



Telemedicine

What it is, how it's practiced,
and approaches to designing for it

Herman Miller Healthcare
Knowledge & Insight Summary



September 2016

What is Telemedicine?

Telemedicine literally means “healing at a distance.”

Medicus (Latin) and tele (Greek)

Patient care + technology + distance = telemedicine.

“The goal of telemedicine is to improve access, quality, and cost by using technology to deliver health services and information at a distance.”

Health Affairs, February 2014, 33:2

Telehealth, which is often used interchangeably with telemedicine, covers a broader range of health-related services, including patient and professional education. Herman Miller Healthcare defines telemedicine as direct patient care delivered remotely. eHealth, mHealth, and connected health, along with telehealth and telemedicine, all express forms of healthcare delivery via technology. Here are some of the ways organizations and practitioners define remote healthcare and services.

Telemedicine uses medical information exchange from one site to another via electronic communications to improve a patient’s clinical health status. This includes telecommunications and information technology to provide access to health assessment, diagnosis, interventions, consultation, supervision, and information across distance.

What is Telemedicine? American Telemedicine Association, americantelemed.org/learn, accessed August 30, 2013

Telemedicine uses technology to deliver clinical services across distance and/or time.

Telemedicine in the Era of Population Health Management, The Advisory Board, March 10, 2014

Telehealth is the use of electronic information and communications technologies to provide and support health care when distance separates participants.

Institutes of Medicine

Why is it important?

In 2014, more than **10 million** Americans were using telehealth services, a number that doubled since 2011.

(Out of) Office Visit, Proto Magazine, Fall 2014

Slow growth of telemedicine practice over several decades was followed by rapid growth that is fueled by technology availability and, most significantly, the Affordable Care Act (ACA).

X-rays transmitted by radio or telephone wires provide diagnosis for hospitals in rural areas that do not have radiologists (1950s)

Video links the Nebraska Psychiatric Hospital in Omaha with a state hospital 112 miles away (1950s)

NASA monitors the heart rates, blood pressure, respiration rates, and temperatures of astronauts in space in an effort to understand the effects of zero gravity on the body and to explore methods for treatment of in-flight medical emergencies (1960s)

Space Technology Applied to Rural Pagago reservation in southern Arizona (STARPAHC); funded by NASA in partnership with Lockheed Missiles and Space Corporation, applies the most advanced technologies to provide a method for treating people on the reservation (1970)

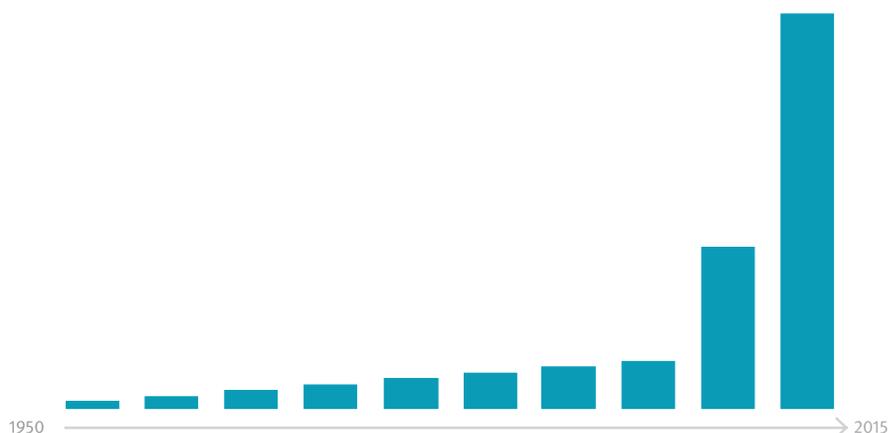
US Public Health Service and Department of Defense sponsor a series of teleradiology projects that lead to the Digital Imaging Network Project that promotes the development and implementation of civilian and military teleradiology (1970s)

Veterans Health Administration (VHA) opens two pacemaker surveillance centers and begins telephone-based monitoring of veterans (1982)

Videoconferencing links fishermen on a trawler in the Pacific Ocean with physicians in Seattle in a 3-month test that opens the door to understanding how sea travelers could be treated remotely (1994)

The first transatlantic telesurgery conducted on a patient in France by a surgeon in New York (2001)

ACA passes and creates new payment models (2010)



Why is it important?

71%

of mid-to large-sized US employers are expecting to offer telehealth services to employees by 2018

Telehealth Industry Trends 2015, The Advisory Board

30%

increase in the number of patients a single physician can care for by shifting some in-person visits to e-visits

Tele-health: Driving Adoption of Virtual Visits, The Advisory Board, 2014

1 in 2

In 2012, half (117 million) of all adult Americans had one or more chronic conditions. 1 in 4 had two or more conditions

Centers for Disease Control (CDC)

Several factors have combined to accelerate the adoption of telemedicine.

Population health: a shared risk model for care of a population and payment for value

- Population refers to the group that is covered by an insurer, in an accountable care organization (ACO), or employed within a self-funded organization

- Care providers are taking responsibility for the quality of care and quality of outcomes

Telemedicine in the Era of Population Health, The Advisory Board, 2014

- A health system gains by lowering emergency visits, readmissions, and improving health maintenance, thus, lowering overall cost of care

Physicians will be reimbursed for a broader range of telemedicine activities

- Historically, physicians were reimbursed only for care that addressed gaps in availability, such as in rural areas where care providers were in short supply

- CMS (Centers for Medicaid and Medicare Services) is expanding the procedures covered under telehealth services

Telehealth Industry Trends 2015, The Advisory Board

Increase in the number of people with chronic diseases

- Maintenance and management of chronic diseases can be done effectively and efficiently through remote monitoring

- In order to contain costs and improve quality, a health system may use telemedicine to monitor patients with a goal of keeping people healthier, managing their chronic diseases, and reducing unnecessary emergency department (ED) admissions and hospitalizations

Why is it important?

95%

of Americans were using mhealth technologies in 2013

Telehealth Industry Trends 2015, The Advisory Board

20%

of US citizens live in areas with an insufficient number of primary care doctors

Health Resources and Services Administration

Technology is woven into the fabric of our society. People of all ages accept and are comfortable using technology. Online communication is normal, and access continues to broaden

- Consumers are busy, and getting time with a physician needs to fit their schedule, not the physician's

- Transition to electronic health records and other digital forms of care delivery are already happening

- "Similar to the internet revolution, mHealth is revolutionizing the way of patients receiving their care." Mary Annecharico, CIO, Henry Ford Health Systems

Telehealth Industry Trends 2015, The Advisory Board

Expanding market presence addresses access disparity

- Access in terms of time
(the average wait for a primary care appointment in the US is 20 days)

- Access in terms of geography

- Access for behavioral health and chronic care management

- Access to a physician (projected shortage of primary care physicians)

- "Access is really the crux of the problem in health care." Dr. Gopal Chopra, CEO of pingmd

Think Telemedicine is Displacing Demand for In-person Visits? Think Again, The Advisory Board Expert Insight, 2014

Why Telemedicine?



Rising population with chronic conditions, rising expense of care, rising age of population



Reduced costs of care through fewer readmissions, fewer ED visits, better care coordination, better management of chronic conditions

How is Telemedicine Practiced?

The practice of telemedicine happens in many locations, but the activities of telemedicine delivery fall into five categories.

1. Messaging

Messaging can be both asynchronous (email) and synchronous (telephone).

- Order and refill prescriptions
- Respond to emails from patients
- Telephone a nurse

2. Data exchange

Data exchange involves the electronic sharing of data for the specific purpose of care provision, diagnosis, and treatment.

- High-quality, inexpensive photo cameras enable accurate sharing of wound, dermatology, and ophthalmology diagnosis and care
- PACS (Picture Archiving Communications Systems) allow radiologists to read images anytime and anywhere

6.5 billion

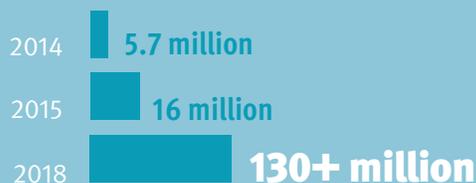
prescription transactions handled in one year by Surescripts, the nation's largest health information network, more than American Express (6 billion) and PayPal (4.2 billion)

Surescripts Press Release, surescripts.com, accessed 10/1/15

3. Real-time consultation

Real-time consultations are video exchanges between patient and care provider or between two care providers. Widely used in behavioral health, dermatology, pediatrics, and stroke care. Enabled by digital equipment, such as otoscopes, stethoscopes, and ultrasound spirometers.

- Anesthesiologists consult remotely with other anesthesiologists in an operating room; a remote control camera allows the consultant to pan and tilt to observe



Doctor-patient video consultations in US

Health & Mobile Product Research, Parks Associates, 2014

How is Telemedicine Practiced?

4. Remote monitoring, home and hospital

Healthcare professionals, from RNs to intensivists, monitor patients in hospital beds and at home. Care providers work from their homes, in offices at hospitals, or in a stand-alone facility that may or may not be owned by a hospital.

- On a daily basis, patients with chronic diseases use digital scales and digital blood pressure cuffs and transmit data to a care manager, who analyzes and contacts patient as needed

**19.1
million**

patients will use connected home monitoring devices by 2018

mHealth and Home Monitoring report, Berg Insight, 2014

5. Real-time intervention

Interventions include surgeries performed remotely via robotic surgical systems.

- A surgeon in Canada has carried out 20+ robotic operations, from colonoscopy to hernia repair, on patients 400 km away

- By 2025, the US Department of Defense aims to have a trauma pod that allows surgeons to operate on soldiers from a distance

Design Considerations

The practice of telemedicine happens in many locations, but the activities of telemedicine delivery fall into five categories.

Whether retrofitting telemedicine technology into an existing space or designing a new space for video communication, here are some basic principles to incorporate in telemedicine settings that may be using video. Three of the following use cases reference these guidelines.

Room location

- Eliminate distractions so that all participants can communicate and concentrate:

- 1) room is away from noise sources such as busy street and elevator, and
- 2) room is away from busy corridor and visual distraction

Room size

- Provide sufficient space for people and equipment to move around as necessary
- Provide open areas to maneuver a cart-based video camera and access patient, possibly from multiple angles
- Room size provides adequate field of view for chosen camera
- Viewing distances vary according to screen size

Background

- Background behind patient or caregiver is clean and uncluttered to reduce unnecessary distraction to person on the other end of the video connection
- Identification of health system, geographic location, or care provider's name is displayed in the camera view
- Background color needs to work well against all skin tones: light gray and robin's egg blue are ideal choices

Camera and display

- Participants will be looking at the display, not the camera. Make sure display is at eye level and place camera as close to eye level or slightly above as possible
- If patient may be in a variety of positions (seated, standing, lying on an exam table), a height-adjustable, mobile cart holding video camera is ideal
- Hardware devices, which may be sensitive and sophisticated, should be stored in a secure and stable location within the room

Design Considerations

Acoustics

- Be aware of background noises, such as those from heating, cooling and ventilation systems, which can interfere with participants' hearing each other
- Add sound-dampening materials to reduce room echo
- Patient confidentiality requirements also apply to telemedicine exams; consider what others may be hearing outside of the exam room and care provider location
- Some telemedicine installations may have an integrated microphone, others may have a tabletop microphone that can be moved for clear audio transmission

Lighting

- Rooms without windows are best. If that is not possible, add shades to control glare and light
- Avoid backlighting from windows and harsh lighting, which create shadows and dark areas on people
- Full spectrum, diffused, soft lighting is best
- Lighting should not alter color accuracy of video

Power

- Avoid cords and cables lying across the floor
- Ensure power and network connection will not be interrupted

Summary

The practice of telemedicine may be growing, but the spaces where it is delivered are not always optimized for the most effective encounters between patient and caregiver. Technology, while becoming a necessary part of care management, is often ugly and distracting from the focus on the patient. Spaces need to be designed to improve the digital interaction and experience between patient and care professional, providing the individualized and connected experience patients seek in their healthcare encounters.

According to Donald M. Berwick, MD, MPP, President Emeritus and Senior Fellow, Institute for Healthcare Improvement, relationships will be the foundation of healthcare's new age:

“That’s Era 3. The quest is clear. It’s not power or accountability or reward or punishment or score sheets or metrics or profit for its own sake. It’s a search for meaning in the value of the person who has come to honor us with his or her quest for some help. And we think to ourselves, is this a president? Is this a hero? Is this a mother? Is this a father? An artist? A craftsman? An honest laborer? A climber of hills? A singer of songs? Who is this person who honors me with their presence, and what can I do to help them?”¹

About this Work

Customer interactions and secondary research were conducted by Doug Bazuin and Nancy Nordstrom. A significant amount of the secondary research came from The Advisory Board, a global healthcare research and consulting organization.

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Special Thanks:	Ryan Anderson, Jolene DeJong, Nicole Jablonski, Amy Keyzer, and Randy Wilda

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¹Berwick, D., MD, The Moral Era: 2015 Keynote at the IHI National Forum, https://www.youtube.com/watch?v=DKK-yFn7e_o