

TeleWatch Patient Monitoring System

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The number of Americans with chronic illnesses is rapidly increasing. Traditional health care delivery systems are incapable of properly treating these patients; however, automated telemedicine systems can be used to provide the majority

of the outpatient monitoring that is required to effectively manage these chronic illnesses. The TeleWatch telemedicine system was designed at APL in collaboration with The Johns Hopkins University Division of Cardiology to study the effectiveness of a telephone and/or web-based telemedicine system (Fig. 1).

The system is currently undergoing clinical studies at the Johns Hopkins Medical Institutions and Johns Hopkins HealthCare LLC with patients suffering from congestive heart failure and other chronic illnesses.

During the course of these studies, patient acceptance of the system has been high. Telemedicine systems such as TeleWatch may be used widely in the future in America and in other developed countries where the prevalence of chronic illnesses that require outpatient monitoring is increasing. The system has also been adapted for use by the JHU Bloomberg School of Public Health and the Centers for Disease Control and Prevention (CDC) to study the side effects of various vaccines.

The TeleWatch system is an automated telemedicine system that monitors patient-reported physiological measurements and symptoms via phone or web entry (Fig. 2). Using readily available durable medical equipment, patients self-obtain disease-appropriate physi-

ologic measurements, possibly including blood pressure, pulse, weight, serum glucose, and pulmonary spirometry. After making these measurements, individuals access the TeleWatch system either by placing a telephone call with a touch-tone phone to a computer that has a phone-interface connection board or by a web connection to the same system. Because no additional equipment is needed by the user, individuals can access the system from home, from work, or when traveling. As a

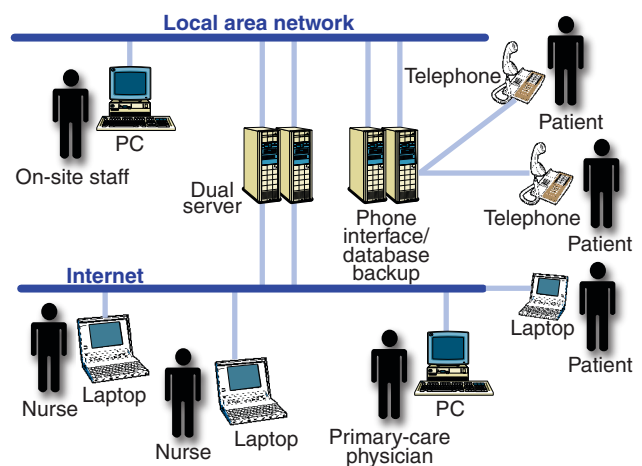


Figure 1. TeleWatch system design.

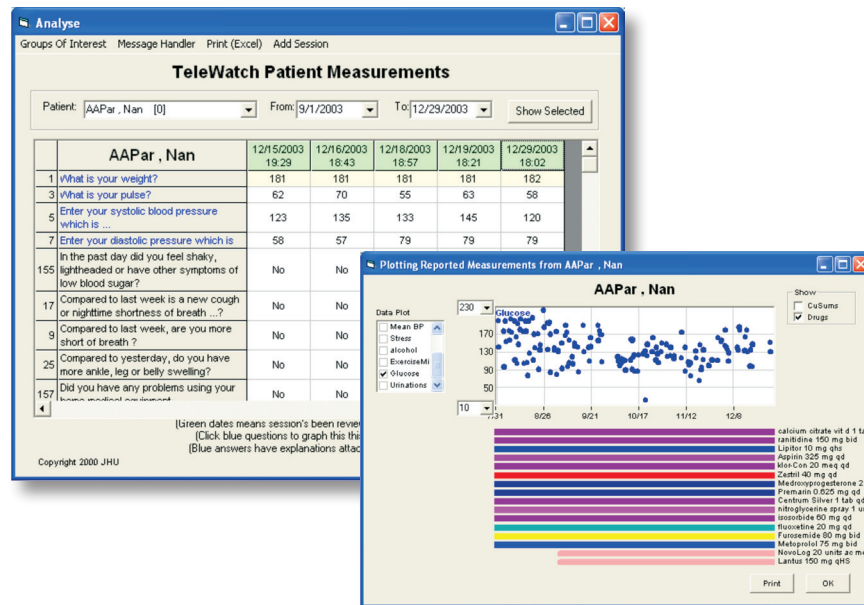


Figure 2. Patient monitoring via easy-to-use screens.

result, the mobility of users is markedly enhanced without degrading the level of monitoring.

Clinicians may view clinical information at a centralized location or from satellite facilities, which are connected to the central computer server via standard telephone lines, virtual private networks, or the Internet. Data may be viewed for individual patients at a question-by-question level, or the patient's results may be graphically represented to aid in pattern recognition. Additionally, population data can be easily and rapidly aggregated, queried, and reviewed. TeleWatch also has two-way store and forward messaging capability, which allows health care providers to leave voice messages for specific patients or system-wide messages to be played each time a person from a particular cohort accesses the system. This feature facilitates education and information dissemination to both individuals and cohorts of patients.

Patient monitoring benefits are as follows:

- Permits frequent monitoring when needed for treatment
- Improves compliance with directed medication and activities
- Facilitates medical decisions by health care providers
- Reduces mortality, hospitalization rates, and costs

Utilization of the system to date includes:

- Johns Hopkins HealthCare has used TeleWatch for ~2000 patients with chronic diseases such as congestive heart failure, diabetes, and hypertension.
- The system has been used by the JHU Bloomberg School of Public Health and the CDC to study the effects of vaccines (yellow fever in 2007 and influenza in 2008).

For further information on the work reported here, see the reference below or contact james.g.palmer@jhuapl.edu.

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