Use of Internet-Based Technology for Remote Patient Monitoring

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The Continuum of Care
An Internet-based technology platform
Patient Interfaces – Is there a market?

- 90% of patients search the internet for information on symptoms and treatment
- 80% of patients want to monitor their health even when they are well
- 78% of patients over the age of 65 will use the Internet for information on symptoms and treatment
- 69% of patients want to see the results from their home monitoring activities

Published: Accenture, Home Healthcare Electronics: Consumers Are Ready, Willing, and Able. Rousel, Nunes, Spring 2002
Patient Interfaces

- Structured data collection is the key to any successful remote patient management system, independent of which technology implemented.

- Patients require non-intrusive, easy to use collection methods.

- Technology must adapt to the PATIENT in the form of SOLUTIONS.
Health Buddy® Appliance

- Simple to install, set up, and use
- Collects structured data
- Fits into the chronically ill patient’s lifestyle
- Promotes extremely high compliance
- Stresses education and behavior modification

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Health Buddy® Web

- Intended for web-savvy patients
- Allows the patient to report information to professionals as well as self-monitor and educate
- Enhances the user experience through graphics, text, and other information

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You are now Viewing Your Daily Results. These are the actual results to questions answered by you on the specified date.

Got a question about Viewing Your Daily Results? Ask the Nurse below!

You can go forward and back a day using the arrows on both the right and left side of the left arrow bar.

To view another category for this day, click on the arrows on the left side through your results for General, Behavior, Symptoms and Treatments.

Last night, did you need to increase the number of pillows you slept on or experience any trouble breathing?

Yes  No

Got a question about Taking Your Health Buddy Survey? Ask the Nurse below!

You will be asked a series of questions. Each category has been selected and used by your care provider to chart your progress and may help with your treatment.

Last night, did you need to increase the number of pillows you slept on or experience any trouble breathing?

You are now Viewing Your Trend Charts. These charts are created from the results of questions you’ve answered over time.

Using the trend charts, you can chart your progress over a period of time. Using weight for example, you can see how your weight has varied within the time span you’ve specified.

Got a question about Viewing Your Trend Charts? Ask the Nurse below!

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Causes, incidence, and risk factors:

To understand diabetes, first consider the normal process of food metabolism. Several things happen when food is digested:

- A sugar called glucose enters the bloodstream. Glucose is a source of fuel for the body.
- An organ called the pancreas makes insulin. The role of insulin is to move glucose from...
• 81% of survey respondents see the benefit of monitoring the condition of a family member or friend

• 30% of survey respondents currently monitor the condition of a family member or friend

• 60% of respondents have elderly parents with chronic disease that are not living with them

Published: Accenture, Home Healthcare Electronics: Consumers Are Ready, Willing, and Able. Rousel, Nunes, Spring 2002
Family CareGiver - Overview

Welcome back, Craig
Your mother has been very compliant over the last 30 days, answering 29 of 30 surveys!

Anita has shown an increase in her **weight** every day for the last 3 days. As you know, this is unhealthy for a **heart failure** patient. You may want to get in touch with Anita today.

Anita is reporting that she’s using less **salt** with her meals. You can read more about why this behavior is important in the Health Information center.

<table>
<thead>
<tr>
<th>Date</th>
<th>Symptoms</th>
<th>Behavior</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/1/2003</td>
<td>Needs review</td>
<td>Minor issue</td>
<td>Good job!</td>
</tr>
<tr>
<td>4/30/2003</td>
<td>Good job!</td>
<td>Needs review</td>
<td>Good job!</td>
</tr>
<tr>
<td>4/28/2003</td>
<td>Good job!</td>
<td>Minor issue</td>
<td>Good job!</td>
</tr>
<tr>
<td>4/28/2003</td>
<td>Good job!</td>
<td>Minor issue</td>
<td>Good job!</td>
</tr>
<tr>
<td>4/27/2003</td>
<td><strong>- NO SURVEY TAKEN -</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**More Information on...**
**Heart Failure**

Heart failure, also called “congestive heart failure,” is a disorder where the heart takes it’s ability to pump blood efficiently. The result is that the body doesn’t get as much oxygen and nutrients as it needs, leading to problems like fatigue and shortness of breath.

Heart failure is almost always a chronic, long-term condition that is managed with medications and lifestyle changes. (Although it can sometimes develop suddenly.) The most common causes for heart failure are hypertension and coronary artery disease. The term “heart failure” should not be confused with cardiac arrest, which is when the heart actually stops beating.

**Symptoms**

- Shortness of breath
- Fatigue

**Prevention**

- Healthy diet
- Regular exercise
- Avoid smoking

**Signs and tests**

- Electrocardiogram
- Chest X-ray

**Treatment**

- Medications
- Lifestyle changes

**Expectations (prognosis)**

- Depends on severity

**Intuitive, consumer focused design gives family caregiver easy access to information and tools to understand it**

**Summary gives a quick overview of key aspects of the patient’s condition**

**Content stresses education and behavior modification**
Family CareGiver – Survey Review

You are now viewing Anita Turner’s results.
You can go forward or back a day using the arrows on either side of the data below. Clicking on the right arrow will move you forward a day, the left arrow will move you back a day.

<table>
<thead>
<tr>
<th>FEBRUARY 18, 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>QUESTION</strong></td>
</tr>
<tr>
<td>Welcome back, Anita! Thank you for using the Health Buddy. Begin whenever you are ready.</td>
</tr>
<tr>
<td>Good job! Did you weigh yourself today?</td>
</tr>
<tr>
<td>What is your weight today? (Use the arrows to indicate weight)</td>
</tr>
<tr>
<td>Needs review</td>
</tr>
<tr>
<td>Needs review</td>
</tr>
<tr>
<td>Needs review</td>
</tr>
<tr>
<td>Needs review</td>
</tr>
</tbody>
</table>

- Data presented in a simple, non-clinical manner
- Results are presented with follow-up indicators, not risk levels
- Info icon promotes learning for the patient and provider

www.healthhero.com
You are now viewing Anita Turner's result.

You can go forward or back a day using the arrow buttons. The left arrow will move you forward a day, the left arrow will move you backward a day.

FEBRUARY 18, 2003

QUESTION
Welcome back, Anita! Thank you for using iCare Buddy. Begin whenever you are ready.

Good job!

Did you weigh yourself today?

What is your weight today? (Use the arrows to weight)

Needs review
This is higher than your usual weight. This may be a sign that your body is retaining fluid. One way to reduce fluid retention is eating foods that contain too much salt.

Remember to limit your salt intake and follow the instructions as prescribed by your doctor. Also, try to eat every day, at the same time, wearing the same clothes.

Needs review
Did you wake up because of shortness of breath?

Waking up with shortness of breath at night can be a symptom of heart failure getting worse. Medical problems:

Symptoms
Prevention
Signs and tests
Treatment
Expectations (prognosis)
Complications

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Family CareGiver – Chart Data

You are now viewing Anita Turner’s health charts. These charts are created from the results of questions Anita Turner has answered over time.

**Graphical representation of results**

**Color-coded indicators for easy to read, “one-look” interface**
Care Continuum - Professional

Patient
Family Caregiver
Care Manager/Nurse
Physician
Pharmacist
• Inherently, professional interfaces provide tools for analyzing collected data, and where appropriate, indicate opportunity for professional intervention.

• Professional interfaces for analyzing data must fit into existing workflow, or enhance the provider workflow significantly.

• Professional interfaces must use existing standards for data definition and interchange.

• Professional interfaces must use these standards to promote secure and HIPAA-compliant data exchange.
• HIPAA-compliant population management tool
• Adaptable to any disease state
• Facilitates monitoring and management of patient
• Fully audited review tools within the clinical information system
• Email style inbox for patient results, escalations, and other workflow tasks

• Built-in, customizable workflow tools

• Configurable to clinical standing orders or operating procedures

• Can be integrated into existing care management systems

www.healthhero.com
CoPilot™ - Diabetes Monitoring by TheraSense

- Provides secure online data access and clinical reporting

- Clinically specific, alternate view on data collected using remote patient monitoring technology
## Improves Productivity/Efficiency

<table>
<thead>
<tr>
<th>Measure</th>
<th>Traditional</th>
<th>Health Hero</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients Managed Per Care Manager (n)</td>
<td>133</td>
<td>133</td>
</tr>
<tr>
<td>Average # Calls/Day</td>
<td>27 (based on 1/wk/pt)</td>
<td>10</td>
</tr>
<tr>
<td>Average Length of Out Bound Call</td>
<td>20 min</td>
<td>2 min 41 sec</td>
</tr>
<tr>
<td>Total Time / Day for CM</td>
<td>9 hours</td>
<td>53 min</td>
</tr>
<tr>
<td>Estimated Nurse:Patient Ratio</td>
<td>1:100</td>
<td>1:500</td>
</tr>
<tr>
<td>Frequency of Monitoring</td>
<td>WEEKLY</td>
<td>DAILY</td>
</tr>
</tbody>
</table>

[Health Hero Network](www.healthhero.com)
Disease Management Programs

- Congestive Heart Failure
- Coronary Artery Disease
- Co-Morbid Congestive Heart Failure/Diabetes
- Co-Morbid Hypertension/Chronic Obstructive Pulmonary
- Hypertension
- COPD
- Diabetes
- Co-Morbid Diabetes/Hypertension
- Co-Morbid CAD/Angina
- Pediatric Asthma
- Adult Asthma
- Depression
- Bi-Polar Disorder
- Senior Wellness
- Cystic Fibrosis
The Question – Does it work?

Success measurements for Remote Patient monitoring technology must consider:

- Clinical Effect
- Financial Effect
- Patient Satisfaction
- Provider Satisfaction
Veterans Demonstration

- Veterans Health Administration Community Care Coordination Service, Florida
- Telemedicine-based care coordination demonstration project
- 791 chronically ill veterans enrolled for 1 year, compared to comparison group data
- Elderly, high-risk, high-cost veterans with hypertension, heart failure, COPD, and diabetes
Mercy Health System in Laredo, Texas

Home-based telemedicine program for uninsured, high-risk, underserved population with diabetes and heart failure

One year study period using comparative cohort data from previous calendar year

Total of 169 patients - 130 females and 39 males with average age of 53 years in both genders (diabetes); 57 heart failure patients
Veterans Results

- 40% reduction in emergency room visits
- 63% reduction in hospital admissions
- 60% reduction in hospital bed days of care
- 64% reduction in nursing home admissions
- 88% reduction in nursing home bed days of care
- Significant improvement in Quality of Life SF36V
- Published in Disease Management, Volume 5, Number 2, 2002
Mercy Laredo Diabetes Results

• Inpatient admissions reduced 32% (p < 0.07)

• Emergency room encounters reduced 34% (p < 0.06)

• Outpatient visits reduced 49% (p < 0.001)

• Published in Diabetes Technology & Therapeutics Journal, December 2002
Medication Compliance Before and After Health Buddy

Medication Compliance
(Figure 3)

Before Health Buddy: 34%
After Health Buddy: 94%

Graphs show percentage of patients who take medication regularly

www.healthhero.com
Mercy Health Center

Reduced charges by $13,159 PPPY, compared to standard care program

Total Costs per Member per Year
CHF-Related Causes

<table>
<thead>
<tr>
<th>Total CHF-Related Costs PPPY ($)</th>
<th>Standard Care</th>
<th>Health Hero</th>
</tr>
</thead>
<tbody>
<tr>
<td>$25,013</td>
<td>$11,854</td>
<td></td>
</tr>
</tbody>
</table>

www.healthhero.com
Most Patients had no difficulty using the Health Buddy® to answer daily questions.

97% had no difficulty using Health Buddy® to answer daily questions.

3% had difficulty using Health Buddy® to answer daily questions.
Patient Satisfaction

Over time patients feel more connected to their doctors, nurses and the hospital.

(Figure 2)
• 90% of providers reported that communication between themselves and the care coordinators was timely and appropriate

• 92% of providers believed the program was beneficial to their patients

• 95% of providers would refer patients to the program

• Published in: Telemedicine Journal and e-Health, Volume 9, Number 1, 2003
How do you feel today?

Great  OK  Poor

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