SCIENCE-IN-BRIEF

TURNING SCIENCE INTO ACTION

Telemedicine Interventions for Chronic Disease Management

The following is a synopsis of "The Empirical Foundations of Telemedicine Interventions for Chronic Disease Management," published in the September 2014 issue of *Telemedicine and e-Health.*

What is already known on this topic?

Chronic diseases, such as heart disease and stroke, are costly and preventable, yet they affect half of all adults. Telemedicine can be a useful tool in reducing deaths and managing the negative health effects associated with these conditions. Telemedicine is often used as a broad term that includes "telehealth," "e-health," "mobile health," and "connected health." These terms refer to the delivery of health care via information and communication technology (ICT). With the advance of ICT, telemedicine can improve access to health care, improve the quality of health care delivery, and reduce health care costs.

What is added by this article?

This systematic review explored use of telemedicine in three chronic conditions: telemonitoring for congestive heart failure (CHF), telestroke for stroke, and telepulmonology for chronic obstructive pulmonary disease.[1] Nine of the 19 CHF studies and 7 of the 21 stroke studies reviewed were conducted in the United States. Across the studies, the researchers investigated several telemedicine technologies, including telephones and smartphones, video conferencing, manual and automated data entry, point-to-point connections, dedicated networks to the Internet, autonomous equipment, and wearable or implantable devices. The authors examined various design and intervention approaches (e.g., providers and patients involved; types, frequency, duration of interventions) to reflect the complex state of current programs designed to manage chronic illnesses.

Health Outcomes

Several CHF studies reported noticeable health outcome improvements among patients participating in telemedicine compared with patients receiving usual care. Results from several studies indicated "fewer episodes of health worsening" and "general improvement in clinical, functional, and quality of life status" among patients receiving telemedicine care. Among CHF patients, the authors found telemedicine was associated with significant reductions in mortality (15% to 56%) compared with patients who underwent usual care. Telestroke may improve access to stroke specialists in medically underserved areas, as prompt diagnosis, treatment initiation, supervision, and referral (if needed) contribute to improved health outcomes for stroke patients. Compared to telephone-only telemedicine intervention, other methods of telestroke reduced patient mortality in the range of 25% during the first year after the stroke.

[1] This synopsis will focus specifically on the CHF and stroke findings.

Use and Cost of Services

The majority of the studies reported that telemedicine reduced hospital admissions, re-admissions, length of stay (LOS), and emergency department (ED) visits; there were some exceptions reported, but in most of those cases, the effect or cost of telemedicine was neutral. Overall, the findings support the economic benefit of telemedicine compared with usual care as measured by (1) changes in rates or volumes of hospital admissions, re-admissions, LOS, and/or ED visits; and (2) cost-benefit and -effectiveness analysis of telemedicine for specific outcomes.

What are the implications for public health practice?

Telemedicine has the potential to become an effective tool to improve health outcomes, improve access to health care services, and reduce health care costs for chronic conditions. Telemedicine was feasible and accepted for chronic disease management by most providers and patients across the studies reviewed. However, telemedicine technology varied by sample size, follow-up, and study designs. Additionally, there were inconsistencies in the methodologies used and significant variations in outcomes measured. Despite these limitations, this information remains useful for policymakers, researchers, program developers, providers, and payers aiming to explore this innovative technology for improving health outcomes and access to care, particularly in medically underserved areas.

Resources

Institute of Medicine
The Role of Telehealth in an Evolving Healthcare Environment
www.iom.edu/Reports/2012/The-Role-of-Telehealth-in-an-Evolving-Health-Care-Environment.aspx

Hall AK, Stellefson M, Bernhardt JM. Healthy aging 2.0: the potential of new media and technology. *Prev Chronic Dis*. 2012;9:E67.
www.cdc.gov/pcd/issues/2012/pdf/11_0241.pdf

National Institutes of Health
mHealth—Mobile Health Technologies
http://obssr.od.nih.gov/scientific_areas/methodology/mhealth

Citation

Bashshur RL, Shannon GW, Smith BR, Alverson DC, Antoniotti N, Barsan WG, et al. The empirical foundations of telemedicine interventions for chronic disease management. *Telemed J E Health*. 2014;20(9):769–800.

National Center for Chronic Disease Prevention and Health Promotion
Division for Heart Disease and Stroke Prevention

For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov **Web:** www.cdc.gov