



# Digital Home Health—A Primer

## A Parks Associates White Paper

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Authored by: Harry Wang  
Published by Parks Associates  
© June 2006 Parks Associates  
Dallas, Texas 75230

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Printed in the United States of America.

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## **1.0 Digital Home Health: Overview**

### **1.1 Defining Digital Home Health**

Home healthcare enters a new stage in the digital age. Previous care delivery models included paid nurse visits, traditional phone-based telemedicine applications, and assisted living/nursing home care, each with its own problems. Traditional telemedicine has been marketed as a substitute for the other two models but with mixed results. The models using home visits by registered nurses and nursing home care have been challenged by factors such as a nationwide shortage of experienced nurses and varying and uncertain reimbursement policies in both private health plans and public sources.

But technological advances are making over the home healthcare industry. Networking technologies and expanded capabilities in telecom infrastructure support faster, more reliable, and more connected care delivery to the home. The Internet opens a new and more efficient communication channel between patients and clinicians. Digital technology has produced new medical devices such as networked glucose readers, digital thermometers, and stethoscopes as well as innovative applications such as motion sensors and video-conferencing tools. Finally, better, faster computers enable patients to communicate with caregivers, acquire medical knowledge, and share advice with one another.

In our view, the future digital home health model involves improved telemedicine applications, new geriatric care tools, and pervasive e-health services, all integrated with care providers' informatics infrastructure so that consumers can receive high-quality care at a lower cost. This model elevates consumers to a more visible role, and they will take the initiative to self-monitor their chronic conditions, self-diagnose symptoms, acquire disease information and wellness knowledge, and actively seek caregivers' assistance in care management and clinical intervention. The home will be as important a healthcare facility as physician offices, clinics, and hospitals.

This model will not take off if payors do not support it with appropriate reimbursement policies, if caregivers are not sufficiently mobilized, or if device manufacturers or service providers do not offer easy-to-use and cost-effective solutions. All stakeholders must be mobilized to make this model work.

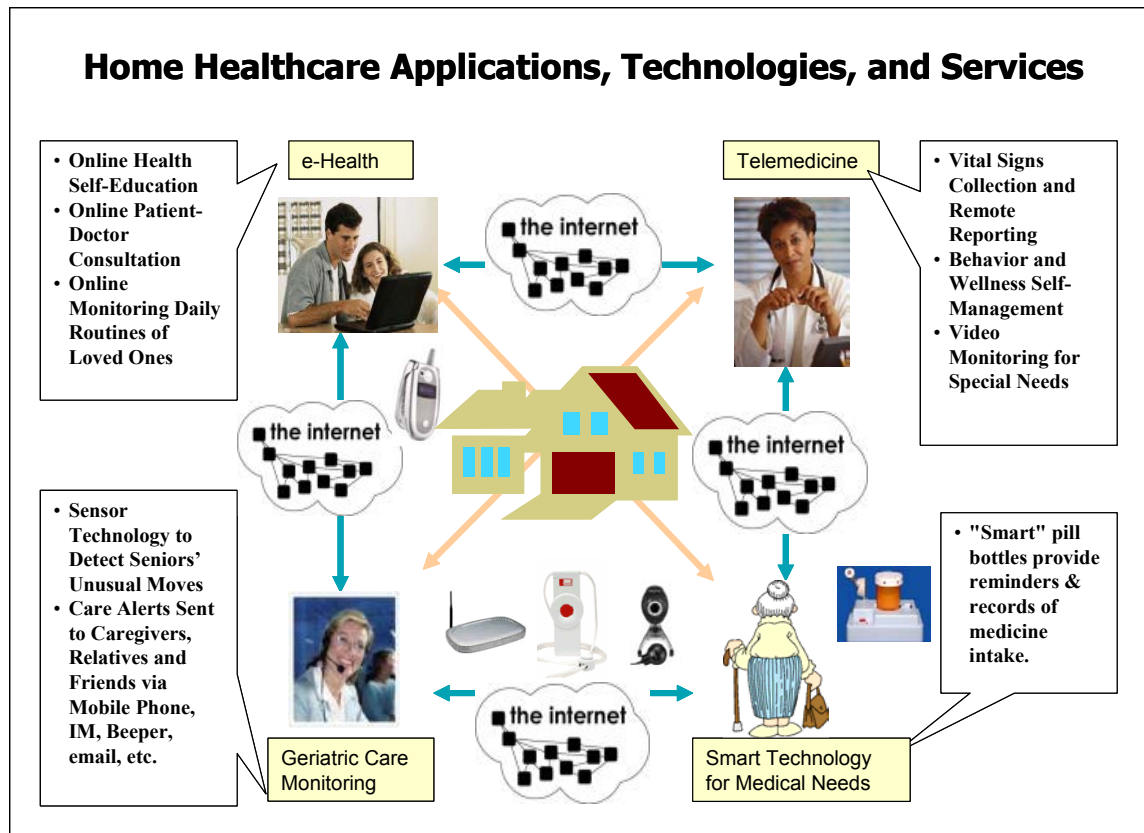


Figure 1: An Ecosystem for Home Healthcare Management

## 1.2 Key Applications and Services

### Remote Monitoring

At the core of digital home health are telemedicine applications offered by companies that have pioneered in this segment, including HomMed, AMD Telemedicine, and American Telecare, and emerging players such as Health Hero, Cardiocom, and Viterion Healthcare. These vendors provide both hardware and software for consumers and clinicians and offer options for service delivery in the forms of service hosting, product licensing, or ASP<sup>1</sup>.

Consumers usually receive a medical device kit that includes a hub-like appliance and peripheral devices (Figure 2). These peripherals can be connected to the hub appliance through a USB port and, in the future, wirelessly. Vital sign readings are transmitted to the hub, which in turn

<sup>1</sup> The service hosting model refers to selling or leasing the hardware and software and hosting the service on caregivers' or vendors' servers. Product licensing is selling the hardware and software directly to caregivers in the perpetual license form, with vendors responsible for maintenance and upgrade. The ASP model is different from the other two in that caregivers do not own the hardware or software; instead, vendors sell access to applications and services to caregivers on a per-user, per-month basis. Applications are usually hosted at vendors' centralized servers, with caregivers accessing them either through the Internet or a dedicated line.

transfers the data through either a normal phone line or a broadband connection to the vendor’s server or servers. The server then re-routes the data to the caregiver’s desktop, where doctors and nurses use support software to chart, trend, and interpret data. The hub appliance at the home also serves as an information-gathering device that can be programmed remotely to ask health-related questions based on clinically approved branching logics for different disease states. These data are usually sent together with vital signs to caregivers.

<b>Illness Categories</b>	<b>Device or Peripherals</b>
Cardiology, such as hypertension, CHF and stroke	Blood pressure monitor, weight scale, digital electronic stethoscope
Respiratory disease, such as asthma and COPD	Peak flow meter, monitor, weight scale, digital stethoscope, digital spirometer
Diabetes and wellness	Blood glucose monitor, weight scale
Post-acute recovery, such as wound care, post-surgical, and post organ transplant	Video camera or other image-capturing devices
Mental health, such as chronic depression and schizophrenia	Video camera for live interactive sessions

**Figure 2: Examples of Monitoring Devices and Their Applications**

### **Geriatric Care Monitoring**

As a supplement to medical condition monitoring, geriatric care applications usually help the elderly, who are often fragile but prefer living by themselves, to enjoy a better and safer life at home and bring peace of mind to their children, relatives, or close friends. These applications involve the use of either simple emergency response systems or more advanced motion-detection sensor technology. Sensors can be strategically installed in kitchens, bathrooms, bedrooms, living rooms, and even on patio decks, where they collect behavior data passively and send them to a base station in the home through wireless technologies (Wi-Fi, Infrared, or IEEE 802.15.4). The base station in turn sends the data through POTS (Plain Old Telephone Service) or a broadband connection to data centers managed by service providers. Unusual movement (a fall in a bathtub, for example) or abnormal behavior patterns (e.g., grandma usually gets up at 7 a.m., but she is still in bed at 10 a.m.) will alert the staff, who will report to the person’s doctors or relatives via phone, beeper, text message, or instant messenger. Living Independently and HealthSense currently provide these services, and a San Francisco-based start-up called Lusora will introduce its products and services in early 2006.

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**Secure Web Messaging and e-Visits**

Consumer familiarity with the Internet and e-mail opens the door for more efficient communication with doctors and nurses and for novel healthcare solutions. Many people want, instead of calling a physician's office and waiting on hold or for a callback, a more efficient channel for patient-doctor communication for their non-urgent medical conditions or administrative issues (changing a schedule, clarifying prescriptions, etc.). Simply e-mailing questions or requests to caregivers raises eyebrows because a commercial e-mail service does not have built-in identity-verification mechanisms. Companies like Relay Health and Medem Inc. have created a new model offering a secure Web messaging service that features encrypted account setup for consumers and clinicians, encrypted message delivery, and restrictive access by authorized personnel at the provider's side. Account holders are alerted by e-mail or instant messenger if their doctor replies to their inquiries.

A more advanced form of communication involves online health consultation, or e-visits, between doctors and patients. In a typical session, patients ask their physicians a series of questions about their health conditions, describe symptoms and medication history, and seek medical assistance. The doctor will decide whether the patient's symptoms warrant an office visit, and the patient usually can determine whether he or she is sick enough to visit the doctor's office. Online consultation saves time, and patients often have longer sessions with their doctors online than in the office. The major disadvantage to this approach is the lack of measurable vital sign data to aid a physician's diagnosis and judgment. Nor does the doctor have the opportunity to observe a patient's complexion and movement for cues.

**Online Self-education and Community Services and Innovative New Products**

Aided by the open nature of the Internet, consumers began adopting online health content services during the Internet boom in the late 1990s. These services are usually provided by commercial vendors such as WebMD or by physician groups and health plans to promote consumer self-education. Many Websites also feature bulletin boards, blog spaces, and expert chat sessions to meet consumers' need for medical knowledge.

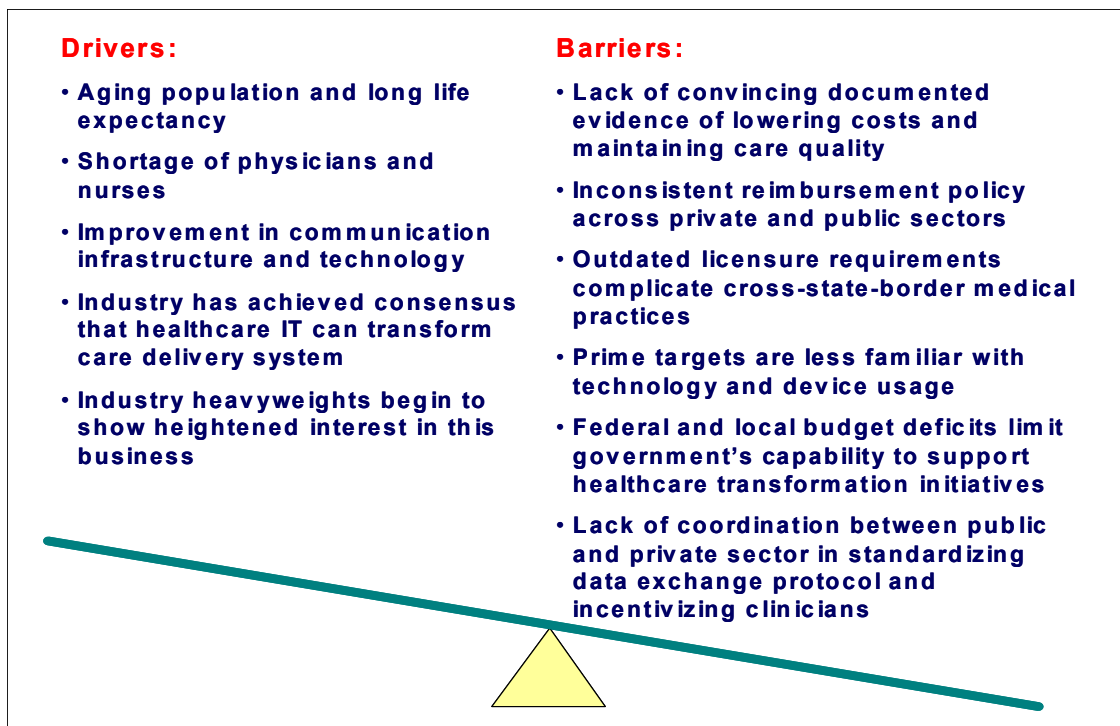
Innovations in the personal care products stand to benefit seniors in making their lives easier and simpler. Electronic reminders, blood pressure watches, and talking pill bottles are examples of these innovations.



### 1.3 Summary of Market Drivers and Adoption Barriers

Figure 3 lists the most important market drivers and barriers for the digital home health industry. Overall, demographic trends paint a promising long-term picture of the industry, but current reimbursement barriers and complicated regulations and policy issues such as funding and licensure outweigh the near-term growth drivers of the industry.

We highlight “lack of convincing clinical and financial benefits” as the most critical barrier for the industry in the near term. It is the direct cause of reimbursement resistance from government/private sectors and can be attributed to clinicians’ hesitance to encourage use of home care services. The industry did produce consumer/provider testimonies and small-scale study results in the past, but these efforts are too little and too immaterial to change insurers’ stance from passive to proactive. Because of the emerging nature of this industry, many small companies have the expertise but not the financial resources to sponsor large-scale studies. We believe that, going forward, as large industry leaders further their commitment to this industry, efforts to prove its clinical and financial advantages over the traditional care delivery model should take the priority. Otherwise, the present situation is unlikely to reverse.



**Figure 3: Summary of Market Drivers and Barriers**

## **2.0 Roadmap for the Future**

### **2.1 New Care Delivery Models**

The traditional care delivery model is not integrated (information cannot be shared in real time to aid diagnosis and treatment), and it is based on an acute-care model (disease is treated only when it strikes) and is bound to healthcare facilities (patients have to go to hospitals or offices to receive care). Many years of medical practice have proven that this model is error-prone, costly, and inconvenient. This inefficient model is at least partially to blame for skyrocketing healthcare costs as well as quality-of-care problems. Scholars and practitioners agree that in order to reverse the current situation, new delivery models must be introduced and implemented. The new system needs to be integrated so that clinicians, including doctors, nurses, and pharmacists, can access a complete patient health record in real time and reference clinically approved guidelines to reduce errors in making critical judgments. The system also must shift from acute care to preventive care that promotes consumer awareness of personal health risks, encourages clinician-assisted wellness and lifestyle-changing programs to prevent or delay the onset of chronic diseases, and strives to reduce hospital stays and emergency room visits. The goal is to improve consumers' overall quality of life through preventive programs and at the same time significantly reduce medical costs. Finally, the system must provide consumers with easier and more convenient access to healthcare services, giving consumers the option to select the type of access to care that meets the needs of their lifestyles, personal schedules, and values.

Digital home health applications and services clearly fit into this new care delivery paradigm, and we are witnessing the start of this transition, led by surging interest in disease management programs from payors and clinicians as well as grassroots efforts from consumers who are increasingly health conscious and eager to know how to manage their lifestyles and illnesses. For this model to take deeper root, however, the industry must win the uphill battle against the inhibiting institutional forces, which requires efforts from private and public insurers, caregivers, and IT companies and a commitment of resources to educate consumers and to convince payors and physicians.

### **2.2 Prospects of Solving the Reimbursement Issue**

Reimbursement for digital home health services will remain an issue in the near term as budgetary constraints and payor attitudes are unlikely to alter overnight. Parks Associates believes that for home monitoring services, private payors are a better target in the near term

than CMS, although the service providers should continue pursuing opportunities to be part of CMS's ongoing demo projects. This conclusion is based on the following reasons:

- CMS is unlikely to change the current reimbursement policy before various demonstration projects end and reports of the results come out. Medicaid follows Medicare's footsteps closely; therefore, we do not believe any significant progress can be made on the Medicaid front in the near term.
- Private payors are a more fragmented market in which payors do not act like CMS, which has to stick to a universal reimbursement policy for different disease states, care services, and beneficiaries. Private payors are more flexible in terms of accepting reimbursement.
- Private payors, especially the employer segment, have an urgent need to cut healthcare costs and improve worker productivity.
- The success of disease management companies in obtaining reimbursement from private payors first is a model that home healthcare service providers can follow.

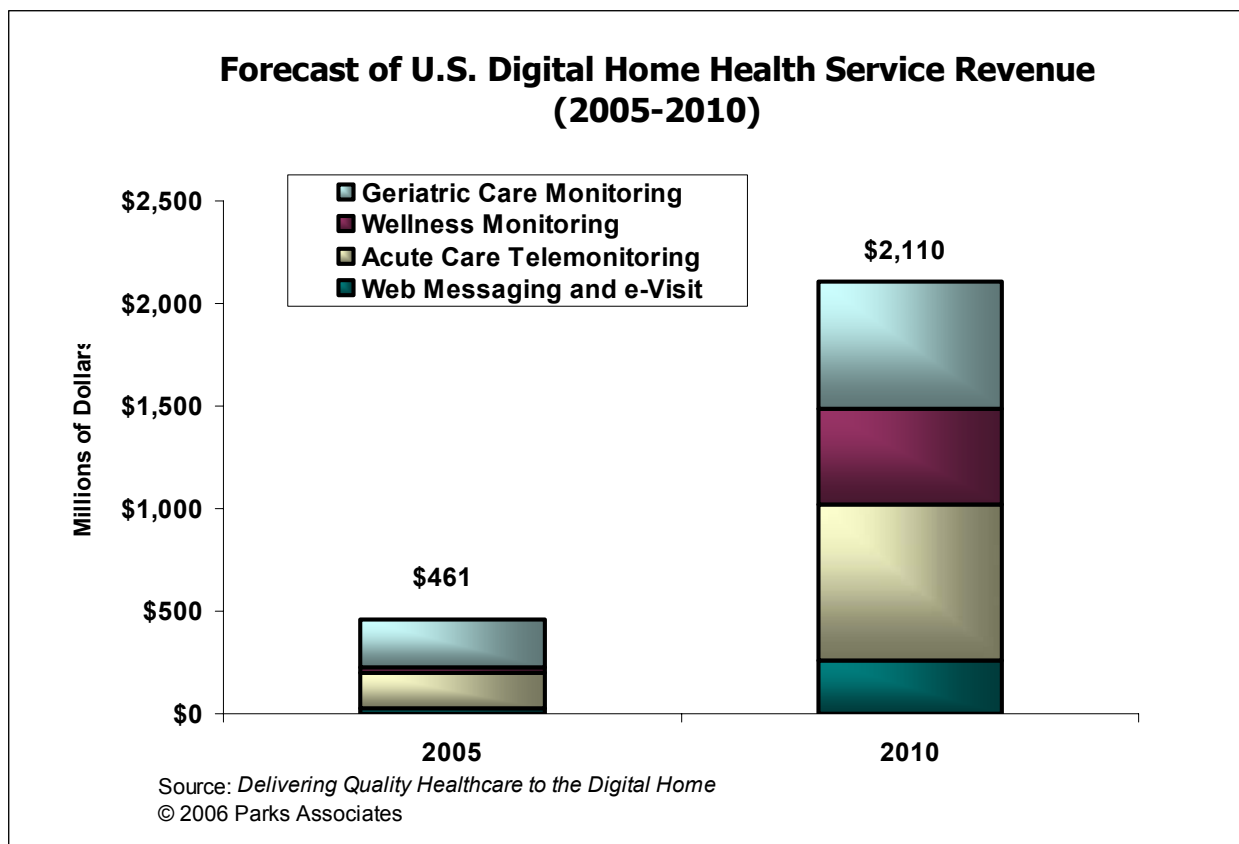
In the longer term, we believe that private payors' willingness to reimburse plus more convincing clinical efficacy results will eventually crack open the door to substantial changes in CMS's reimbursement policy.

## 2.3 Forecast of Demand for Digital Home Health Services

Parks Associates estimates that the U.S. digital home health market generated \$461 million in revenue in 2005. Going forward, in order to quantify the disease management industry's contribution, the in-home clinical care monitoring service segment is split into two categories. One is called acute care monitoring and deals mainly with high-cost chronic diseases such as late-stage diabetes, heart diseases, COPD, and severe asthma. The other is called wellness monitoring and targets high-risk consumers or those seeking a healthy life by actively managing their health conditions. The total market for digital home health services is expected to grow to \$2.1 billion in 2010, fueled mainly by wellness monitoring services (CAGR 74%), Web messaging, and online consultation services (CAGR 54%). This rapid growth will occur because the market is beginning from a very low base and these two services target younger people who are more familiar with technology and more willing to adopt new services. Revenue for acute care monitoring services is estimated to grow at an average rate of 35% annually over the next few years, with the bulk of growth seen after 2008. Geriatric care monitoring will achieve annualized 22% growth. Parks Associates attributes the relatively flatter growth curve of this segment to the impact of price competition. As technology matures and new vendors emerge, we

believe that the current pricing environment is unlikely to sustain in the year 2010. Other important assumptions include the following:

- In 2008, CMS will begin to relax reimbursement restrictions on in-home clinical care monitoring services.
- The disease management industry will continue to grow over the next five years and positively impact the digital home health market.
- The total addressable market for digital home health services (excluding e-visit services) will consist of 64 million people in 2010.



**Figure 4: Forecast of Demand for Digital Home Health Services in the U.S. (2005-2010)**

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**INDUSTRY EXPERTISE:** Digital Media Technology, Fixed and Portable Consumer Electronics, Online Music and Video Services, Digital Imaging Devices, Software and Services, Media Trend and Advertising Technologies, and Digital Health Products and Services

**About Parks Associates:** Parks Associates is a market research and consulting firm focused on all product and service segments that are “digital” or provide connectivity within the home. The company’s expertise includes home networks, digital entertainment, consumer electronics, broadband and Internet services, and home systems.

Founded in 1986, Parks Associates creates research capital for companies ranging from Fortune 500 to small start-ups through market reports, multiclient studies, consumer research, workshops, and custom-tailored client solutions. Parks Associates also hosts two executive seminars, both part of the Fall Focus series, and co-hosts CONNECTIONS™ (in partnership with the Consumer Electronics Association) each year. [www.parksassociates.com](http://www.parksassociates.com).