Right Care
Right Place
Right Time

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IHI 26th National Forum
December 7, 2015

Health Care Delivery System Transformation
Strategic Improvement Priorities and System Level Measures

System Level Measures

<table>
<thead>
<tr>
<th>ACCESS</th>
<th>FLOW</th>
<th>PATIENT SAFETY</th>
<th>CLINICAL EXCELLENCE</th>
<th>REDUCE HASSLES</th>
<th>TEAM WELLBEING</th>
<th>FAMILY CENTERED CARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd Next available appointment</td>
<td>% of eligible patients with delays</td>
<td>Adverse drug events (ADES) per 1,000 doses</td>
<td>Codes outside the ICU rate/1000 days</td>
<td>Touch Time for Providers</td>
<td>Employee Satisfaction</td>
<td>Overall Rating: Patient Experience</td>
</tr>
<tr>
<td>Discharge Prediction and Execution</td>
<td>Growth Prediction</td>
<td>Nosocomial infection rates</td>
<td>Standardized PICU Mortality Ratio – Expected/Actual</td>
<td></td>
<td>Staffing Effectiveness</td>
<td></td>
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<td></td>
<td></td>
<td>Bloodstream infection rate</td>
<td></td>
<td>Functional Health Status</td>
<td>Physician Satisfaction</td>
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<td></td>
<td></td>
<td>Surgical site infection rate</td>
<td></td>
<td></td>
<td>Voluntary staff turnover rate</td>
<td></td>
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<td></td>
<td></td>
<td>infection rates: VAP</td>
<td></td>
<td></td>
<td>Accident rate for staff with Work days lost</td>
<td></td>
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<td></td>
<td></td>
<td>Serious Safety Events</td>
<td></td>
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Risk Adjusted Cost per Discharge

M15
I have nothing to disclose
Challenges of Growth
Operating Above Optimal Occupancy

We are increasingly operating above optimal census of 460 (85% occupancy) and frequently operating above a system stressing census of 485 (90% occupancy)

What Do Patients “Hire” Us to Provide
What do they call “Value”

- Make the Right Diagnosis
- Deliver the Correct Therapy / Treatment
- Prevent Complications or Errors in Care
- Deliver Safe Care regardless of the Inherent Risks
- Get Me Home, Keep me at Home
- Respect my needs
- Give me my Money’s Worth

This is all FLOW management – it is essential for SAFETY, PATIENT / FAMILY EXPERIENCE and QUALITY DELIVERY
“Flow” is a Safety Initiative

- Prediction Framework for Safety
- Getting the “Rights” Right
  - Right Diagnosis and Treatment
  - Right Patient in Right Bed – Location
  - Right Nursing Staff and Staffing Expertise
  - Disease Specific Expertise
  - Equipment Expertise
- Requires ability to “Predict” future needs, and manage present capacity control variability
- Operations Management techniques to understand and manage variability are the key to success

Value Equation for Healthcare

\[
\text{Value} = \frac{(\text{Outcomes} + \text{Patient Experience}) \times \text{Appropriateness}}{\text{Cost} + \text{“Hassle Factor”}}
\]
Critical Flow Failure Recognition

Weekly Critical Flow Failures
Over the last 52 weeks

Critical Patient Flow Failures by Month

Last Update: 9/14/2015 by M. Ponti-Zins, James M. Anderson Center for Health Systems Excellence
Data Source: MPS
Key Drivers for Capacity Management

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IHI Theory on Flow

Outcomes | Primary Drivers | Secondary Drivers | Specific Change Ideas |
---|---|---|---|
| | Shape or Reduce Demand | Relocate care in ICUs in accordance with patients’ EOL wishes | 1. Assess seasonal variations and changes in demand patterns and proactively plan for variations |
| | | Relocate care in Med/Surg Units to community-based care settings | 2. Develop advanced illness planning programs (hospital-based and community-based) |
| | | Relocate low-acuity care in EDs to community-based care settings | 3. Adjust admission policies to reduce high-risk populations |
| | | Decrease demand for hospital beds through delivering appropriate care | 4. Implement Strategic Capacity Management (SCM) (i.e., amendments, discharges, and discharges) |
| | | Decrease demand for hospital beds by reducing hospital-acquired conditions | 5. Real-time demand and capacity management processes |
| | Match Capacity and Demand | Increase capacity to meet hourly, daily and seasonal variations in demand | 6. Flex capacity to meet predicted demand patterns |
| | | Early recognition for high census and surge planning | 7. Improve efficiency and throughput in the OR, ED, ICUs, and Med/Surg Units |
| | | Improve efficiencies and throughput in the OR, ED, ICUs, and Med/Surg Units | 8. Reduce surgical and unscheduled flows in the OR |
| | Reroute the System | Discharge Line Optimization (frail elders, SNF residents, stroke patients, etc.) | 9. ED efficiency changes to reduce LOS in ICUs, EDs, and Med/Surg Units |
| | | Reducing unnecessary variations in care and managing LOS “outliers” | 10. Increase LOS in ICUs (i.e., timely consults, tests, and procedures) |
| | | Redesign surgical schedules to improve throughput and to improve smooth flow of patients to downstream ICUs and inpatient units |
| | | Separate scheduled and unscheduled flows in the OR |
| | | ED efficiency changes to decrease LOS |
| | | Increase LOS in ICUs (i.e., timely consults, tests, and procedures) |
| | | Decrease LOS on Med/Surg Units (case management for patients with complex medical and social needs) |
| | | Increase LOS on Med/Surg Units (case management for patients with complex medical and social needs) |
| | | Advance planning for transfers to community-based care settings |
| | | Cooperative agreements with care facilities, SNF’s and nursing homes |
## Key Drivers for Capacity Management

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### Evidence Based Care

- Evidence Based Care Guidelines serve as an interface between rapidly evolving scientific information and busy clinical practices
- Developed by Inter-disciplinary teams – experts
- Implementation
  - Awareness of recommendation to facilitate change
  - Easy access to the Evidence
  - Feedback on Outcomes
  - Feedback on further improvements
- Culture of Improvement / Evidence Based Care
Bronchiolitis

- Population – Infants 1 year or younger with bronchiolitis
- 3 years control data vs. 3 years post implementation
- Results
  - Admissions – 30% decrease
  - LOS – 17% decrease
  - Nasal Washings (RSV) – 52% decrease
  - Chest X Ray – 14% Decrease
  - Respiratory Therapies – 17% decrease, repeat Tx - 28% decrease
- Net Cost Reduction
  - Total Costs – 14% decrease
  - Respiratory care services – 72% decrease
- Re-Admissions – No change


Cytomegalovirus Prophylaxis

- 75% Decrease in CMV infection – liver/intestine transplants
- Decreased IV-IGG expense

Danziger-Isakov, Lara et al. CCHMC Integrated Solid Organ Transplant
Yearly SSI Patients - CCHMC

**774 SSI’s**

9 Years
387 SSI’s Prevented

337 SSI’s

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**Case Average**
10 days LOS
$27,000.00

**Business Case**
3870 days LOS
$10.5 million

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Standardization for Outcomes
Merging Evidence and Practice

SSI Accomplishments

- Baseline rate: 4.4 SSIs/100 procedures, Current Rate: 1.7 SSIs/100 procedures
  - 60% reduction
- Overall SPS - Estimated 3,699 fewer children harmed
- Since October 2009 - $79 million in health care costs saved

Toltzis P, O’Riordan M, Cunningham DJ, Ryckman FC, Bracke TM, Olivea J, Lyren A.
Inflammatory Bowel Disease

Remission rate
(PGA, Centers >75% registered)

71 Care Centers
>19,500 patients
>575 physicians
>35% of all IBD patients

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Surgical Streams of Care

- **Urgent / Emergent Surgery**
  - Predictable and Measurable – Natural Variation
  - Possible to Model
  - Can be managed within the System with resource allocation
  - Delay \(\rightarrow\) Increased risk and worse outcomes

- **Elective Surgery**
  - Unpredictable – Whim of Surgical Schedule
  - High variability over time
  - Delay \(\rightarrow\) Case specific risk

- **Initial Design around Urgent Needs**
  - Goal – No urgent cases in Block Time
  - Allocate “Block” for Urgent Needs

Traditional Block

- Reactive System
- Urgent Emergent Cases placed within Block Time as needed
- Elective Case Plan disrupted, prolonged waiting time for elective patients
- Inefficient (Unsafe) Access for Urgent Cases
- Push complex Elective Cases into the late hours
  - Overtime
  - Wrong Team in OR

INITIAL MODEL

TWO CASE SCHEDULING TYPES

SCHEDULED CASES  
85-90% all Cases

EMERGENCIES  
10-15% of all Cases

DAILY SCHEDULE

95% of all OR time allocated to Doctor Specific Blocks

Emergencies done at end of the day, or forced into slots between scheduled cases.

RESULT

- Long Add-On List at the conclusion of the day
- Long Waiting Times for parents and children with urgent needs
- Often doing complex cases in evening or at night when resources were limited

END OF DAY

Not Ideal
Scheduling Guidelines – A to E

GUIDELINES FOR SURGICAL CASE GROUPING DIAGNOSES/PROcedures
(guideline only: medical judgment required) Revised Master 031307

Acute Life and Death Emergencies

A < 30 Minutes
- A to E
- NOT RECOMMENDED
- A

Urgent C < 4 Hours
- A to E
- NOT RECOMMENDED
- A

Add-on case to elective schedule
- E < 24 Hours

Emergency, but not immediately life threatening

B < 2 Hours
- A to E
- NOT RECOMMENDED
- A

Semi-Urgent D < 8 Hours
- A to E

Options from Simulation

<table>
<thead>
<tr>
<th># Case Included</th>
<th># Rooms</th>
<th>Average Waiting Times (minutes)</th>
<th>Probability 1 or More Rooms Will Be Available</th>
<th>Utilization Rate</th>
<th>Recommendations/Considerations</th>
</tr>
</thead>
</table>
| 1 A, B, C, D, “missing” treated as B | 3 | A: 45 B: no waiting C: 31 D: 103 | 6/7 | 46% | NOT RECOMMENDED
- Must wait for A case would exceed total limit |
| 2 A, B, C, “missing” treated as B | 3 | A: 21 B: no waiting C: 36 | 7/8 | 24% | NOT RECOMMENDED
- Low utilization rate |
| 3 A, B, C, “missing”) | 3 | A: 17 B: 19 C: 23 | 1/1 | 16% | NOT RECOMMENDED
- Low utilization rate |
| 4 A, E, “missing” treated as D | 3 | A: 18 B: 19 C: 24 D: no waiting | A: no waiting 4/5 B: waiting 70% 10/10 | 6/7 | NOT RECOMMENDED
- Low utilization rate |
| 5 A, E together, “missing” treated as B | 2 | missing E will take any A-E case | A: 7 B: no waiting C: 16/17 D: 17 | 1/1 | RECOMMENDED
- Very good waiting times (Wait for A case would exceed stated limit about 1/3/5/12 weekdays (21.4 weeks)) |

Health Systems Excellence

James M. Anderson Center
For
Healthcare Improvement
Block with Urgent Access Assured

- Predictive system
- Urgent Cases in Defined Rooms with Scheduled Teams
- Resources needed can be modeled
- Care based on Urgency / Medical Need

B-E Case Access - % Successful

Chart showing OR Renovation:
1 Add-On Room Closed
"A" Case Access Times – Target 30 Minutes

ICU Bed Availability – ICU Scheduling

Case Statistics by Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Total PICU Days</th>
<th>Case Count</th>
<th>ALOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short</td>
<td>224.47</td>
<td>177</td>
<td>1.27 (27%)</td>
</tr>
<tr>
<td>Medium</td>
<td>304.74</td>
<td>82</td>
<td>3.72 (37%)</td>
</tr>
<tr>
<td>Long</td>
<td>302.56</td>
<td>31</td>
<td>9.76 (36%)</td>
</tr>
<tr>
<td>Grand Total</td>
<td>831.78</td>
<td>290</td>
<td>2.87</td>
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Short: 61% cases, 27% days
Long: 11% cases, 36% days
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Discharge Prediction

- Various approaches to Discharge Management
- 1980’s – Keep it a Secret
- 1990’s – 2000’s Discharge goals
  - AM before 11 > 30-40%
  - “Shift” goals
  - 4 hour time block goals with prediction of “window”
- Reactive
- “Not Patient Centered”
- 2008 - Prediction
- 2013-14 – Discharge when Medically Ready
Discharge when Medically Ready

- Criteria based entirely on completion of necessary treatment plan
- Discharge criteria are determined on admission by treating physician / service
- Standardization of criteria for all common treatment protocols –
  - All Hospital Medicine Pediatrics
  - Surgery – Gen, ENT, Orthopedics, Cardiac
- Develop mechanism to execute

Timeline for DC when Medically Ready

- Criteria established at admission
- Nurse at bedside notifies service when Medical discharge criteria are met
- Discharge from floor in < 2 hours
- Review Length of Stay and Re-Admissions as balancing measures

Not about Speed – Now about Efficiency
SMART AIM
Increase percentage of all HM patients who have met* medically ready criteria who will be discharged within two hours of reaching that goal* on A6S, A6N, LA1W from 75% to 80% by June 30, 2014

GLOBAL AIM
Productivity: Optimize use of facilities and staff and improve patient flow to achieve 20% greater utilization of existing assets by June 30, 2015

KEY DRIVERS
- Criteria for Medically Ready Defined at Admission
- Shared Ownership/Accountability and Buy-In Among Physicians and Nurses
- Communication regarding prediction of discharge and defined goals is ongoing through the hospital stay
- Potential Barriers to Discharge are Clearly Articulated and Mitigation Plans Established
- Performance by team is transparent
- Evidence of Preoccupation with Failure
- Clear expectations for Parents/Families

INTERVENTIONS (LOR)
- Agreement among HM attendings and nursing staff of discharge criteria for order set diagnoses and general admissions (LOR 2)
- 1) 8 pm Huddle discussion re: early discharges (LOR 2)
- 2) 0630 notification of patients ready for discharge (LOR 1)
- Performance Management (LOR 1)
- Standardized and modifiable order sets (LOR 2)
- Identify and Mitigate Plans:
  1) Transportation- census based (LOR 1)
  2) Pharmacy- priority fills (LOR 2), Outpt. delivery to patient room (LOR 1)
  3) Consults- proactive evaluation (LOR 2)
  4) RT- process in PICU (LOR 1)
  5) Home Health Care
- Daily Feedback reports to RNs and MD’s with ID and mitigation of process and outcome measure failures (LOR 2)
- Feedback of data by HM team in conference room and by email (LOR 1)
- Auto notification to resident team that patient has met all criteria (LOR 2)
Balancing Measures – Length of Stay

Hospital Medicine Average Length of Stay
For patients with selected diagnosis

<table>
<thead>
<tr>
<th>Unit</th>
<th>FY11</th>
<th>FY13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>2.12</td>
<td>2.1</td>
</tr>
<tr>
<td>Unit 2</td>
<td>2.52</td>
<td>1.97</td>
</tr>
<tr>
<td>Unit 3</td>
<td>1.14</td>
<td>1.4</td>
</tr>
<tr>
<td>All</td>
<td>2.1</td>
<td>1.87</td>
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Balancing Measures – Readmission Rate

Hospital Medicine 30-day Readmission Rate
For patients with selected diagnosis

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<th>Unit</th>
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<th>FY13</th>
</tr>
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<tbody>
<tr>
<td>Unit 1</td>
<td>8.23%</td>
<td>7.32%</td>
</tr>
<tr>
<td>Unit 2</td>
<td>7.92%</td>
<td>6.20%</td>
</tr>
<tr>
<td>Unit 3</td>
<td>5.73%</td>
<td>3.36%</td>
</tr>
<tr>
<td>All</td>
<td>7.69%</td>
<td>6.19%</td>
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Prediction – Model for the Future

- **Static Analytics**
  - Performing a **ONE TIME** analysis of processes with historical data in order to **PREDICT** what’s going to happen under certain circumstances.
  - **Critical Care Bed Modeling for Growth**
- **Real Time Analytics**
  - Performing **ONGOING** analysis of processes with latest available data in order to continuously **PREDICT** what's going to happen under certain circumstances.
  - **RN Bedside Nurse Staffing Model**
Critical Care Bed Predictions

- Discrete Event Simulation
- Variable Input – Growth, Length of Stay, Readmissions
- “What if” scenarios

Sample Output – Probability of Full Unit

YEAR 2-7 Forecasted PICU Bed Needs - Mid-Range/Most Likely
Bed Needs for PICU - Probability of a Full Unit
20 Replications of a 456 Period (90 Day Warnings - Mean Probability
POPULATION: Unscheduled Medical/Surgical, BMT, ENT Airway ICU Elective Cases OR CAP=3

Models future status
Allows for Safety Considerations
Construct “right size” units
Forecasted Bed Needs
Advantages of Efficiency

Estimated number of beds required for given probability of the unit being full.

<table>
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<th>Forecast Time Frame</th>
<th>Probability of Full Unit</th>
<th>PICU Beds</th>
<th>CICU Beds</th>
<th>ICU Bed Needs</th>
<th>Combined ICUs</th>
<th>Estimated Savings</th>
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<tbody>
<tr>
<td>Year 2</td>
<td>10%</td>
<td>34</td>
<td>27</td>
<td>61</td>
<td>56</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>36</td>
<td>29</td>
<td>65</td>
<td>58</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td>38</td>
<td>30</td>
<td>68</td>
<td>59</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>1%</td>
<td>40</td>
<td>33</td>
<td>73</td>
<td>62</td>
<td>11</td>
</tr>
<tr>
<td>Year 5</td>
<td>10%</td>
<td>35</td>
<td>31</td>
<td>66</td>
<td>60</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>37</td>
<td>32</td>
<td>69</td>
<td>64</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td>38</td>
<td>34</td>
<td>72</td>
<td>66</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>1%</td>
<td>41</td>
<td>37</td>
<td>78</td>
<td>71</td>
<td>7</td>
</tr>
<tr>
<td>Year 7</td>
<td>10%</td>
<td>36</td>
<td>33</td>
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<td>73</td>
<td>66</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>3%</td>
<td>39</td>
<td>37</td>
<td>76</td>
<td>68</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>1%</td>
<td>42</td>
<td>39</td>
<td>81</td>
<td>71</td>
<td>10</td>
</tr>
</tbody>
</table>

POPULATION: Unscheduled Medical/Surgical, BMT, ENT Airway ICU Elective Cases, Heart Institute Patients

Real World Impact of Business Analytics

- Bed demand predictions facilitate staffing and overflow planning – right patient – right team
- ED admit predictions improved from 40% to 70% accuracy – resource allocation
- Encourages staff to more consistently predict and document estimated discharge date, which helps guide care – system efficiency
- Uncovers scheduling issues – efficiency and access
- One-stop source to determine where there is capacity (or lack thereof) to add services (infusions, etc.) – efficiency and utilization
Environmental Impact Assessments

- Predict program demand on current institutional capacity and resources
- Utilize simulation modeling and data analytics to project future capacity needs in the areas of:
  - Inpatient beds (ICU, Step-down/Floor)
  - Outpatient (Clinical, Testing, Radiology, Therapy, Bronchoscopy)
  - Other (OR resources, pharmacy, blood products, lab)

Understanding Capacity Needs & Variability for New/Growth Programs

Utilize information from historic data, subject matter experts, market analysis, and outside sources to develop model that predicts future resource demands.
Quantify Model Results for Analysis & Planning

Number of beds needed based on probability of having a full unit (5%, 2%, 1%, 0%) and the growth estimate.

<table>
<thead>
<tr>
<th></th>
<th>Low/Conservative</th>
<th>Mid-Range/Most Likely</th>
<th>High/Aggressive Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5% 2% 1% 0%</td>
<td>5% 2% 1% 0%</td>
<td>5% 2% 1% 0%</td>
</tr>
<tr>
<td>1 Yr</td>
<td>2 2 2 3 3</td>
<td>2 2 3 3 4</td>
<td>2 2 3 4 5</td>
</tr>
<tr>
<td>3 Yr</td>
<td>2 2 3 3 4</td>
<td>2 2 3 4 5</td>
<td>2 3 4 5 6</td>
</tr>
<tr>
<td>5 Yr</td>
<td>2 2 3 3 4</td>
<td>2 2 3 4 5</td>
<td>3 3 4 5 6</td>
</tr>
<tr>
<td>7 Yr</td>
<td>2 2 3 3 4</td>
<td>3 3 4 5 6</td>
<td>4 3 5 6 6</td>
</tr>
<tr>
<td>10 Yr</td>
<td>2 2 3 3 4</td>
<td>3 3 4 5 6</td>
<td>4 3 5 6 6</td>
</tr>
</tbody>
</table>

Outpatient Clinic Needs

<table>
<thead>
<tr>
<th>Year</th>
<th>Clinics/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>3</td>
<td>2-3</td>
</tr>
<tr>
<td>5</td>
<td>2-4</td>
</tr>
<tr>
<td>7</td>
<td>3-5</td>
</tr>
<tr>
<td>10</td>
<td>4-7</td>
</tr>
</tbody>
</table>

Key Drivers for Capacity Management

<table>
<thead>
<tr>
<th>IHI Drivers</th>
<th>CCHMC Initiative</th>
<th>Operations Possibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape / Reduce Demand</td>
<td>Predictable Care Delivery</td>
<td>Evidence Based Best Practices, Analysis of ALOS and outliers, Standardize then Customize, Eliminate unnecessary care</td>
</tr>
<tr>
<td></td>
<td>Management of Variability</td>
<td>Identify Patient Streams – Inpatient/Outpatient/OR Manage System Variation</td>
</tr>
<tr>
<td>D/C Match</td>
<td>Optimization of Flow Delivery</td>
<td>Placement initiatives – D/C Matching plans Discharge prediction and planning, Home Care, Parent Initiatives</td>
</tr>
<tr>
<td></td>
<td>Capacity Prediction</td>
<td>Integration of simulation modeling and planning &quot;Environmental Impact&quot; Reports for growth programs</td>
</tr>
<tr>
<td>System Re-Design</td>
<td>Capacity Management</td>
<td>Simulation for design and patient placement &quot;Environments Impact&quot; Planning</td>
</tr>
<tr>
<td></td>
<td>Flow:Safety Matching</td>
<td>Flow Failure Analysis, GARDIANS</td>
</tr>
</tbody>
</table>

James M. Anderson Center
For Health Systems Excellence

Institute for Healthcare Improvement
Staffing Prediction – Proactive Planning

- Data to Front Line Leaders – Updated daily
- Right Staff for the Right Patients
- Correct Number and Competency
- Flexible with Changing Environment
- Prediction of Needs – Be Prepared – Be Resilient

Weekly Census Prediction Report
Hospital Wide System for Safety

3 Times - Every Day

Individual Room / Floor / System Predictions – Capacity and Safety

- Floor Huddles
- PeriOp Huddle
- Outpt, Home, Psych
- ED Huddle
- ICU Huddles

Institutional Wide Bed Huddle – Capacity Management

- Pharmacy
- Pt. Transport
- Facilities

Institutional Daily Operations Brief

System Prediction – Mitigation Strategy

- Security
- Housekeeping
- P.F.E.

Operations and Prediction Meeting (Weekly)
COO, RN Leadership, In-Chiefs, Sr. VP's, Safety Director, ED Director

Make it Personal

- Don’t let the Data Drown out the Dream
- Stories not Statistics
- Names and Faces
- Accountability is Personal & Group Responsibility
- Collective Mission/Vision

James M. Anderson Center For Health Systems Excellence

Institute for Healthcare Improvement
Patient Satisfaction

• Only 3-4% of 1 Million outpatient visitors rank our care in the lower half (0-6 of 10 pts)
  • 35,000 patient per year

<table>
<thead>
<tr>
<th>Great American Ballpark</th>
<th>Paul Brown Stadium</th>
</tr>
</thead>
<tbody>
<tr>
<td>42,319</td>
<td>65,535</td>
</tr>
</tbody>
</table>

Lessons Learned

• Building “Will” to work on Flow is a challenge
  • When it works, it is not on anyone’s radar
  • If it works for me, it is not my problem….
  • When I does not work, it is someone else’s problem
  • Linkage Safety and Flow
• Speed vs Efficiency
• Work Backwards not just Forward
• Embrace Mathematics and Analytics
• Standardize processes and work flows
Thanks !