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The Veterans Health Administration – an Integrated Health Care System

Wisconsin Institute for Healthcare Systems Engineering

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Vision: To be the premier research institute that transforms health care through engineering.
Health Care Is at a Critical “Fork in the Road”

Do we continue down a path that frustrates clinicians, confuses patients and doesn’t consistently align incentives with improving quality and value?

Do we align quality and value efforts with care where it matters, at the front line with clinicians and patients?
The Quadruple Aim

- Patient Experience of Care
- Reducing Per Capita Cost of Health Care
- Improving the Health of Populations
- Satisfaction of Clinicians and Patients

VETERANS HEALTH ADMINISTRATION
• VHA’s Ongoing Transformation
• Common Challenges Faced by VHA and the Private Sector
• Health Systems Engineering: Examples from the VHA
VHA’s Transformation: From Crisis to Clarity

Out of crisis comes clarity.

Randolph O'Toole

meetville.com
The quality of mental health care provided by VA is superior to that provided to a comparable population in the private sector.

Watkins et al. in Psychiatric Services

Every report on the VHA over the past two years has documented that the system provides care equal to or superior to private-sector care…”

-- Suzanne Gordon, The American Prospect (August 2016)
## VA Performance vs. Private Sector Performance

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<tr>
<th>MEASURE</th>
<th>PRIVATE SECTOR</th>
<th>VA</th>
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<td>Mortality Rates</td>
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<td>Pharmacy Benefit</td>
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High Performance Network

Investing in programs essential to VA and not duplicating services in the private sector.

The Veteran’s Whole Health Care

- Disease Management
- Disease Prevention
- Mental Health

Patient Navigation/Basic Care Coordination

Care/Disease Management

Case Management

Well-being Programs

Social Reports

Community Resources
VA outpatient care outperformed non-VA outpatient care on most quality measures.

Out of 47 Outpatient Measures:

- VA BETTER: 45
- VA SAME: 2
- VA WORSE: 0
VA Health Care?
VA and Private Sector Health Care Face Similar Challenges

- Access
- The Shift from Inpatient to Outpatient Care
- New Approaches to Emerging Needs & Patient Expectations
- High-Reliability Health Care
- Patient Engagement
166 VA facilities now have same-day access in primary care and mental health.
Agency Priority Goal:
Improving Access to Care by Listening to Veterans

- Patient Centered Medical Home Survey
- Specialty Care Consumer Assessment of Healthcare Providers and Systems (CAHPS) Survey
Common Challenges:
The Shift from Inpatient to Outpatient Care
This study suggests the value of coordinated team relationships within a delivery system emphasizing the integration of physical and mental health care.
Cowboys and Pit Crews

BY ATUL GAWANDE

This afternoon, Atul Gawande delivered this year’s commencement address at Harvard Medical School.

In his book “The Youngest Science,” the great physician-writer Lewis Thomas described his internship at Boston City Hospital in pre-penicillin 1937. Hospital work, he observed, was mainly custodial. “If being in a hospital bed made a difference,” he said, “it was mostly the difference produced by warmth, shelter, and food, and attentive, friendly care, and the matchless skill of the nurses in providing these things. Whether you survived or not depended on the natural history of the disease itself. Medicine made little or no difference.”
High-Reliability Health Care: Quality & Patient Safety at VA

- VA is transparent in reporting its quality and safety performance to the public

- VA is initiating major efforts to address diagnostic error, the latest frontier in the journey to high-reliability

- Independent reviews of VA effectiveness report that VA generally does well, but not all Veterans receive high quality care across all VA facilities
Common Challenges: How Do We Engage Patients?

- Patient-centeredness is the most challenging of the IOM’s six domains of quality
- But it’s the most important, because it contains elements of all other domains
- Two requests to make of patients:
  - “Tell me your goals.”
  - “Tell me what you heard.”
Health Systems Engineering: Examples from the VHA

- Interactive Visual Navigator (IVN)
- National Initiative to Reduce Missed Opportunities (NIRMO)
- REACH VET Program
- Site Selection Tool for Dialysis
Health System Stakeholder: Large health-care organizations

Selected Challenges

- Managing new payment models that reward outcomes vs. process
- Errors and gaps in care
- Wasted resources from inefficient workflows
- Wasted resources from unnecessary administrative processes

Example Systems Methods and Tools to Address Selected Challenges

- Standardized protocols that incorporate new evidence and can be tailored to individual patients
- Predictive analytics to identify potential risks before problems occur
- Supply-chain management to minimize waste in supplies and pharmaceuticals
Health System Stakeholder: Patients

Selected Challenges

- Uncoordinated care
- Inefficient use of their time and effort
- Care not centered on their needs, goals, and circumstances

Example Systems Methods and Tools to Address Selected Challenges

- Operations management to ensure resources are available when needed
- Checklists or dashboards to ensure reliable care delivery
- Reengineering processes to incorporate patient input
Health Systems Engineering Technical Domains*

- **Enterprise Health Systems**: Design, testing, deployment and control of complex, enterprise-level systems
- **Engineered Systems Management**: Develop/deploy models processes and standards for systems management
- **Health Systems Improvement**: Application of Systems Engineering/Science methods to design, analyze and control local, targeted or bounded systems (Lean, LSS)
- **Professional Development**: Development of VHA workforce capacity in Systems Thinking

*VHA Health System Engineering Technical Domains were designed to closely correspond to DoD SE Domains to facilitate VHA/DoD sharing of SE methods/research
VERC Historical Context

Building a Better Delivery System
A New Engineering/Health Care Partnership

- Published in 2005 by the National Academy of Engineering and Institute of Medicine

- Objectives:
  1. Identify engineering applications that can contribute to improvements in healthcare delivery,
  2. Assess factors that will facilitate the deployment of these applications and
  3. Identify areas of engineering research that can contribute to rapid improvements in healthcare delivery

- VA Engineering Resource Centers (VERCs) provided over 6 million man-hours of HSE support to VA, VHA, VBA, and NCA since inception in 2009 through 2016
VERC Core Program Lines leverage resources and expertise across three VERC field sites:

- VA Pittsburgh VERC
- VA Center for Applied Systems Engineering (Indianapolis VAMC)
- New England VERC (Boston VAMC)

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<th>VERC Program Lines</th>
<th>Program Description (Brief)</th>
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<td>Access to Care</td>
<td>Improve Access to VHA services across the Continuum of Care</td>
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<td>Health Policy</td>
<td>Integration of SE methods to support effective policy deployment</td>
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<tr>
<td>Population Health</td>
<td>Translation and testing of clinical evidence base through OR/SE methods to impact VA patient populations</td>
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<tr>
<td>Program Management</td>
<td>Enterprise System Deployment, System Management</td>
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<td>Lean Management</td>
<td>Systems Thinking development through Lean/Lean Six Sigma training and Lean Enterprise Transformation deployment</td>
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<tr>
<td>Transactional/ Business Systems</td>
<td>Design and deployment of optimized transactional and business systems</td>
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<tr>
<td>Clinical Systems</td>
<td>Design and deployment of optimized clinical systems</td>
</tr>
<tr>
<td>Safety Systems</td>
<td>Design and deployment of enterprise Patient Safety systems</td>
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<tr>
<td>Innovations</td>
<td>Design and testing of next generation VHA Health Systems Engineering applications</td>
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IVN is a web-based application presenting standardized procedural guides using touch screen technology.

- IVN simplifies the process for technicians, presenting instructions when and only if they are needed, reducing alarm fatigue.

- For each workflow, IVN has a process file modelling the correct sequence of steps and conditional branch logic per source materials (SOPs, manufacturer instructions). This defines how relevant instructions are presented.

- IVN features include timers, branch logic, emailed notifications and competency screening to promote “doing the right thing”

- SPS systems benefit from the following IVN functions: data capture and reporting, emailed alerts, document control, and electronic records
IVN Guides Workflows

IVN addresses The Quadruple Aim

• IVN improves patient experience of care—in at least one documented instance, the use of IVN prevented the recurrence of the 2009 incident involving improperly re-processed RME.

• IVN improves health of population—by reducing errors in reprocessing, IVN protects Veteran patients.

• IVN reduces per capita cost of healthcare—by reducing errors in reprocessing, IVN protects VHA facilities. In-house development of IVN presents lower costs that COTS alternatives.

• IVN improves healthcare worker experience/satisfaction—by guiding completion of workflows and automatically capturing time and results data, IVN eases technician burden and protects VHA employees.
National Initiative to Reduce Missed Opportunities (NIRMO)

Rationale for NIRMO

• Voice of the Customer questionnaire indicated that #1 reason for no-shows is that the patient forgot

• Live reminder call pilot resulted in significant NS rate reduction, presumably because the patients no longer forgot

• Resources limit the number of live reminder calls that can be made

• A NS predictive model helps to target the patients for whom calls will be most effective

NIRMO Predictive Model

• The model is used to identify patients for targeted reminder calls

• The pilots reduced MO rates by 50%

• Used 6 years of appointment data from VA Pittsburgh Health System
NIRMO Pilot Results

- Model predicts no-show probability using logistic regression.
- Five separate models, one for each service line (clinical support, primary care, medical, surgical, behavioral).
REACH VET Program

- Started nationwide at the end of October
- Uses data to identify Veterans at high risk for suicide
- Notifies VA providers of the risk assessment
End Stage Renal Disease (ESRD) and Dialysis

- Chronic renal failure is a progressive disease culminating in ESRD
- Very vulnerable and costly population; dialysis expenditures by VA exceed $500 million/year
- VA cares for a population at high risk of ESRD
  - Antecedent burden of severe chronic kidney disease
  - Hypertension, diabetes, predominantly male population
- Veterans are “dual eligible,” and can have either VA or Medicare pay for their dialysis

**Prevalence of moderate to severe chronic kidney disease**

General population fromUSRDS 2010 report
VA population courtesy of Dr. Ann O’Hare

**Observed incidence of ESRD, PMP**

General population data from 2010 USRDS report
VA population determined from data of Dr. Ann O’Hare
Predictive Analytic Tools Suggested an Increase in Veteran Utilization

- Multi-compartment agent based models predicted expansion of pool at high risk of ESRD
- Imputed incidence rates aligned well with observed values
- Markov process analyses (2013 and subsequent) predicted increasing utilization
- These predictions have proved quite accurate

![Graph showing predicted utilization per 1000 Veterans and observed utilization compared over years.](image)
## VA Provides ESRD Services (Primarily Dialysis) via Contracted Care and in VA Facilities

### Contracted Care
- VA contracts with individual dialysis organizations, not the industry as a whole
- Major issues are cost and Veteran access
- Rigorous geospatial analyses have detailed interactions between
  - Vendor and Veteran market mix
  - Contracted price
  - Contract structures
  - **and**
  - Cost to VA
  - Veteran access
  - Market stability

### VA Facilities
- VA has had interest in constructing more of its own dialysis facilities
- Major issues are financial viability, long term sustainability, Veteran access, and strategic value
- Rigorous geospatial analyses have identified optimal locations for construction sensitive to
  - Veteran access
  - Competing populations
  - Current and projected costs/growth
  - Proximity to existing VA resources
  - Uncertainty in future conditions
Contracting analyses used an agent based, geospatially and contractually fluent tool to predict consequences of strategic changes such as exclusion of particular vendors, changes in contracted rates, etc.

Impact of contractual changes on Veteran access, VA expenditures, and vendor revenue.
The Site Selection Tool Was Used to Identify Optimal Locations for the Construction of (Costly) VA Facilities

This tool used:
- Geospatial information to maximize Veteran access
- Veteran density distributions and anticipated growth to address sustainability
- Medicare density distributions to characterize competition for limited resources
- Non-VA facility locations and capacities to elucidate Medicare options and strategic benefit
- VA facility and staffing data to ensure optimal utilization of additional VA resources
- A purpose built algorithm to account for uncertainty of future VA and industry conditions

The algorithms employed were entirely objective, ensuring that the tool provided an unbiased list of “best candidates” via an entirely transparent process.

Economically feasible candidates minimizing commute

Objective scoring algorithm

Locational characteristics
- Distance to parent facility (DP)
- Non-VA vendor options (NV)
- Non-Fee basis Veterans within 30 mile radius (NF)

Parent VAMC characteristics
- Current expenditures (CE)
- Growth in expenditures (GE)
- Growth in unique fee basis dialysis (UG)
- Workforce (W)

Site specific characteristics
- Catchment size (CS)
- Mean commute (MC)

“Uncertainty Engine”

Robust candidate sites
... But There’s No Time to Waste

“Everything depends on execution; having just a vision is no solution.”

– Stephen Sondheim
Questions?