VA-CASE

VA Center for Applied Systems Engineering

VA Center for Applied Systems Engineering (VA-CASE)

Heather Woodward-Hagg

Director, VA-CASE

VA Center for Applied Systems Engineering (VA-CASE)

- Primary Mission: Development, testing, and deployment of innovative methods of operational systems engineering (OSE) within VHA nationally to enable new models for VA healthcare delivery
- VA-CASE Vision:
  - Interdisciplinary, collaborative entity
  - Paired partnership of VHA staff and OSE faculty
  - Leverage significant OSE, informatics and implementation science expertise present in VHA health systems and affiliated academic partners
- FY13 budget: $12M

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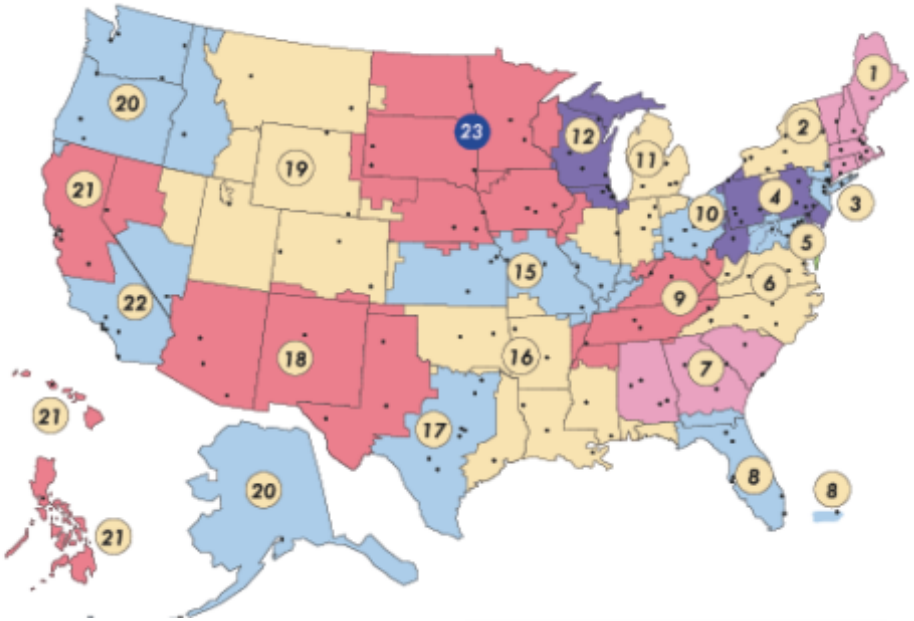
In Partnership
VISN 11 Healthcare Network
Department of Veterans Affairs

Veterans Health Administration (VHA) Background

VHA's Mission: Honor America's Veterans by providing exceptional health care that improves health and well-being

Characteristics of the VHA System

- 152 Medical Centers
- 986 Outpatient Clinics
  - 817 Community-Based,
  - 152 Hospital-Based,
  - 11 Mobile, and
  - 6 Independent
- 300 Vet Centers
- 70 Mobile Vet Centers
- 98 Domiciliary Residential Rehabilitation Programs
- 133 Community Living Centers



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VETERANS IN PARTNERSHIP
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Veterans Health Administration (VHA) Background

Vital Statistics FY 2011

- 8.57M Enrollees
- 6.17M Unique Patients Treated
- 79.8M Outpatient Visits
- 295,500 Outpatient Surgeries
- 692,100 Inpatient Admissions
- 266.8M Lab Tests (Inpatient & Outpatient)
- 263M Prescriptions Dispensed (30-Day Equivalent)
- 12.5M Prosthetics Services Performed

* Over 269,000 employees – 20,000 Physicians, 70,000 Nurses

VHA's Bridge to Excellence

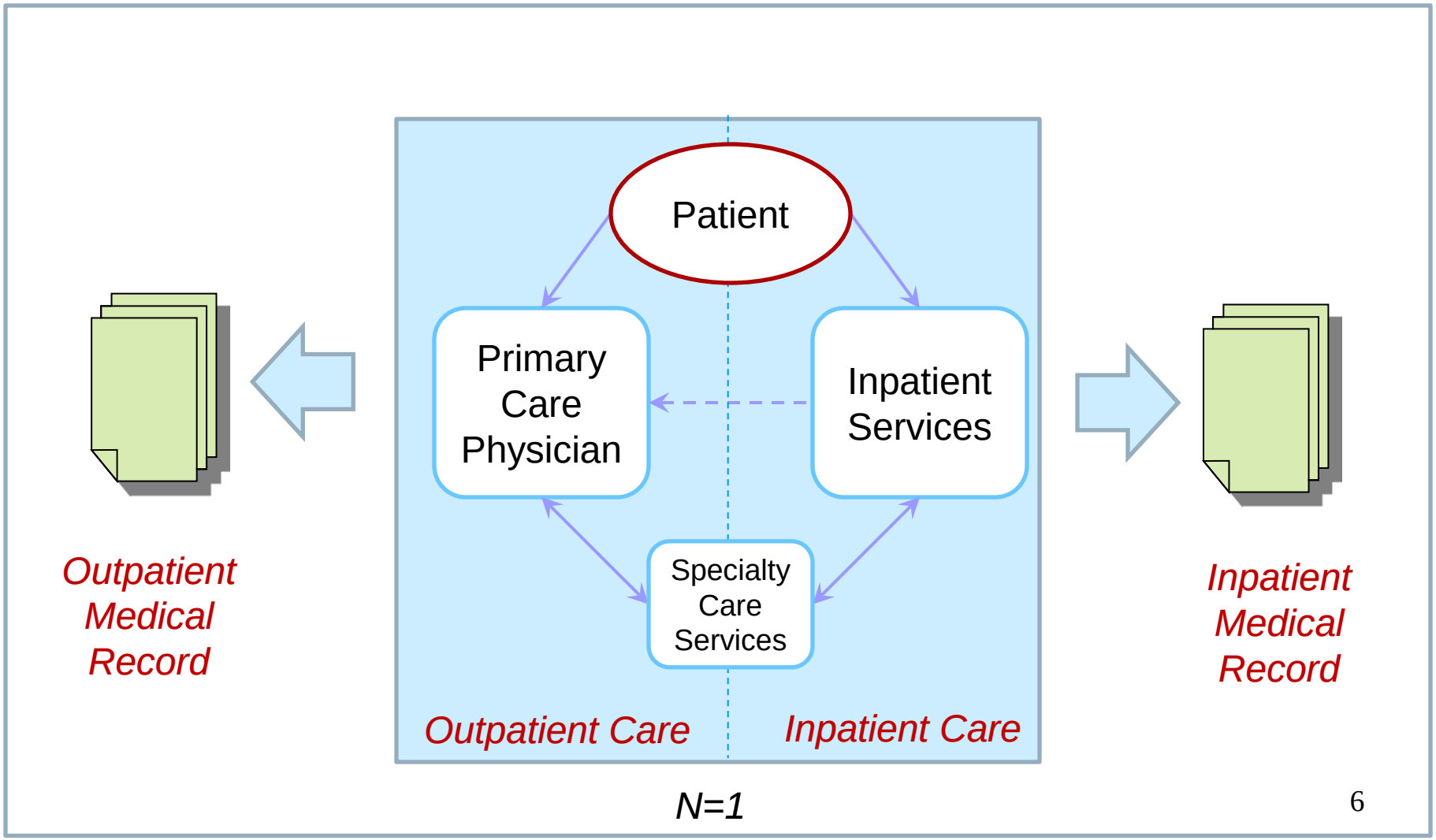
"Patients are in control of their health care, and the system is designed around the needs of the patient."

-Robert A. Petzel, M.D., Under Secretary for Health Department of Veterans Affairs

*Patient-Driven * Team Care * Continuous Improvement*
* Data-Driven & Evidence-Based * Value *Prevention / Population Health*

Past VA	Present VA	Future VA
"What can I fix?"	"How can we help what is wrong with you?"	"How can we help you live the life you want to live?"
Physician	Clinical Team	Veteran, Family and Health Care Team
Case-Based Paper Medical Record	Disease-Based Electronic Medical Record	Whole-Person Electronic Health Record
"We'll address your immediate concern."	"You have a risky problem, please follow this plan to improve by your next visit."	"We can design your personalized health plan to meet your goals."

Traditional (Physician-Centric, Episodic) Health Care Delivery Model



Patient Centered, Integrated Health Care Delivery Model

VHA Key Enablers (1997-present)*:

- Comprehensive Care Management Approach (Primary Care Medical Home)
- Standardized care pathways and clinical guidelines
- Funding aligned with desired outcomes
- Accountability driven through performance measures/public reporting
- System-wide electronic health record

Integrated Electronic Medical Record

Result (1997-2003)*:

- Increase patient volume by 24%
- Reduced BDOC by 68%
- Decreased staffing by 12%
- Significant reduction in annual operating costs
- Improved Patient Satisfaction
- Improved quality of care per standardized measures

*Kizer KW, Dudley RA. Extreme Makeover – Transformation of the Veterans Health Care System. Ann Rev Public Health. 2009;30:18.1-18.27.

VAMC EMR Implementation

8 feet of paper per week

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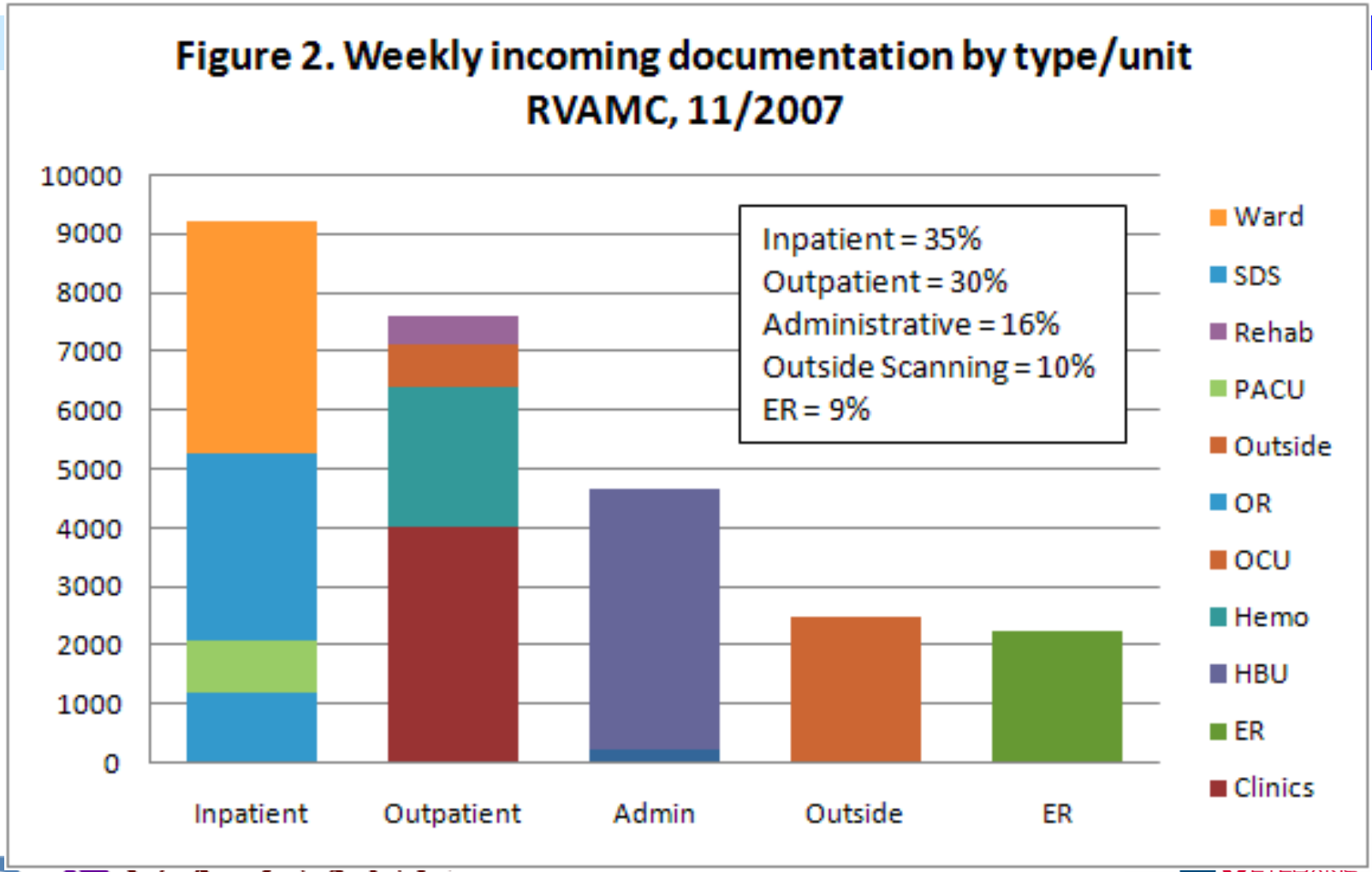
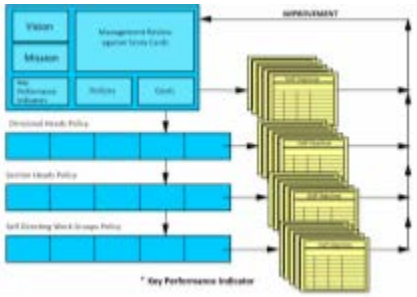
Incoming Documentation by type/unit



Personalized, Proactive, Veteran-Driven Health Care



Near Real-time Decision Support related to:
- *Clinical Outcomes*
- *Customer Satisfaction*
- *Operational Performance*

Data Sciences/ Analytics

Primary Care Team

Specialty Care Services

Inpatient Services

Health Management Platform

Veteran

Friends

Family

Community Services

Clinical Care

Social System

N=60,000

N=1

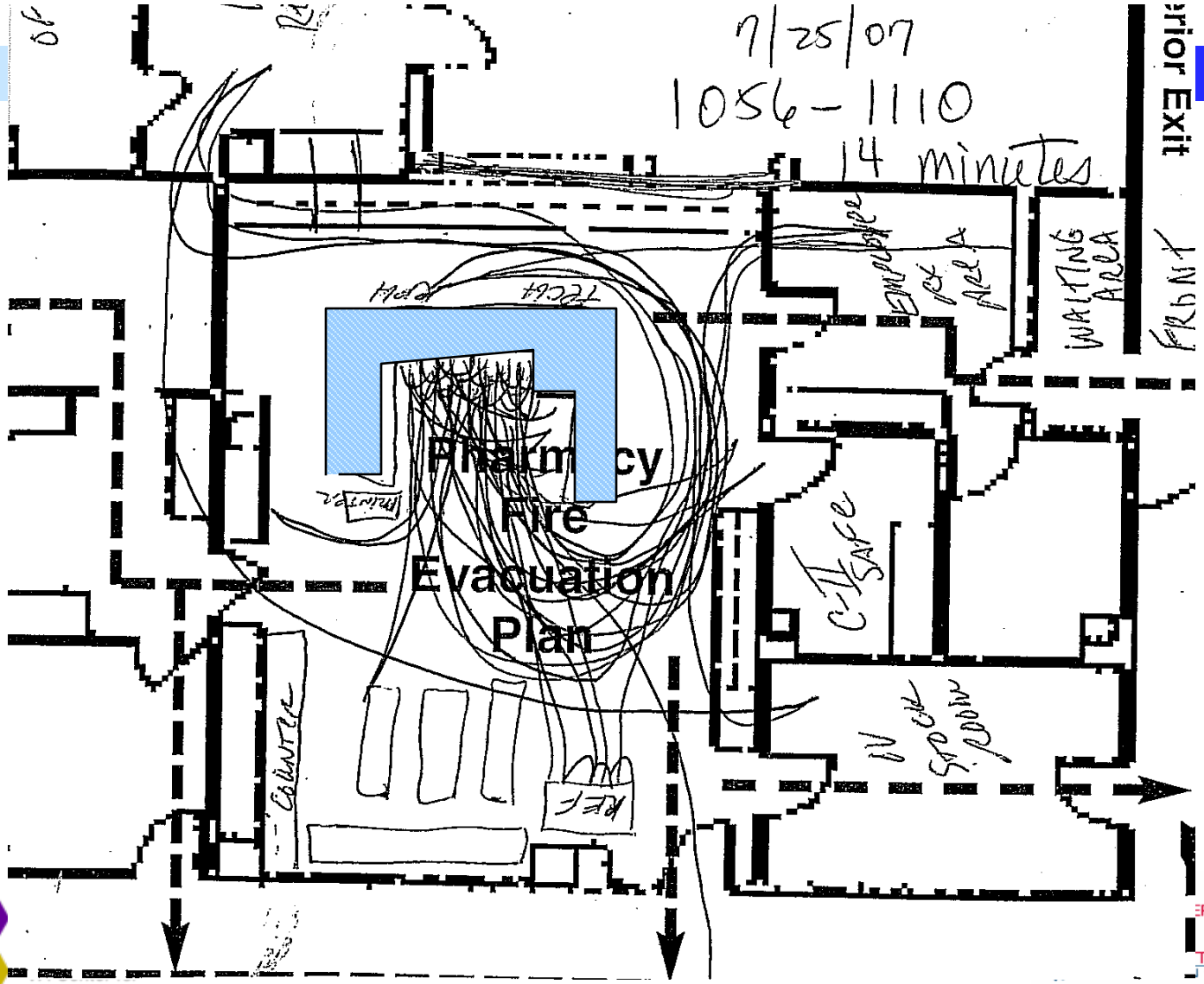
Key Challenges: Health Care as a Complex Adaptive Systems

- Relationship vs Systems focus
- Significant Inequities in Risk Distribution
  - Key Stakeholders (Insurance Companies, Device Manufacturers, Pharmaceutical Companies) transfer risk to Healthcare Systems and (uninsured) patients in order to maximize profits
- Long term vs short term focus on behavioral change – customer/patient + staff
- Complexity shift to consumer

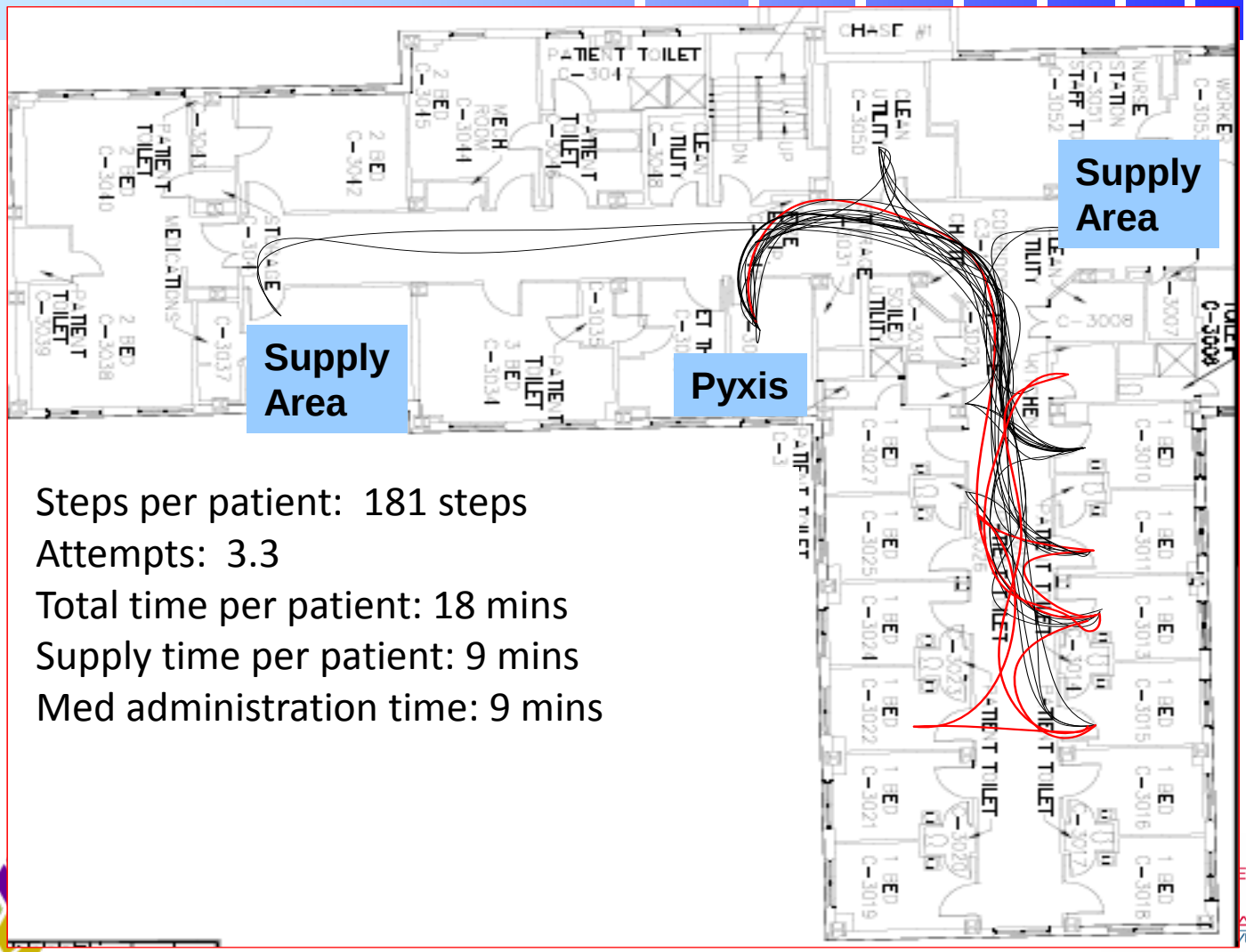
Medication Delivery

- Estimated 30% of all medical errors occur during medication delivery processes
- Average litigation expense = $680,000
- Technology available to prevent errors:
  - BCMA – Bar Code Medication Administration
  - Pyxis – Automated Medication Delivery
  - Infusion (Alaris) pumps – regulates IV flow

14 minutes in the life of a Pharmacy Tech

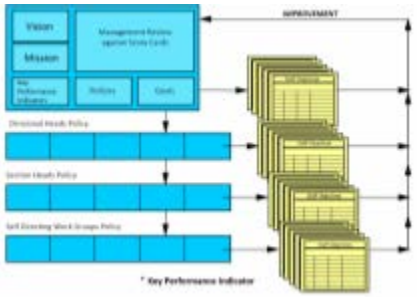


BCMA Medication Pass



Steps per patient: 181 steps
Attempts: 3.3
Total time per patient: 18 mins
Supply time per patient: 9 mins
Med administration time: 9 mins

Personalized, Proactive, Veteran-Driven Health Care



Evidence Base related to:
- *Clinical Outcomes*
- *Customer Satisfaction*
- *Operational Performance*

Data Sciences/ Analytics

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N=60,000

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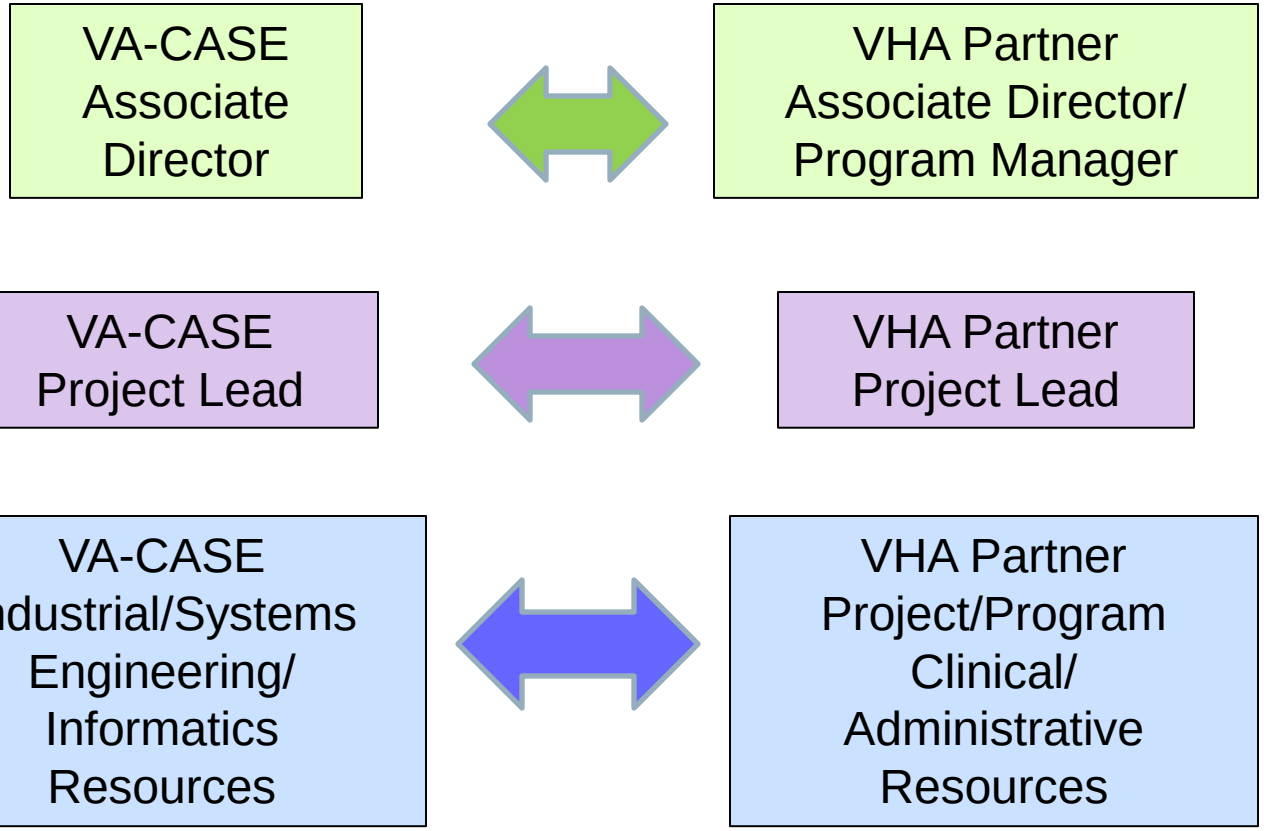
Operational Systems Engineering

VA-CASE ‘Paired Partnership’

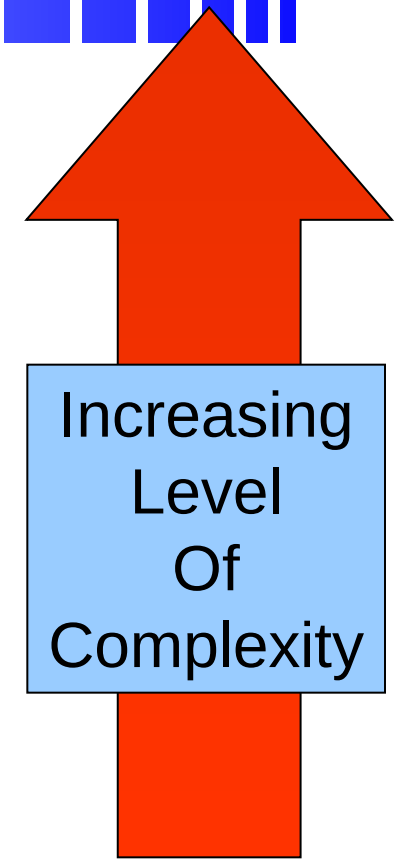


If you build it with them….they’re already there!

Applied Systems Engineering

Systems Engineering Tools/Methods

- Predictive Analytics
- Modeling and Simulation
- Measurement System Analysis (MSA)
- Value Stream Mapping
- Time and Motion Studies
- Process Observation
- Process Mapping
- PDSA Cycles



80% of issues can be resolved with lower complexity tools

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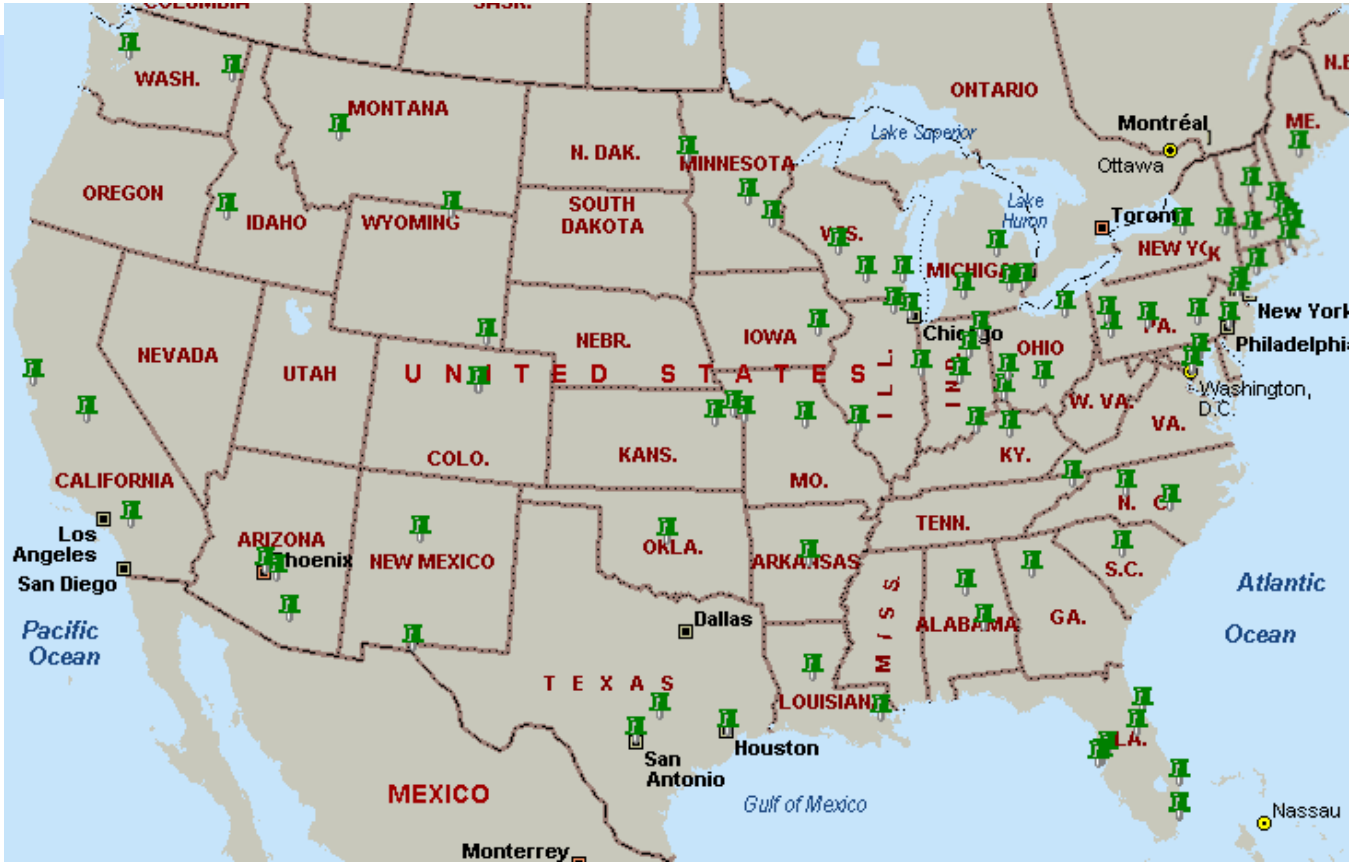
VA-CASE National Engagement

Over 170 distinct **on-site** engagements:

- Consultation
- Training
- Project Team Mentoring
- Technology Integration/ Implementation



Denotes VA-CASE Industrial Engineer or Informatics on-site support/training or engagement activity, individual markings may indicate multiple engagements

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VA-CASE Partnerships

VHA Partners	Academic/Affiliate Partners
• VISN 11 Office • VISN11 Contracting • VHA Office of Patient Care Services • VHA Purchased Care Program Office (CBO) • VHA Business Policy Division (CBO) • VHA Business Integration Service Lines (BISL) • VHA Optimizing Cancer Care Committee • National ISO9000 Compliance Division • National PACT Steering Committee • National Office of Specialty Care • National Surgery Office (NSO) • VHA Office of Sterile Processing • VHA Office of Informatics/Analytics • National Real Time Locating Systems PMO (RTLS PMO)	
• VA Ann Arbor HCS	• University of Michigan (UM) College of Engineering
• Detroit VA Medical Center	• Wayne State University
• Indianapolis VA Medical Center • VA HSR&D Center • Stroke QUERI • HIV/AIDs QUERI	• Regenstrief Institute • Purdue Center for Medication Safety Advancement • Purdue School of Engineering & Technology • Indiana University School of Medicine • Worcester Polytechnic Institute • University of North Carolina (UNC)– Chapel Hill • University of Georgia

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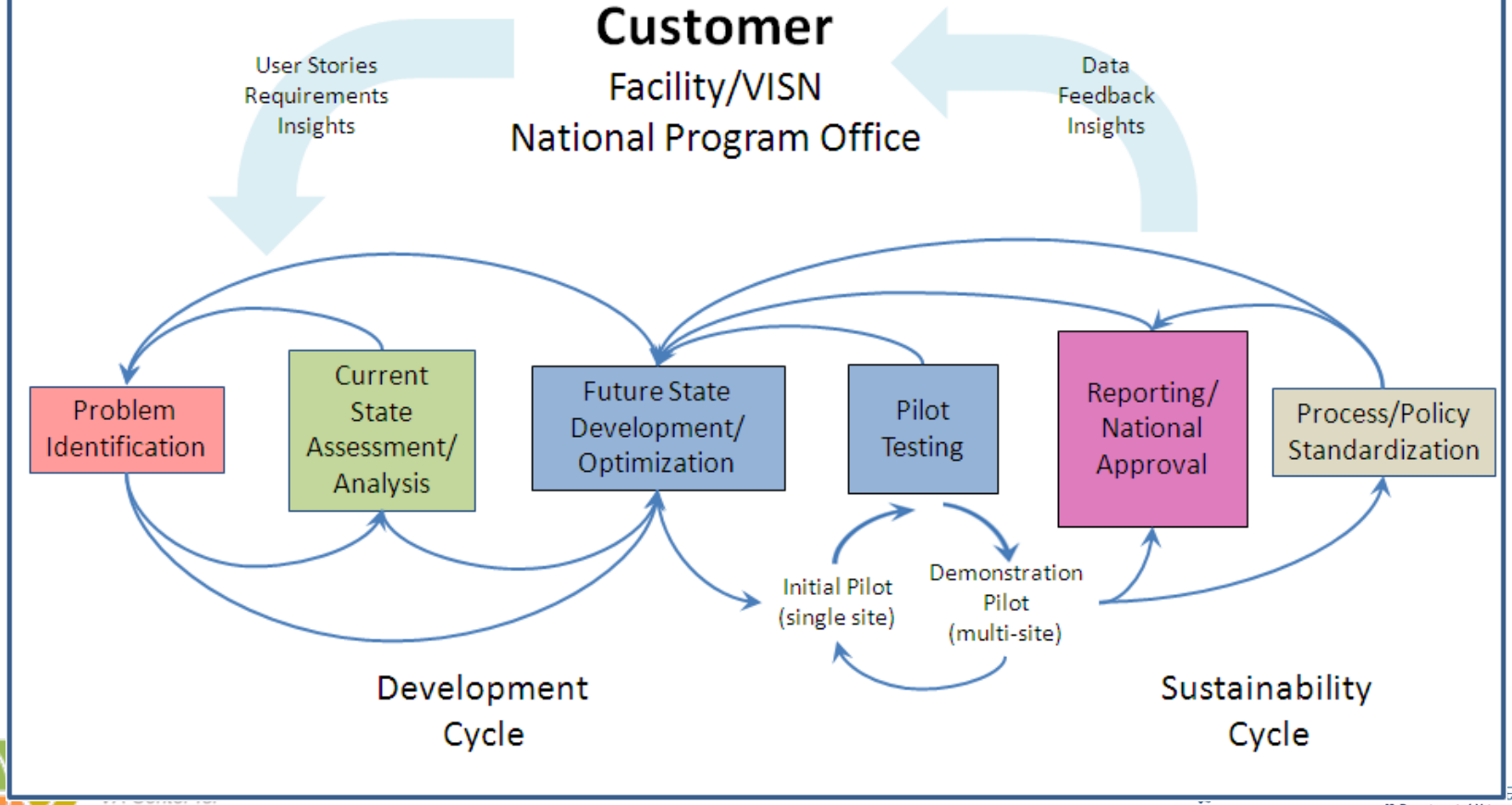
Rapid Cycle Innovation → Impact Model

Innovation			Implementation		Impact	
Planning	Proof of Concept		Future State Optimization		Evaluation	Deployment
Proposal Development	Currrent State Analysis	Concept Development/ Testing	Initial Pilot (single site/VISN)	Demonstration Pilot (multiple sites/VISNs)	Review/ Approval	National Deployment



iPhone Applications

"Health 4 Heroes"

- Funded through OPCC/CT
- Mobile app to assist Veterans in integration of healthcare information
- App development for iPhone, iPad
- Agile software development methodology used
- Next: TBI Symptom Self-Assessment App

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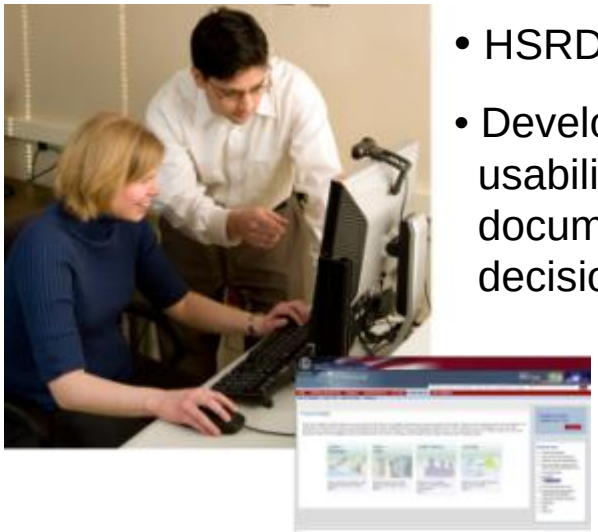
Human Computer Interaction (HCI) Lab



- HSRD/VA-CASE co-funded (FY11)
- Developed to investigate the usability of clinical documentation and decision support tools

- Rapid Usability Evaluation (RUE) Method developed and utilized to capture usability data, assess user interaction with information systems and conduct simulation studies

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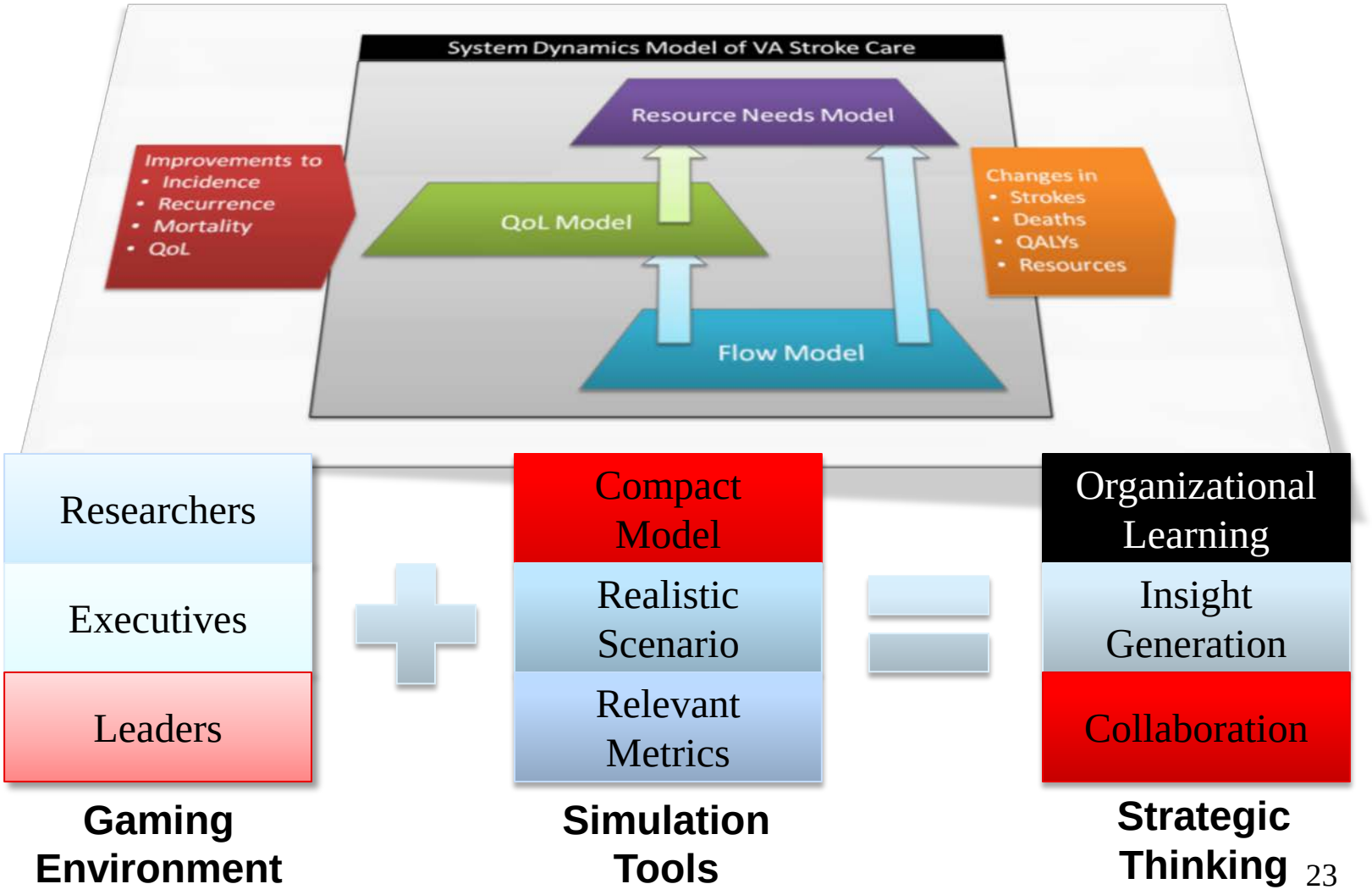
Serious Gaming for Stroke Policy Experimentation



RME Re-Processing Future State

Business Intelligence for High Reliability

Design Evaluation

Design Strategy

ISO 9001:2008

PRISM iQMS

Formal QMS Governance

Effective Re-processing

Location
Inventory
Demand

RTLS

IVN

Logistics Governance

Work Process Governance

RME Near Real Time Decision Support System

VAMC – NRT Resource Management
SPS - OR - ER - Clinics - Labs

New Informatics /Analytics Universes, New Ways of Decision Support in Near Real Time

RME NRT DSS FRAMEWORK

SPS

Sterile Processing Service

+

SQWM

+

RTLS & IVN

RTLS Real Time Location Systems

SPS

SPS/RTLS Input

- Staffing Schedule & Equipment Levels
- RME Inventory Count & Location
- Staff Competency
- OR Case Schedules & Clinic Appointments
- Delays & Cancellations
- Anticipated Demand
- …

User/ Supplier Output

RME NRT DSS (Modular Architecture)

Simulation & Optimization Tools

SPS Output

- Prioritization of RME Sterilization
- RME Delay & Availability Reports
- Appointment & Surgery Case Cancellation Reports
- OR, ED, Clinic , Lab, Radiology, BMS, Utilization Reports
- Expedited RME Orders
- Advisory Schedule Changes
- …

User/Supplier Input

Users/Suppliers

GI ENT Dermatology

OR

Radiology

ED

Labs

Clinics

Inpatient Wards ICU/PACU

Logistics

Users/Suppliers

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Questions?

Thank you!