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Implementing Telemedicine Services for Low-Income Seniors: Potential Strategies

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A growing number of health care organizations are using telemedicine—communications and information technology that transmits medical diagnostics and monitoring services between health care users and providers who are separated geographically—as a way to deliver care. Since 2000, Mathematica has been leading the way in evaluating telemedicine applications for people with substantial barriers to care. This brief draws partially on our study of personal computer and web-based home telemedicine services provided under a demonstration program to Medicare beneficiaries with diabetes living in two medically underserved areas. It suggests key factors for policymakers and funders of telemedicine interventions to consider as they move forward in developing initiatives for groups with little education and limited experience with technology.

Designing User-Friendly Interventions

Boosted by advances in technology and falling prices for telecommunication and computer equipment, health care practitioners are using telemedicine increasingly in home-based settings. This so-called “tele-home care technology” holds promise for helping people overcome barriers to care, such as limited personal mobility or residence in a remote or medically underserved area. Tele-home care is also

helping people with chronic illnesses, such as congestive heart failure, depression, and diabetes, manage their conditions better—for example, by providing timely, frequent, and personalized reminders on monitoring and care.

Recent home-based telemedicine interventions for Medicare beneficiaries with chronic illnesses have been designed to include the following elements:

- Self-monitoring of symptoms and behavioral or physiological measures and transmission of these measures to databases or providers
- Communication between users and service providers, such as case managers, through audio- or videoconferencing or text messaging
- Access to web-based resources, such as educational materials and chat rooms used by other people with similar conditions

Creating effective interventions involves paying attention to users’ experience with computers or related technology, as well as their health literacy and functional impairments. Many seniors have never used personal computers or the internet. Some may also have limited capability to read, comprehend, and act on medical instructions. Others may have cognitive and physical limitations that restrict their ability to use complex technology. Users of tele-home care interventions must be as proficient as possible in the technology if they are to benefit fully.

Steps for Success

Several factors are key to successful interventions for low-income seniors with barriers to care:

KEY COMPONENTS OF HOME TELEMEDICINE

- User interface with the system
- Audio- and videoconferencing or text messaging capabilities
- Case management and application software
- Electronic devices capable of digital data collection
- Secure data transmission between health care user and provider
- Data storage and management
- Evaluation of usage information and feedback

- **Assess familiarity with the technology.** Before a system design is selected, it is important to evaluate users' familiarity with monitoring devices (for example, blood pressure and glucose meters), equipment such as web-based cameras needed for audio- or videoconferencing, and personal computers and peripherals. Telemedicine systems for this population may need to be based on technology such as the telephone or television that, while not cutting edge, is familiar and easy to use.
- **Assess literacy levels and ability to comprehend material on computer screens and monitoring devices.** Low literacy levels—already significant barriers for some people in conventional medical settings—and lack of familiarity with electronic visual displays pose important challenges to system designers. These challenges must be considered while planning the system interface. For instance, although many seniors with diabetes are familiar with keeping hard-copy diaries of their blood pressure and blood sugar measurements, they may have problems understanding how to monitor these readings from tabular displays, such as vertical lists of systolic and diastolic pressure readings or plots of these measurements, on monitoring devices. System designers need to ensure that the visual displays and audio alerts are easily understandable to users.
- **Involve users during the design phase to explore expectations about the technology and services it will deliver.** User testing can reveal features that

are not user friendly and help redirect design efforts. One-on-one discussions with a representative group of users, focus groups with users and providers, or in-home demonstrations of the system can help involve users in the design and generate useful feedback at a stage in which it can be easily incorporated.

- **Select a compact, easy-to-operate, and low-maintenance system.** The size and configuration of a telemedicine system can have important implications for its usability. For example, users who live in small apartments may be reluctant, because of space restrictions, to embrace a system based on personal computers. Likewise, in older residences, a limited number of electrical outlets may make it difficult to install hardware in convenient places, potentially increasing hazardous placement of equipment and wires.
- **Minimize the cost users must incur for electricity and telephone service needed to operate the system.** Users may be unwilling to accept equipment if they think it will increase their monthly electricity and telephone bills, since many are on tight budgets. Instructing elders on when and how to turn hardware off and on, as well as informing them about the actual power consumption of such equipment, can help allay concerns. Likewise, use of toll-free numbers to access the internet can eliminate extra phone charges for operating internet-based systems.
- **Provide in-person training on all components that seniors are expected to use.** Although many older people are motivated and capable of learning how to use health information technology, this learning becomes more difficult with age. Moreover, older people are less acquainted with new technologies than younger people—one of the many dimensions of the so-called “digital divide.” To address this challenge, qualified and responsive instructors can provide personalized one-on-one training, as well as retraining when needed.
- **Develop simple print and video tutorials and help manuals to support the use of telemedicine services.** Once seniors are on their own with a

telemedicine system, their confidence and ability to benefit fully depend on easy-to-follow help guides and tutorials. In particular, video tutorials (either online or DVD) that provide step-by-step guidance on how to use the system are likely to be more effective than printed booklets.

- **Train service providers to troubleshoot and help users with the technology.** In a telemedicine system that includes audio- or videoconferencing capabilities or text messaging, service providers (such as case managers) can use these capabilities to help users solve simple technical problems and answer questions. A toll-free phone hotline with sensitive and empathetic staff should also be available.
- **Correct software and hardware problems as soon as they surface to avoid undermining users' confidence.** Relatively simple problems—such as the replacement of batteries in monitoring devices—can create barriers if left unresolved. These kinds of issues have the potential to undermine users' confidence in the technology, particularly if they believe their difficulties stem from lack of computer skills.
- **Pilot test the system before large-scale implementation.** Because home-based telemedicine systems can sometimes be expensive to design, and may involve additional time and resources to install and maintain, pilot testing is important. It can help prevent major software or hardware problems that surface after equipment has been installed and substantial costs for making on-site changes or retraining users.
- **Collect and analyze usage data to provide feedback to system designers and managers.** Tracking data, such as those collected by web-based interventions, can be valuable for identifying problems with system components. Moreover, usage data (on most popular web pages viewed, for example) can also help in monitoring users and providers, and in evaluating an intervention's effectiveness. Monitoring should be done early and often so that any design problems can be corrected right away.

Finding effective ways to manage difficult and costly chronic diseases is a pressing policy concern. Many disease management programs are embracing tele-home care, with its emphasis on education and self-monitoring, to monitor patients and potentially to enhance their access to care. For example, some programs are equipping patients with pagers that remind them to take medications or exercise, as well as more complex devices that prompt them to enter vital signs and other data, answer a series of health-related questions, and receive feedback. This type of care has the potential to help rural and underserved patients manage complex diseases.

Mathematica is conducting several evaluations of disease management and care coordination programs and issues related to implementing these initiatives in state Medicaid programs. Selected publications from these studies include:

“Disease Management Options: Issues for State Medicaid Programs to Consider. Trends in Health Care Financing, Issue Brief #3.” Princeton, NJ: Mathematica Policy Research, Inc., April 2004, Randall Brown and Arnold Chen.

“How Seniors Learn.” Washington, DC: Center for Medicare Education, vol. 4, no. 9, 2003, Beth Stevens.

“Care Coordination and Medicaid Managed Care: Emerging Issues for States and Managed Care Organizations. Policy Brief.” Princeton, NJ: Mathematica Policy Research, Inc., June 2000, Margo Rosenbach and Cheryl Young.

“Best Practices in Coordinated Care.” Princeton, NJ: Mathematica Policy Research, Inc., 2000, Arnold Chen, Randall Brown, Nancy Archibald, Sherry Aliotta, and Peter D. Fox.

“Managed Care of Chronically Ill Older People: The U.S. Experience.” *British Medical Journal*, vol. 321, October 2000, Chad Bould, Robert L. Kane, and Randall Brown.

“Care Coordination in Medicaid Managed Care: A Primer for States, Managed Care Organizations, and Providers and Advocates.” Princeton, NJ: Center for Health Care Strategies, October 1999, Margo Rosenbach and Cheryl Young.

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Implications for the Future

Home-based telemedicine is emerging as a powerful tool that may improve access to care for Medicare beneficiaries with chronic conditions who live in medically underserved areas. It also has the potential to help prevent costly treatment of medical complications in the future. To realize this potential, designers and managers of telemedicine systems for low-

income seniors must invest the time and resources needed to make the technology appealing and easy to use.

For more information about our research in this area, conducted for the Centers for Medicare & Medicaid Services, contact Lorenzo Moreno, (609) 936-2766, lmoreno@mathematica-mpr.com. To find out more about our disease management and coordinated care research, contact Randall Brown, (609) 275-2393, rbrown@mathematica-mpr.com.

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