

I. Title:

- Agile Modeling for Analysis and Design of Automated Clinical Decision Support in Electronic Health Records and Radiology Information Systems

II. Abstract of area to be covered and proposed presentations

A. Short Description:

Designing effective Clinical Decision Support (CDS) tools in an Electronic Health Record (EHR) or Radiology Information System (RIS) can prove challenging, due to complex real-world scenarios and newly-discovered requirements. Modeling CDS behavior removes ambiguity and promotes shared understanding of desired behavior, but risks analysis paralysis. An 'Agile Modeling' approach can foster effective rapid-cycle CDS design and optimization. Statistical analysis can identify anomalous behavior of CDS after release into production environments and prompt rapid-cycle redesign using agile modeling to enhance CDS effectiveness.

B. Learning Objectives:

Learning Objective 1: Understand what CDS in EHR/RIS systems is, why use of automated CDS is growing, and why CDS design/development can be challenging.

Learning Objective 2: Explain benefits of an Agile Modeling approach compared with traditional BDUF (big design up-front) for rapid-cycle design and optimization.

Learning Objective 3: identify which specific UML and non-UML models prove most helpful in CDS design, and practice applying them to realistic CDS design and development problem scenarios.

Learning Objective 4 : appreciate the wealth of data collected about CDS activity in current EHR/RIS systems, and explore how to use R for statistical analysis of CDS behavior for ongoing enhancement of CDS effectiveness

III. Short biographical sketches of the organizer and each invited speaker

A. DuWayne Willett, MD, MSIS, MMM

DuWayne Willett is the Chief Medical Informatics Officer (CMIO) at the University of Texas Southwestern Health System in Dallas, which encompasses two teaching hospitals and over 50 clinics covering all major medical specialties and subspecialties. DuWayne led the initial design and implementation of the Health System Data

Warehouse at UT Southwestern, with integrated clinical, operational, financial, and patient satisfaction data. As the CMIO, DuWayne oversees the design of UTSW Health System's clinical information systems, including configuration of the enterprise EHR and its interfaces with ancillary clinical systems.

DuWayne received his MD degree from the Medical College of Wisconsin, an MS in Information System from Drexel University in 2003, and a Master's in Medical Management from the University of Texas at Dallas in 2007. His MSIS degree included course work on structured analysis and design, object-oriented analysis and design, and data modeling including data warehouse design. DuWayne has taught courses on Health IT, process mapping and UML modeling to Master's and MBA students at UT-Dallas, and to medical students at UT-Southwestern.

#### B. Vaishnavi Kannan, MS

Vaishnavi Kannan is a clinical decision support and population health specialist on the EHR team at the University of Texas Southwestern. In her role, Vaishnavi gathers requirements, designs, and constructs advanced clinical decision support products, patient registries, reports and dashboards.

Vaishnavi developed the first MEWS (Modified Early Warning System) reporting capability in UTSW's EHR, with demonstrated impact on improving inpatient safety, and continues to advance its design. She works closely with the Medical Informatics group on clinical decision support (CDS) design, providing expertise on the EHR's CDS and rules engine capabilities. Vaishnavi also serves as the lead technical specialist on UTSW's EHR-based disease registries, both registries native to the EHR vendor and those custom-developed at UTSW. She works closely with the data warehousing team on importing data warehouse-derived patient registry data back into the EHR.

Vaishnavi received an MS in Biotechnology at the University of Texas-Dallas, and subsequently completed a Health Information Technology certificate program at the University of Texas-Austin.

#### C. Seth Toomay, MD

Seth Toomay is an interventional radiologist by training with demonstrated aptitude for information technology and process control. He became the Deputy CMIO of the University of Texas Southwestern Health System in 2011 and oversees the health system's imaging-related information systems, including the radiology information system (RIS) and picture archiving & communication system (PACS). Dr. Toomay additionally performs data analysis and visualization using R (with a particular emphasis on process control), and has published articles on application of natural language processing (NLP) to radiology reports.

After graduating from Brown University, Seth attended medical school and completed residency and fellowship training in Interventional Radiology at UT-Southwestern.

#### D. Mujeeb Basit, MD

Mujeeb Basit is currently a Clinical Informatics Fellow at Harvard Medical School in the Division of Clinical Informatics at Beth Israel Deaconess Medical Center, where he conducts innovative statistically-based research on patterns and modes of failure of Clinical Decision Support tools in EHRs.

Mujeeb studied Computer Science at Baylor University, graduating with honors. After graduation, he worked first on the Human Genome Project, and then as the lead architect and Director of Information Systems for the Dallas Heart Study, a landmark

population-based study which led to multiple discoveries, including a recent brand new class of drugs for treating high cholesterol in patients who cannot take statins . After developing the DHS database and information systems, he attended medical school at George Washington University, then completed specialty training in Internal Medicine and Cardiology.