DIABETES PATIENT ADHERENCE PROJECT

BACKGROUND

Facilitating treatment adherence among patients with chronic conditions poses a significant challenge to healthcare providers. In the context of health care, adherence is defined as the extent to which a person's behavior in terms of taking medication or executing life-style changes coincides with medical advice. Diabetes is a highly prevalent chronic condition confounded by high levels of treatment non-adherence. Diabetes treatment outcome is largely driven by patient self-management, which includes modifying life activities based on regular feedback about blood glucose control. The glucometer is a tool to aid in self-management activities, and the control of blood glucose levels, but may actually impede adherence due to glucometer interaction issues and patient behavioral and physiological limitations.

OBJECTIVE

The study sought to identify when, how and why non-adherence to self-monitoring of blood glucose (SMBG) occurred over a 60-day study period. This was accomplished by qualitatively modeling and empirically quantifying the factors in each dimension (when, how, why) using surveys, medical records, and glucometer downloads. Visualizing this data in a decision-centric and user-centric form can provide disease progression insight to diabetes stakeholders (patient, provider), inform diabetes treatment strategies, and improve outcomes.

Detailed study information and data description can be found in the Description of Diabetes Study Data document.

SHORT-TERM PROJECT: Physiological Changes

Using existing software, create a visualization of blood glucose, daily SMBG testing frequency, and daily adherence values over a 60-day period. Consider the following:

- How would this visualization differ for provider-accessible Electronic Health Records (HER) versus patient-accessible Patient Health Records (PHR) (i.e., mobile or web-based disease management app)?
- What critical features of each variable should be highlighted (i.e., days when testing did not occur, exceeding normal blood glucose values), and how would this information help to track changes in disease progression?
- What other physiological, behavioral or technological variables would be important to include in this visualization?
- How would you propose this visualization to be integrated into the diabetes treatment decision making process?

LONG-TERM PROJECT: Systems-Level Relationships

There are many interacting parts of the diabetes treatment system, particularly when evaluating patient self-management behaviors. These relationships involve 1) physiological, behavioral, and technological interactions and 2) the relationship between patient adherence causal factors (why) and behavioral manifestations (when, how).

- **When:** Hierarchical task analyses provide information on the specific meter interaction task (i.e., remembering to test, inserting the testing strip) that is the most difficult for the patient.
- **How:** A glucometer-specific unsafe act classification provides information on the type of non-adherence behavioral manifestation (i.e., patient doesn’t believe testing is important, doesn’t test due to social stigmas).
• **Why:** Physiological (i.e., diabetes complications, lab tests), behavioral (i.e., depression, family support, insurance), and technological (i.e., glucometer usability, device model) data are provided to understand the causal factors for non-adherence.

Develop new software to visualize the relationship between these systems in a way that would be meaningful to a diabetes provider and may provide information that enhances traditional medical records. Consider the following:

• What system level of abstraction is the most appropriate for certain types of decisions?
• How can patient vs. population level data be captured in the visualization?
• How can relationships between longitudinal and static data be visualized?
• How would you propose this visualization to be integrated into the diabetes treatment process?