Symposium on Natural Language Processing (NLP)
Building An Agenda for Research that Is Innovative and Implementable

David Atkins, MD, MPH
Director
Health Services Research and Development

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Overview of Introduction

• Orientation to VA research and data
• Goals of HSRD informatics research portfolio
• Goals of this meeting: How can you help us?
Continuum of Health Services Research

- **Foundational research** to improve data sets, validate measures, develop tools for investigation
- Observational research on how **patient outcomes** vary with factors at the level of patient, provider, practice, facility and organization
- **Research on innovations in practice and systems interventions** to reduce variation and improve access, satisfaction, quality or efficiency
- **Implementation research** to improve implementation and spread of effective health service innovations (much of this falls in QUERI)
- **Measurement and evaluation** research to demonstrate that efforts lead to lasting improvements
Annually:
- 1.6 billion outpatient encounters, 9 million hospital admissions
- 3.2 billion clinical orders; 5.6 billion lab tests, 1.5 billion prescriptions filled
- 165 million radiology procedures
- 2 billion text notes (unstructured), hugely enriched with a lot of information

Typical day:
- 420,000 patient encounters, 2.4 million lab results, 553,000 pharmacy fills.
Virtual Computing Environment and Research

Data
- CDW prime
- Transitional Legacy Data Systems
- Registries
- External (DOD, CMS, State claims)
- Extracted from free text

Workspace
- Analytic
- Development
- Remote Desktop

Applications
- SAS Grid
- Other Analytic Applications
- VINCI Workbench (NLP, rules engine)
- Custom web-services apps
- Geospatial

VINCI Research
- Services & Administrative Core
  - Services
    - Tools & Methods
    - Data access
    - General Help
  - Requirements & Translation
  - Quality Improvement
- NLP Research: Sampling & Extraction
- Annotation Rsrch: Bias & Visualization
- Epi-NLP Rsrch: Information value

Information Technology
Data in VINCI

- 22.6 million patients (7.4m seen/year, 927k new/year)
- 7.2 billion lab tests (1.6m new/day)
- 4.3 billion orders (949k new/day)
- 3.0 billion procedures (721k new/day)
- 2.8 billion clinical notes (865k new/day)
- 2.1 billion medication fills (405k new/day)
- 2.2 billion outpatient visits (597k new/day)
- 14.7 million inpatient visits (2.2k new/day)
VA Research Priorities that Could Benefit from NLP

- Creating and refining disease phenotypes for genomic research with Million Veterans Program (MVP)
- Improving ability to control for confounders in comparative effectiveness research (e.g., disease severity)
- Improve outcome identification for research on quality and safety (e.g., adverse events)
- Understanding patient experience of care
  - Patient reported outcomes
- Understanding coordination of care (including non-VA care)
- Monitoring for changes in function and disability relevant to Veteran benefits
- Surveillance for new symptom clusters, emerging diseases, etc.
Challenges for VA research on NLP

- We have small but growing pool of researchers with NLP expertise
- Modest budgets for NLP and other informatics research
- We want to move from research that uses NLP as a tool to some a narrow problem to research that is more *innovative* and advances more *generalizable solutions*
- At same time, we want our research to have potential for direct applications in VA care
  - Partnerships with Office of Informatics and Analytics who direct use of CDW data for operational purposes

- **What are innovative new advances in NLP that our researchers should know about?**
- **Where are VA’s unique advantages that may allow us to make unique contributions to NLP research?**