

Original Research

Federal Efforts to Define and Advance Telehealth—A Work in Progress

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Abstract

Background: The integration of telecommunications and information systems in healthcare is not new or novel; indeed, it is the current practice of medicine and has been an integral part of medicine in remote locations for several decades. The U.S. Government has made a significant investment, measured in hundreds of millions of dollars, and therefore has a strong presence in the integration of telehealth/telemedicine in healthcare. However, the terminologies and definitions in the lexicon vary across agencies and departments of the U.S. Government. The objective of our survey was to identify and evaluate the definitions of telehealth/telemedicine across the U.S. Government to provide a better understanding of what each agency or department means when it uses these terms. **Methodology:** The U.S. Government, under the leadership of the Health Resources and Services Administration in the U.S. Department of Health and Human Services, established the Federal Telemedicine (FedTel) Working Group, through which all members responded to a survey on each agency or department's definition and use of terms associated with telehealth. **Results and Conclusions:** Twenty-six agencies represented by more than 100 individuals participating in the FedTel Working Group identified seven unique definitions of telehealth in current use across the U.S. Govern-

ment. Although many definitions are similar, there are nuanced differences that reflect each organization's legislative intent and the population they serve. These definitions affect how telemedicine has been or is being applied across the healthcare landscape, reflecting the U.S. Government's widespread and influential role in healthcare access and service delivery. The evidence base suggests that a common nomenclature for defining telemedicine may benefit efforts to advance the use of this technology to address the changing nature of healthcare and new demands for services expected as a result of health reform.

Key words: telemedicine, telehealth, U.S. Government, healthcare reform

Background

Telemedicine and telehealth are often used synonymously. While telehealth is a relatively new term, telemedicine has been in use for some time. Although there is disagreement as to the term's genesis, it is widely agreed that the practice of healthcare through the use of telemedicine was initiated in the 1960s.¹ From the start, the U.S. Government's role in the development and advancement of the use of telemedicine has been significant. In recent decades, several agencies have invested significant funds and ongoing support to advance telemedicine initiatives.^{2,3}

The breadth of the U.S. Government's investment in advancing the use of telehealth spans from expanded communications and public awareness to the integration with information technology (IT) to measuring the clinical efficacy of the use of telemedicine.⁴

One of the U.S. Government's key roles is to address market failures to protect the common good.⁵ As such, the U.S. Government supports services to a diverse set of communities and individuals. Each population base, whether because of its profession or personal circumstances (e.g., astronauts,⁶ military personnel,¹ or disaster victims^{6,7}) or because of limited access to healthcare services as a result of geography or limited communication (e.g., patients and physicians separated by some distance like in Massachusetts² and Nebraska⁸), can benefit from telemedicine and telehealth as a significant adjunct to traditional in-person healthcare as well as a tool to be incorporated into current systems of healthcare, education, and communication.

Organizations such as the U.S. Department of Agriculture (USDA)*, the U.S. Department of Health and Human Services (DHHS) (specifically the National Library of Medicine [NLM]²), the National Aeronautics and Space Administration (NASA),⁶ the U.S. Army's Telemedicine and

*USDA's support of telemedicine is available at www.healthcareitnews.com/news/usda-grants-support-telemedicine-rural-areas

Advanced Technology Research Center,^{9,10} and the Veterans Administration^{11,12} are but a few of the agencies or departments that have been involved in the development and support of telehealth and telemedicine. Within the DHSS, the Centers for Medicare & Medicaid Services (CMS) is also a key partner. This agency has the authority to evaluate and determine how the U.S. Government may reimburse for the use of telemedicine within the limits of the Medicare statute.

In addition, professional organizations, including the American Telemedicine Association (ATA) and broader medical associations such as the American Medical Association, have a history of collaborating with the U.S. Government to determine how to best integrate telemedicine and telehealth into the practice of medicine, including the development of practice guidelines.¹³

These private sector entities as well as others each have their own definition of telehealth and telemedicine, which is based on review of the literature or the evidence base.¹⁴⁻¹⁸

Federal Telehealth Workgroup

Since the latter half of the 20th Century, the U.S. Government's activity in telemedicine has been documented in both peer-reviewed literature and publicly available reports. These include the efforts initiated by NASA in the late 1950s and those supported by DHHS since the 1960s.^{4,19} Beginning in the 1990s, the NLM's² and the U.S. military's increased use of telemedicine has also been well documented.^{9,10}

In 1992, U.S. Vice President Al Gore identified telemedicine as a key component of the National Information Infrastructure.²⁰ Under the leadership of the U. S. Department of Commerce, the White House Information Infrastructure Task Force examined innovative uses of the National Information Infrastructure and coordinated National Information Infrastructure initiatives throughout the U.S. Government. In 1994, the Information Infrastructure Task Force created the Health Information Application Working Group (HIAWG), with a subgroup that focused on telemedicine. The HIAWG had representation from several Federal departments and agencies that were either using or were investing research dollars in telemedicine.²¹

In the mid-1990s, DHHS established the Office for the Advancement of Telehealth. It was determined that the leadership of the Office for the Advancement of Telehealth would coordinate and chair the functions of the HIAWG, which would be regularly convened to communicate and coordinate cross-Federal activities related to telemedicine. The HIAWG also championed several notable Federal initiatives through collaboration with the DHHS's Office of Rural Health Policy. These activities brought together a wide variety of clinicians, administrators, and policy makers to discuss the state-of-the-art in telemedicine, including definitions.

Some of these activities included telemedicine conferences sponsored by NASA in 1991 and 1994,²² a report by the Office of Rural Health Policy in 1997, the NLM activities related to telemedicine in 1998,² and the NLM/National Center for Research Resources activity and 2008.²³ Each of these activities brought together a wide variety of individuals from government, academia, and industry to discuss telemedicine and telehealth operations and research. These efforts, along with other federally sponsored meetings, helped to shape the definition,

dialogue, and policy related to telemedicine and telehealth. In 2008, researchers at Michigan State University brought together a diverse group of individuals from across the United States to participate in a federally funded workshop to address the "grand challenge" of successful telehealth implementation. This resulted in a series of white papers that outlined a roadmap for the future. This series of articles was published in the *Telemedicine and e-Health Journal* in 2008.²⁴⁻²⁹

In 1995, the HIAWG evolved into the Joint Working Group on Telehealth (JWGT), which helped prepare several congressional reports,³⁰⁻³² testified before the Federal Communications Commission on telemedicine issues, and prepared formal responses to the Federal Communications Commission and other regulatory initiatives, including commentary on technical issues, such as electromagnetic interference with medical devices. In January 1997, the JWGT produced a report summarizing the progress in the use of telehealth to the U.S. Congress.³³

Initially, the JWGT participants included only Federal participants, but over time the Working Group evolved to include representatives from the private sector in order to gain a wider range of expertise and engagement. Several organizations, including the American Medical Association, the ATA, the Center for Telemedicine Law, the Council on Competitiveness, the Federation of State Medical Boards, and the Koop Foundation participated in meetings with the JWGT to discuss their mutual concerns and participate in collaborative activities.




In 2004, the Secretary of the DHHS established the Office of the National Coordinator for Health Information Technology (ONC). The National Coordinator was tasked with coordinating cross-Federal efforts with respect to the use of health IT. In order to accomplish these efforts in 2005, the Secretary established the American Health Information Community, a federally chartered advisory committee tasked with providing recommendations to the Secretary on how to accelerate the adoption and use of health IT. In order to accomplish these efforts, several subcommittees were established to focus on key issues such as privacy and interoperability. A chronic care subcommittee was created to identify recommendations for how health IT might be leveraged to improve access and care for individuals with chronic conditions. This subcommittee, staffed by the ONC, identified telehealth and telemedicine as key resources to advance the care of individuals with chronic care to improve the quality and reduce overall costs. The subcommittee developed several recommendations intended to advance the use of telehealth, which were presented to the American Health Information Community in 2008.^{34,35}

In 2009, the Health Information Technology for Economic and Clinical Health (HITECH) Act was enacted as part of the American Recovery and Reinvestment Act. Under HITECH, DHHS authorized \$25.9 billion to promote and expand the adoption of health IT.^{36,†}

†HITECH funding of \$25.9 billion (the site was archived [original URL: 111th Congress. American Recovery and Reinvestment Act of 2009: Title XIII. 2009:1-407. Available at <http://hhs.gov/recovery/programs/#Health|Health> (last accessed July 19, 2013)] as cited by Wang and Huang³⁵).






FEDERAL EFFORTS TO DEFINE AND ADVANCE TELEHEALTH

Table 1. Federal Departments or Agencies That Are Members		
DEPARTMENT	SYMBOL	AGENCIES RELATED TO DEPARTMENT
Health and Human Services		
		Agency for Healthcare Research and Quality (AHRQ)
		Centers for Disease Control and Prevention (CDC)
		Centers for Medicare & Medicaid Services (CMS)
		Food and Drug Administration (FDA)
		Health Resources and Services Administration (HRSA)
		Indian Health Service (IHS)
		National Institutes of Health (NIH)
		Office of the Assistant Secretary for Preparedness and Response
		Office of the National Coordinator for Health Information Technology (ONC)
		Substance Abuse and Mental Health Services Administration
Defense		

Table 1. <i>continued</i>		
DEPARTMENT	SYMBOL	AGENCIES RELATED TO DEPARTMENT
		Department of the Army (Telemedicine & Advanced Technology Research Center [TATRC])
		U.S. Army Medical Department
		U.S. Department of the Navy
		National Center for Telehealth & Technology (T2)
Justice		
		Federal Bureau of Prisons
		National Institute of Justice
Labor		
Transportation		
Veterans Affairs		
Agriculture		
Commerce		

continued →

Table 1. Federal Departments or Agencies That Are Members
continued

DEPARTMENT	SYMBOL	AGENCIES RELATED TO DEPARTMENT
		International Trade Administration (ITA)
		National Institute of Standards and Technology (NIST)
Independent agencies		
		Federal Communications Commission (FCC)
		National Aeronautics and Space Administration (NASA)
		National Science Foundation (NSF)

Part of the HITECH Act authorized DHHS's CMS to encourage the adoption of electronic health records through financial incentives for the "meaningful use" of certified electronic health records technology to improve patient care. Although the "meaningful use" standards are subject to development in future rulemaking, proposed rulemaking indicates that features of telehealth may be incorporated into future standards.³⁷ Furthermore, in March 2010, U.S. President Barack Obama signed the Patient Protection and Affordable Care Act into law. This law authorizes the establishment of accountable care organizations with the intent to transform traditional fee-for-service reimbursement models into an approach to healthcare that rewards preventive measures and cost containment. Telehealth components such as the use of mobile technologies and remote patient monitoring are expected to play significant roles in these accountable care organizations.

Anticipating this shift in policy, in collaboration with the White House Office of Science and Technology Policy, the ONC established the Federal mHealth Collaborative in 2010. Within a year, it became apparent that there was a need for a cross-agency workgroup that expanded beyond mobile health (m-health) but included m-health under the broader umbrella. As a result, under the leadership of the Health Resources and Services Administration (HRSA) a cross-Federal workgroup on telehealth, called Federal Telemedicine (FedTel), was established. Endorsed by the Office of Science and Technology Policy, FedTel includes voluntary representation from

agencies and offices across the U.S. Government that have an interest in or investment in telehealth. The purpose of this group is to reduce organizational silos with respect to telehealth, facilitate telehealth education and information sharing among the members, coordinate funding opportunity announcements and other programmatic materials, and summarize the key telehealth activities of the participants. The workgroup convenes bimonthly and includes over 100 participants from agencies and departments as outlined in *Table 1*.

FedTel Structure, Roles, and Responsibilities

To increase efficiency and provide appropriate feedback to the FedTel, several subgroups were established based on priority topics: (a) access, (b) public education, (c) technology/innovation/standards, (d) health IT integration, (e) telebehavioral health; (f) m-health; and (g) emergency preparedness. At its inception, FedTel initiated coordination efforts through the establishment of a joint Web site for its federal members, which includes resources including telehealth-related documents and reports published by different agencies. The FedTel also established an inventory of telehealth-related activities as identified by all of the member organizations as of 2012. Additional information on FedTel can be found at www.healthdata.gov/data/dataset/cross-federal-workgroup-telehealth-fedtel-inventory-activities.

Materials and Methods

Each agency or department with an interest or activity in telemedicine was invited to participate in FedTel. Representatives of these agencies and departments were asked to provide information on the definition that is in current use by their organization, which was then collated into a comprehensive table (*Table 2*). Of the 12 agencies represented in FedTel, 7 provided at least one definition of telehealth as used by its respective agency, and 5 did not respond.

Input and definitions were solicited for the following terms: (a) telehealth, (b) telemedicine; (c) telemonitoring; (d) telepresence; (e) store-and-forward, and (f) m-health. HRSA was the only agency with specific definitions for telepresence and telemonitoring and, as such, will not be further discussed in the context of this article.

Results and Discussion

TELEHEALTH

As the recognized overarching category, the term "telehealth" garnered the most responses from across the federal agencies. Ten unique definitions from seven agencies representing 14 offices were received. Within the DHHS, there are six different definitions of telehealth in use across seven offices (*Tables 2 and 3*).

Given the large number of definitions submitted to the workgroup, an effort was undertaken to identify key commonalities and differences in the definitions put forth. The top five are summarized in *Table 4*. The principal differences among definitions are related to the inclusion or description of healthcare services, education, public health, health administration, and rural/underserved communities.

After discussion, all FedTel members agreed that "healthcare services" should be included in the definition of telehealth, and most

Table 2. Telehealth Definitions (Non-Department of Health and Human Services)

AGENCY/ OFFICE	DEFINITION ^{a,b}
USDA	Technologies, such as electronic information and telecommunications, that ensure the availability of quality healthcare services, education, and healthcare information to rural America. USDA Rural Development is working to improve collaborations with stakeholders to strengthen the healthcare infrastructure in rural communities and create telehealth projects.
DOC/NIST	Uses ATA's definitions: telemedicine and telehealth both describe the use of medical information exchanged from one site to another via electronic communications to improve patients' health status. Although the definitions are evolving, telemedicine is sometimes associated with direct patient clinical services, and telehealth sometimes associated with a broader definition of remote healthcare and is sometimes also perceived to be more focused on other health-related services.
DOD	T2: the use of electronic information and telecommunications technologies to support long-distance clinical healthcare, patient and professional health-related education, public health, and health administration
FCC	Often used as a synonym for e-care, but includes nonclinical practices such as continuing medical education and nursing call centers. E-care is the electronic exchange of information—data, images, and video—to aid in the practice of medicine and advanced analytics. Encompasses technologies that enable video consultation, remote monitoring, and image transmission ("store-and-forward") over fixed or mobile networks
NASA	Telemedicine is the interactive transmission of medical images and data to provide better healthcare for people in remote or "medically underserved" locations.
VA	"The wider application of care and case management principles to the delivery of healthcare services using health informatics, disease management and telehealth technologies to facilitate access to care and improve the health of designated individuals and populations with the intent of providing the right care in the right place at the right time."

^aDefinitions were provided by the Department/Agency representative in response to Federal Telemedicine queries. These responses should not be considered the formal, legal, or comprehensive definitions for each agency; such a determination was not within the scope of the Federal Telemedicine effort. The objective was to illustrate potential similarities and differences in telehealth-related definitions across the agencies.

^bNo responses were received from the U.S. Department of Homeland Security, U.S. Department of Transportation, National Science Foundation, U.S. Department of Justice, and U.S. Department of Labor.

AHRQ, Agency for Healthcare Research and Quality; ATA, American Telemedicine Association; CMS, Centers for Medicare & Medicaid Services; DOC/NIST, U.S. Department of Commerce/National Institute of Standards and Technology; DOD, U.S. Department of Defense; FCC, Federal Communications Commission; NASA, National Aeronautics and Space Administration; ONC, Office of the National Coordinator for Health Information Technology; USDA, U.S. Department of Agriculture; VA, Veterans Administration.

(4/7) included “education” in their definition. Three (NASA, DHHS/HRSA, and USDA) included rural/underserved in their definition. This inclusion can be traced back to the agencies’ respective missions, which include helping remote, underserved, and/or vulnerable populations. The U.S. Department of Defense and DHHS definitions of telehealth both include “public health” and “health administration” with identical definitions of telehealth: “the use of electronic information and telecommunications technologies to support long-distance clinical healthcare, patient and professional health-related education, public health, and health administration.” This inter-agency overlap is notable as no other interagency commonalities were found in this survey.

TELEMEDICINE

Four agencies provided five unique definitions of telehealth representing eight different offices (Table 5).

Agencies that reported a definition for telemedicine agreed that telemedicine constitutes a subset of telehealth and refers specifically to direct patient care. A large number of respondents—with the exception of the U.S. Department of Commerce/the National Institute

for Standards and Technology (NIST)—specified that telemedicine only includes real-time, direct patient care. The definition in use by NIST is broader than that of the other agencies and indicates that asynchronous data transmission of the following is included in their definition of telemedicine: videoconferencing, transmission of still images, e-health including patient portals, remote monitoring of vital signs, continuing medical education, and nursing call centers. This may be explained by the fact that NIST uses the ATA’s definition, and as the ATA is not a Federal agency, their stakeholder perspective is different from that of a Federal agency.

STORE-AND-FORWARD

Five store-and-forward definitions were reported from four agencies and six offices (Table 6).

Every agency and/or office agreed that store-and-forward concerns the asynchronous transmission of data (usually images) from one location to another to support a clinical consultation. The only difference, which is not merely semantic, was found in the specification by the CMS that, although services can be furnished using store-and-forward technology, those services generally are not

Table 3. Telehealth Definitions (Department of Health and Human Services)

AGENCY/OFFICE	DEFINITION ^{a,b}
AHRQ	Generally AHRQ adopts the definitions as they fit the problem, hypothesis under study, or research funding issue. As technology changes, the definition of a given term may change to be more inclusive or more focused depending on the intent of the user.
CMS	Telehealth (or telemonitoring) is the use of telecommunications and information technology to provide access to health assessment, diagnosis, intervention, consultation, supervision, and information across distance. Telehealth includes such technologies as telephones, facsimile machines, electronic mail systems, and remote patient monitoring devices that are used to collect and transmit patient data for monitoring and interpretation. Medicare defines telehealth more narrowly and makes payment for telehealth services only under certain circumstances specified by statute. ^c
ONC	Telehealth is the use of telecommunications technologies to deliver health-related services and information that support patient care, administrative activities, and health education. The technology is a means to improve access to care, while reducing cost of transportation and increasing convenience to patients' care.
HRSA NIH	Telehealth is the use of electronic information and telecommunications technologies to support long-distance clinical healthcare, patient and professional health-related education, public health and health administration. Technologies include videoconferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications.
IHS	Telehealth is the use of electronic information and telecommunications technologies to support health-related services that emphasize relationships and communication while facilitating improved healthcare quality, cost-effectiveness, and value. The telehealth toolkit encapsulates real-time videoconferencing, "store-and-forward" consultation, secure messaging, remote patient monitoring, and mobile health services.

^aDefinitions were provided by the Department/Agency representative in response to Federal Telemedicine queries. These responses should not be considered the formal, legal, or comprehensive definitions for each agency; such a determination was not within the scope of the Federal Telemedicine effort. The objective was to illustrate potential similarities and differences in telehealth-related definitions across the agencies.

^bNo responses were received from the U.S. Department of Homeland Security, U.S. Department of Transportation, National Science Foundation, U.S. Department of Justice, and U.S. Department of Labor.

^cCenters for Medicare & Medicaid Services (CMS) clarified that the definition here, provided in response to the Federal Telemedicine query, does not imply that all telehealth services are considered as such under Federal programs, nor are they covered and payable except under the circumstances specified in the statute [see, e.g., 42 USC §1395m(m) (defining and setting Medicare coverage and payment conditions for telehealth services)].

AHRQ, Agency for Healthcare Research and Quality; HRSA, Health Resources and Services Administration; IHS, Indian Health Service; NIH, National Institute of Health; ONC, Office of the National Coordinator for Health Information Technology.

Table 4. Commonalities and Differences in Definition of Telehealth

	USDA	DOC	DOD	DHHS				FCC	NASA	VA
				CMS	HRSA AND NIH	IHS	ONC			
Healthcare services	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Education	✓	✓	✓	✓	✓		✓			
Public health			✓		✓					
Health administration			✓		✓		✓			
Rural/underserved	✓			✓ ^a		✓			✓	

^aCoverage of Medicare telehealth services is limited by statute to services furnished to beneficiaries located in a rural area [see 42 USC §1395m(m)(4)(C)(i)].

CMS, Centers for Medicare & Medicaid Services; DHHS, U.S. Department of Health and Human Services; DOC, U.S. Department of Commerce; DOD, U.S. Department of Defense; FCC, Federal Communications Commission; HRSA, Health Resources and Services Administration; IHS, Indian Health Service; NASA, National Aeronautics and Space Administration; NIH, National Institutes of Health; ONC, Office of the National Coordinator for Health Information Technology; USDA, U.S. Department of Agriculture; VA, Veterans Administration.

Table 5. Telemedicine Definitions

AGENCY/ OFFICE	DEFINITION ^{a,b}
DOC/NIST	Telemedicine is the use of medical information exchanged from one site to another via electronic communications to improve patients' health status. Closely associated with telemedicine is the term telehealth, which is often used to encompass a broader definition of remote healthcare that does not always involve clinical services. Videoconferencing, transmission of still images, e-health including patient portals, remote monitoring of vital signs, continuing medical education, and nursing call centers are all considered part of telemedicine and telehealth.
DOD/T2	The use of medical information exchanged from one site to another via electronic communication to improve patients' health status. Telemedicine is a subcategory of telehealth.
DHHS/CMS	Two-way, real-time interactive communication between the patient and the physician or practitioner at the distant site. This electronic communication means the use of interactive telecommunications equipment that includes, at a minimum, audio and video equipment. Telemedicine is viewed as a cost-effective alternative to the more traditional face-to-face way of providing medical care (e.g., face-to-face consultations or examinations between provider and patient) that states can choose to cover under Medicaid. ^c
DHHS/HRSA DHHS/NIH	The use of electronic communication and information technologies to provide or support clinical care at a distance. Included in this definition are patient counseling, case management, and supervision/preceptorship of rural medical residents and health professions students when such supervising/precepting involves direct patient care.
VA	Telemedicine refers to remote care interactions between patients and providers via closed-circuit television at their nearest Community Based Outpatient Clinics. For many Veterans who live a significant distance from the medical center, telemedicine is a viable option.

^aDefinitions were provided by the Department/Agency representative in response to Federal Telemedicine queries. These responses should not be considered the formal, legal, or comprehensive definitions for each agency; such a determination was not within the scope of the Federal Telemedicine effort. The objective was to illustrate potential similarities and differences in telehealth-related definitions across the agencies.

^bNo responses were received from the U.S. Department of Homeland Security, U.S. Department of Transportation, National Science Foundation, U.S. Department of Justice, and U.S. Department of Labor.

^cThe Medicare statute describes and provides for payment of telehealth services at Social Security Act § 1834(m) (42 USC § 1395m(m)). There may be different formulations of definitions and policies for the purposes of Medicare and Medicaid.

CMS, Centers for Medicare & Medicaid Services; DHHS, U.S. Department of Health and Human Services; DOC/NIST, U.S. Department of Commerce/National Institute of Standards and Technology; DOD/T2, U.S. Department of Defense/National Center for Telehealth & Technology; HRSA, Health Resources and Services Administration; NIH, National Institutes of Health; VA, Veterans Administration.

considered—and therefore are not covered under Medicare—as telehealth services.[‡] The specification is based on the statutory authority given to the agency. The agency does not have authority to alter the definition without Congressional action [see Social Security Act § 1834(m)(1) (42 USC § 1395m(m)(1))].

M-HEALTH

The three reported definitions for m-health were provided by three separate agencies (Table 7).

Across these three offices, there is little difference in how m-health is defined. This is likely due to the term and concept being in its nascent phases. Although m-health is commonly considered to be technology deployed via a smartphone application, the U.S. Gov-

[‡]CMS regulations require that, in general, Medicare telehealth services are only those furnished using an interactive telecommunications system but include an exception to reflect the statutory requirement to permit payment for services furnished using store-and-forward technology for federal telemedicine demonstrations in Alaska and Hawaii [see 42 CFR §410.78(a)]. A broader range of services furnished using telehealth technology of all kinds might be covered under various state Medicaid plans.

ernment has a broader interest in this space, as seen in the annual mHealth Summit originated by the Foundation for the National Institutes of Health.

Conclusions

The primary purpose of this article is to provide an overview of Federal efforts to advance the use of telehealth and telemedicine and present the assorted definitions adopted by agencies and departments of the U.S. Government as these definitions relate to their primary missions. A common “Federal” definition may be elusive, especially when accounting for agencies or departments with unique populations or missions. Yet there is sufficient overlap that we believe a common definition is feasible for the terms discussed in above (telehealth, telemedicine, store-and-forward, and m-health).

Telehealth is a broader concept than telemedicine and addresses the use of information technologies not only for delivering medical care remotely, but also for delivering preventive health and other public health interventions remotely. Telemonitoring is a subset of remote healthcare used primarily within telemedicine and consists of the remote transmission of patient inputs (ether biologic or manual data entry) to the healthcare provider. Although it may be assumed that telemonitoring will result in better coordination of care by the

Table 6. Store-and-Forward Definitions

AGENCY/ OFFICE	DEFINITION ^{a,b}
DOC/NIST	Utilizes ATA's definition: S&F is a type of telehealth encounter or consult that uses still digital images of a patient for the purpose of rendering a medical opinion or diagnosis. Common types of S&F services include radiology, pathology, dermatology, and wound care. S&F also includes the asynchronous transmission of clinical data, such as blood glucose levels and electrocardiogram measurements, from one site (e.g., patient's home) to another site (e.g., home health agency, hospital, clinic).
DHHS/CMS	Transfer of data from one site to another through the use of a camera or similar device that records (stores) an image that is sent (forwarded) via telecommunication to another site for consultation. Asynchronous or "S&F" applications would not be considered telemedicine. ^c
DHHS/HRSA DHHS/NIH	HRSA (NIH utilizes HRSA's definition): information that is stored in a specific format and sent to a consulting provider for a diagnosis, interpretation, confirmatory opinion, second opinion, or for any reason that the input of the consulting provider is requested
FCC	Remote monitoring and image transmission ("store-and-forward") over fixed or mobile networks
VA	Telehealth involving S&F telehealth technologies acquire and store clinical information (e.g., data, image, sound, video) that is then forwarded to (or retrieved by) another site for clinical evaluation

^aDefinitions were provided by the Department/Agency representative in response to Federal Telemedicine queries. These responses should not be considered the formal, legal, or comprehensive definitions for each agency; such a determination was not within the scope of the Federal Telemedicine effort. The objective was to illustrate potential similarities and differences in telehealth-related definitions across the agencies.

^bNo responses were received from the U.S. Department of Homeland Security, U.S. Department of Transportation, National Science Foundation, U.S. Department of Justice, and U.S. Department of Labor.

^cCenters for Medicare & Medicaid Services (CMS) clarified that services furnished using asynchronous applications are considered to be Medicare telehealth services under certain circumstances [see Social Security Act § 1834(m)(1) (42 USC § 1395m(m)(1))]. Although there is no Medicare prohibition on the use of asynchronous applications to deliver services under conditions where they are not considered "telemedicine," CMS may not deem such services to constitute covered services for which payment could be made under Medicare.

ATA, American Telemedicine Association; DHHS, U.S. Department of Health and Human Services; FCC, Federal Communications Commission; HRSA, Health Resources and Services Administration; NIH, National Institutes of Health; S&F, store-and-forward; VA, Veterans Administration.

healthcare provider, the focus of the information transmission is unidirectional—from the patient to the provider. Telepresence is also a subset of telemedicine and involves the use of these technologies to simulate an in-person encounter between patient and provider. Lastly, store-and-forward is considered a special type or subset of telemedicine.

The term e-health is used more broadly to encompass all aspects of telehealth as well as other uses of digital technology related to

healthcare. *The Journal of Medical Internet Research* defines e-health as health services and information delivered or enhanced through the Internet and related technologies. M-health is similar but constrained to mobile technologies that are intended to be worn on or carried with the individual during normal daily activities.³⁸ There is a common misperception that e-health is restricted to the use of the Internet; however, components of e-health such as m-health, can be broader, including utilization of the cellular phone networks. There are

Table 7. Mobile Health Definitions

AGENCY/ OFFICE	DEFINITION ^a
DHHS/HRSA	A term used for the practice of medical and public health, supported by mobile devices. The term is most commonly used in reference to using mobile communication devices, such as mobile phones and personal digital assistants, for health services and information.
FCC	The use of mobile networks and devices in supporting e-care. Emphasizes leveraging health-focused applications on general-purpose tools such as smartphones and short message service (text) messaging to drive active health participation by consumers and clinicians
VA	Smartphone applications for self-management of health conditions 24/7. One example is posttraumatic stress disorder coaching.

^aDefinitions were provided by the Department/Agency representative in response to Federal Telemedicine queries. These responses should not be considered the formal, legal, or comprehensive definitions for each agency; such a determination was not within the scope of the Federal Telemedicine effort. The objective was to illustrate potential similarities and differences in telehealth-related definitions across the agencies.

DHHS/HRSA, U.S. Department of Health and Human Services/Health Resources and Services Administration; FCC, Federal Communications Commission; VA, Veterans Administration.

various interpretations as to how various terminologies such as telehealth, e-health, and m-health fit together. In spite of these disagreements as to the relation of each of these terms to one another, it is commonly agreed that any telehealth term implies that a health-care professional is somewhere in the communications network, even if only as a backup for situations such as alerts that fall outside of the automated, preprogrammed algorithm.

Inherent in the definition of telehealth and its related terminology is the understanding that IT can be used to support remote communications and digital data sharing for interactions that were previously only feasible through in-person encounters. Although e-health and m-health do not assume the need for the inclusion of the healthcare provider, they still support the concept of access to healthcare services or information sharing using IT.

Summary

As described above, the U.S. Government’s role in telehealth has been extensive and played a tremendous role in advancing its scope and impact. The creation of the JWGT in the 1990s and the more current FedTel activities, coupled with the extensive research that has been funded by the U.S. Government, suggests the need for a better understanding of the interpretation and related terminology being used to frame these efforts. Although some agencies and departments have a unique mission, DHHS is ultimately the U.S. Government’s arm of healthcare for the U.S. population and is responsible for implementing the law of the land when it comes to healthcare reform.

Although an official U.S. Government definition of telehealth or related terms may be elusive, it is critical that, as a community, Federal partners understand, accept, and embrace the integration of healthcare, IT, and health communications to enhance access to and advance the effective and efficient utilization of healthcare resources across the United States.^{39,40}

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Disclosure Statement

With the exception of J.J., all of the authors are current Federal employees. J.J., a Federal employee with DHHS during the development of these FedTel efforts, is currently with Aetna in Washington, DC. C.R.D. is on an Intergovernmental Personnel Assignment to NASA from the University of Cincinnati.

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