Automatic Clinical Summarization as an EHR Usability Improvement Tool

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To improve EHR usability we need to take a broad socio-technical view

- EHRs used within complex adaptive health care system consisting of high-pressured, fastpaced, and distributed settings of care
- Need to differentiate between:
 - User interface that is difficult to navigate
 - Clinical data that is not well organized
 - Order entry application is slow to respond
 - Computers only available at the nursing station

External Rules & Regulations - State & Federal



Summarization Project Goals

- Develop methodologies that:
 - Model and summarize complex, chronically-ill patients' EHR data
 - Enhance decision making with contextappropriate, evidence-based recommendations
- To improve clinician decision-making under information overload and time pressure

Broad definition of Summarization

- Developed & published a generic clinical summarization model – AORTIS
- Describe how people think and what an EHR could do to help them...
 - Aggregation: the collection of data
 - Organization: structuring of the data
 - Reduction: culling salient information
 - Transformation: altering the data view
 - Interpretation: context-based analysis of data
 - Synthesis: combining two or more data elements

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Current Work

- Extracting knowledge from Unified Medical Language System Metathesaurus (UMLS)
 - Using NDF-RT medication may_treat problem relationships
- Exploring "crowd-sourcing" techniques
 - Using problem medication links MDs are making
- Using Association Rule mining to increase number of problems on problem list
 - Using market-basket analysis to identify undocumented patient problems

McCoy AB, et al. AMIA Annu Symp Proc. 2011. Wright A, et al. J Am Med Inform Assoc. 2011 May 25°

Summary

- Current state-of-the-art for summarization in commercial EHRs is limited
- Need methods to help clinicians create accurate problem lists and link appropriate medications to them
 - Use of existing ontologies requires improvements in granularity and content
 - Crowdsourcing also has great promise if we can develop better methods to enter data
 - Association rule mining has great promise need more data

Thank you

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