Accessible Home Vitals Signs Monitoring System

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Outline

• Background Information
• Clients
• Similar Devices
• Accessible Home Vital Signs Monitoring System
• Budget
• Conclusion
RERC on AMI National Student Design Competition

• Rehabilitation Engineering Research Center on Accessible Medical Instrumentation
• Open to biomedical engineering, industrial design, and related programs
• Up to $2000 reimbursement for design costs
Home Health Care

- About 7.6 million individuals receive home care in the United States
- 69.1% 65 years or older
- Not only cost effective but also a humane and supportive way to deliver health care
- 23.4% use medical devices
Clients

- Mat
  - Good physical condition, blind, small stroke
- Sani
  - Head injury, partially paralyzed on right side
- Dolores
  - Deaf, severe arthritis, heart problems
Accessibility Objectives

• Device must be usable by the vision and hearing-impaired
• Require little force and little fine motor control
• Easy to operate for all ages and abilities
• Unobtrusive appearance
Current Models

**Welch Allyn Vital Signs Monitor**
*300 Series*

**Specifications**
- 10” by 6” by 6.6”
- 5.4 lbs
- Approximate Cost: $3000

**DRE Philips SureSigns VS1 Vital Sign Monitor**

**Specifications**
- 9.4” by 9.8” by 9.3”
- 8 lbs
- Approximate Cost: $2000
Current Model Lackings

- Unable to store vital signs off of device
- Vital signs transmitted via phone line (3rd party)
- No auditory output
- Designed primarily for use by health care professionals
- Buttons not fully accessible
Accessible Home Vital Signs Monitoring System Overview

- Measure four vital signs: heart rate, blood oxygen saturation, blood pressure, and body temperature
- Save measurements to USB flashdrive
- Transmit vital signs to health care provider via a secure website
Accessible Home Vital Signs Monitor

- Large well-lit LCD screen
- Raised buttons with Braille or universal symbol
- Handle for portability
- Speaker for auditory output and prompts
- Alarm on top
Accessible Home Vital Signs Monitor

- Instrument ports
- On/Off button
- USB port
Accessible Home Vital Signs Monitor

- Power cable
- Bag to hold instruments
Secure Web Site

- Maximizes patient privacy
- Allows patients to transmit vital signs from any internet connected PC
- Removes 3rd party from monitoring system
Budget

- To the right is a table showing the expected cost to construct the device.

- Expected total cost of the prototype is $700 which is 35% of our $2000 total budget.

<table>
<thead>
<tr>
<th>Product</th>
<th>Cost</th>
<th>Supplier</th>
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</thead>
<tbody>
<tr>
<td>Plastic Casing</td>
<td>$30</td>
<td>Mouser</td>
</tr>
<tr>
<td>Microprocessor</td>
<td>$69</td>
<td>Mouser</td>
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<tr>
<td>Circuit Board</td>
<td>$204</td>
<td>PCBexpress</td>
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<tr>
<td>Power Cord</td>
<td>$3</td>
<td>Mouser</td>
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<tr>
<td>Rechargable Batteries</td>
<td>$13</td>
<td>Amazon</td>
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<tr>
<td>LCD Screens</td>
<td>$7</td>
<td>Mouser</td>
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<tr>
<td>Electrical Components</td>
<td>$40</td>
<td>Newark in One</td>
</tr>
<tr>
<td>USB Port</td>
<td>$7</td>
<td>Newark in One</td>
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<tr>
<td>Buttons</td>
<td>$6</td>
<td>Happcontrols</td>
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<tr>
<td>Computer Software (Security)</td>
<td>$30</td>
<td>TagLock Pro.</td>
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<tr>
<td>Alarm</td>
<td>$15</td>
<td>Epill</td>
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<td>Transducers (BP Cuff, thermometer, SpO2 probe)</td>
<td>$200</td>
<td>DREMEd</td>
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<tr>
<td>USB Flashdrive</td>
<td>$60</td>
<td>SanDisk</td>
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<td>Speaker</td>
<td>$16</td>
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<td><strong>Total:</strong></td>
<td><strong>$700</strong></td>
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Conclusion

• Current products are very expensive so our main aim is to design an affordable device

• The device must meet the needs of our clients

• The device and computer system will be very easy for anyone to use

• With our design, we plan to increase our clients’ quality of life while continuing to closely monitor their health
References
