Comparative Effectiveness Research in the Veterans Health Administration

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The 3 Translational Blocks

Basic biomedical science → T1 → Clinical efficacy knowledge → T2 → Clinical effectiveness knowledge → T3 → Improved health care quality and value and population health

Key T1 activity to test what care works
Clinical efficacy research

Key T2 activities to test who benefits from promising care
Outcomes research
Comparative effectiveness research
Health services research

Key T3 activities to test how to deliver high-quality care reliably and in all settings
Measurement and accountability of health care quality and cost
Implementation of interventions and health care system redesign
Scaling and spread of effective interventions
Research in above domains

Comparative Effectiveness Research – Definition (FCC)

- Comparative effectiveness research is the conduct and synthesis of research comparing the benefits and harms of different interventions and strategies to prevent, diagnose, treat and monitor health conditions in “real world” settings.
- The purpose of this research is to improve health outcomes by developing and disseminating evidence-based information to patients, clinicians, and other decision-makers, responding to their expressed needs, about which interventions are most effective for which patients under specific circumstances.
  - To provide this information, comparative effectiveness research must assess a comprehensive array of health-related outcomes for diverse patient populations and sub-groups.
  - Defined interventions compared may include medications, procedures, medical and assistive devices and technologies, diagnostic testing, behavioral change, and delivery system strategies.
VA Programs in Comparative Effectiveness Research

- **Research**
  - Cooperative Studies Program
    - Clinical trials
  - Health Services Research – health system oriented research
  - Rehabilitation

- **Implementation/Translation**
  - Quality Enhancement Research Initiative program
  - Evidence Synthesis program
Large Capacity for Research

- Intramural research system - a unique strength
  - Community of ≈3000 VA researchers embedded in the health care system
- 117 VAMCs have Federal Wide Assurances for research
- ≈2100 VA funded projects

- Electronic Health Record
  - Infrastructure for clinical trials, Health Services Research and EHR analysis
VA Cooperative Studies Program -- Examples

- **Computerized Tomography vs Positron Emission Tomography in solitary pulmonary nodule (PET better)**
  - Journal of Nuclear Medicine, 2008

- **Sotolol vs Amiodarone in atrial fibrillation (similar)**
  - New England Journal of Medicine, May 5, 2005

- **Standard care with & without Phlebotomy in stable peripheral artery disease (no sign difference)**
  - Journal of the American Medical Association, February 14, 2007

- **Medical therapy vs Coronary revascularization prophylaxis prior to elective vascular surgery (no sign difference)**
  - New England Journal of Medicine, December 30, 2004
VA Cooperative Studies Program -- Examples

- Percutaneous coronary intervention/optimal medical therapy *vs* Optimal medical therapy alone (COURAGE) (no sign difference)
  - New England Journal of Medicine, March 27, 2007

- Open mesh *vs* Laparoscopic mesh repair for inguinal hernia (open mesh better)
  - New England Journal of Medicine, April 29, 2004

- Care model (patient’s self-management, continuity of care, information via nurse care coordinator) *vs* Standard care in Bipolar Disorder (care model better for most end points)
  - Psychiatric Services, July 2006

- Intensive *vs* Less Intensive Renal Support in Critically Ill Patients with Acute Kidney Injury (no sign difference)
  - New England Journal of Medicine, July 8, 2008

- Prolonged Exposure Therapy *vs* Patient-Centered therapy in PTSD (PET better)
VA Cooperative Studies Program - Ongoing

- Radical Prostatectomy vs Palliative Expectant Management for localized Prostate Cancer
- Intensive vs Standard glycemic control in diabetes
- Home monitoring vs “High quality” anti-coagulation clinic in atrial fibrillation and/or mechanical heart valve
- CABG vs Percutaneous coronary intervention with stents in diabetes
- Robotic assisted training in upper extremity movement vs Intensive stretching and range of motion exercise via trained therapist vs Usual care in stroke
- Self-management (education, action plan & case management) vs Standardized care in severe Chronic Obstructive Lung Disease
- Under Discussion: Colonoscopy at 2-3 and 5 years vs 5 years only in asymptomatic subjects with small colorectal polyps
HSR&D Research Priorities:

Disease Oriented:
- Post Deployment Health (TBI, polytrauma, pain)
- Mental Health (PTSD, substance abuse, suicide)
- Care of Complex, Chronic Conditions
- Health Services Genomics

Sociological & Cultural:
- Health Equity & Disparities
- Long-Term Care & Caregiving
- Access/Rural Health

Methodological:
- Healthcare Informatics
- Education to improve outcomes
- Implementation (QUERI)
Why is HSR Essential To CER Portfolio

- Assesses “effectiveness” in real-world settings with representative population
- Examines comparative questions that are difficult to answer in prospective RCT
  - Timing, technology, study size, harms
- Studies CER questions that relate to organization and delivery of care
CER Examples:

- Impact of change in resident duty hours on patient safety indicators. Rosen et al, Medical Care, 09
- Impact of veteran prescription copayment increase on medication adherence. Doshi et al, Circulation, ‘09
- Impact of integrated HIV care on successful viral suppression. Hoang et al, Medical Care, ‘09
- Impact of optimized antidepressant therapy & pain self management on depression and pain reduction. Kroenke et al, JAMA, ‘09
Chlorhexidine-Alcohol versus Povidone-Iodine for Surgical-Site Antisepsis

- Is preoperative skin cleansing with chlorhexidine-alcohol is more protective against infection than is povidone-iodine in clean-contaminated surgery?

- RCT at 4 sites. Primary outcome any surgical site infection within 30 days

- Chlorhexidine-alcohol was significantly more protective than povidone-iodine against both superficial incisional infections (4.2% vs. 8.6%, P=0.008) and deep incisional infections (1% vs. 3%, P=0.05) but not against organ-space infections (4.4% vs. 4.5%).
IOM Priorities for CER

- Many of the top priorities involved “Health Care Delivery System” interventions (23 of 100)
- “Compare the effectiveness of dissemination and translation techniques to facilitate use of CER”
- “Compare the effectiveness of comprehensive care coordination programs... in chronic disease.”
QUERI Program

- **Mission** - Systematically implement/translate evidence-based clinical practices & research findings into routine clinical practice
QUERI’s Research/Implementation Pipeline

**Identify Research Area**
**Identify Best Practice**
**Implement Intervention & Document outcome**

Clinical Research / Guideline Development
Mainstream Health Services Research

**Assess Existing Practice**

Implementation Research

**Phase 1**
Pilot Projects

**Phase 2**
Small-Scale Demonstrations

**Phase 3**
Regional Demonstrations

**Phase 4**
“National Rollout”

Implementation Policy, Improved Health
VA Evidence Synthesis Program

- Reviewing the evidence on a topic

- *Policy oriented* synthesis of evidence to inform medical practice and health systems planning
  - *Informed by policy considerations* with input by Patient Care Services

- Recent topics
  - Drug management of BPH – Led to Formulary change
  - Osteoporosis – Incorporated into Guideline on screening male veterans
  - Pain in Polytrauma – Need more research
Example: Implementing Collaborative Care to Improve Depression Rx

- Multiple studies demonstrate advantage of “collaborative care” for depression

- Mental Health QUERI Program -- “TIDES”
  - Demonstrate success at a few facilities
  - Show it can be rolled out broadly
  - Test its transferability to different settings (e.g. substance abuse clinics)
# Implementation of System Change: Collaborative Care of Depression

## Collaborative Care Model

<table>
<thead>
<tr>
<th>Site</th>
<th>Key Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Hills Twin Ports Sioux Falls</td>
<td>Depression symptoms, Depression severity, Anti-depressant meds</td>
</tr>
<tr>
<td>Akron Canton Youngstown</td>
<td>Outpatient utilization, Patient satisfaction, Hospitalization rates</td>
</tr>
<tr>
<td>Beaumont Pensacola Lufkin</td>
<td>Barriers to collaboration, Collaborative care costs, Implementation fidelity</td>
</tr>
</tbody>
</table>

### 1st-generation sites

- Single site
- 3 VISNs: 9 sites
- 18-30 sites: 4 VISNs

### 2nd-generation sites

- BRIDGE to National Rollout

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**VISN 10**

**VISN 16**

**VISN 23**

**Sustainability in 1st-generation sites**

**Implementation**

**Adaptation to VA**
EHR used by and tailored to needs of clinicians and researchers

With these features, the VA has made extensive use of the EHR in clinical and health services research, quality assessment and implementation of EBP

Diabetes Mellitus database and cohort is an example of this
Current Data Flow & Aggregation in VistA (simplified)

Local VistA Systems:

- Site 1
- Site 2
- Site 128

Extract Software

National Database (DSS, PBM, etc*)

Custom Extracts

External Data:

- Deaths
- Medicare Claims
- Research Database (e.g. DEpiC)

Researchers

* Key: PBM: Pharmacy Benefits Management; DSS: Decision Support System (VA clinical utilization data)
EHR makes it possible to assess longitudinal care rather than relying on cross-sectional prevalence of disease

- Multiple repeated measures on same individual
- Enables distinction of cohort changes (Pt population changes over time) from within-subject time effects
- Less “gameable” quality measures important for research and quality improvement are possible
Diabetes Intermediate Outcomes in VA: 2000 - 2005

Based on results from the VA External Peer Review Program

Sawin CT, Walder DJ, Bross DS, Pogach LM, "Diabetes process and outcome measures in the VHA," Diabetes Care, 1999
## Cross Sectional Trends in A1c Measures

<table>
<thead>
<tr>
<th>Year</th>
<th>All</th>
<th>Prevalent</th>
<th>Incident</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>&lt;7%</td>
<td>&lt;8%</td>
</tr>
<tr>
<td>2000</td>
<td>7.7</td>
<td>54%</td>
<td>76%</td>
</tr>
<tr>
<td></td>
<td>7.0</td>
<td>76%</td>
<td>89%</td>
</tr>
<tr>
<td>2001</td>
<td>7.5</td>
<td>59%</td>
<td>80%</td>
</tr>
<tr>
<td></td>
<td>7.0</td>
<td>78%</td>
<td>91%</td>
</tr>
<tr>
<td>2002</td>
<td>7.4</td>
<td>59%</td>
<td>81%</td>
</tr>
<tr>
<td></td>
<td>7.0</td>
<td>75%</td>
<td>90%</td>
</tr>
<tr>
<td>2003</td>
<td>7.3</td>
<td>60%</td>
<td>83%</td>
</tr>
<tr>
<td></td>
<td>6.9</td>
<td>75%</td>
<td>90%</td>
</tr>
</tbody>
</table>

Adherence in meeting threshold measures in overall diabetes population is dependent upon diabetes “duration”
Conclusion: Serial Cross Sections Overestimate Improvement:
Average HbA1c by Month in VA - FY1999-2003

Prevalent panel surviving: -0.06% per year

Prevalent panel died: -0.14% per year

Prevalent new to VA: -0.12% per year

Incident: -0.01% per year

Best way to study trends in glycemic control is with multi-level growth curve longitudinal modeling – beyond scope of
Plot of monthly A1c change rates (95% CI) average patient by facility.
Trends in HbA1c by Month by Race/Ethnicity in the National Panel of VA Diabetes Patients FY2000-2004 (Fixed Panel)

Standardized to combined age & sex distribution

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>FY2000</th>
<th>yearly Δ</th>
<th>FY2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>7.89</td>
<td>-0.08</td>
<td>7.48</td>
</tr>
<tr>
<td>Hispanic, White</td>
<td>7.81</td>
<td>-0.03</td>
<td>7.68</td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>7.60</td>
<td>-0.06</td>
<td>7.32</td>
</tr>
</tbody>
</table>

- **African American**: 7.89% DA 7.48
- **Hispanic, White**: 7.81% DA 7.68
- **White, non-Hispanic**: 7.60% DA 7.32

FY2000 year: 70.2% 152,352
FY2004 year: 8.6% 18,716
VA Research Mission

Mission: “To discover knowledge and create innovations that advance the health and care of veterans and the nation.”