Conflict of Interest

Todd Frantz has no real or apparent conflicts of interest to report.
Agenda

• Who is Florida Hospital
• Change in Healthcare
• Importance of RTLS and Analytics
• RTLS Proof of Concept with Staff Workflow
• RTLS OR Patient Flow & Analytics
• Lessons Learned
• Next Steps
• Benefits Realized
Learning Objectives

• Application of data to patient flow process and efficiency
• Accountability practice behind the data in real-time visibility boards
• Accelerating process improvement and maximizing resources
Realizing for the Value of Health IT

• **Satisfaction:**
  – Improve patient experience by reducing wait times and improved communication to waiting family members
  – Improve staff communication and efficiency

• **Treatment/Clinical:** Improve timeliness in patient care

• **Electronic Information/Data:** Transform real-time data into visual dashboard for immediate decision making and performance analytics

• **Prevention & Patient Education:** Prevent bottlenecks with improved thru-put

• **Savings:** Increase capacity in OR and maximize utilization of staff

http://www.himss.org/ValueSuite
Who is Florida Hospital?

• Founded in 1908 by members of the Seventh-day Adventist Church
• Eight campuses
• Licensed for 2,600+ beds
• Market leader in Central Florida
• Most Wired Award Recipient
• HIMSS Level 6
Florida Hospital Vision Statement

Florida Hospital will be a global leader providing highly advanced, faith-based healthcare and will lead a sustainable community health system that:

• Improves the experience of care
• Improves the health of our community
• And reduces the per-person cost of healthcare

This system will provide major, relevant contributions to the re-shaping of America’s health care.

Our Mission:
Extend the Healing Ministry of Christ
We know we have to...

Cut 20-40% of Costs, Improve the Experience, Increase the Value
Poll Question # 1
What tool do you use to drive improved patient flow?

• Value stream mapping
• Real-time patient location monitoring
• Patient satisfaction scores
• Nothing in particular
How? We have all of these... but what’s missing?
RTLS Data Provides the Context

Real-time Location System (RTLS) meets 2 critical needs

Event Alerts

1. Adding context to the patients pathway, trending and predictive modeling, actionable data at the right time to the right person

Customer Satisfaction

2. Real time access, information and flow – engagement in care process, alerts for wait states, knowledge of their progress in their care
Evolution to actionable information

- Real time, automated
- 30 days old...
- 24 hours old/
  manual/
  time consuming
Celebration Health: A Living Laboratory

• Built 1996, SW Orlando Market
• Chosen to be the health location for the “EPCOT” Celebration Community Plan
• Continuous growth:
  – 203 beds
  – 15 K+ admissions / 75K+ ED Visits
  – High tourist traffic
  – 13,000 + Surgical & Endo
  – Leading robotic surgery site
  – 15,000 surgeons trained annually on robotic and innovative surgical techniques
• Living Laboratory
Methodical Approach

Staff Workflow
- Efficiency
- Standardization
- Productivity
- Unit Design

Patient Experience
- Rounding
- Bedside Report
- Time with Caregivers
- IPC Integration
- Patient Family Waiting Room Board

Capacity and Throughput
- Live OR Patient Flow Monitoring
- Equipment Tracking
  - beds, pumps, etc…

Safety
- Hand Hygiene
  - Patient Contact based
- Falls Prevention
  - Bed Integration, live 8/18
- OR Suite and Sterile Supply Temperature/Humidity Monitoring
Poll Question # 2

What is your top barrier to improving OR patient flow?

- Budget & resource constraints
- Uncertainty about tools, techniques & impact
- Staff resistance & cultural issues
- Competing priorities
OR Throughput
Patient Flow
First Hospital OR Installation
Co-Developing OR Solution

- Needs Assessment (clinical and operations)
- Leveraging RTLS Data Analytics
- RTLS Vendor Pre-Developed Clinic DBs
- FHIL Session
- Phase 1 Implementation
- Fail Fast & Fix
- Phase 2 Implementation
High-level OR Patient Flow

- Basic patient experience and OR utilization dashboards
- Real-time visibility gives staff in each area visibility into the phase “feeding” their area

Visibility Dashboards by Area
FHIL Sessions: Concept to Design
OR Patient Flow: Registration to Discharge

Pre Surgery
- Registration
- Waiting Area
- Pre-Op

Intra-Op
- OR
- Case Closing

Recovery
- PACU
- PACU Phase 2
- Ready for Unit
- Acute Care Unit
- Discharge

In-patient
Out-patient
Patient Registration

• Patient receives RTLS badge
• Educate patient on the purpose and benefits of monitoring their progress through surgery and recovery
• Waiting area is sectioned by exciters on the ceiling to reduce yelling of names
  – Allows staff to quietly walk to the patient’s location when Pre-Op is ready, promoting a peaceful and pleasant environment
Waiting Area

Patient Real-Time Status Screen
## Patient Real-Time Status Screen

### OR Patient Progress Board

<table>
<thead>
<tr>
<th>Patient</th>
<th>Waiting Room</th>
<th>Pre-Op</th>
<th>In Procedure</th>
<th>Recovery</th>
<th>Transit to Unit</th>
<th>Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK 7662</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>AR 4908</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BH 6990</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>BK 9968</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CB 6461</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>CC 7641</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC 8655</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CM 1133</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DH 0703</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DL 2862</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DW 5359</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GM 4265</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Takeaway:**

Gives Waiting Family Peace of Mind Knowing the General Location of Loved One
Pre-Op

Real-Time Flow Management and Alerts to Monitor Patient Arrival and Prep Status
## Pre-Op

<table>
<thead>
<tr>
<th>Patient</th>
<th>Surgeon</th>
<th>Milestone</th>
<th>Location</th>
<th>Scheduled Time</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33333</td>
<td>Pre-Op</td>
<td>Phase 2</td>
<td>12:50</td>
<td>Green</td>
</tr>
<tr>
<td>2</td>
<td>44444</td>
<td>Pre-Op</td>
<td>Waiting 5</td>
<td>13:10</td>
<td>Green</td>
</tr>
<tr>
<td>3</td>
<td>55555</td>
<td>Pre-Op</td>
<td>Pre-Op</td>
<td>14:15</td>
<td>Green</td>
</tr>
<tr>
<td>4</td>
<td>66666</td>
<td>Pre-Op</td>
<td>Pre-Op</td>
<td>16:35</td>
<td>Green</td>
</tr>
<tr>
<td>5</td>
<td>77777</td>
<td>Pre-Op</td>
<td>Pre-Op</td>
<td>12:00</td>
<td>Red</td>
</tr>
<tr>
<td>6</td>
<td>88888</td>
<td>Pre-Op</td>
<td>Pre-Op</td>
<td>12:10</td>
<td>Red</td>
</tr>
<tr>
<td>7</td>
<td>99999</td>
<td>OR Waiting</td>
<td>OR Waiting Area</td>
<td>12:40</td>
<td>Yellow</td>
</tr>
<tr>
<td>8</td>
<td>00000</td>
<td>Pre-Op</td>
<td>Pre-Op</td>
<td>15:35</td>
<td>Green</td>
</tr>
<tr>
<td>9</td>
<td>11111</td>
<td>Pre-Op</td>
<td>Pre-Op</td>
<td>14:05</td>
<td>Green</td>
</tr>
<tr>
<td>10</td>
<td>22222</td>
<td>Pre-Op</td>
<td>Pre-Op</td>
<td>13:20</td>
<td>Green</td>
</tr>
</tbody>
</table>

**Takeaway:** Real-Time Status Updates for Immediate Decision Making and On-time Starts
OR Map View

Takeaway:
Visual Status
Updates to Queue
Activity
Pull and Push Data for Monitoring PACU Capacity and Bottlenecks
<table>
<thead>
<tr>
<th>Patient</th>
<th>Milestone</th>
<th>Location</th>
<th>Blocked Reason</th>
<th>Notes</th>
<th>Total Recovery Time</th>
<th>Time to Crit. Met</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blocked - Unknown</td>
<td>PACU</td>
<td></td>
<td></td>
<td>1h 49m</td>
<td>1h 49m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>OR 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>OR 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Blocked - Unknown</td>
<td>PACU</td>
<td></td>
<td></td>
<td>1h 58m</td>
<td>1h 58m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recovery</td>
<td>PACU</td>
<td></td>
<td></td>
<td>46m</td>
<td>46m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blocked - Ready to Leave</td>
<td>PACU</td>
<td>Unit - Pending discharge</td>
<td>Rm 341</td>
<td>2h 39m</td>
<td>34m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recovery</td>
<td>PACU</td>
<td></td>
<td></td>
<td>35m</td>
<td>35m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blocked - Unknown</td>
<td>Phase 2</td>
<td></td>
<td></td>
<td>1h 48m</td>
<td>1h 48m</td>
<td></td>
</tr>
</tbody>
</table>

**Takeaway:** Real-Time Visual Queues for Proactive Patient Management
Receiving Inpatient Unit

Pull and Push Data for Monitoring Acute Care Unit Capacity and Bottlenecks
### Unit Status Screen

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Patient Status</th>
<th>Blocked Reason</th>
<th>Location</th>
<th>Unit</th>
<th>Bed</th>
<th>Bed Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In Room</strong></td>
<td><strong>Out of Room</strong></td>
<td></td>
<td>CEL MAIN - 3rd Floor/F366</td>
<td>3-C3IU</td>
<td>F366</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>In Room</strong></td>
<td><strong>Out of Room</strong></td>
<td></td>
<td>CEL MAIN - 3rd Floor/F356</td>
<td>3-C3IU</td>
<td>F356</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>Recovery - Ready for Unit</strong></td>
<td><strong>Unit - Room ready</strong></td>
<td>CEL MAIN - 3rd Floor/Pre-Ops</td>
<td>3-Surgery</td>
<td>3-C3IU</td>
<td>F344</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>In Room</strong></td>
<td></td>
<td></td>
<td>CEL MAIN - 3rd Floor/F344</td>
<td>3-C3IU</td>
<td>F344</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>Blocked - Ready to Leave</strong></td>
<td><strong>Unit - Room ready</strong></td>
<td>CEL MAIN - 3rd Floor/PACU</td>
<td>3-Surgery</td>
<td>3-C3IU</td>
<td>F350</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>In Room</strong></td>
<td></td>
<td></td>
<td>CEL MAIN - 3rd Floor/F350</td>
<td>3-C3IU</td>
<td>F357</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>In Room</strong></td>
<td></td>
<td></td>
<td>CEL MAIN - 3rd Floor/F357</td>
<td>3-C3IU</td>
<td>F357</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>On Unit</strong></td>
<td></td>
<td></td>
<td>CEL MAIN - 3rd Floor/Nurse_Station</td>
<td>3-C3IU</td>
<td>F362</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>Off Unit</strong></td>
<td></td>
<td></td>
<td>CEL MAIN - 3rd Floor/F360</td>
<td>3-C3IU</td>
<td>F360</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>On Unit</strong></td>
<td></td>
<td></td>
<td>CEL MAIN - 3rd Floor/F367</td>
<td>3-C3IU</td>
<td>F367</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>Blocked - Unknown</strong></td>
<td><strong>Unit - Room ready</strong></td>
<td>CEL MAIN - 3rd Floor/PACU</td>
<td>3-Surgery</td>
<td>3-C3IU</td>
<td>F344</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>Off Unit</strong></td>
<td><strong>In Room</strong></td>
<td></td>
<td>CEL MAIN - 3rd Floor/F350</td>
<td>3-C3IU</td>
<td>F350</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>In Room</strong></td>
<td><strong>Recovery - 60 Mins</strong></td>
<td>CEL MAIN - 3rd Floor/PACU</td>
<td>3-Surgery</td>
<td>3-C3IU</td>
<td>F367</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>In Room</strong></td>
<td></td>
<td></td>
<td>CEL MAIN - 3rd Floor/F367</td>
<td>3-C3IU</td>
<td>F367</td>
<td>Bed Assigned</td>
</tr>
<tr>
<td><strong>On Unit - Post Op</strong></td>
<td><strong>In Room</strong></td>
<td></td>
<td>CEL MAIN - 3rd Floor/F345</td>
<td>3-C3IU</td>
<td>F345</td>
<td>Bed Assigned</td>
</tr>
</tbody>
</table>

**Takeaway:**
Real-Time Capacity Management and Proactive Staffing Assignments
Unit Map View

Takeaway: Room Availability, Patient Ambulation, Nurse Contact and More
OR Real-Time Analytics

Takeaway:
Daily Insights for Immediate Decision Making vs. 3 Months Out
## OR Daily Drone Dashboard

### Recovery Units

<table>
<thead>
<tr>
<th>% all Recovery Pts Button pushed</th>
<th>% Endo pts buttons pushed</th>
<th>% PACU patients buttons pushed</th>
<th>Recovery Pts who went home</th>
<th>Goal 1 Met (All Recovery Pts.)</th>
<th>Goal 1 met (Non Endo Pts only)</th>
<th>Goal 1 met - (Endo only)</th>
<th>Opportunity! % pts. &lt; 10 min. over GOAL 1 target</th>
<th>#Pts who went home &amp; did not meet Goal 1 target</th>
<th>GOAL 2 met All Recovery pts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>78%</td>
<td>n/a</td>
<td>78%</td>
<td>47%</td>
<td>28%</td>
<td>22%</td>
<td>n/a</td>
<td>22%</td>
<td>11</td>
<td>36%</td>
</tr>
</tbody>
</table>

*Goal 1 met criteria <= 60min from enter PACU  
**Goal 2 PACU Hold time <= 30min

### OR First Case Starts

<table>
<thead>
<tr>
<th>Date</th>
<th># 1st Cases</th>
<th># 1st On Time Cases</th>
<th>Compliance %</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/7/2015</td>
<td>6</td>
<td>5</td>
<td>83%</td>
</tr>
<tr>
<td>7/8/2015</td>
<td>9</td>
<td>5</td>
<td>56%</td>
</tr>
</tbody>
</table>

**Takeaway:**  
Compliance and Process (1st), Accurate Data (2nd)
OR Phase of Care Analytics Design 1

Summary:
- Number of Visits: 719
- Average Cycle Time in Minutes: 388.44

Average Time in Minutes by Phase of Care:
- Pre-op: 101.62
- OR: 83.39
- OR Waiting: 59.67
- Blocked - Unknown: 38.33
- Recovery - 60 Mins: 18.49
- Blocked - Reedy to Leave: 17.71

Average Time by Phase of Care by Day of Week:

- Monday:
  - Margin of Error: 16.90
  - Blocked - Ready to Leave: 20.10

- Tuesday:
  - Margin of Error: 29.15
  - Blocked - Ready to Leave: 15.10

- Wednesday:
  - Margin of Error: 22.22
  - Blocked - Ready to Leave: 19.39

- Thursday:
  - Margin of Error: 18.38
  - Blocked - Ready to Leave: 18.78

- Friday:
  - Margin of Error: 36.52
  - Blocked - Ready to Leave: 17.52

Average Time in Minutes by Date:

- Feb 25: 205.82
- Feb 27: 249.33
- Mar 1: 279.52
- Mar 3: 299.34
- Mar 5: 261.23
- Mar 7: 298.14
- Mar 9: 415.04
- Mar 11: 377.04
- Mar 13: 320.24
- Mar 15: 413.94
- Mar 17: 406.81
- Mar 19: 401.59
- Mar 21: 524.89
- Mar 23: 485.24
- Mar 25: 524.89
- Mar 27: 416.84
- Mar 29: 342.79
- Apr 2: 274.92
- Apr 4: 435.23
- Apr 6: 435.23
- Apr 8: 319.59
- Apr 10: 459.28
OR Phase of Care Analytics Final Design

Summary
- Number of Visits: 361
- Median Cycle Time: 387.50 Minutes

Median Time by Phase of Care
- Checked-In: 0.05
- OR Waiting: 37.72
- Pre-Op: 92.23
- OR: 109.03
- Total Recovery: 128.85
- In Transit: 2.2
- On Unit: 0.02

Cycle Time
- Total & (Median) Time by Phase of Care by Day of Week

Volume/Median Time by Date for Visit

Graph showing the number of visits and time duration by date.
OR Patient Visit Analytics

Patient Visit Details

Please click a patient's name or shift date in the following table, or input a patient's name or ID in Search to get the visits details.

Patient Visit Timeline

Search (Patient's Name or ID)

Surgeon

(AAll)

Time Period

Last 8 months

Shift

24 Hours

Exclude Margin of Error

Yes

Exclude Weekends

Yes
Benefits Realized for the Value of Health IT

- **24 mins**
  - A reduction of 10-24 minutes in the total time in recovery for patients in the OR (May 2015 vs. May 2014)

- **20%**
  - Total recovery times are significantly more predictable, on average 20% less variation

- **16 mins**
  - A reduction of 6-16 minutes in hold times in the PACU between when a patient meets release criteria to when they are moved to an acute care unit

- **75%**
  - 75% reduction in calls or person-to-person communication between staff in the acute care unit to confirm basic information, which is now displayed through dashboards
OR Implementation Learnings

• Appropriate placement, configuration and tuning of equipment is paramount

• Real patient movement can’t be completely replicated. Extensive pre-go-live system validation is critical, but expect some fixes when tags are worn by real patients

• Numbering Patient-Flow event names based on “normal” flow helps tremendously, as well as adding accurate descriptions

• Ensure adequate system resources in the OR environment
OR Implementation Learnings, Cont.

• Validate the supporting networking infrastructure

• Data accuracy must be unquestionable
  – The clinical staff MUST believe the data

• Periodic analysis and feedback of the data is extremely important in validating system performance and data accuracy
Where We Plan to Go...

**Value Based Purchasing & Pay for Performance**

**Capacity and Throughput**
- Patient Flow – ER Patient and Staff Flow Monitoring (Q1 2017)
- Expansion to more nursing units (Q3 2016)
- Capacity Management – EMR Integration (2016)

**Staff Workflow**
- Integration of EMR and Bed Management data (Late 2016)

**Business Intelligence**
- Real-Time decision making capabilities (in process)
- Predictive modeling (in process)
- Real-Time visual analytics

**Patient Experience**
- Continued IPC Integrations
Key Learnings

• Adoption and Culture
• Surprises
• Resource Requirements
• Organizational and IT Support
Poll Question # 3

What would you have liked to hear more about?

• IT specs requirements
• Implementation best practices
• More ROI information
• More clinical best practices/lessons learned
Questions?

Todd Frantz

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Director of Innovation Development

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