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INFORMATICS

The field of informatics is a relatively new discipline that has been spurred by the rapid growth of health care technology. In its broadest sense, informatics attempts to improve the effectiveness and delivery of health care by using health information technology.

ABOUT INFORMATICS

- Informatics research initiatives cover several areas of broad focus, with the goal of extracting and making health data accessible to researchers and clinicians. One way to do that is studying data within electronic health records (EHR).
- Natural language processing (NLP) is a field of study that uses artificial intelligence to interpret and understand written language. It is especially useful to researchers who wish to use medical data contained within an EHR.
- Adverse event monitoring is an important part of patient care. Informatics tools can be used to monitor postsurgical adverse events and medication reconciliation to ensure patient well-being.
- Clinical decision support applications can help physicians deliver the best care to medically complex patients. These tools are especially useful for caring for patients who are aging and experience multiple chronic diseases.

VA RESEARCH ON INFORMATICS: OVERVIEW

- [Health Services Research & Development \(HSR&D\)](#) supports a comprehensive informatics research program, funding intramural research projects and

maintaining [two resource centers](#) that promote access to clinical and administrative data for VA researchers.

- [The VA Informatics and Computing Infrastructure \(VINCI\)](#) is a research resource center aiming to improve access to VA data and to facilitate the analysis of those data in a secure environment, making it easier to create sophisticated analytics tools.
- [VA Information Resource Center \(VIREC\)](#) is tasked with advancing VA capacity to use data effectively for research and quality improvement, and to foster communication between research data users and the VA health care community.
- [The Consortium for Health Care Informatics Research \(CHIR\)](#) is a multisite collaborative research program that was instrumental in contributing to the development of HSR&D's NLP research portfolio.
- Phenotype studies search for specific traits across populations of patients by using informatics tools like NLP. Optimal phenotyping is vital for large-scale research programs underway in VA, including the [Million Veteran Program](#).

SELECTED MILESTONES AND MAJOR EVENTS

- **2008** – Funded VINCI, a high-performance analytic environment with secure access

to corporate data warehouse and other VA data sources

- **2013** – Funded two Collaborative Research to Enhance and Advance Transformation and Excellence (CREATE) centers on informatics research to facilitate collaboration between investigators and VHA program offices

- **2015** – The Natural Language Processing State of Science conference was convened to showcase the achievements of VA's NLP research in the last decade

- **2016** – The Central Role of Phenotyping in VA Research workshop began discussions on the role and importance of phenotyping for a broad range of research studies in the VA

- **2017** - Established partnership between VA and the Department of Energy to create the Big Data Science Initiative, which will use large data sets and high-performance computing to advance research in targeted areas of health care for Veterans

RECENT STUDIES: SELECTED HIGHLIGHTS

- **Health providers receive an overwhelming number of electronic notifications via the EHR**, making it difficult to focus on important patient information. Researchers at the VA Center

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for Innovations in Quality, Effectiveness, and Safety in Houston set out to measure the number and type of EHR notifications so that they could calculate physician burden. ([JAMA Internal Medicine](#), April 2016)

• **Recurrent kidney injury is common among patients who had been hospitalized with acute kidney injury.** Using VA health care data, researchers at the VA Tennessee Valley Healthcare System and other institutions identified clinical risk factors that could predict risk for recurrent kidney injury after acute kidney injury. Risk factors included longer acute kidney injury duration, congestive heart failure, liver disease, and cancer. ([Journal of the American Society of Nephrology](#), April 2016)

• **While free text medical records offer valuable information about patient psychological and social characteristics, processing the volume of records poses a logistical problem.** Researchers at the VA Salt Lake City Health Care System used NLP algorithms to examine more than 1,500 patient records to extract key psychosocial concepts, allowing them to focus their data searches on selected key terms. ([JAMIA](#), Dec. 1, 2013)

• **This study partnered with primary-care clinicians at several ambulatory care sites to find out what types of information clinical team members need** to be most effective in delivering care. Researchers at the VA Center for

Innovations in Quality, Effectiveness, and Safety in Houston and other institutions combined research and implementation science methods to address important gaps in existing care-coordination literature. ([Implementation Science](#), Oct. 19, 2015)

• **Researchers at the VA Salt Lake City Health Care System and other institutions set out to document heart failure treatment performance metrics** of two common medications, angiotensin converting enzyme inhibitors and angiotensin II receptor blockers. They used two methods of detecting and extracting data from EHRs: a rules-based learning system and a machine learning-based system. A combination of both tracking methods led to the data extraction results. ([Studies in Health Technology and Informatics](#), Jan. 1, 2015)

• **Care transitions can be fraught with poorer outcomes for older, bilingual patients.** Researchers at the James J. Peters VA Medical Center and the Icahn School of Medicine at Mount Sinai in New York reviewed health outcomes for bilingual Veterans to see if there were significant differences in care transitions. Older, bilingual Veterans reported poorer communication related to care transition, highlighting the importance of asking the language preference of patients with some English proficiency. ([Journal of the American Geriatrics Society](#), May 1, 2016)

• **Veterans now have access to their online medical records via patient portals;** however, most clinical notes are written in jargon. Researchers at the Bedford VA Medical Center in Massachusetts and other institutions set out to develop a NLP system to identify terms most important to patients. The FOCUS system is able to automatically rank terms from EHR, which may help develop future interventions to improve quality of care. ([JMIR Medical Informatics](#), Nov. 30, 2016)

• **Investigators used data from a national cardiovascular registry to implement a continuous surveillance program** to monitor post-surgical outcomes for implantable vascular-closure devices. Researchers from the VA Tennessee Valley Healthcare System and other institutions analyzed 73,124 patients who had received Mynx devices. They found that prospective, active surveillance of a clinical registry could rapidly identify potential safety signals. ([N Engl J Med](#), Feb. 9, 2017)

For more information on VA studies on informatics and other key topics relating to Veterans' health, please visit www.research.va.gov/topics

Informatics research helps make health data available to researchers and clinicians.

For a digital version of this fact sheet with active links to sources, visit www.research.va.gov/topics
