Decision Healthcare: Using Computers to Facility Diagnoses

Peter Ragone, Joanne Luciano, Deborah McGuinness

Tetherless World Constellation, Rensselaer Polytechnic Institute, Troy, New York, USA

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ABSTRACT

Motivation: Decision science can provide tremendous benefits for healthcare providers. However, despite these advantages, most providers shy away from these software packages and their recommendations. We theorize that a lack of trust is the root cause, and propose some solutions.

1 INTRODUCTION

Healthcare providers face interesting challenges everyday, and with every patient. Based on a conversation with individuals unaccustomed to their field, and with often nonspecific complaints, physicians, nurse practitioners, physician assistants and other healthcare providers are expected to make definitive diagnoses, and treat the patient appropriately. While some patients certainly fall into clearly defined categories - the 65 year old male, complaining of chest pain radiating to his neck and left shoulder after shoveling snow, showing ST elevation and depression on a 12-lead ECG and corresponding raised troponin levels - many patients may present to family practice physicians with very unspecified complaints - the 45 year old female with occasional abdominal pain and weekly migraines.

While some medical specialties are given the foresight of focusing on their profession - cardiologists and orthopaedists come to mind - many other specialities are expected to face every possible patient complaint - namely emergency medicine and general practice providers. This latter group may simultaneously be dealing with the medicare patient who has had foot pain for three weeks, the athlete who just broke his arm, the elderly patient who fell, and the older adult having a heart attack. Despite not having the experience or thorough training of an orthopaedist, geriatrician, or cardiologist, the ER practitioner is expected to handle each of these patients with ease. Furthermore, emergency room physicians have the added complication of a brand-new patient for nearly every case; while there are certainly some “frequent fliers”, many patients are unknown to the provider, who must therefore balance possible drug interactions and drug allergies with the potential benefit of a particular treatment plan.

2 DECISION HEALTHCARE

Certainly, a healthcare provider placed in the aforementioned situations would greatly benefit from decision science-based software in order to aid with diagnoses, provide accurate and appropriate prescription, and advocate on the patient’s behalf. Indeed, such systems are already available and in use by some practitioners. However, the PCAST report accurately indicates that the vast majority of providers are not using this software. We reckon the preventive measure is a lack of trust between the provider and the software.

2.1 Decision Healthcare: Humans

The disadvantage of current software is its inability to hold a conversation. Currently, if two providers are discussing a patient’s case, and one recommends a certain treatment, the other can inquire as to the reasoning. Depending on the software, this may or may not be possible. Certainly the software would have some difficulty, in its present state, of referring to experience, for example.

The downside with humans, of course, is the possibility of an equal amount of ignorance; two emergency department physicians may both be oblivious to an obscure orthopaedics syndrome. Clearly, a system could be created to include the benefits of a human, without the corresponding detriments.

2.2 Decision Healthcare: Computers

While the current state of computers and software might not be at the level (save, perhaps, for IBM’s Watson) of carrying a thoughtful conversation, computers are certainly able to process tremendous amounts of data outside the purview of a healthcare provider. In an appropriate scenario, computers can provide vital information for physicians - from unique diagnoses to alerts for drug interactions. Drawing from enormous amounts of data, computers have the potential to play critical roles in healthcare.

3 RESEARCH

Research into the validity of the theory presented here - that trustworthiness is the primary detriment to the use of healthcare decision systems by providers - must be evaluated first. A survey of practitioners would likely provide the most relevant data; it should include the following:

- Providers that do and do not use EHR
- Providers that use EHR with and without decision systems
- Providers that use EHR with decision systems that do or do not utilize these systems
- Potential reasoning behind not using EHR, not using EHR with decision systems, and not using the decision systems available with EHR

These data points will provide a start towards testing the validity of this hypothesis. Once this data has been collected, futures work could include testing potential advances in trust between providers and computers, as well as between patients and computers.

4 POTENTIAL CONFLICTS

While healthcare decision systems provide the potential for great advances and improvements in healthcare, they also
pose a tremendous liability. Professors and teachers of future practitioners must remember to instruct their students on medicine, and merely include the technology as an aside. Providers must focus their efforts on the health of the patient, and not allow the disagreement of a computer to overrule their natural instincts.

CONCLUSION
Healthcare decision systems provide the opportunity for tremendous advances in healthcare. However, despite their possible benefits, most practitioners fail to make use of available systems. We theorize that the primary culprit is a lack of trust between currently available computer systems and the providers, and lay out a potential research path for pursuing this line of work. Future advances in computer technology and software engineering, as well as the integration of semantic technologies with medicine, will provide a more robust system to further facilitate patient healthcare of the future.

REFERENCES
PCAST. (2010) Report to the President Realizing the Full Potential of Health Information Technology to Improve Healthcare for Americans: The Path Forward.