From Critique to Collaboration: Rethinking Computerized Clinical Alerts

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Problem Space

Motivation

Drug safety alerts are critical for patient safety but largely ignored by doctors during medication prescribing.

- Up to 96% of such warnings are ignored by physicians on a daily basis.
- Non-compliance to DDI leads to increased risk of prescribing unsafe medications, which may cause serious health complications and even death.
- The alerts are particularly at risk, with 20-40% of patients over 65 being exposed to a potential DDI, and 5-15% experiencing an actual DDI-induced adverse event.

Despite efforts to improve alert design and reduce alert fatigue, physicians continue to distrust computerized recommendations.

Unsolved Challenges

- Alert fatigue
- Poor Visual Display
- Inadequate Timing and Interaction Mechanics
- Lack of Trust in Advice Given

How can we fundamentally rethink alerts so that they can be trusted and followed by physicians?

Aims and Methods

- To improve alerts, we must first look at how to improve the trust between physician and computerized advice.
- We explore the foundational principles of what physicians consider important when taking advice from peers.
- We use this knowledge to create novel designs for drug safety guidance that elicit physician trust and a sense of collaboration.

Aim 1. Unearth principles that accompany trusted physician-to-physician advice regarding appropriate medication prescribing.

- Formative studies in a variety of clinical settings to understand key factors in forming and sharing trusted advice among doctors when sharing drug-drug interactions.

Aim 2. Ideate and demonstrate novel designs for computerized drug safety guidance that elicit physician trust and a sense of collaboration.

- Develop and demonstrate novel DDI user interfaces to convey drug safety information to providers. Examples include pre-emptive advice, peer-based suggestions, personalized risk communication, and ambient displays.
- We will prototype and deploy these system designs in real-world CPOE environments in central Indiana hospitals.

Aim 3. Evaluate the impact of the proposed strategies on physician compliance and experience.

- Comparative evaluation studies to assess the short-term and long-term effect of the proposed alert designs on usability and DDI compliance during medication prescribing.
- Wishard-Eskanazi Health, one of the five largest public health systems in the United States, will serve as a living laboratory.

Anatomy of in-patient Team Dynamics

Themes Driving Trusted Advice Among Physicians

Specialization
- The recommendation of a specialist is trusted because there is an implicit disparity of knowledge and experience (barriers to override their recommendations)
- Even if a recommendation from a trainee fellow in a specialty will often receive a higher weight than an attending generalist
- Professionally recognized role and thus implied standard of care

Role in the Medical Hierarchy

Demonstrated Experience
- One way to demonstrate experience is following the common pattern presenting the patient.
- Communication is a way that is expected – so it helps understanding

Evidence of Understanding of the Patient Situation
- Demonstrating an understanding of the specific patient situation is critical
- Done through articulation of accurate data about the patient (reporting patient situation etc.)
- Situated motivation for trust
- This situated factor can trump other global factor of trust building

Demonstrated Knowledge of Evidence from the Literature
- Done through referencing relevant studies and other literature
- Strengthens credibility and overall trust

Empathy
- Empathy important for earning trust
- Empathy for the patient – makes the advice more trustworthy. It’s the expression of care
- Empathy among physicians – or the receiver of the advice
- Empathy draws in trust in the advice

Collaborative and Inclusive Language
- Cue for inclusive decision making
- Advice delivery (“let’s do this”) from the attending/senior person…here is what we do
- It’s clear who has to do it
- Put perceived, additional responsibility on the team as a whole

Perceived Focus of Attention
- If I perceive the other is distracted while I am asking for advice, I perceive the advice given as less trustworthy
- Possibly trumped by actual demonstration of knowledge (he seems distracted but turned out to be knowledgeable)

Perception of Being Heard
- I can trust more an advice/decision I was part of, for which my ideas have been considered/heard

Empathy among physicians – or the receiver of the advice
- Empathy for the patient – makes the advice more trustworthy. It’s the expression of care

“Teamness”
- There is trust among team members because they serve a common goal (trust)
- They have been working together over time
- Motivation to help each other
- Recognize shared responsibility

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Future Work

- Empirically validate principles of trusted advice among a large cohort (>50) of physicians
- Ideate alert designs based on key themes
- Iteratively evaluates prototypes in the lab and devise deployment strategies

Ongoing Results [8 months into the project]