A mobile health application for a chronically ill, low-literacy population

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“To safeguard one's health at the cost of too strict a diet is a tiresome illness indeed.”

-- Francois De La Rochefoucauld
1613-1680, French Classical Writer
Hemodialysis Patients

- Daily Limits:
  - 1 liter water
  - 2 grams sodium
- 80% do not adhere to diet
Hemodialysis Patients

- 1/3 report difficulty with performing conversion calculations
- Urban population: low literacy rates
Hemodialysis Patients

- Paper diaries have 11% compliance rate
- Electronic diaries have up to 94% compliance
DIMA Approach

Dietary Intake Monitoring Application

• Portable device to track nutrition anywhere
• Bar code scanner for easiest input
• Icons for foods without bar codes
• Real-time feedback
Iterative Design Process

• Study #1: Can they physically use PDAs? *(Interact ’05)*
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- Study #2: Can they scan barcodes at home? *(PervasiveHealth ‘06)*
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• Study #2: Can they scan barcodes at home? *(PervasiveHealth '06)*
• Study #3: Voice v.s. scanning *(Chapter in Mobile Health Solutions 2008)*
Iterative Design Process

- Study #1: Can they physically use PDAs? *(Interact ’05)*
- Study #2: Can they scan barcodes at home? *(PervasiveHealth ’06)*
- Study #3: Voice v.s. scanning *(Chapter in Mobile Health 2008)*
- Study #4: Icon interface
  - #4A: Icon choices *(CHI ’06)*
  - #4B: Navigation
Emergent Themes

• Patients often preferred an interface they used incorrectly

Feedback Icons

- .5 liter of 1 L used
- .1 g of 2 g used
Emergent Themes

• Patients often preferred an interface they used incorrectly
  – Fill-up consumption icon only one read correctly by all patients

Feedback Icons

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Emergent Themes

- Patients often preferred an interface they used incorrectly
- Integration into daily routines very important
Emergent Themes

• Patients often preferred an interface they used incorrectly
• Integration into daily routines very important
• Showing off to others
  – Technology is a status symbol
Emergent Themes

- Patients often preferred an interface they used incorrectly.
- Integration into daily routines very important.
- Showing off to others.
- Domain experts didn’t always have it right.
  - Patients lie to their caregivers.
DIMA Prototype

- 6 week pilot study
  - 20 participants using DIMA
  - 20 control participants, tracking physical activity