Accessible Simulation Methods to Support Healthcare Improvements

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Who are we?

• Claire Cordeaux: Lead for Healthcare, SIMUL8 Corporation

• Michele Stuart: President, Efficiency Engineers

• Stephen Burrows: NHS Institute Worldwide
1. What is discrete event simulation?
2. Why isn’t everyone using it?
3. Methodologies and solutions developed to make simulation more accessible to health care professionals:
   – Focused simulations (Claire)
   – Limited features for specific questions (Claire)
   – The Geisinger Experience (Michele)
   – The Productive Ward (Stephen)
4. Questions
Claire Cordeaux

• Claire Cordeaux

• SIMUL8 Corporation

• Discussing new applications and techniques which are helping healthcare organizations to gain the benefits of simulation
Simulation: Explained

- Models a flow of events
- Allows for the passing of time and expected changes
- Shows resulting demand, cost and resource implications
A simple simulation
The benefits of simulation

- Risk-Free
- Uses data intelligently
- Increases confidence in decision making
- Test and compares potential solutions
- More accurate than a spreadsheet
- Models variability
- Simulates the passing of time
- Visual-Engages Stakeholders
Planning for Healthcare

- How much can I spend?
- How much resource have I got?
- What is my demand likely to be?
- How long is it reasonable for patients to wait?
- What are my expected outcomes?
Slow adoption in healthcare

The academic research...

- Resistance to manufacturing industry methods
- Constant change
- Cost of software and consulting advice
- Lack of in-house expertise
- Lack of useful data
- Academic simulations too large and complex
Slow adoption in healthcare

What healthcare staff tell us...

• “Too difficult”

• “I have a big problem to solve – by next month. I haven’t got time to learn a new technique AND solve the problem”
Making it easier

Our tools and techniques....
Creating focused simulations

Common healthcare questions

• One specific issue to solve
• Pre-loaded scenarios
• User interface to localize specific aspects
• Graphics to aid understanding
• Dialogs to guide user interface
• Results in format to embed in business case
Example: Dementia simulation

Simulating Future Service Needs for Dementia Care
This simulation allows users to see the effect of altering % of patients diagnosed with dementia on Dementia Services in 3 years.
Common healthcare applications

• Variety of questions - requires flexibility
• Only requires features limited to those applications
Example: SimLean

Combines simulation and Lean in hospitals

Features:
• Arrivals
• Patient types
• Processes
• Queues
• Time
• Graphics
**Example: Scenario Generator**

**Strategic planning – whole system**

**Features:**
- Pre-loaded data and algorithms driving arrivals
- Processes
- Time
- Cost
- Volume
- **Queues**
• Michele Stuart

• Efficiency Engineers

• Sharing how simulation techniques are enabling the improved efficiency and effectiveness
The Geisinger Experience

• Complete/Complex Healthcare System
  – Hospitals
  – Clinics
  – Physicians
  – Insurance

• Data driven society

• Always interested in new tools, if well credentialed
HELP – Healthcare Enabled Logistics Project

Problem: How to reduce nursing time (15-20%) spent performing logistics - retrieving, searching, ordering?
HELP – Healthcare Enabled Logistics Project

Solution:
Master model of all logistics interaction, worked with each group for details and validation

Results:
– System-wide visual for the *first* time
– Discovered over 35 different groups delivering to inpatient units!!
– Consolidation of silos underway
Pneumatic Tube Optimization

**Problem:** How to “see”, test, and gain acceptance for updates to this core delivery system?

**Solution:** Convert key internal knowledge into interactive tool

**Results:**
- Reduce critical path times – Lab samples
- Low risk and easier justification for designing expansions/department relocations
• On Demand Food Delivery

**Problem:** Innovation to have on-demand instead of scheduled food delivery

**Solution:** Master’s thesis collecting internal and research to determine new structure to guarantee delivery within 30-45 minutes of request

**Results:**
- New process design for staffing, scheduling, space
- Lets team test brainstorm ideas - inclusive and expansive
The Geisinger Experience

• Bed Turnover Analysis

  Problem: Wait for inpatient beds clogging ER, bed turnover time the issue

  Solution: Conflicting solutions from different sectors needed to be “tested” for optimum solution

  Results:
  – Only required one additional staff to reduce turnover time by 40% across the hospital
Other Questions being Handled:

- **Case Managers – Workload Analysis**
  - What is the optimum mix for a Case Manager to guarantee service & quality levels?

- **Health Managers – Scheduling**
  - How often should patients be “touched” to decrease hospital re-admissions?
The Geisinger Experience

• Expanding Accessibility:
  – Users Group to share data, models, and experience
  – Rollout as tool for the Quality Institute to bring the “live” value stream map to the operations level
  – Involve “C” level and use for strategic planning as new hospitals brought into system
Stephen Burrows

•Stephen Burrows

•NHS Institute for Innovation and Improvement Worldwide

•Will provide insight into work in Care Oregon where nurses are engaged in the use of simulation to release their time to care for patients.
Releasing Time to Care

• A front-line, top-enabled approach to improving care
• Unit-based to preserve your unique culture while standardizing nursing processes
• Based on Lean principles using language created by and for nurses
• Structured, continuous quality improvement
• A way to build leadership at the front lines of care
"Lasting innovation and improvement come when staff are fully engaged. Releasing Time to Care is a very effective way to make this happen. RT2C organizes the LEAN tools in such a way that an already excellent staff can become more efficient, more effective and happier with their jobs. We appreciate the leadership that Care Oregon has shown."

Karen Logsdon, Nursing and Patient Care Chief Nursing Officer, Providence Portland Medical Center
RT2C Simulation

**Step 1:** Construct task overview in Excel

**Step 2:** Import data into SIMUL8

**Step 3:** Set number of activities per day

**Step 4:** Run model

**Step 5:** Analyze results

Productive Ward Sim
Working together

• Community approach overcoming obstacles to using simulation
• Join our community at simhealthcare.com to share experience, tools and techniques
• Come and see us at Society for Healthcare Systems 18-20 February Mirage Hotel, Las Vegas
Questions?