Predicting Readmissions Among Children with Special Health Care Needs

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Treo Solutions. An Essential Partner in Transforming Care.

The right information in the right hands at the right time.

**Offerings**

**Foundation:**
- Data Enrichment & Aggregation
- Business Rules & Methodology
- Multi layered Portals

**Strategy:**
- Strategic Opportunity Assessments (SOA)
- Provider & Population Mgmt
- Transforming Payment
- Value Based Metrics and Alignment for True ROI

**Logistics:**
- Intelligent Transparency
- Intelligent Analytics
- Intelligent Provider and Population Engagement

| Commercial Payers | Government Payers | Health Systems | All Payer Claims Data Bases | Multi-Payer Initiatives |
Presentation Goals

- Understand Value of Public Health Social Ecological Model for Predictive Analytics in Health Care
- Understand Value of Population Health Perspective in building models
- Identification of approaches to improving model ROI through action flags
- Illustrate these concepts with a Readmission Model for Children with Special Health Care Needs.
Treo Predictive Analytics: Start with the population not a disease.

Population health is key to reducing readmissions

Reform Update: Broad approach may be better for reducing readmissions, study suggests

By Maureen McKinney
Posted: November 25, 2013 - 3:15 pm ET
Tags: Comparative Effectiveness, Healthcare Reform, Hospitals, Insurance, Patient Care, Readmissions

As the CMS begins the second year of a penalty program for preventable hospital readmissions required by the healthcare reform law, new research indicates that hospitals fare better when they focus on patient care more generally rather than targeting specific conditions, such as heart failure, or specific timeframes such as 30 days post-discharge.
Public Health Social Ecological Model

Illustration From CDC: http://www.cdc.gov/cancer/crccp/sem.htm
A Population Health Perspective leads to the Ecological Action Framework

Opportunity

 Identified through Treo Analytics

High Readmission Rates

Sphere of Influence

System

Limited intra system Information
Limited Access to PCP

Clinician

Poor Continuity of Care
Poor Chronic Care Management

Person

Poor Adherence
Low Patient Engagement

Intervention

Integrated information with PA
Discharge/community integration
Wrap around ICM
Expanded PCP Network

Rotating Evening Clinic Hours
Distributed work through care teams (e.g. Health Coach)
Advanced access scheduling
Electronic Access Channels

Skill set intervention (e.g. Stages of Change, teaching problem solving)
HRA, CAHPS, HYH
Treo models begin with identification of:
- Opportunities in the populations of interest and
- Customer Initiatives that are underway at each level

The most important attribute of a model is that it is used!

That is why we begin by defining the opportunity (e.g., high spend, ancillary use, readmissions, ACSC visits, etc.)

Next we determine if a predictive score would make a difference. Would a predictive score in a workflow change workflow and outcomes?
After reviewing key findings in the literature and soliciting hypothesis from the program staff, we build the model with attention to action flags.

The model is validated statistically and with program staff. Anticipated ROI is assessed and ongoing feedback loops established.

The final model results are delivered via a variety of platforming and timing delivery options.

The model performance is assessed on a monthly basis. Model coefficients are updated monthly. Model structure is revisited as needed.
We have produced a number of models for general and special populations including:
- Persons with disabilities receiving long term home and community based services
- Dual (Medicare and Medicaid) recipients
- Persons characterized by severe and persistent mental illness
- Persons 60+ with multiple chronic conditions
- Children with special health care needs

Most of our modeling is for populations that are known to the program and are relatively stable in membership.
Treo Predictive Intelligence—Dynamic and Adaptive

- Wide scope administrative data is the primary source of information (including ADT) and facilitates recurring dynamic results reflecting each level of the health eco system.

- Periodic Functional Status information has also been used and we are testing lab data and publically available eco system social determinants.

- Zip code has proven to be a key determinant in all of our readmission models. It is a useful but crude indicator.

- Social and behavioral determinants of health are clearly the next frontier for PA in special populations. Indicators of system integration/coordination will also be critical metrics.
Model results can be used for individual interventions and in aggregate to assist program managers deciding between program strategies and population priorities.

Patterns of troubling system issues or provider behavior can be identified by clustering the action flags produced by the predictive model.

Resource allocation can be optimized in the light of perceived impactability of the problem within the parameters of current skill sets and competing opportunities.
Children with special health care needs (CSHCN) have serious chronic health care problems and numerous interactions with health care providers. They are susceptible to high rates of readmission.

CSHCN was defined for the study as having an Aggregate Clinical Risk Group (ACRG) status of a single dominant chronic condition or greater using the 3M Clinical Risk Group (CRG)* technology with some exclusions.

A word about data integrity and enrichment
   – During both development and Implementation

*3M technologies also used to establish APRDRGs, Potentially Preventable Admissions (PPA), Potentially Preventable Visits (PPV), Potentially Preventable Readmissions (PPR)
Children With Special Health Care Needs

- A special program was underway by the customer to link children with special health care needs to high intensity care managers associated with specialized medical care homes.

- Readmissions were identified as a key quality and financial metric and Treo was requested to develop a model for prioritizing children for the intervention.

- 5406 discharges from 78 hospitals in one State were identified for modeling readmissions among children with special health care needs (CSHCN) 1 to 18 years old enrolled in the Medicaid program for at least 12 consecutive months prior to the discharge.

- A readmission risk model was devised that could be deployed routinely and with little or no data acquisition cost to providers beyond the usual practice of completing administrative data completion requirements.
# Children With Special Health Care Needs

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<th>AGE</th>
<th>Re Admit (Days)</th>
<th>Last Year PMPM</th>
<th>This Year PMPM</th>
<th>MD Vsts</th>
<th>ER Vsts</th>
<th># Unique MDs</th>
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Sample of Variables Assessed

**Person**
- Health Status
  - EDCs (Subset)*
  - CRG (Subset)*, Shift CRG (T1-T2)
- Demographics
  - Gender, Age

**System**
- Zip code*, SES
- IP & ER Follow up 30 days* and 7 day
- Inpatient
  - Facility Auspice -- Last LOS*
  - Facility DRG Vol -- # Readmits*
  - Index DRG* -- # ACSC*
- ER Visits & ACSC ER Visits*

**Provider**
- Primary Care
  - PCP*, # PCP’s
  - # PCP visits ,
  - Degree of Association*,
  - Scope, Dispersal*
  - Coordination of Care
- Specialist & Ancillary
  - #Non PCP’s & # Non PCP visits
  - Imaging $
  - Physical Therapy, Home Care & DME

**Cost of Care**
- Total Curr QTR, Curr Year, Prior Year
- Shift, Spike, Persistence*
- RX scripts & $ Curr QTR, Curr/Prior Year

*SIGNIFICANT PREDICTORS
Performance of the Model. How accurate?

[Image: ROC Curve for Model with Area Under the Curve = 0.7868]
Final Variables

**Patient**
- EDCs (12)
- Single, Pairs, or Multiple Chronic Conditions
- Persistence in high cost

**Provider**
- PCP Risk (36)
- Is there a Care Director?
- Specialist Dispersion

**System**
- Zip Code (35)
- ACSC Admits
- ACSC ER visits
- Prior Readmissions
- No 30 day D/C follow up
- DRG risk
- Index LOS
Action Flags

- A good model is a diagnostic for action.

- Can’t just assign a risk score and hope it all works out.

- The core elements should be actionable. But some of can be unpacked.

- ~Recursive/path analysis concepts used to identify action flags
  
  Examples:
  
  - What makes some DRGs more “risky” than others? (volume?)
  - Why are some PCP’s more “risky” than others? (Continuity, Panel size?)
  - Why are some zip codes more “risk” than others? (Supply, distance?)
## Member List (limited to 1,000 members)

This list includes all patients who are attributed to the provider and who have had two or more Emergency Room Visits during the latest 12 months for which data is available.

### Search:

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<tr>
<th>Member ID</th>
<th>Member Name</th>
<th>Age</th>
<th>Gender</th>
<th>Base Risk Group</th>
<th>Physician Name</th>
<th>Outpatient ER Visits</th>
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Showing 1 to 10 of 517 entries
**Dashboards for Payers, Managers, Providers**

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**Patient Profile**

Patient: BONNIE N. ROBERTS (DE-ID)  
(DOB: 07/12/1961)  
Period: 01/01/2012 to 12/31/2012

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**GENERAL INFORMATION**

**Member**
- Name: BONNIE N. ROBERTS (DE-ID)
- County:
- Zip code: 58261
- DOB: 07/12/1961
- Age: 51
- Gender: Female

**Insurance**
- Primary Payer: Commercial
- Enrolled Since: 01/01/2009

**Primary Care Physician**
- Name: EARL Y. HALL (DE-ID) MD
- VIS: 0.84

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**Medical Summary**

- Member Risk Group: Cerebrovascular Disease - 2 or More Other Dominant Chronic Diseases Level - 3
- Treo Population Health Segment: Complex Chronic

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**UTILIZATION SUMMARY**

**Visit Summary**
- Inpatient visits: 2
- Outpatient visits:
  - ER: 4
  - Non-ER: 10
- Professional:
  - PCP: 12 - last visit: 11/05/2012
  - Specialist: 74 - distinct specialties: 15
- Total visits: 102

**Prescriptions**
- Total prescriptions: 23
- Unique prescriptions: 16

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<th>Member Months</th>
<th>CRG Weight</th>
<th>Fall Out Report</th>
<th>Jumpers Report</th>
<th>Newly Chronic</th>
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