Continua Health Alliance Aims for Interoperable Personal Health Solutions

Chuck Parker

Enhanced care coordination is vital for an effective and truly integrated system of care. Better care coordination—among family physicians, a host of specialists, and other healthcare professionals as well as with consumers and caregivers—is essential to improve healthcare outcomes and reduce costs. Additionally, a shift to an increasingly consumer-focused, prevention-based model of care will help improve quality of life while controlling total healthcare costs.

Healthcare professionals and other industry stakeholders are increasingly aware that extending healthcare into the home is a critical component of the care coordination continuum.[1] The medical home concept also improves access to services for those living in remote areas as well as for frail or elderly individuals who may find it physically difficult to get to medical offices for routine appointments.

To that end, personal connected health solutions can deliver information and services beyond hospital and clinic walls to consumers at home and on the go. By linking individuals with healthcare professionals, these solutions have the potential to transform care coordination and healthcare delivery. Uncomplicated consumer medical devices and other connected health solutions make it easy for individuals and caregivers to take accurate measurements and transmit crucial health data to healthcare teams as often as needed.

Convenient access to up-to-date health trend data helps healthcare professionals make more informed treatment decisions and intervene more quickly as needed, before costly emergency room visits or hospital admissions. As a result, healthcare professionals are able to provide more comprehensive, efficient, and cost-effective care.

Several studies have confirmed this, with some interesting findings about the U.S. Veterans Health Administration (VHA), which operates the nation's largest integrated health care system providing comprehensive care to more than 5.6 million veterans each year. A recent study by the Center for Information Technology Leadership reported that the VHA's use of information technology during the decade from 1997 to 2007 lowered costs by $3.09 billion, while improving quality, safety, and patient satisfaction.[2] A study of the VHA's home telehealth program showed a 25% reduction in numbers of bed days of care and a 19% reduction in numbers of hospital admissions between 2003 and 2007.[3]

Devices such as blood pressure cuffs, weight scales, glucose device readers, and pulse oximeters can link individuals with healthcare teams so that conditions can be screened without the need for additional office checkups or unnecessary hospital visits. Christian Nasr, MD of the Cleveland Clinic is conducting a study of more than 250 individuals with diabetes, hypertension, or a history of heart failure to evaluate the benefits of a connected health environment. As part of that study, individuals at home send data from various devices such as pedometers, blood pressure monitors, and glucose meters to a secure portal, where Nasr can review their progress. The doctor then sends them messages with observations about their numbers, words of encouragement, or suggestions for improvement. The study has provided encouraging evidence about the benefits of a connected health environment that extends beyond the doctor's office and into people's daily lives.

These personal connected health devices and services also empower individuals and their loved ones to take a greater role in managing health and fitness, the key to prevention-based medicine. U.S. health reform is laying the ground for a new era of individualized care and a more patient-focused health system, according to PricewaterhouseCoopers.[4] The next phase of health reform in

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the United States will reflect a concerted effort to keep people well, out of the hospital, and more actively engaged in managing their own health.

To reap the full benefits of connected health, however, these solutions will need to be broadly deployed. For that to happen, a broad set of industry standards and design guidelines is needed to establish a compatible system of interoperable consumer health solutions.

The Need for Connected Health Standards

Home healthcare technology will reach its potential to help advance care coordination, improve outcomes, and reduce costs only if it is easy for consumers and healthcare teams to mix and match personal health devices and services from various providers and manufacturers as required to meet specific individual needs. In addition to interoperability, there must be assurance of compatible communications and trustworthy data exchange across the disparate networks used by consumers and healthcare professionals in the care coordination continuum.

While work has taken place for many years for the clinical environments, until recently, there was not a comprehensive set of standards or design guidelines to ensure consistent quality and interoperability among electronic home healthcare solutions. Providers, consumers, and insurers were left to choose among numerous, often incompatible products and services from various vendors with few operability standards, inconsistent connectivity, and variable functionality. By the same token, device manufacturers and service solution providers were forced to develop entire connection models on their own without comprehensive design guidelines to ensure their products or services would work with other personal connected health solutions.

A growing number of healthcare constituents supported the development of formal industry guidelines, as well as a testing and certification process to establish consistent device and technology standards they can trust. Continua Health Alliance (www.continuaalliance.org), a nonprofit industry collaborative, has brought together more than 230 healthcare and technology companies to develop design guidelines for an ecosystem of interoperable personal health solutions. The Alliance defines personal connected health use cases and then creates design guidelines based on industry standards to provide a framework for the development, certification, and implementation of interoperable personal health solutions.

The Outlook for Connected Health

As device and technology developers begin using a consistent set of standards to create compatible and connected personal health systems, home healthcare will flourish. Personal connected care is expected to grow very rapidly, from a $3 billion market in the United States and Europe in 2009 to an estimated $7.7 billion market in 2012.[5] Subscribers to a variety of connected health services—ranging from weight loss management and chronic condition monitoring to fall monitors and medical alerts—are projected to grow at a compounded annual growth rate of 72% to 55.5 million by 2016 (InMedica, 2008).[6] The number of gateways used for home health hubs used in connected health applications such as remote disease and home-health monitoring is expected to increase to over one million in 2014 and to around 3.6 million in 2018 (InMedica, 2010).[7]

Continua Design Guidelines

Members of Continua Health Alliance are collaborating closely with healthcare providers, payers, policy makers, and other industry stakeholders to make connected health a reality. Continua has created a set of voluntary interoperability guidelines which specify how to use existing standards to build interoperable personal healthcare solutions. Paving the road for interoperability and greater consistency among healthcare devices, Continua issued its Version 1 Design Guidelines in January 2009. The guidelines, written for device manufacturers and solution providers that intend to go through the Continua certification process, contain references to the industry standards and specifications that the Alliance selected to ensure interoperability of devices and services. These guidelines constrain to Continua-specific implementations and also advance interoperability by reducing options in the underlying standard or specification.

The first set of guidelines focused on the Personal Area Network (PAN) interface and the electronic Personal Health Record Network (xHRN) interface. The PAN interface includes support for consumer devices such as weighing scales, blood pressure monitors, glucose meters, pulse oximeters, and thermometers, as well as fitness devices. The guidelines for the xHRN interface also enable consumers using various personal monitoring services to share that data with their physicians or their own personal health records to get a broader overview of their own health status, with complete confidence in privacy and security.

Continua will issue its new Version 1.5 Design Guidelines in mid-year 2010 to broaden the framework for further development of personal health solutions. These guidelines will allow the addition of new devices such as a step counter for cardiovascular fitness equipment, insulin pumps, peak flow meters, and adherence monitors to help consumers stay on top of their medication regimes. Additionally, Continua has selected ZigBee Health Care technology for low power sensors that can be networked in a variety of settings, and utilized in devices such as motion detectors and bed pressure sensors to enhance the daily living of those who require assistance in aging independently. ZigBee Health Care technology is particularly well-suited for fixed-location sensors and devices that can be used to create secure networks for individuals at home or in larger environments such as assisted care facilities due to its low cost, long battery life, and secure networking.

The Version 1.5 guidelines also will incorporate a wide area network interface and enable the addition of e-mail to package and send results securely.

Continua identified select Health Level 7 (HL7) V2.6 (www.hl7.org) messages and the Integrating the Healthcare Enterprise Patient Care Domain (IHE PCD)-01 profile (www.ihe.net) transmitted over a lightweight Web Services Interoperability (WSI) implementation as a means to accomplish data sharing between WAN devices and the xHRN interface. This WSI model enables connectivity without the need for a browser through Internet services. WAN interfaces will allow full end-to-end interoperability and has been demonstrated at several recent presentations by Integrating the Healthcare Enterprise, an international initiative to improve how healthcare systems exchange information.

The Version 2 guidelines expected to be released in 2011 will include Bluetooth Low Energy wireless technology (pending finalization of the specification), which is particularly well suited to enable low power mobile devices such as activity monitors and heart rate sensors to track an individual's health and fitness levels.
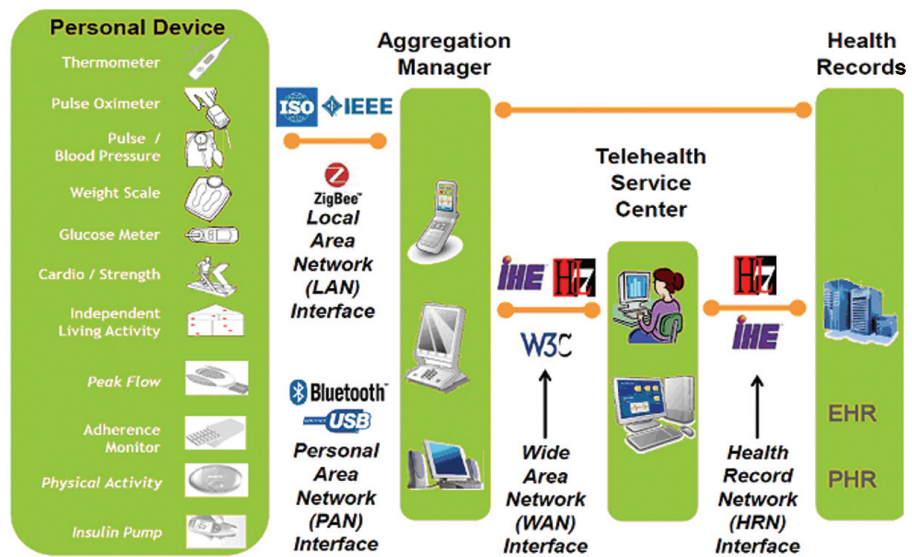

Figure 1. Interfaces and standards used by Continua Health Alliance.

Influencing Healthcare Policy

Along with common design guidelines, policy reform is needed to advance connected health solutions. Throughout the recent healthcare reform process, Continua submitted comments calling for the inclusion of technology references with concepts like e-care, remote patient monitoring, care coordination, expanded telehealth, the patient-centered medical home, personal connected healthcare, and many others. As a result, the landmark healthcare bill contains more than 50 specific provisions related to telehealth, remote patient monitoring, and personal connected care.

Continua Health Alliance works with government regulators as well. Last January, the Alliance worked with the U.S. Food and Drug Administration and the Center for Integration of Medicine & Innovative Technology to hold a workshop on medical device interoperability issues. The workshop brought industry stakeholders together to identify new models and effective ways to regulate interoperable medical systems with interconnected devices and IT systems.

Continua Health Alliance Organization

Collaboration with a broad range of stakeholders in the healthcare system is critical to the success of connected health. Members of Continua Health Alliance range from small firms to the largest companies in healthcare.

With three membership levels, Continua Health Alliance provides a forum for healthcare providers, device manufacturers, and technology providers to discuss healthcare technology issues and drive the market for interoperable personal telehealth solutions.

Advancing Care Coordination

From consumers and healthcare professionals to insurance companies and technology providers, personal connected home healthcare promises to benefit all constituents. Consumers will benefit from convenient interoperable solutions that help them track and manage their own health at home or on the go, as well as more affordable prices for out-of-pocket services and equipment. Healthcare providers can make more informed treatment decisions through easier access to ongoing trend data about their patients' health. Physicians and other members of care teams will be able to monitor consenting consumers' health, empowering them to intervene before health status changes can lead to emergency room visits or hospital admissions. Payers will benefit from reduced costs and enhanced efficiency in healthcare management while enhancing quality of care and customer satisfaction. Technology providers will have clear guidelines to follow when creating personal connected health devices and solutions. Creating and implementing compatible, consistent, high-quality connected healthcare solutions is vital to advancing care coordination and fostering consumer engagement in preventive medicine. ■

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