

**REACHING UNDERSERVED ADULTS WITH  
DIABETES THROUGH INTERACTIVE  
TECHNOLOGY: MOBILE DIABETES  
DETECTIVE (MODD)**

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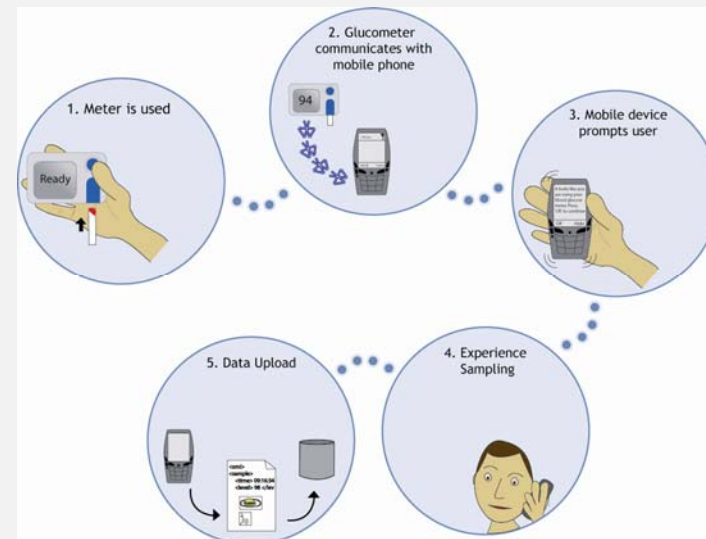
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## BACKGROUND

- Diabetes self-management education is effective in improving glycemic control
- Medically underserved do not receive DSME
- Delivering DSME using health information technology could improve access
- Medically underserved are adopting technology at increasing rates
- TTM individual progresses through the five Stages of Change
- Change processes includes both cognitive and behavioral activities

## MOBILE ACCESS TO HEALTH INFORMATION (MAHI)

- Interactive technology including a conventional blood glucose meter (LifeScan OneTouch™) enhanced with a Bluetooth adapter and a cell phone (Nokia N80™).
- Data capture includes the user's interaction with the glucose meter, blood glucose values, and media recordings of participants voices and pictures.



## STUDY DESIGN

- To develop a theoretically grounded knowledge base for problem solving in diabetes
- To develop an expandable knowledge base related to DSME/S
- To promote diabetes self-management in underserved adult with type 2 diabetes using patient-centric decision support tools (MoDD)

# DEVELOPMENT OF THE MOBILE DIABETES DETECTIVE

Participatory Design Employed by an Interdisciplinary Team

Bioinformatics Knowledge Engineers

Certified Diabetes Educators



Development of MoDD Knowledge Base

4 Knowledge Elements

8 Glycemic Problem Patterns



Validation of the MoDD Knowledge Base

Federally Qualified Health Centers CDEs and Clients

## KNOWLEDGE BASE DEVELOPMENT

- Conducted in collaboration with Clinical Directors Network (CDN)
- Knowledge base was created in a participatory design
- Used knowledge acquisition with academic diabetes educators (ADE) as domain experts
- Recruited CDE's and participants from from Community Health Centers (CHC)
- Validated by scenario-based approach with CDEs and participants from CHC
- Inclusion criteria: Age- 18-65, T2DM, language proficiency English or Spanish

## VALIDATION OF THE DATA BASE

Purpose: Evaluate domain accuracy, completeness, and missing items of knowledge base

- **2 focus groups** with 8 diabetes educators at FQHC sites lasting 1.5 hours each
- **5 semi-structured interviews** with participants of MoDD at FQHCs
- Presented with case-scenarios
- Asked how they would problem-solve these patterns
- Discussion of potential causes, recommendations or action to be taken

## ABOUT MODD

- Web based intervention to promote problem solving in diabetes self-management
- Theoretically grounded in TTM of stages of change and theories of problem-solving in diabetes
- Focus on individual discovery and problem solving
- Structured around 8 glycemic problems and 4 knowledge elements



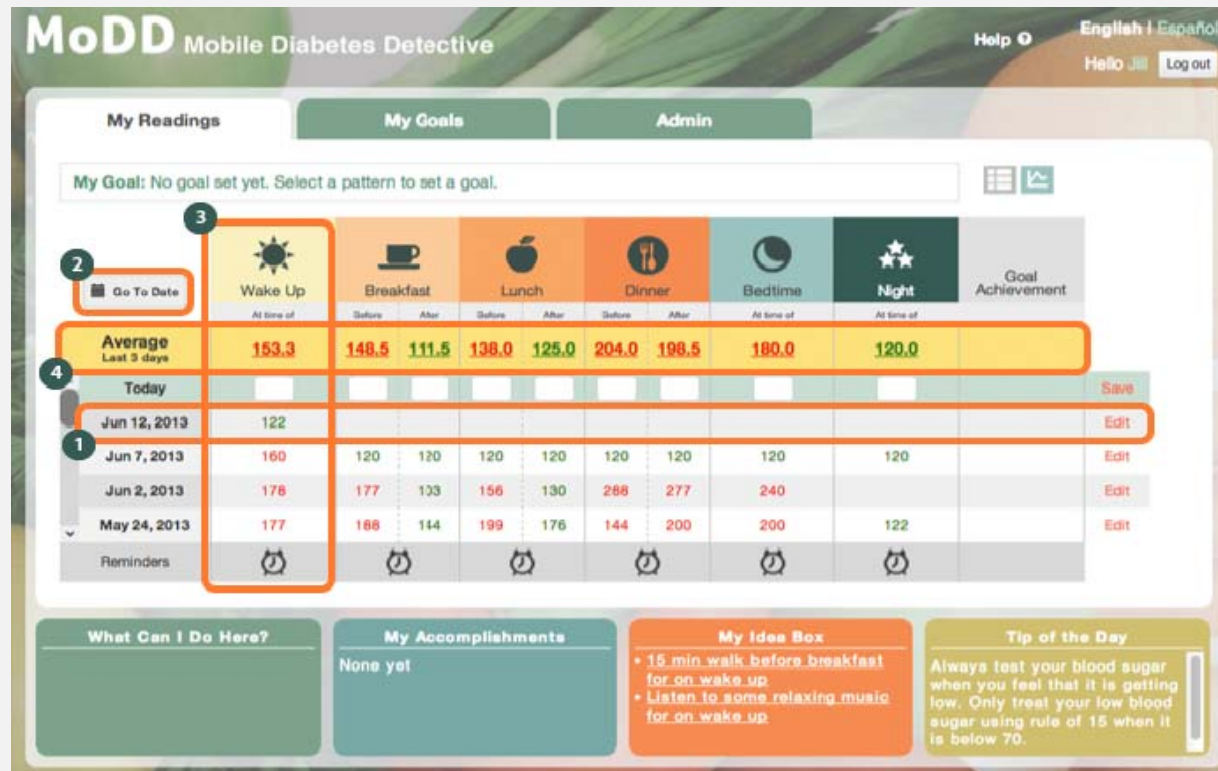
## MoDD PLATFORM

- User enters BG readings into MoDD website, or sends through SMS
- MoDD organizes BG readings and helps user to identify patterns where BG is too high or low
- Engages user in problem solving by:
  1. Identifying Glycemic control pattern (i.e. high upon waking)
  2. Identify potential behavioral trigger (i.e. did not take medication)
  3. Action-oriented goal related to this behavior
  4. Notifications to Implement the change and to monitor it

# IDENTIFY A GLYCEMIC PATTERN



# IDENTIFY PARTICULAR BEHAVIORAL TRIGGER



# ACTION ORIENTED GOAL

The screenshot displays the MoDD Mobile Diabetes Detective app interface. At the top, the app name 'MoDD Mobile Diabetes Detective' is visible on the left, and 'Help', 'English | Español', 'Hello Jill', and 'Log out' are on the right. Below the header, there are three tabs: 'My Readings', 'My Goals', and 'Admin'. The 'My Goals' tab is active, showing a pattern: 'Blood glucose upon waking is too high' and a goal: 'No goal set yet'. The main content area is divided into two columns. The left column has a list of categories: 'Introduction', 'I take herbal remedies', 'No exercise in the morning', 'I have been upset or stressed', and '+ Add your own'. The right column contains text: 'On the day, simple things like walking for 10-15 minutes every morning can make a difference in your blood sugar values during the day. It is okay to start small and walking counts too! Think about ways that you can incorporate a few extra steps into your morning routine. What you can do differently? Here are some things that you can try to make the change. Select one to learn more:'. Below this text is a list of five options, each with a right-pointing arrow: 'Walk every day same time', '15 min walk before breakfast', 'Try new walking routines', 'Walk with a friend', and 'Get off subway early and walk'. A red box highlights this list. To the right of the list, there is a 'My Goal: Try new walking routines' section with the text: 'Introduce some variability into your daily exercise routine. For example, for your morning walk take a different route every day.' Below this is a '+ Save this idea to my idea box' link and a 'Set the goal' button. At the bottom, there are four tabs: 'What Can I Do Here?', 'My Accomplishments', 'My Idea Box', and 'Tip of the Day'. A 'More:' section with numbered buttons (1, 2, 3, 4, 5) is located at the bottom left of the main content area.

# NOTIFICATIONS TO MONITOR AND RE-EVALUATE



## CONCLUSIONS

- Combination of theory-driven and participatory design approaches led to the knowledge base that is theory-driven and patient-centric tools for Diabetes Self-management
- MoDD is a decision-support tool that helps individuals make daily self-management decisions
- Decision support tool development needs to consider:
  - Cultural sensitivity
  - Low literacy
  - Actionable short term goal setting
  - Access to healthy food, health care and diabetes education
- Similar knowledge base tools can be extended to other chronic diseases