Advancing the Quadruple Aim Leveraging a Clinically Integrated Supply Chain

Session ID: SC2; *February 11, 2019*

Anne W. Snowdon RN, PhD, FAAN

Professor, Strategy and Entrepreneurship Chair, World Health Innovation Network, University of Windsor, Odette School of Business

Conflict of Interest

Anne W. Snowdon RN, PhD, FAAN

Has no real or apparent conflicts of interest to report.

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Agenda

- Trends in global health systems which will require a robust Clinically Integrated Supply Chain
- Product Failure: International Consortium of Investigative Journalists Study
- Quadruple Aim: Clinically Integrated Supply Chain as a Strategic Asset
- Evidence of Value and Impact of Clinically Integrated Supply Chain
- Future of Health System Transformation: Predictive Analytics

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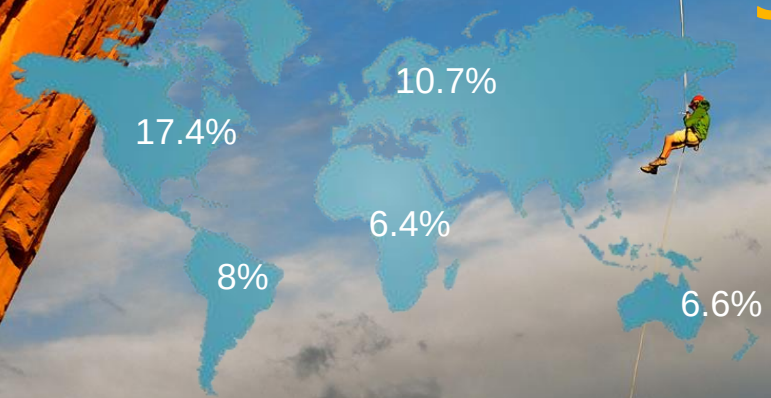
Learning Objectives

- Examine global health system trends that are influenced by Supply Chain Infrastructure
- Examine the prevalence of Medical Error facing health systems
- Understand the link between Quality, Safety, and Performance of health systems and the value of Clinically Integrated Supply Chain Infrastructure
- Explore the value of Clinically Integrated Supply Chain in Advancing the Quadruple Aim

THE GLOBAL CHALLENGE OF SUSTAINABILITY



Rising Global Healthcare Costs:

5.3% per year (2014-2017)

Highest global spending as a percentage of GDP is in North America

Deloitte, 2014

Trends in Health Systems: Personalization and Precision

- “Omics” technologies – make personalization possible - personalized to the unique genetic make-up of the individual
- Information Technologies driving new expectations and demands among consumers

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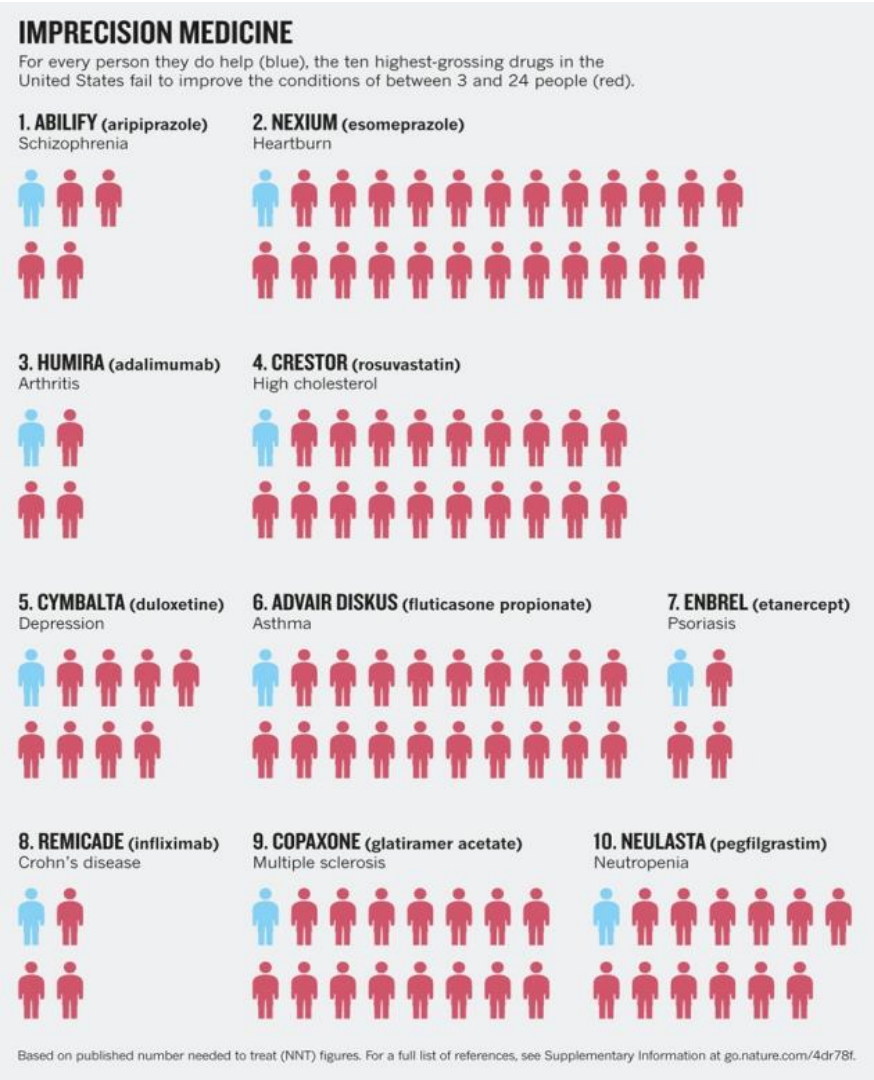
Pressure of PRECISION MEDICINE

Drive towards **Precision Medicine vs. the cost of these therapies** for health systems
- the 10 highest grossing drugs in the USA, number of people that improve (blue) vs. number that fail to improve (red)

Significant Pressure to find Value at the system level to achieve sustainability



Personalized medicine: Time for one-person trials
Nicholas J. Schork *Nature* 2015. Volume 520, Issue 7549

Evidence of Impact and Outcomes for Personalized Medicines of the Future

Clinical trials will no longer be “enough” evidence to adopt new medicines and therapies

System level tracking and traceability will be foundational to quality and safety for the future of health systems

THE IMPLANT FILES

Why many Canadians face long waits or big bills to have painful medical devices removed

A global investigation reveals the rising human toll of lax controls and testing standards pushed by a booming industry.

By ICIJ / November 25, 2018

The Need for Real-World Evidence

Meet Jim: COPD, Stroke, 24 medications, 8 providers visiting weekly, 8 admissions to hospital in last 14 weeks, multiple ED visits & Wife struggling to cope

Complexity means that "One Size Fits All" (Clinical Pathways) is not effective, this population requires "One size fits one"

Medical Error is now the 3rd leading cause of death in North America

…251,454 deaths USA, 633 people/day (Makary, 2016)

International Consortium of Investigative Journalists analysis of US data reveals:

1.7 million injuries (2008-2017)

83,000 deaths linked to Medical Devices

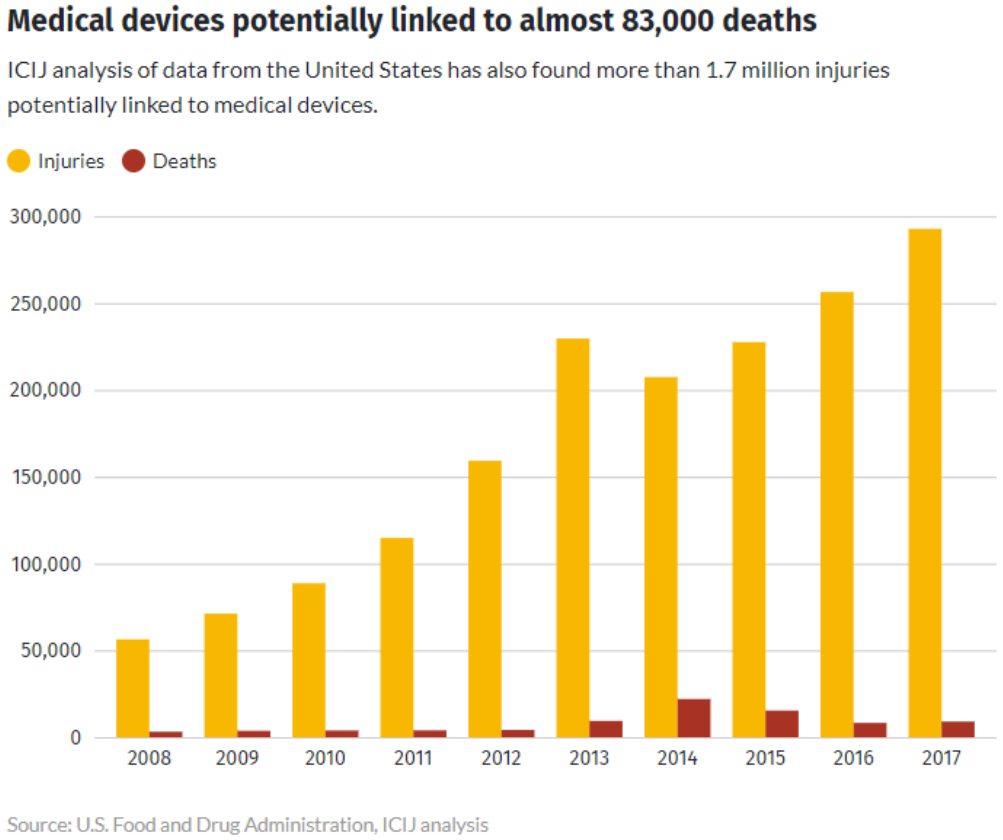
Baker, 2004

The Implant Files

- The year-long investigation was led by editors and reporters from the International Consortium of Investigative Journalists (ICIJ)
- ICIJ partnered with more than 250 journalists in 36 countries to examine how devices are tested, approved, marketed and monitored
- The team collected recall notices, safety warnings, legal documents and corporate financial filings
- Conducted an analysis of more than 8 million device-related health records, including death and injury reports and recalls
- A machine learning algorithm was used to screen millions of reports

Source: https://www.icij.org/investigations/implant-files/about-the-implant-files-investigation/

The Implant Files: What they Found



Source: https://www.icij.org/investigations/implant-files/new-database-tracks-faulty-medical-devices-across-the-globe/

The Implant Files: What they Found

- Few countries collect or publish data on incidents caused by medical devices

- The public don’t know when products fail, or the track record of the products that are being implanted into them

The investigation discovered that fewer than 20 percent of the countries in the world had public data online permitting citizens to find safety alerts and recall information on medical devices

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Source: https://www.icij.org/investigations/implant-files/about-the-implant-files-investigation/

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Product Traceability: Global Traceability of Product Failure

In the case of the metal-on-metal joint implants it took 4-5 years before evidence was accumulated and reported. We are left with more than 500 000 patients with metal-on-metal prostheses in the USA and more than 40 000 in the UK who are at elevated risk of device failure, which will inevitably result in the burden of further surgical treatment as well as billions of dollars in costs to taxpayers (Lancet, 2015)

Adverse Events in Community Settings in Canada

51,631 = 13.31% of 2009 **Home Care** clients experienced an adverse event.[18]

56% of adverse events occurring in home care were judged to be preventable.[18]

42% of all drug-related adverse events in Long-Term Care are preventable

Falls, pressure ulcers, medication errors, and infections are the most common adverse events in the Long-Term Care setting.[19]

"The current state of patient safety in **Emergency Medical Services** is very much a mystery, there is almost no data describing prehospital adverse events."[20]

3rd Highest Rate of Death occurs due to patient safety incidents in Mental Health Settings. This setting also has the 5th highest rate of harms compared with other community settings.[21]

"The number of safety incidents occurring in Canadian Primary Care is unknown"[22]

Traceability of Care Outcomes in Communities

13.5% Adverse Events, nearly double the rate in hospitals (7.5%)

Automating Clinical Environments Clinician Teams

OR door opens
Every 1.5 min

Percentage of supply related openings: 30%

(R. W. Bradley, 2018)

Clinicians become used to **missing information** (1:4 pts), equipment is **missing** or defective (1:3 pts), “cut corners” to get the work done.
“Accept poor reliability as the norm, and stop reporting problems”
“Reporting is voluntary – fear of being blamed, receive no feedback, view reporting as unlikely to lead to change” (Baker, 2014)

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What is Supply Chain Infrastructure?

Tracking and traceability of products, care processes, provider teams, all linked to individual patient outcomes.

Real-World Evidence of Value

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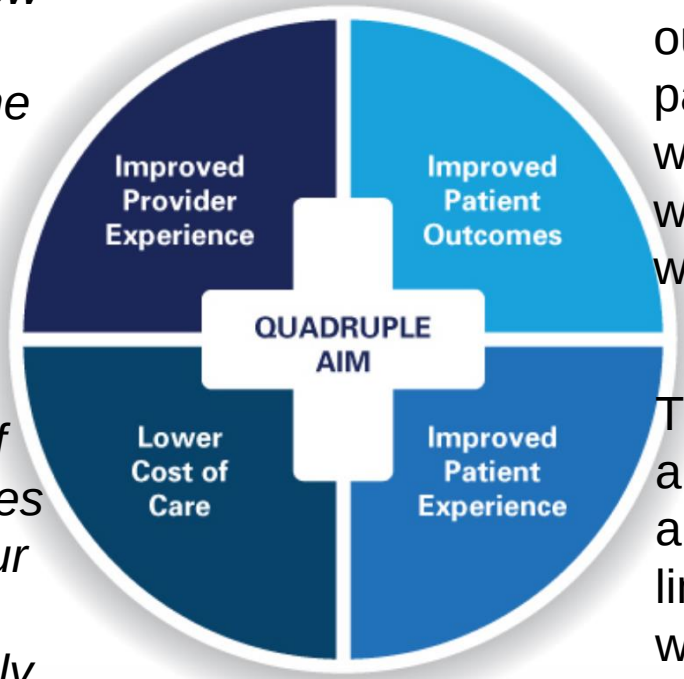
How Supply Chain Advances the Quadruple Aim

Automated flow of data, captured at the point of care informs clinician practice

Automation of work processes reduces labour costs, and reduces supply waste



Evidence of outcomes for patients - what works best, for who and under what conditions

Transparency in data about care provided and products used, linked to outcomes which offers shared decision making

Emerging Evidence of Supply Chain Impact

Case study research examined supply chain transformation as a strategy to strengthen health system performance in three global health systems:

- Canada – Alberta Health Services
- U.K. – National Health Service
- U.S. - Mercy Health System

(Case studies released February 15, 2018)

Impact of Supply Chain Transformation in Global Health Systems

Alberta Health Services (AHS), Canada

· Integration of supply chain processes into clinical programs across the entire province

· Integration into patient information system at point of care planned 2019

Online Adverse event reporting system and performance dashboard

National Health Services, England (NHS), United Kingdom

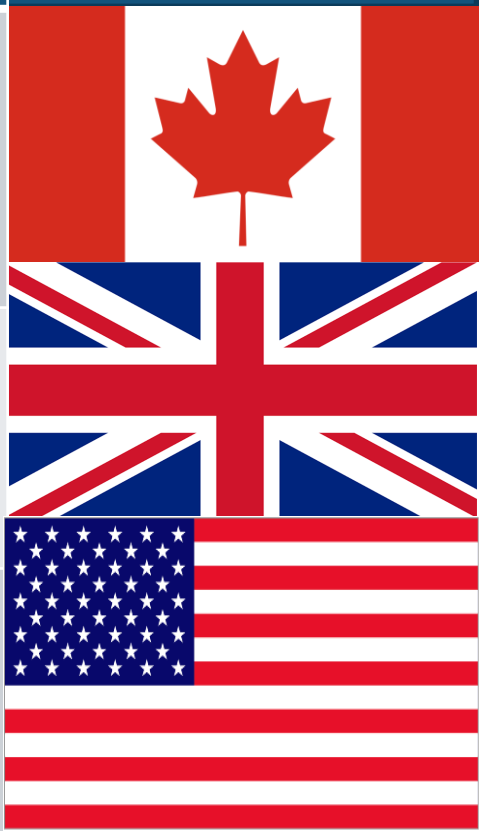
- Implemented supply chain infrastructure in six NHS trusts' specialty programs, traceability of patients, providers, locations, products and outcomes
- By 2021, implementation planned for all 148 trusts is expected to generate £1 billion in savings (£30 million/month)

Mercy Health, United States

- Integration of supply chain best practices into Perioperative program in 3 of 45 hospitals
- $1 billion in savings as a direct outcome of optimizing and transforming supply chain processes, most savings due to inventory management
- Automated perioperative environments with point of care scanning – integrated supply chain team and clinician teams

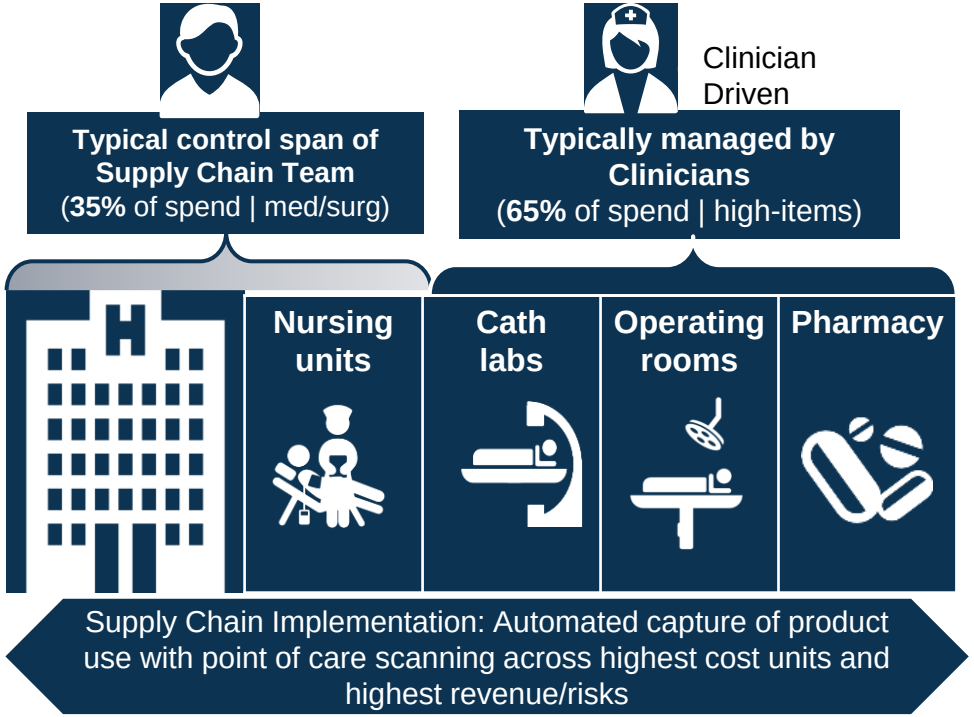
Return on Investment: Three Countries

Country	Health System	ROI
Canada	Alberta Health System	**7:1** to date from inventory savings only **$301,438,786 in savings** over 7 years, point of care data - 2019 Savings are from **inventory only** to date
England	National Health Service	**4:1** expected by year 3 from inventory savings, **£1,034,000,000 savings projected by year 7** (£30M/mon.) **16 FTE's in labour savings/ Trust**.
United States	Mercy Health System	**$1 billion savings** as a direct outcome of optimizing and transforming supply chain processes across Mercy. **29.5% decline in labour costs/case**



Impact and Value of Supply Chain

(based on supply chain data from 10 North American Hospitals)



Performance metrics	Improvements
Clinical engagement in decisions	55% to 80%
Orders, Replenishment, Stock Taking	36% to 78%
Stock-outs	90% to 98%
Inventory value	20% to 53%
Expiries	37% to 75%
Expense write-offs	50% to 63%

Payback within 12 months (annualized)

Alberta Health Services, NHS England, Mercy focused on Operating rooms as a 1st step

Supply Chain team works with Clinicians on product standardization, demand forecasting = **Value**

Patient Safety as Key Driver

- **Automated product recall** and traceability to individual patients

- **Automated Cues for Clinicians** at point of care (proactive risk reduction):
  ex. Reduction in Never Events

*** Automation of Work Environments**
  - **greater efficiency, productivity, increased OR case volumes, reduced cost/case**

*** Automated Tracking of Outcomes: Cardiology, Orthopedics, to date**

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Key Conditions for Success

- A Burning Platform: Drive for Performance, Knowledge of the potential for supply chain infrastructure impact
- **C-Suite engagement: view** supply chain as a strategic asset that enables and informs solutions:
  - System level pressure on **Costs-Revenue**
  - Public pressure for safety, quality, access to care

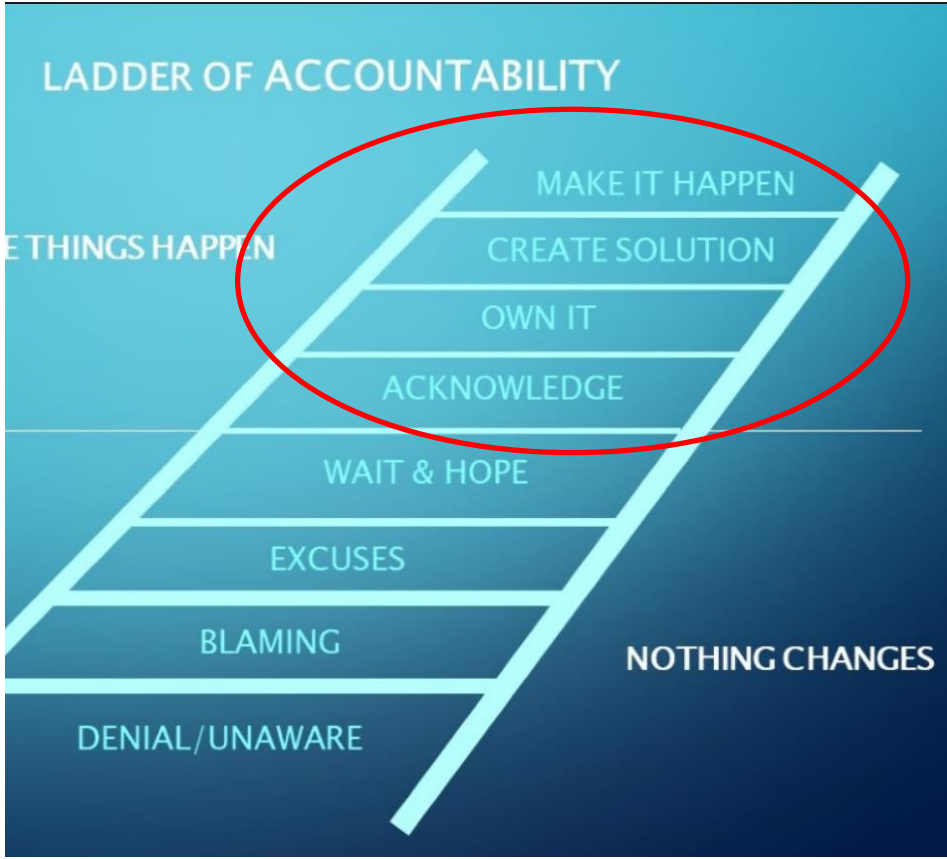
Empowered Clinician Champions

- Clinicians lead decisions to improve quality, informed by data
  - Reduce unwarranted variation
  - Leverage MD Competitiveness
  - Outcomes driven
  - Advocacy with Vendors, C-Suite
- Cost and patient outcome data informs decisions on value , procurement, clinical practice

"If I had asked people what they wanted, they would have said faster horses"

Accountability: "Ward to Board"

- Relentless focus on the Vision: "best care at lowest cost
- Board focus on supply chain as strategic asset, that "makes things happen"; Transparency
- Performance and cost/case measured accurately



Data >>> Information >>> Knowledge >>> Action >>> Accountability

ROI for High Cost, High Impact Programs

- Early Impact: 7:1 ROI, achieved 14 – 18 mon
- Early Momentum and focus on Value: informs scalability
- Surgeons: Key Influencers and Champions
- OR: 60% revenues in US market

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Integration of Supply Chain/Data teams into Clinician Teams

- **Supply Chain team mobilizes digital tools, data, analytics for Clinician leaders to inform decisions**
  - **Informs Procurement decisions on value, innovation**
  - **Reduces Variation in Care**
  - **Cues clinicians on risk of error**
  - **Supplies Costs, Streamlining practices**
  - **Measure outcomes**
  - **Accurately tracks cost/case due to variability**

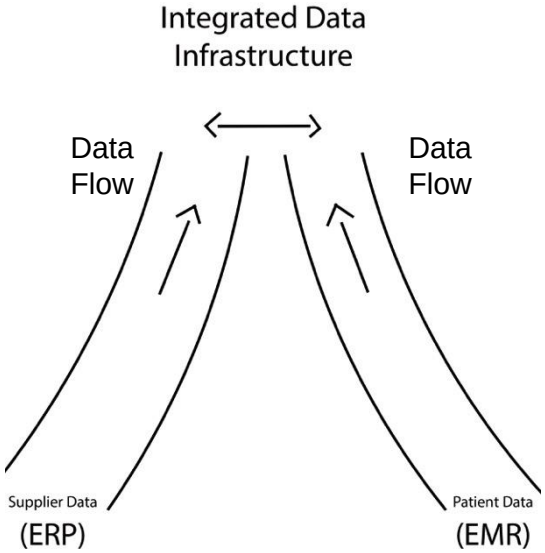
- **Real-World Evidence** emerging from supply chain infrastructure drives decisions on cost, safety, quality in “real time”

Clinically Integrated Supply Chain: Creates Real-World Evidence

Products, equipment procured based on best outcomes at lowest cost, informed by **real world**

Best outcomes for patient population segments based on care received, products used in care and conditions under which best outcomes are achieved at a

Care Pathways with best outcomes for patient pop'n segments > **real world evidence of value**



ERP Data:
Finance-invoicing, Case Costing
Supply Chain Management-inventory costs
Product Procurement-value

Patient data
Utilization: volumes, wait times, LOS
Quality indicators: readmissions, mortality/morbidity, infections, complications
Safety: adverse events, never

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Data Flow >>> Real World Evidence>>> Predictive Tools

Patient Care Outcomes Data: outcomes for patient population segments, care conditions and products that achieve best outcomes, Value defined by best outcomes relative to cost.

Quality and Safety Data: Adverse event reporting, traceability of equipment/safety, never event tracking, quality outcomes relative to cost = value

Product performance data: recalls, expiry, safety events, best patient outcomes to define value, reduce variation in care, optimize care delivery

Inventory Costing Data: product utilization data, demand forecasting, opportunities to reduce waste, supplies cost/case,

Product Data – lot, batch#, expiry, cost. Global standards enable traceability worldwide

AI: Predictive Algorithms

- **predict best outcomes for patient segments at lowest cost**
- **Product performance predictors for procurement**
- **Predictive algorithms to reduce risk (ex. Prevent Sepsis, joint replacement revisions)**
- **Predictive tools to inform care decisions, risk analysis, proactive outcomes**

Questions?

Dr. Anne Snowdon, Academic Chair, WIN
Anne.Snowdon@uwindsor.ca

Ms. Lori Turik, Executive Director, WIN
Lori.Turik@uwindsor.ca

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