Personal Diary and Survey Methodologies for Health and Environmental Data Collection

Paul N. Kizakevich
RTI International

Session 6: Diary surveys that effectively utilize technology to facilitate recordkeeping or recall
Agenda

Example diary collection methodologies

• **PFiLES**
  Real-time exposure-related diaries of activity, location, environment, dietary consumption, and product use

• **Personal Health Monitor (PHM)**
  Daily/weekly PTSD and TBI symptom and risk assessment

• **BreathEasy**
  Daily assessment of asthma triggers, health, and ventilation

New technology

• **Personal Health Intervention Tool**
  Dynamic multiple-instrument data collection and interactions
PFILES - Voice Diary

Headset/Fob

Pocket PC

Activity / Location / Diet Coding

Diary request

Questions

Responses
PFILES - Photo Diary

120° lens
Pocket PC
Image Censoring & Analysis
PFILERES - Daily activities - multilevel menus

- Frequent Activities
  - Caring for Self
  - Eating / Drinking
  - Preparing Food / Drinks
  - Sleeping / Napping / Waking
  - Riding - motor vehicle
  - Using computer
  - Walking
  - Watching TV
  - MORE Activities

- Activity
  - Caring for Self
  - Caring for Other
  - Meals or Snacks
  - Indoor / Outdoor Chores
  - Leisure / Sports Activities
  - Shopping / Obtaining Services
  - Sleeping / Napping / Waking
  - Traveling
  - Work / Education / Training

- Activity
  - Bicycling
  - Boating, fishing, hunting
  - Climbing, spelunking, caving
  - Exercise, aerobics, spa, yoga
  - Hiking
  - Other sports
  - Team sports
  - Walking
  - Other, specify
PFILES – User-specified information

Other – Specify form allows for text, voice, or script data entry
PFILES – Second generation features

Diary Review
- Tap time or entry label to edit
- Tap Add to insert new entry

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tu</td>
<td>11:00A</td>
</tr>
<tr>
<td>Tu</td>
<td>12:00P</td>
</tr>
<tr>
<td>Tu</td>
<td>1:00P</td>
</tr>
<tr>
<td>Tu</td>
<td>2:00P</td>
</tr>
<tr>
<td>Tu</td>
<td>3:00P</td>
</tr>
<tr>
<td>Tu</td>
<td>3:43P</td>
</tr>
<tr>
<td>Tu</td>
<td>4:00P</td>
</tr>
<tr>
<td>Tu</td>
<td>4:34P</td>
</tr>
<tr>
<td>Tu</td>
<td>5:00P</td>
</tr>
<tr>
<td>Tu</td>
<td>5:16P</td>
</tr>
<tr>
<td>Tu</td>
<td>5:19P</td>
</tr>
<tr>
<td>Tu</td>
<td>5:20P</td>
</tr>
<tr>
<td>Tu</td>
<td>5:22P</td>
</tr>
<tr>
<td>Tu</td>
<td>6:00P</td>
</tr>
<tr>
<td>Tu</td>
<td>7:00P</td>
</tr>
</tbody>
</table>

Diet
- Tap a food item to select, then use bulk actions.

- Multigrain (M)
- Butter (S)
- Jam or Jelly (S)
- Coffee (XL)

- Breads, bagel, crackers, roll
- Cereal, oatmeal, granola
- Dairy, milk, cheese
- Danish, muffins, pancakes
- Eggs, any style
- Fruit
- Meat / Eggs / Seafood
- Water, Beverages, and Juices
- All Food and Drinks
Example activity and dietary data

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Time</th>
<th>Food / Beverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00:44</td>
<td>Grooming/Dressing</td>
<td>17:01:43</td>
<td>Tea</td>
</tr>
<tr>
<td>15:24:06</td>
<td>Wash/Dry/Sort/Iron Clothes</td>
<td>18:05:59</td>
<td>Cheese (plain or as part of dish)</td>
</tr>
<tr>
<td>15:25:40</td>
<td>Riding in Motor Vehicle</td>
<td>18:05:59</td>
<td>Crackers, any kind</td>
</tr>
<tr>
<td>15:26:40</td>
<td>Clothes</td>
<td>18:03:02</td>
<td>Beef or veal</td>
</tr>
<tr>
<td>16:42:33</td>
<td>Eating/Drinking</td>
<td>18:03:02</td>
<td>Potatoes, any other</td>
</tr>
<tr>
<td>16:44:44</td>
<td>Picking up/Putting Away Items</td>
<td>18:03:02</td>
<td>Other salad</td>
</tr>
<tr>
<td>18:23:56</td>
<td>Household Paperwork</td>
<td>13:06:20</td>
<td>Nuts (peanuts, etc.)</td>
</tr>
<tr>
<td>18:24:57</td>
<td>Relaxing or Resting</td>
<td>13:06:20</td>
<td>Coffee</td>
</tr>
<tr>
<td>19:38:21</td>
<td>Picking up/Putting Away Items</td>
<td>21:59:52</td>
<td>Tea</td>
</tr>
<tr>
<td>19:39:52</td>
<td>Preparing Food</td>
<td>13:15:03</td>
<td>Banana</td>
</tr>
<tr>
<td>19:40:33</td>
<td>Watching TV</td>
<td>13:15:03</td>
<td>Chicken, turkey or other poultry</td>
</tr>
<tr>
<td>23:14:07</td>
<td>Other Washing</td>
<td>17:51:26</td>
<td>Beans, green</td>
</tr>
<tr>
<td>23:14:38</td>
<td>Sleeping</td>
<td>17:51:26</td>
<td>Potatoes, any other</td>
</tr>
</tbody>
</table>
### Data Entry Burden (median)

Time to complete entry in seconds

<table>
<thead>
<tr>
<th>Act/Loc/Environ</th>
<th>Measured Menu</th>
<th>Perceived Menu</th>
<th>Perceived Voice</th>
<th>Perceived Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Menu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>11</td>
<td>45</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Location</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combustion</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows/doors</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning products</td>
<td>36</td>
<td>60</td>
<td>n/a</td>
<td>60</td>
</tr>
<tr>
<td>Pesticides</td>
<td>131</td>
<td>60</td>
<td>n/a</td>
<td>120</td>
</tr>
</tbody>
</table>

*Burden for each entry of an activity/location and for each product use questionnaire*
PHM - Home and Instrument Menus

Touch-enabled forms and browser buttons facilitate usability.
### PHM - Daily Sleep Quality

#### Sleep Quality

**Last night, how long did it take you to fall asleep?**

- 5 minutes
- 15 minutes
- 30 minutes
- 45 minutes
- 60 minutes
- 2 hours
- Did not sleep

#### Sleep Quality

**Last night, why did you have trouble sleeping? Check all that apply,**

- [ ] Could not fall asleep within 30 minutes
- [ ] Woke up in the middle of the night
- [ ] Got up to use the bathroom
- [ ] Could not breathe comfortably
- [ ] Coughed or snored loudly
- [ ] Felt too cold
- [ ] Felt too hot
- [ ] Had bad dreams
- [ ] Had pain
- [ ] Other reasons

#### Sleep Quality

**Last night, did you take medicine to help you sleep? Check all that apply.**

- [ ] No medicines
- [✓] Prescribed
- [ ] Over the counter

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Object-oriented form attributes facilitate design and presentation.
BreathEasy Android App

- Collects Observations of daily living (ODLs)
- Symptoms
- Rescue and controller medication usage
- Daily reminder
- Automatic data Transmission
- Health related SMS messages
- Weather alerts
Observation Daily Living

- Peak Flow Rate
- Medication use
- Asthma triggers and symptoms
- Emotional measurement
- Activity, Sleeping
- Smoking
BreathEasy Website Dashboard

Designed for clinicians to monitor patient status

Name: Yury / MRN: 9586472 / Birthdate: 2/10/1970 / Study Phone: 18044575228 / Best PEF: 600 / Non-smoker and On Controller Meds

Data Range: All

Observations of Daily Living

- Peakflow
- Controller Meds
- Rescue Meds
- Asthma Triggers
- Physical Activity
- Depression
- Anxiety
- Sleep
- Smoking
- Asthma Symptoms

ODL Chart Legend
- Positive
- Negative
- Peakflow
- No data
- Peakflow Zones
  - 80%-100%
  - 50%-79%
  - < 50%

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Personal Health Intervention Tool

**Goal** – Mobile, personalized, adaptive health management.

**How** –

- Monitor and measure health, behavior, and environment
- Periodically assess health and behavior status
- Plan and schedule interventions and assessments
- Provide interventions, education, exercises, and other activities to improve health, behavior, and social and cognitive support
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PHIT Health Management Model

**Instrumentation System**
- History
- Daily Screen
- PCL-M
- PSQI
- HRV
- Actigraphy
- Cognitive Battery

**Virtual Advisor**
- **Measures, Sub-scores, Scores**
- **Health State Criteria Thresholds**
  - Clinical Alert
  - Subclinical Suspect
  - Normal

**Health State Domains**
- Hyperarousal
- Depression
- Sleep disorder
- Avoidance
- Sociality
- Alcohol use
- Pain

**Activity Manager**
- Seek Medical Care
- Self-Help Prescription Ontology
- Evidence
- Activity Resources
- Self-Help Activity Metrics
- Self-Help Plan
- Activities

**Sub/Obj Measurement**
- **Health Assessment**
- **Activity Planning**