Chronic Condition Management Using Remote Monitoring and Telehomecare

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INTRODUCTION

Timely access to healthcare in both urban and rural settings is a worldwide challenge because no nation committed to the health of its population can afford to replicate in every community all the resources required for each community's healthcare needs. Telenetworking of patients, providers, and relevant health information may be the only way to make healthcare services and outcomes-driven decision-making available, responsive, and convenient for consumers, practical for providers, and economically viable for healthcare systems.

By definition, chronic conditions (CC) last a year or more, and limit activities of daily living and/or require on-going medical attention (Hwang, 2001). They include physical medical conditions, mental and cognitive disorders, developmental disabilities, and addiction disorders. The prevalence and burden of fifteen selected CC was summarized by the Centers for Medicare and Medicaid Services (CMS, 2013). Selected conditions (percentage of Medicare beneficiaries) included: Hypertension (58%), High Cholesterol (45%), Ischemic Heart Disease (31%), Arthritis (29%), Diabetes Mellitus (28%), Heart Failure (16%), Chronic Kidney Disease (15%), Depression (14%), Chronic Obstructive Pulmonary Disease (12%), Alzheimer's Disease (11%), Atrial Fibrillation (8%), Cancer (8%), Osteoporosis (7%), Asthma (5%), and Stroke (4%). All are more prevalent in individuals 65 years of age or older, except depression and asthma.

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Multiple chronic conditions (MCC):

- Increase with age:

<65(52%) 65-74(63%) 75-84(78%) ≥85(83%)

- Increase hospitalizations in a year:

0-1CC/MCC (4%/63% hospitalized; <1%/16% ≥3 hospitalizations):

- Increase use of post-acute care (at least one visit):

0-1(1%) 2-3(7%) 4-5(19%) ≥6(49%)

- Increase home health visits:

0-1(1%) 2-3(5%) 4-5(9%) ≥6(36%)

- Increase physician office visits (0/≥13):

0-1(34%/4%) 2-3(7%/15%) 4-5(7%/30%) ≥6(8%/46%)

- Increase emergency department visits (0/≥13):

0-1(86%/≤3%) 2-3(75%/4%) 4-5(59%/8%) ≥6(30%/27%)

- Increase admissions with a re-admission within 30 days in people ≥65 years old:

0-1(7%) 2-3(7%) 4-5(13%) ≥6(24%)

- Increased per capita Medicare 2010 spending:

0-1($2,025) 2-3($5,698) 4-5($12,174) >6($32,658)

Effective real time management of many CC, such as Diabetes Mellitus (DM), Hypertension (HTN), Congestive Heart Failure (CHF), and Chronic Obstructive Pulmonary Disease (COPD), requires patient self-management and behavior modification, occurs away from healthcare facilities, and depends on the regular collection of condition status data in real-life settings (remote monitoring). Measurements such as capillary blood glucose, blood pressure, respiratory peak flow rate, weight and others allow clinicians to recommend, and patients to own, behavior modifications and self-administration of prescribed medications. Electronic data capture and their Internet-enabled timely review by clinicians (remote monitoring) can enable interventional or preventative management adjustments between office visits (telehomecare). As universal Internet access approaches reality, these facts are changing the healthcare system and re-defining the roles of its players - patients, clinicians, health educators, hospitals and clinics, public health, health insurance agencies, and health care-related companies (Stachura, 2007; Singh, 2011; Mistry, 2012). It is, therefore, essential to overcome barriers to universal broadband access (Kaplan, 2003) and remove obstacles to reimbursement for multi-tiered, on-going, remote when possible, physician-led, but team-delivered, services. The resulting enhanced access to information and services should contribute importantly to strategic frameworks for the care of patients with MCC and encourage outcomes-driven, cost-effective, efficient, individual and community health while lowering the cost of healthcare systems that provide it. Nowhere are these considerations more important than in elderly populations, characterized by patients with MCC. Aging in place is, after all, the desire of most older Americans (Farber, 2011).

Patients are turning from the role of passive recipients of provider instructions and interventions to more self-responsible, active and knowledgeable participants in the monitoring, decision-making, and management activities relevant both to their medical conditions and to life-style modifications that will improve and maintain health. Clinicians who were previously the custodians of health information are increasingly becoming patient and family advisers concerning the use, relevance, and individually specific applicability of generally available health information. The resulting combination of information access and clinician advice can support and empower patients for decision-making and action.

BACKGROUND

Consumers are becoming active participants in all aspects of their health, including decision-making, screening, monitoring, and the behavioral change aspects of health maintenance, healthcare, CC management, and disease prevention. They live in an Internet- and wireless-linked world where they and their dependents expect access when and where they themselves perceive the need for access (Simmons, 2007). As with other commodities and services, patients seek access that maximizes their own convenience rather than the convenience of the provider (Simmons, 2007) Consequently, they tend to report dissatisfaction with inefficiencies and personal inconveniences encountered in the current healthcare system: wait time for appointments, the inconvenience of physician office hours and office wait time (Higgs, 2001) and limited access to after-hours care - currently available only in emergency departments (EDs) and urgent care clinics (Afilalo, 2004) - for problems that cause patients concern but are not classified by providers as medical emergencies. Providers and businesses have begun to explore ways to provide off-hour routine and low-level urgent care (Serbaroli, 2007).

Consequently, telehomecare is an increasingly recognized and valuable tool with the potential for enhancing CC care management quality while delivering new savings for both patients and providers. Patients can experience fewer office and ED visits, fewer and reduced duration of hospitalizations, reduced travel time and expense, and increased services access. Clinicians can deliver cost-effective and efficient case management, make more informed decisions, and experience enhanced patient participation and compliance (Smit, 2011). There are, however, technology, infrastructure,