

# Personal Diary and Survey Methodologies for Health and Environmental Data Collection

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*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



Diary request

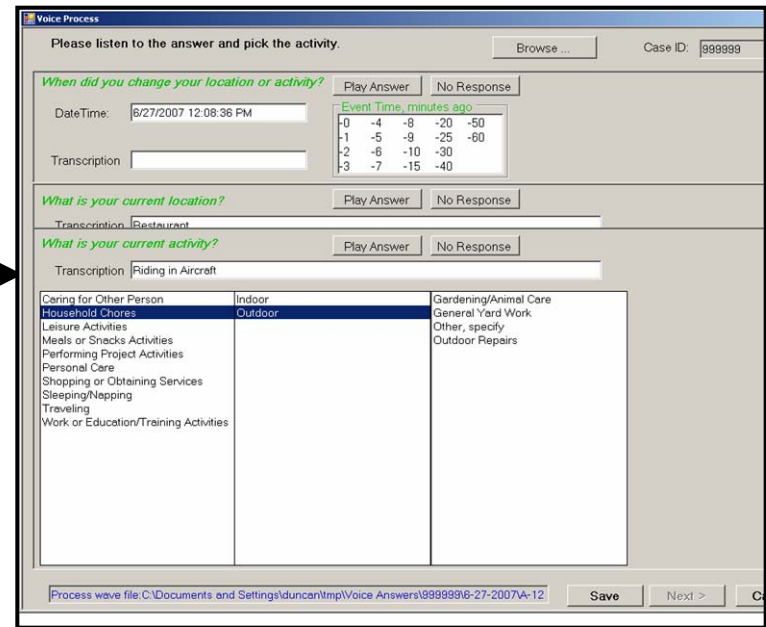
Questions

Responses

## Pocket PC



## Activity / Location / Diet Coding





# PFILES - Photo Diary

120° lens



Pocket PC

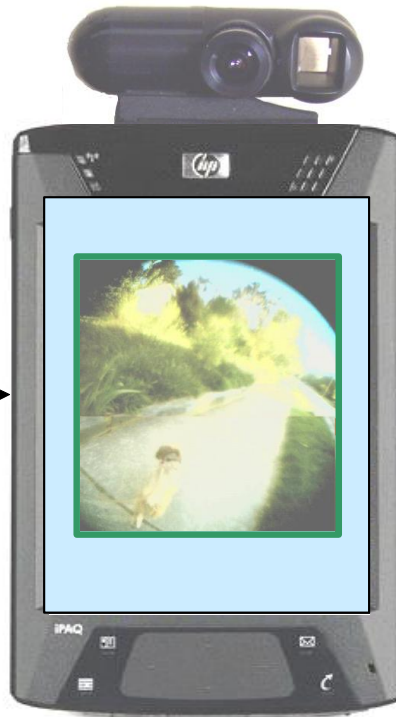
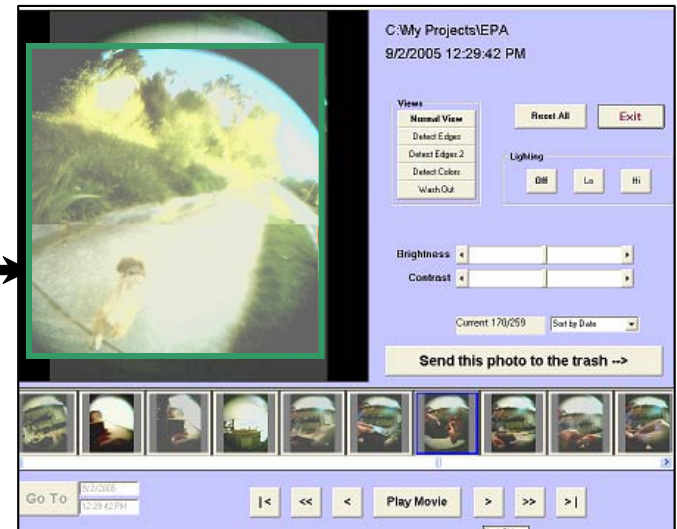
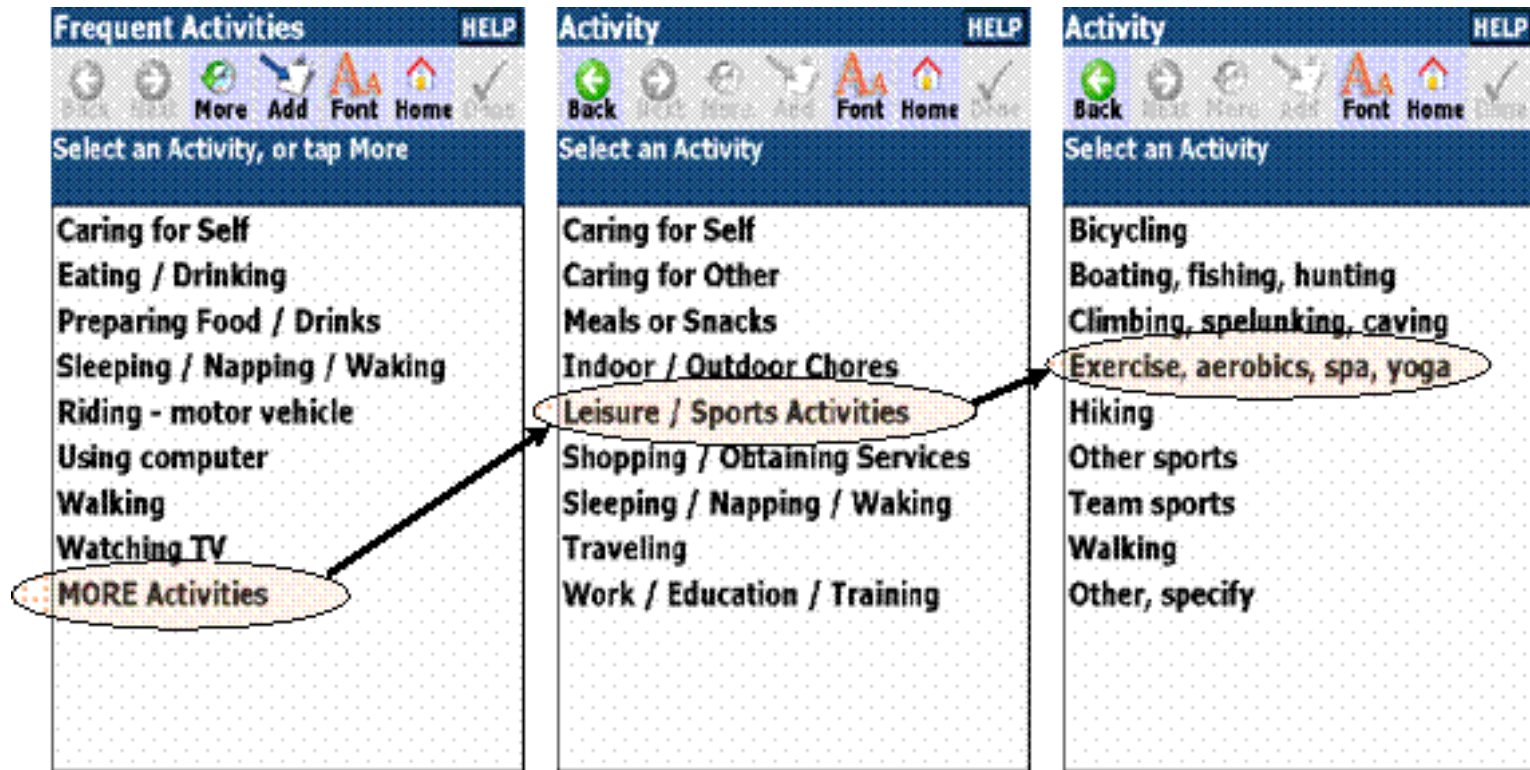


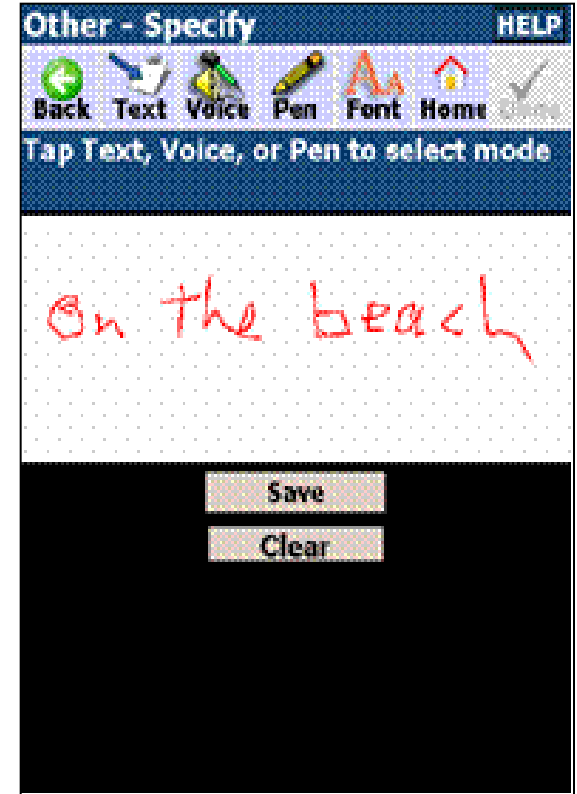
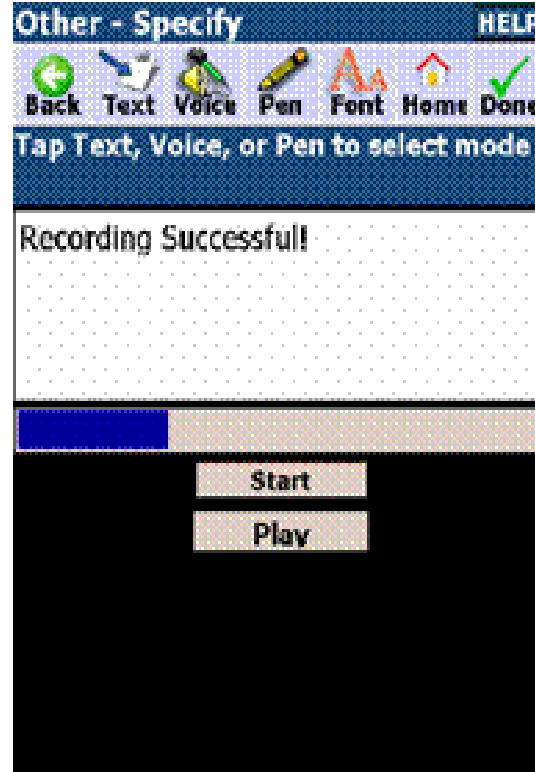
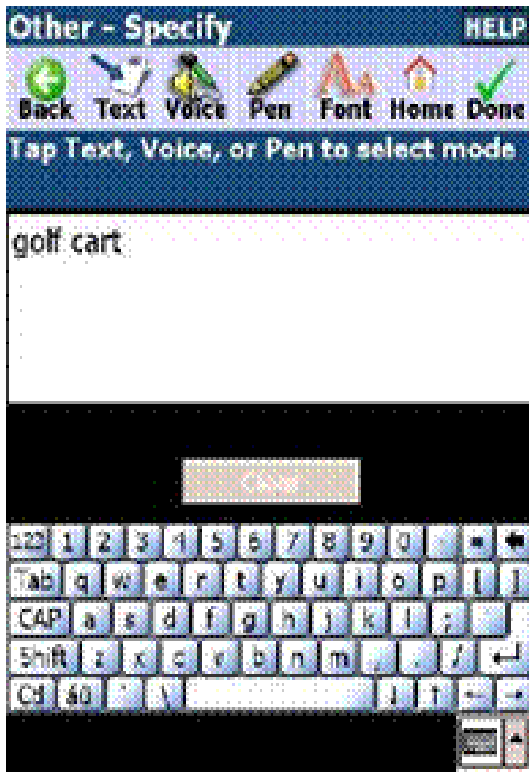
Image Censoring & Analysis



# PFILES - Daily activities - multilevel menus



# PFILES – User-specified information



*Other – Specify form allows for text, voice, or script data entry*



# PFILES – Second generation features

| Diary Review |                              | HELP   |
|--------------|------------------------------|--|
| PgUp         | PgDn                         | Done   |
| LnUp         | LnDn                         | Tap time or entry label to edit<br>Tap Add to insert new entry |
| Tu 11:00A    |                              |  |
| Tu 12:00P    |                              |  |
| Tu 1:00P     |                              |  |
| Tu 2:00P     |                              |  |
| Tu 3:00P     |                              |  |
| Tu 3:43P     | Athletic field or playground |  |
| Tu 4:00P     |                              |  |
| Tu 4:34P     | Athletic field or playground |  |
| Tu 4:35P     | Basketball                   |  |
| Tu 5:00P     |                              |  |
| Tu 5:16P     | Walking                      |  |
| Tu 5:19P     | Parking lot                  |  |
| Tu 5:20P     | Pickup truck                 |  |
| Tu 5:22P     | Riding - motor vehicle       |  |
| Tu 6:00P     |                              |  |
| Tu 7:00P     |                              |  |

| Diet             |      | HELP |
|------------------|------|------|
| Back             | Home | Done |
| 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**

| Diary Review                             |                       | HELP |
|--|-----------------------|------|
| PgUp                                     | PgDn                  | Done |
| Add                                      | Font                  | Zap  |
| Tap a food item to select, then use      |                       |      |
| Delete?                                  |                       |      |
| Remove 'Cranberry juice' from the diary? |                       |      |
| Yes                                      |                       | No   |
| Th 7:50A                                 | Eggs, any style (M)   |      |
| Th 7:50A                                 | Multigrain (M)        |      |
| Th 7:50A                                 | Butter (S)            |      |
| Th 7:50A                                 | Coffee (XL)           |      |
| Th 7:50A                                 | Other Dairy products  |      |
| Th 7:50A                                 | Sugar, syrup, topping |      |
| Th 7:50A                                 | Cranberry juice (L)   |      |
| Th 8:00A                                 |                       |      |

# Example activity and dietary data

| Time     | Activity                      |
|----------|-------------------------------|
| 12:00:44 | Grooming/Dressing             |
| 15:24:06 | Wash/Dry/Sort/Iron Clothes    |
| 15:25:40 | Riding in Motor Vehicle       |
| 15:26:40 | Clothes                       |
| 16:42:33 | Eating/Drinking               |
| 16:44:44 | Picking up/Putting Away Items |
| 18:23:56 | Household Paperwork           |
| 18:24:57 | Relaxing or Resting           |
| 19:38:21 | Picking up/Putting Away Items |
| 19:39:52 | Preparing Food                |
| 19:40:33 | Watching TV                   |
| 23:14:07 | Other Washing                 |
| 23:14:38 | Sleeping                      |

| Time     | Food / Beverage                   |
|----------|-----------------------------------|
| 17:01:43 | Tea                               |
| 18:05:59 | Cheese (plain or as part of dish) |
| 18:05:59 | Crackers, any kind                |
| 18:03:02 | Beef or veal                      |
| 18:03:02 | Potatoes, any other               |
| 18:03:02 | Other salad                       |
| 13:06:20 | Nuts (peanuts, etc.)              |
| 13:06:20 | Coffee                            |
| 21:59:52 | Tea                               |
| 13:15:03 | Banana                            |
| 13:15:03 | Chicken, turkey or other poultry  |
| 17:51:26 | Beans, green                      |
| 17:51:26 | Potatoes, any other               |



# Data Entry Burden (median)

Time to complete entry in seconds

|                          | Measured<br>Menu | Perceived |           |            |
|--------------------------|------------------|-----------|-----------|------------|
|                          |                  | Menu      | Voice     | Paper      |
| <b>Act/Loc/Environ</b>   | <b>28</b>        | <b>45</b> | <b>60</b> | <b>60</b>  |
| ▪ Activity               | 11               |           |           |            |
| ▪ Location               | 9                |           |           |            |
| ▪ Combustion             | 1                |           |           |            |
| ▪ Smoking                | 3                |           |           |            |
| ▪ Windows/doors          | 4                |           |           |            |
| <b>Cleaning products</b> | <b>36</b>        | <b>60</b> | n/a       | <b>60</b>  |
| <b>Pesticides</b>        | <b>131</b>       | <b>60</b> | n/a       | <b>120</b> |

*Burden for each entry of an activity/location and for each product use questionnaire*

# PHM - Home and Instrument Menus

| Home                               |                        |         |
|------------------------------------|------------------------|---------|
| RTI <b>EXIT</b> <b>HELP</b>        |                        |         |
| 7:35 PM, Saturday, August 29, 2009 |                        |         |
| 100 %                              |                        |         |
| <b>Baseline</b>                    |                        |         |
| <b>Health</b>                      |                        |         |
| <b>Stress</b>                      |                        |         |
| <b>Sleep</b>                       |                        |         |
| <b>Activity</b>                    | Riding - motor vehicle | 7:34 PM |
| <b>BrainGame</b>                   |                        |         |
| <b>Beverage</b>                    |                        | 6:40 PM |
| <b>Feedback</b>                    |                        |         |
| BodyPack Status    HR Belt Status  |                        |         |
| Heart Rate Data                    |                        |         |
| Acceleration Data                  |                        |         |
| Room Identification                |                        |         |
| GPS data                           |                        |         |

| Baseline   |  |
|--|--|
| HELP   |  |
|  |  |
| <b>Select Instrument</b>   |  |
| <b>Demographics (Basic)</b><br><b>Demographics (Extended)</b><br><b>Health Issues</b><br><b>Social support</b><br><b>Combat Exposure</b><br><b>Blast Exposure</b><br><b>Concussion Checklist</b><br><b>3 Question DVIC</b> |  |

| Cognition   |  |
|---|--|
| HELP  |  |
|   |  |
| <b>Select Cognitive Exercise</b>  |  |
| <b>Simple Reaction Time</b><br><b>Procedural Reaction Time</b><br><b>Go-NoGo Reaction Time</b><br><b>Mathematical Reaction Time</b><br><b>Matching to Sample</b><br><b>Synthetic Work (SynWork)</b><br><b>Sleep Scale</b><br><b>BrainGame</b> |  |

**Touch-enabled forms and browser buttons facilitate usability.**

# PHM - Daily Sleep Quality

**Sleep Quality** HELP

Back Next More Add Font Home Done

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** HELP

Back Next More Add Font Home Done

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** HELP

Back Next More Add Font Home Done

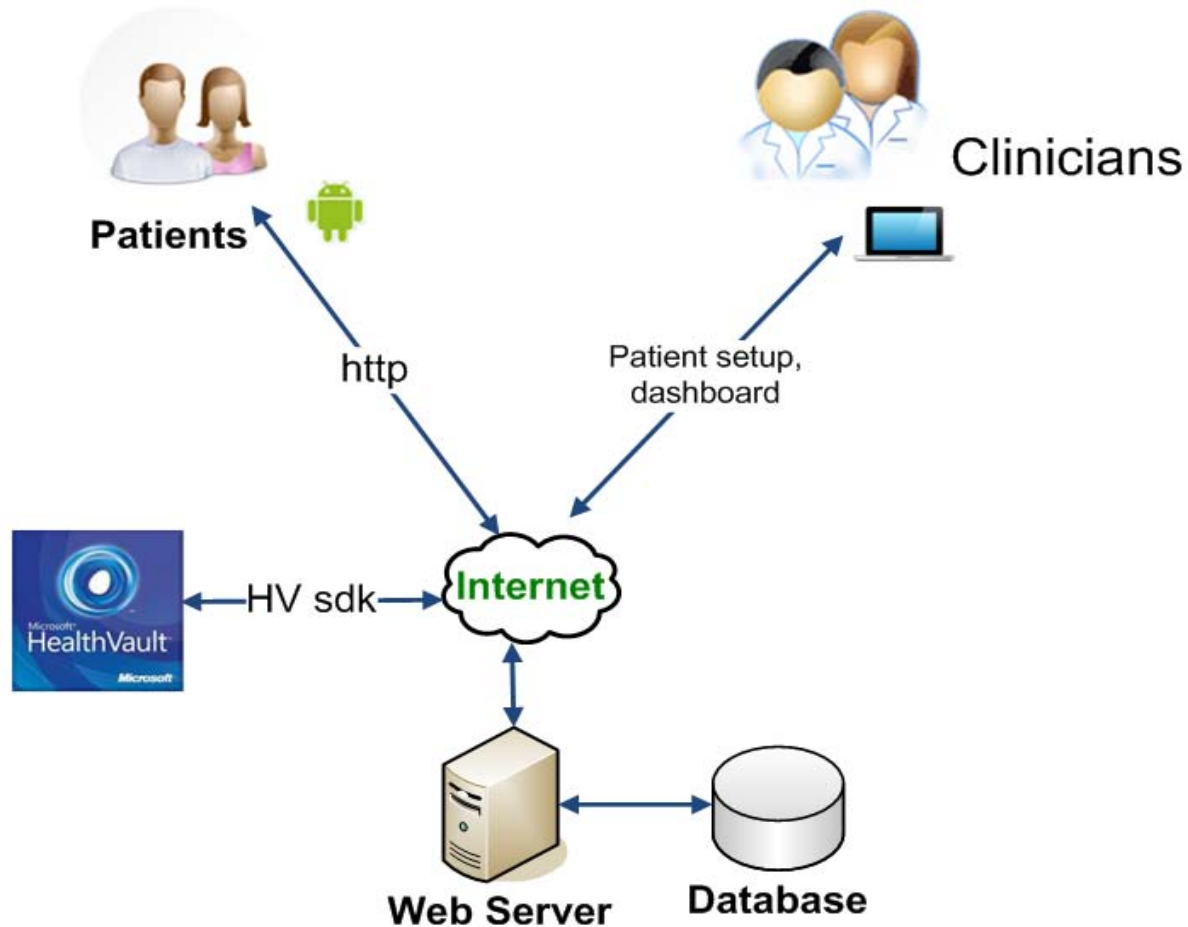
Last night, Did you take medicine to help you sleep? Check all that apply.

No medicines  
 Prescribed  
 Over the counter

Object-oriented form attributes facilitate design and presentation.

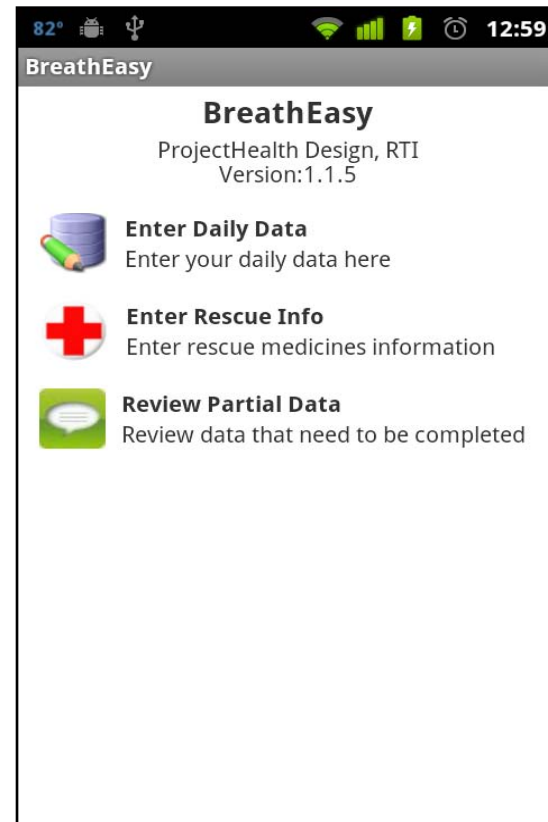


# BreathEasy



# BreathEasy Android App

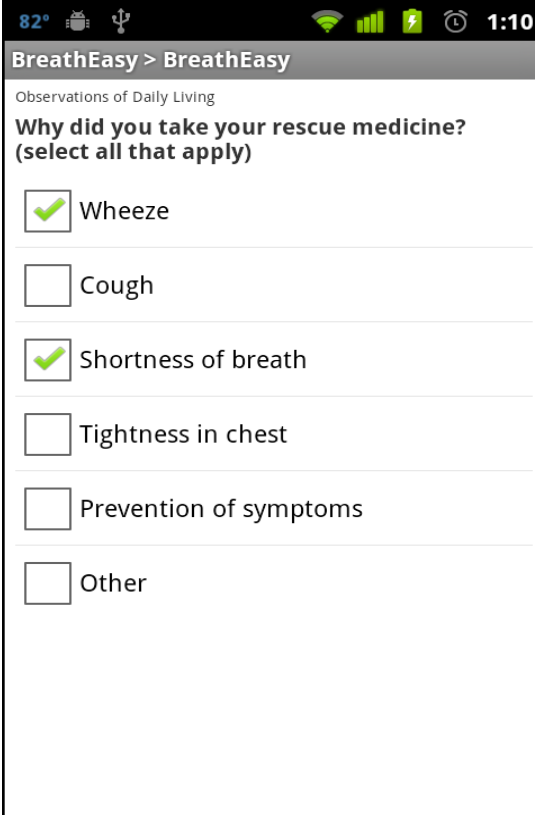
- Collects Observations of daily living (ODLs)
- Symptoms
- Rescue and controller medication usage
- Daily reminder
- Automatic data Transmission
- Health related SMS messages
- Weather alerts









# BreathEasy Android App

## Observation Daily Living

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



82°       1:10

BreathEasy > BreathEasy

Observations of Daily Living

**Why did you take your rescue medicine?**  
(select all that apply)

Wheeze

Cough

Shortness of breath

Tightness in chest

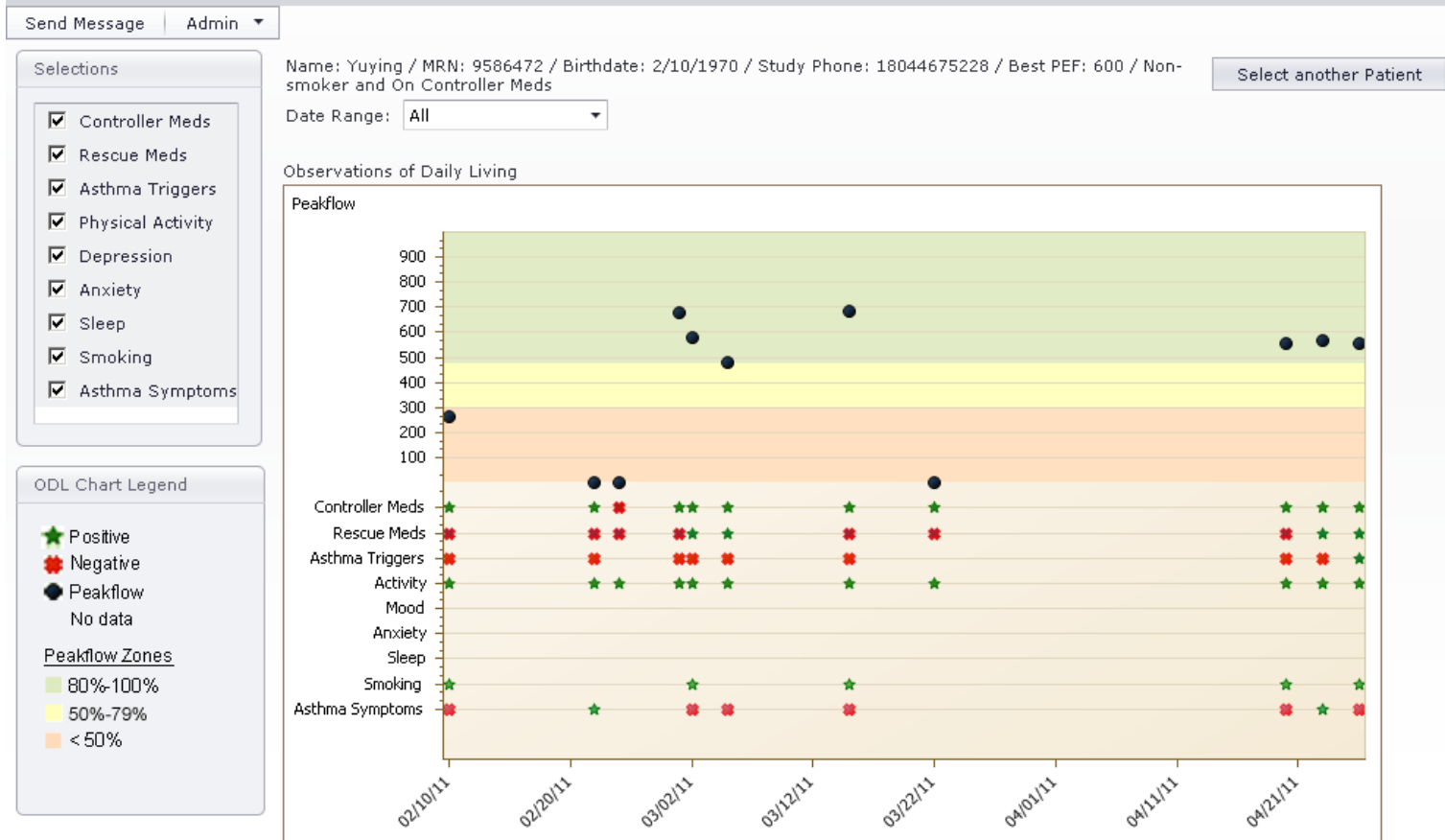
Prevention of symptoms

Other



# BreathEasy Website Dashboard

Designed for clinicians to monitor patient status



# Personal Health Intervention Tool

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

**How** –

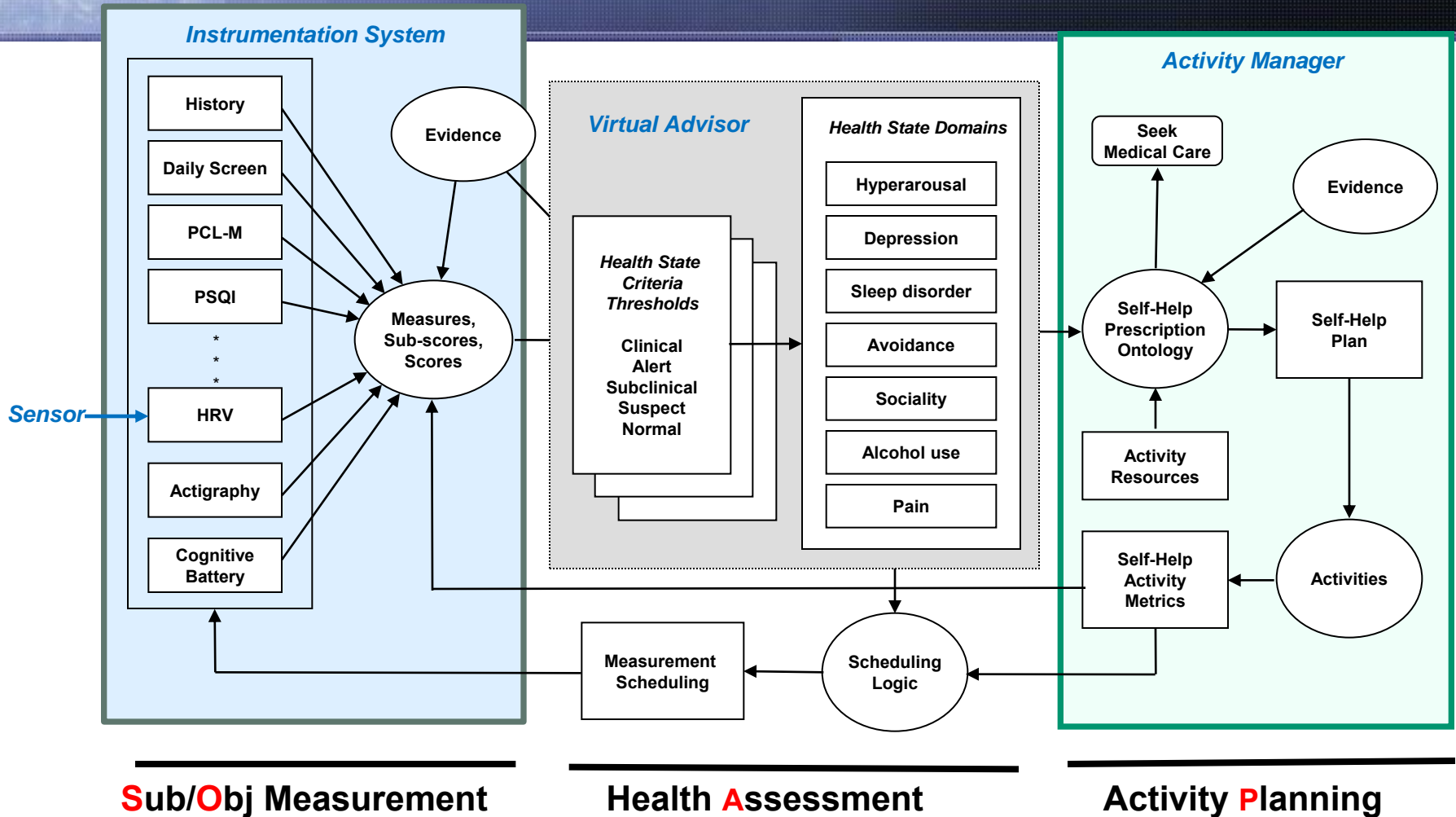
Monitor and measure health, behavior, and environment

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

# PHIT Health Management Model





# PHIT Process & Data Model

