Medicine in the Age of Electronic Health Records

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ABSTRACT

In the era of EHRs, it is possible to examine the outcomes of decisions made by doctors during clinical practice to identify patterns of care—generating evidence based on the collective practice of experts. We will discuss methods that use unstructured patient data to monitor for adverse drug events, profile specific drugs, identify off-label drug usage, uncover 'natural experiments' and generate practice-based evidence for difficult-to-test clinical hypotheses. We will describe how to detect associations among drugs and their adverse events several years before an alert is issued as well as compute the true rate of drug-drug interactions. We will present approaches to identify novel off-label uses of drugs using the patient feature matrix along with prior knowledge about drugs, diseases, and known usage. We will review a natural experiment—where a subset of congestive heart failure patients who were prescribed Cilostazol despite its black box warning— and profile its safety. We will discuss the testing of a clinical hypothesis about an association between allergic conditions and chronic uveitis in patients with juvenile idiopathic arthritis.

Categories and Subject Descriptors

J.3 [**Computer Applications**]: Life and Medical Sciences--*Health*

Keywords

Learning health system; unstructured EHR; clinical data warehouse; practice-based evidence

Bio

Dr. Nigam H. Shah is an Assistant Professor of Medicine (Biomedical Informatics) at the Stanford School of Medicine. Dr. Shah researches methods of using machine learning, text-mining, and medical ontologies to learn medical evidence from unstructured clinical data. He teaches a graduate class on data-driven medicine. Dr. Shah holds an MBBS from Baroda Medical College, India, a PhD from Penn State University, USA and completed post-doctoral training at the Stanford Medical School in 2007.