Managing through the changes in healthcare.

*How the power of data and analytics can lead to success.*

John Roy
GM, Inventory Management Solutions
Cardinal Health

Ramy Hanna
VP, Supply Chain Management
Centura Health

March 16, 2017
Welcome

• Appreciate mounting pressures on the hospital supply chain
• Applying best-practice inventory management across an enterprise
• Driving cross-functional stakeholder alignment
• Leveraging data to improve actionable decision-making
About Cardinal Health

LOGISTICS

PRODUCT

BUSINESS

PATIENT

We're in over three-quarters of U.S. hospitals.

#1

Recognized by Gartner as #1 for supply chain innovation
Centura Health

- Formed in 1996 by sponsors Adventist Health System and Catholic Health Initiatives
- 17 hospitals in Colorado and Kansas and 13 affiliate hospitals
- Over 100K annual admissions
- Over 100K annual procedures
- 1.4M physician office visits
- Highest supply spend in Cardiovascular, IR and Operating Rooms
- Relied on manual process for inventory management

Data from 2015
Complicated healthcare landscape

- Global demand swells
- Healthcare consumerism
- Power of generics and breakthrough innovation
- Precision medicine
- Government's expanding role
- Consolidation and Partnerships
- Mobile connectivity
- Value-based care
- Care shifts to more efficient settings
## Opportunity for supply chain value

### Inefficiencies

- **25%** Typical inventory overstock
- **3.5%** Products expire on shelves
- **Up to 2.5** Hours spent on supply chain tasks and non-direct care (per shift)
- **57%** Recall a time when physician did not have supplies when needed
- **18%** Aware of patient harmed for not having right supplies at right time

### A better supply chain

- Healthier patients
- Happier nurses
- Drive efficiency
- Optimize workflows
- Improve charge capture and total revenue
- Control inventory

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**Sources**

1. Cardinal Health Supply Chain Survey Data
3. [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3037121/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3037121/)

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Polling question

What is your biggest challenge with the current healthcare evolution?

A. Achieving aggressive short-term financial goals
B. Labor shortages affecting capacity and talent
C. Improving patient care and outcomes
D. Having the right data to make informed decisions
E. Staying on top of technology innovation
Supply chain challenges faced by Centura

- Manual processes
- No visibility to supplies or usage including consigned products
- Difficulties with supply planning and forecasting
- Misaligned priorities and responsibilities with cross-functional teams
Supply chain goals

• Product visibility across supply chain at department and hospital level

• Improved ordering ensuring right amount of inventory while reducing waste and expired product

• Ability to view data at procedural level such as cost per case, supplier and physician usage

• Scalable to grow with us as we change
Achieving alignment

VP
Supply Chain

Director
Finance
Physician
Clinician
Materials Mgmt.
IT

Partnership

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Polling question

What is your largest barrier to implementing change?

A. Achieving cross-functional stakeholder alignment
B. Leadership capacity for conflicting priorities
C. Determining the best solution partner
D. Obtaining investment funds to implement
E. Workforce resistance to new methods
Benefits of automation

• Supply chain and clinical workflow efficiency
• Par level optimization
• Simplified ordering and replenishment
• Real-time cycle counting
• Seamless expiration and recall management
# Best practices for product lifecycle data

<table>
<thead>
<tr>
<th>Method</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kanban</strong></td>
<td>• Best for low-cost commodity products where unit tracking unnecessary</td>
</tr>
<tr>
<td></td>
<td>• Increases service levels with general par optimization; reduces labor</td>
</tr>
<tr>
<td><strong>Barcode</strong></td>
<td>• Best for low-cost products and vendor stock where unit tracking is required</td>
</tr>
<tr>
<td></td>
<td>• Acceptable when only minimal touch-points are required</td>
</tr>
<tr>
<td><strong>RFID</strong></td>
<td>• Best for medium-to-high cost or critically managed products</td>
</tr>
<tr>
<td></td>
<td>• Enables automated real-time cycle-counts and can track lot, serial, expiration data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enablers</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Point-of-Use</strong></td>
<td>• Capturing product utilization tied to patients, procedures and staff</td>
</tr>
<tr>
<td></td>
<td>• Must seamlessly adapt to workflow in surgical and procedural areas</td>
</tr>
<tr>
<td>** Interfaces**</td>
<td>• MMIS enables product sync, cost intelligence, ordering and tracking improvements</td>
</tr>
<tr>
<td></td>
<td>• EMR enables ADT synch, charge capture automation, and cost-per-case intelligence</td>
</tr>
<tr>
<td><strong>Dashboards &amp; Analytics</strong></td>
<td>• Provides real-time actionable alerts for expiration, recall, ordering needs, etc.</td>
</tr>
<tr>
<td></td>
<td>• Analytics can automate par optimization, contract and purchasing optimization, standardization opportunities, etc.</td>
</tr>
</tbody>
</table>
Dashboards with real-time alerts

Alerts

Clinical Alerts

Attention! You have clinical alerts

- 5 Expired Items

Products At Risk

- 34 Missing more than 1 day
- 0 Expiring in 7 days
- 36 Significantly above Par

Product Unavailability

- 0 Orders older than 3 Days
- 0 Orders without PO
- 166 Out of stock products
- 15 Items that have been in transit for more than 1 business day

To Do List

Orders

- 126 Suggested items from 7 suppliers
- 23 Orders to place for used products

Find Items

- 128 Received but not read into inventory

My Catalog Setup

- 5 Products on hand that need to be added to My Catalog
- 37 Products in My Catalog without a Dept Par
- 823 Products in My Catalog without a Cost

Implant Registration

- 1 Received items without an Implant Registration Card
Easy analytics to inform status and trends

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Group</th>
<th>Product</th>
<th>Model</th>
<th>Par</th>
<th>On Hand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott</td>
<td>Trek RX Balloon Dil...</td>
<td>Trek RX 3.25mm x 15...</td>
<td>1012275-15</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Abbott</td>
<td>Trek RX Balloon Dil...</td>
<td>Trek RX 4.00mm x 15...</td>
<td>1012278-15</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Abbott</td>
<td>Xience Alpine RX</td>
<td>XIENCE Alpine EE RX...</td>
<td>1125250-23</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Abbott</td>
<td>Xience Alpine RX</td>
<td>XIENCE Alpine EE RX...</td>
<td>1125325-08</td>
<td>25</td>
<td>14</td>
</tr>
</tbody>
</table>
Advanced analytics enable strategic decisions

**DASHBOARD**

<table>
<thead>
<tr>
<th>Total Annual Cost</th>
<th>3.44%</th>
<th>14.77%</th>
<th>0.57%</th>
<th>4.33%</th>
</tr>
</thead>
<tbody>
<tr>
<td>$46,515,022</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**COST VARIABILITY**

- **Case Type**
  - Cardiac Rhythm Management (CRM)
  - PCI
  - EP
  - Coronary Diagnostic
  - Peripheral Diagnostic
  - Peripheral Intervention
  - Other

- **Annual Cost**
  - CRM: $15,405,253
  - PCI: $12,068,662
  - EP: $6,729,969
  - Coronary Diagnostic: $4,450,963
  - Peripheral Diagnostic: $1,800,158
  - Peripheral Intervention: $1,732,251
  - Other: $1,705,546

- **Case Volume**
  - CRM: 1,781
  - PCI: 5,256
  - EP: 1,510
  - Coronary Diagnostic: 1,837
  - Peripheral Diagnostic: 1,148
  - Peripheral Intervention: 737
  - Other: 297

- **Cost per Case**
  - CRM: $8,850
  - PCI: $2,302
  - EP: $6,444
  - Coronary Diagnostic: $2,423
  - Peripheral Diagnostic: $1,568
  - Peripheral Intervention: $2,352
  - Other: $4,059

- **90 days**
  - CRM: ▲ 4.02%
  - PCI: ▲ 10.09%
  - EP: ▲ 1.97%
  - Coronary Diagnostic: ▲ 13.91%
  - Peripheral Diagnostic: ▲ 11.36%
  - Peripheral Intervention: ▼ 0.04%
  - Other: ▲ 37.32%

- **YY**
  - CRM: ▲ 4.91%
  - PCI: ▲ 5.88%
  - EP: ▲ 15.74%
  - Coronary Diagnostic: ▲ 29.00%
  - Peripheral Diagnostic: ▲ 14.74%
  - Peripheral Intervention: ▲ 9.48%
  - Other: ▲ 67.85%
Predictive analytics were critical to success

### Inventory Summary

- **Value:** $7,015,959
- **Volume:** 13,010

### Purchased vs Consigned

- **Total Purchased:** $3,730,592
- **Total Consigned:** $3,277,367

### Suppliers and SKUs

- **Suppliers:** 51
- **SKUs:** 3,621

### Departmental Breakdown

<table>
<thead>
<tr>
<th>Department</th>
<th>Purchased</th>
<th>Consigned</th>
<th>Total value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR Lab #1</td>
<td>$912,014</td>
<td>$1,602,228</td>
<td>$2,514,242</td>
</tr>
<tr>
<td>Cath Lab #1</td>
<td>$764,058</td>
<td>$960,832</td>
<td>$1,724,890</td>
</tr>
<tr>
<td>IR Lab #2</td>
<td>$978,153</td>
<td>$248,449</td>
<td>$1,226,602</td>
</tr>
<tr>
<td>Cath Lab #2</td>
<td>$742,545</td>
<td>$156,495</td>
<td>$899,040</td>
</tr>
<tr>
<td>Cath Lab #3</td>
<td>$160,129</td>
<td>$143,688</td>
<td>$303,817</td>
</tr>
<tr>
<td>Cath Lab #4</td>
<td>$102,639</td>
<td>$165,575</td>
<td>$268,214</td>
</tr>
<tr>
<td>Hybrid OR</td>
<td>$79,155</td>
<td>$0</td>
<td>$79,155</td>
</tr>
</tbody>
</table>
## Par management

<table>
<thead>
<tr>
<th>Department</th>
<th>Total SKUs</th>
<th>On hand product value (purchased)</th>
<th>Current par value (in department)</th>
<th>“Smart Par” value*</th>
<th>Smart Par change from on hand value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR Lab #1</td>
<td>793</td>
<td>$742,545</td>
<td>$606,903</td>
<td>$566,404</td>
<td>$176,141</td>
</tr>
<tr>
<td>Cath Lab #1</td>
<td>1,309</td>
<td>$912,014</td>
<td>$812,000</td>
<td>$1,050,000</td>
<td>($137,986)</td>
</tr>
<tr>
<td>IR Lab #2</td>
<td>1,327</td>
<td>$764,058</td>
<td>$716,644</td>
<td>$800,850</td>
<td>($36,792)</td>
</tr>
<tr>
<td>Cath Lab #2</td>
<td>176</td>
<td>$79,155</td>
<td>$79,312</td>
<td>$65,800</td>
<td>$13,355</td>
</tr>
<tr>
<td>Cath Lab #3</td>
<td>703</td>
<td>$978,153</td>
<td>$1,024,716</td>
<td>$824,726</td>
<td>$153,427</td>
</tr>
<tr>
<td>Cath Lab #4</td>
<td>480</td>
<td>$102,639</td>
<td>$75,585</td>
<td>$64,168</td>
<td>$38,471</td>
</tr>
<tr>
<td>Hybrid OR</td>
<td>386</td>
<td>$160,129</td>
<td>$175,572</td>
<td>$151,182</td>
<td>$8,947</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,174 (3,621 unique)</strong></td>
<td><strong>$3,738,693</strong></td>
<td><strong>$3,490,732</strong></td>
<td><strong>$3,523,130</strong></td>
<td><strong>$215,563</strong></td>
</tr>
</tbody>
</table>

*Table values do not include consigned product
Leveraging expired product

- Data is viewed in the past and looking ahead
  - Identified products expiring in upcoming months
  - Instead of wasting products we moved the products to departments in need rather than placing a new order

<table>
<thead>
<tr>
<th>Department</th>
<th>Expired in January</th>
<th>Expiring in February</th>
<th>Will expire in March</th>
</tr>
</thead>
<tbody>
<tr>
<td>IR Lab #1</td>
<td>$11,262</td>
<td>$5,163</td>
<td>$4,242</td>
</tr>
<tr>
<td>Cath Lab #1</td>
<td>$7,296</td>
<td>$8,034</td>
<td>$28,928</td>
</tr>
<tr>
<td>IR Lab #2</td>
<td>$8,011</td>
<td>$3,912</td>
<td>$5,971</td>
</tr>
<tr>
<td>Cath Lab #2</td>
<td>$0</td>
<td>$14,750</td>
<td>$0</td>
</tr>
<tr>
<td>Cath Lab #3</td>
<td>$5,795</td>
<td>$1,987</td>
<td>$11,029</td>
</tr>
<tr>
<td>Cath Lab #4</td>
<td>$1,408</td>
<td>$1,650</td>
<td>$1,817</td>
</tr>
<tr>
<td>Hybrid OR</td>
<td>$816</td>
<td>$840</td>
<td>$299</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$34,588</strong></td>
<td><strong>$36,336</strong></td>
<td><strong>$52,286</strong></td>
</tr>
</tbody>
</table>
The supply chain is a trusted partner

- Cultural shift
  - Transition from counting supplies to trusting automation
- Visibility of supplies across multiple departments
- Increased communication with data to drive discussions
- Improved ordering and reduced waste
- Simplified workflows
- Clinicians spending less time on inventory and focused on patient care
Scalable solutions for changing world

more than 150 Hospital locations in the U.S. have deployed our solution in the past 12 years

more than 200% ROI
Providers typically experience within 6-12 months

12 Week deployment using a Lean Six Sigma implementation plan

Uniquely positioned across the continuum of care to
- Help reduce the cost of care
- Allow nurses more time for patient care
Components for a complete inventory management system

Store
RFID-enabled products are stored in Smart Cabinets or other convenient locations

Use
Clinicians retrieve products and wave them at the EMR interfaced point of use stations to link items to procedures

Replenish
Interfaces with MMIS systems to gathering consumption data while triggering reorders

Analyze and optimize
Users get powerful real-time analytics for full visibility and improved decision-making