = 1 \)

If the number of readmissions is reduced 10%,

Number of readmissions expected is 1800 readmissions a year
Number of readmissions observed is 1680 readmissions a year

Then the O/E ration goes to 1680/1800 or 0.93

As O/E is less than 1.0, there is a continued improvement in performance.
Carolinas HealthCare System Readmissions Journey Implementation of Predixion™

*Updated 7/14/2015*
Carolinas HealthCare System Readmissions Journey
Multifaceted, multi-campus approach to improvements

*Updated 7/14/2015
Results

• In the metro city Charlotte market, CHS recently saw an even further drop in readmissions by requiring the use of a standard order set amongst hospitalists caring for patients with COPD.

• Coupling standardized management with interventions aimed at the highest risk populations dropped the readmission rate in half again.

• So what does this tell us? A sharper focus built upon predictive analytics, coupled with intentional strategies aimed at the highest risk patients, can measurably decrease the readmission rate.
CHS Multi-year Journey on Readmissions

- Consolidated Case Management Across Metro Hospitals
- System wide Summits held on the topic of readmissions
- A CHS QSOC™ was formed and meets quarterly
- A System Wide Executive Steering Committee was formed.
- Although CMS was focusing penalties on only 3 DRG at the inception of the program, CHS chose to internally measure its performance against all diagnoses, and all causes.
- Co-development of model of readmissions based upon 2 years of historical data from CHS (> 300K discharges).
- Training of Case Management in use of Predixion Tool
- Development of accountability of Case Managers for using tool and applying appropriate interventions.
- Spread of use of tool beyond just Case Management
- Importance of readmissions reflected in its outcome linked to Executive Dashboard.
- You must have an accurate focus on the impactable patient, and apply the meaningful interventions.
Multifaceted approach leads to
1. Reducing O/E by 0.2 from 2011 to 2015.
2. Gaining insights into which patients are at highest risk
3. Gaining insights into which interventions impact readmissions.

So what does this mean?
Conclusion

- Carolinas HealthCare System (CHS) has been on a multi-year journey to meaningfully decrease unplanned 30 day readmissions.
- Since adopting predictive analytics as part of their comprehensive strategy in summer of 2013, CHS has managed over 300,000 patient discharges in the hands of 200 case managers.
- As part of a comprehensive strategy, CHS has seen year over year improvement in decreasing the readmission O/E, and has increased insight into which patients should receive transition of care services.
- It’s all about change management