The Promise of New Technologies in an Age of New Health Challenges
A.J. Maeder et al. (Eds.)

doi:10.3233/978-1-61499-712-2-99

The Same Language Speak We Do – Consensus Terminology for Telehealth

Richard E SCOTT[a,b,1] and Maurice MARS[a]
[a] *Department of Telehealth, University of KwaZulu-Natal, South Africa*
[b] *NT Consulting - Global e-Health Inc., Calgary, Alberta, Canada*

Abstract. e-Health has grown to become interjurisdictional in scope and in practice. Central to successful implementation and scaling of e-heath solutions is clear and concise communication of ideas and principles, and instructions during construction. This paper addresses the need for an agreed taxonomy and terminology and focuses on explaining, proposing, and recommending terms and action for an international consensus-based terminology for telehealth. *Methods* Two structured database literature searches were performed to identify literature relevant to telehealth / telemedicine taxonomy or terminology. *Results* The terminology search identified 162 resources of which 4 met the inclusion criteria, while the taxonomy search identified 447 resources of which 5 met the inclusion criteria. Using these literature sources, a telehealth terminology was developed. *Discussion* The literature shows clear lack of and need for a common telehealth taxonomy and terminology. Of those proposed in the literature none has been universally adopted or applied. *Conclusions* Proponents of telehealth and those working in or aligned with the field, must develop, agree upon, adopt, and use clear and accurate telehealth terminology to ensure concise and accurate communication in the application of telehealth globally.

Keywords. Telehealth, terminology, taxonomy, definitions

Introduction

The myth of the Tower of Babel is commonly known – once different languages were imposed on workers, they could no longer understand one another and building of the Tower became impossible. *Bâbel* – the name of the Tower - means 'a confused noise'. This concept can be transferred to the context of e-health (the use of Information and Communication Technologies (ICT) for health [1]), where there has been substantial confusion generated due to a lack of a common taxonomy and terminology. Proponents of e-health have been largely responsible for this circumstance, as evidenced by the volume of definitions of both e-health and telemedicine/telehealth [2, 3]. Fatehi and Wootton identified that the terms 'telemedicine', 'telehealth' and 'e-health' are often used interchangeably, and concluded that the variation in the level of adoption for these terms suggested ambiguity in their definition and a lack of clarity in the concepts they refer to. These differences can exist within a country [4] or a profession [5].

When casually debating, when describing indicators and measures, or when striving to develop telehealth implementations, it is essential that a common understanding exist of what is meant by any particular term. There may be confidence about Integrated

[1] Corresponding Author: Richard E. Scott, NT Consulting - Global e-Health Inc., Calgary, Alberta, Canada. e-Mail: NTC.eHealthConsulting@gmail.com.

Services for Digital Network (ISDN), Internet Protocol (IP), and 4G, but whilst technology is an essential component of telehealth, it is not the core. Rather, the heart of telehealth lies in the skills, experience, and enthusiasm of the people involved which is conveyed in less technical terms. Further, the networked nature of telehealth (e-Health) requires that it cross many barriers or boundaries, making uniformity in understanding of the words exchanged central to building a strong foundation for each project, intervention, or policy. Consistent taxonomy and terminology is crucial to effective communication intra- and inter-jurisdictionally. At this time there is no single or universally accepted source available that describes or defines common terms applied within the telehealth environment.

A further complication exists. How do you create a stable taxonomy and terminology for something that is 'incomplete'? e-Health and its component parts (telehealth; health informatics; technology enabled and enhanced learning; e-commerce) are not fundamental 'laws' or 'constants'. The field is in a constant state of flux, with new ideas and technologies - and evolving capabilities - sprouting. Recently, social media have begun transforming e-health, a decade ago m-health was not common practice, and ten years before that neither was teleradiology. Just how many pieces are there to this e-health puzzle? Can e-health and its myriad components be accurately and concisely categorised, and defined or described at this time?

But without this, gaps in understanding arise creating inconsistencies, adversely impacting the quality of evidence, and damaging effective communication, interaction, and consultation amongst and between stakeholders - the public, healthcare providers, health system managers, researchers, and policy makers - in regard to e-health. This paper addresses the need for an agreed taxonomy and terminology within the telehealth setting. It provides insight regarding the terms taxonomy and terminology, and other closely related terms, discusses the current literature regarding taxonomy and terminology in relation to telehealth (telemedicine), and then provides a preliminary listing of recommended terms and their definition or description. Adoption and consistent use of these terms would ease precise data acquisition and meaningful comparison of initiatives, and facilitate more rapid and insightful knowledge growth.

A variety of words have been used when speaking of consistency in language for telehealth. These include:

- ***Glossary.*** A list of technical terms in some specialised field of knowledge
- ***Lexicon.*** A stock of terms used in a particular profession, subject, or style
- ***Ontology.*** An explicit formal specification of how to represent the objects, concepts and other entities that are assumed to exist in some area of interest and the relationships that hold among them
- ***Taxonomy.*** Classifying according to presumed relationships; division into ordered (hierarchical or networked) groups or categories
- ***Terminology.*** The vocabulary of technical terms used in a particular field, subject, science, or art
- ***Vocabulary.*** The sum of words used by, understood by, or at the command of a particular person or group.

These are not one in the same, and serve two types of purpose. One group refers to categorising or classifying terms (taxonomy, ontology), while the second group are more explanatory in nature, describing and / or defining terms (terminology, vocabulary, or lexicon). A 'glossary' is simply a list of the terms, whether categorical or defining. Here, the intent is not to develop an 'ontology', which is a far more philosophical debate than

a practical tool. Lexicon and vocabulary inter-relate and can be subsumed under 'terminology'. This leaves 'terminology' and 'taxonomy'?

Taxonomy is the practice and science of classification; ordering things into a hierarchical structure. The process creates a catalogue able to provide a conceptual framework for discussion, analysis, or information retrieval. A good taxonomy is simple, easy to remember, and easy to use. Within a taxonomy there is a need to be clear about what is meant by any word or phrase. For this a terminology is required, that is, a vocabulary of specialised terms that focus on clearly transmitting meaning and conveying concepts. More specifically, the International Standards Organization (ISO) indicates terminology is a "set of designations belonging to one special language" [ISO 1087-1], the main goal of which is to eliminate ambiguity by means of standardisation.

Since they are closely related and interdependent there is a need to concomitantly develop a common terminology whilst at the same time developing some taxonomic structure. These tasks are related but distinct goals, and must be clearly differentiated. Whilst a categorisation scheme is needed to form a common frame of reference, you cannot categorise until you know the full scope and clarity around the number and type of terms required. Thus, a terminology may have more entries than a taxonomy, but each entry from a taxonomy must also have a description or definition within a terminology!

1. Methods

To understand available literature, two searches of PubMed were completed. Searches of PubMed used the following strings: Telehealth AND (Terminology OR Vocabulary OR Lexicon OR Nomenclature), and Telehealth AND (taxonomy OR ontology). Inclusion criteria were: abstract available and direct reference to telehealth / telemedicine and a search term; no date restriction. Titles and abstracts were reviewed to determine inclusion or exclusion. These searches were supplemented by hand searching.

2. Results

The first search identified 162 resources of which 4 met the inclusion criteria, while the second search identified 447 resources of which 5 met the inclusion criteria. Despite the fundamental importance of the issue presented, the literature shows limited work on either telehealth taxonomy or terminology [4, 6-13].

The taxonomy related search identified 5 papers. Vincent and colleagues created a taxonomy by identifying four characteristics against which a telehealth encounter could be matched [12]. These were: the type of telehealth interaction, the location of the controlling medical authority, the urgency of care required, and the timing of the communication (real-time or synchronous, versus store-and-forward or asynchronous). Using these parameters a matrix was created which the authors considered was comprehensive in categorising telehealth activities, and had distinct advantages over previous taxonomies. In the same year, Tulu et al. created a taxonomy they intended to help categorise and compare existing programmes and help in planning for future programmes [13]. The authors used five dimensions to classify telemedicine activities: application purpose, application area, environmental setting, communication infrastructure, and delivery options. Each dimension had multiple sub-dimensions. This

model was then used in an analysis of data from the Telemedicine Information Exchange (TIE) to identify trends while comparing and categorising 211 active telehealth programmes. The authors anticipated that application of telemedicine in different application areas would use different combinations of options available in the delivery dimension for different purposes. Their analysis validated the model and provided interesting insight into active telehealth programmes.

In 2011 Bashshur et al. presented a comprehensive discussion, analysis, and ultimately a taxonomy of telemedicine [11]. Certain debatable positions were taken regarding various terms in the analysis, highlighted and discussed by the authors (e.g., differentiation of telehealth and telemedicine), but were secondary to the task of creating a taxonomy. The final taxonomy presented had functionality, applications, and technology as the first level dimensions, each of which was then split into additional sub-dimensions, and each of those then had further sub-divisions. The authors concluded by noting that confusion around nomenclature and taxonomy hinders research and implementation by impeding research focussed on the true benefits and costs, and by interfering with informed decision-making by stakeholders. The authors urged clarity and consensus regarding what constitutes the content of telemedicine, telehealth, e-health, and m-health. This is something that would be significantly aided by establishment of a common taxonomy.

More recently Santana et al. presented the Telehealth Ontology (TEON) for the delivery of telehealth services in an attempt to differentiate telehealth service from telehealth practice [9]. Interestingly they promoted the use of both ontologies and/or terminologies but chose to address ontology to create domain-specific, controlled terms. Colucci took a more reflective approach, and highlighted that the issue is not just theoretical, but has practical ramifications in preventing useful comparison between initiatives, impeding repeatable research, and hindering identification of lessons thereby interfering with proper applicat7777ion of ICT in healthcare [10]. He then performed an etymological analysis using the terms ‘telehealth’ and ‘telemedicine’ as the starting point. A classification scheme with domains, subdomains, and actions was presented, but its general applicability is unclear.

The terminology related search identified 4 papers. Doarn et al. surveyed members of the Federal Telemedicine Working Group representing 26 US Government agencies [4]. They found that the terminologies and definitions in the lexicon of those agencies varied. They also found that although similar, the individual definitions used were nuanced to reflect each organisation's legislative intent and the population they served; that is, they were stipulative definitions. Although they concluded that a common nomenclature for defining telemedicine would be of benefit, they did not proffer such. However, they did highlight important aspects by acknowledging the term e-health broadly encompasses all aspects of telehealth as well as other uses of digital technology related to healthcare, that telemedicine is subsumed under telehealth, and that a common misperception is that e-health is restricted to use of the Internet.

Reynolds et al. addressed the tele-intensive care unit, and developed a comprehensive lexicon (terminology) for activities and technology solutions applied to the tele-intensive care setting [6]. These authors created a set of general, structural, and care model ‘Descriptors’ for the tele-Intensive Care Unit (ICU). Some of the approaches may have value in looking towards a broader terminology for telehealth.

In 2010, Ludwig and colleagues performed a systematic literature review to examine and develop a nomenclature for sensor enhanced trans-institutional health information system architectures for home telehealth services for elderly people [8]. These authors

proposed six important descriptor groups that influence design of home telehealth architectures; users, services, operating organisations, information flow, geographic reach, and architectural paradigm. Specific terms were identified for each of the six descriptor groups, and then each of these discussed in some depth. Specific definitions were not provided. Ingenerf, in 1999, focussed on terminology servers (servers for supporting the semantic interoperability between software systems) as a means for improving the interpretability of medical language data by machines, but did not address a specific terminology for telehealth or telemedicine [7].

Handsearching of the literature provided additional insight. Canada Health Infoway produced in 2006 its first Benefits Evaluation (BE) Indicators Technical Report [14], and later in 2012 version 2 [15]. Intended to provide guidance to those planning evaluations of the benefits of e-health, they contained clear definitions or descriptions of various indicators, which is a rich source of potential terms to be considered. The first version also contained a listing of telehealth related terminology (Appendix A4), much of which has been used below, some with slight modification. Also, in the late 1990's, the Australia New Zealand Telehealth Committee (ANZTC) did excellent work in preparing a document entitled the ANZTC Telehealth Data Definitions Summary. The document is no longer available but was reported on elsewhere [16]. Within that document the Committee listed 30 'items' (within 5 'entities'; telehealth facility, telehealth session, client, healthcare worker, and telehealth service). Each item was defined, and additional insight was provided including context, guide for use, source, and comment. This work did not receive widespread publication, acknowledgement, or application.

Other literature referred to the task of defining fundamental terms such as e-health, telehealth, and telemedicine. For example, in 2007 Sood et al. identified 104 definitions of telemedicine from 1974 to 2003 [2], discussed their theoretical basis, and proffered a revised definition of telemedicine: "a subset of telehealth, (telemedicine) uses communications networks for delivery of healthcare services and medical education from one geographical location to another, primarily to address challenges like uneven distribution and shortage of infrastructural and human resources." These authors noted that definitions do not reflect the evolution of technology and perspective that is an inherent property of such a dynamic field as telemedicine. To this point, none of the proposed taxonomies, terminologies, or definitions identified above have prevailed.

3. Discussion

There has been a substantial amount of miscommunication generated within the telehealth (e-health) field due largely to a lack of common taxonomy and terminology. This may have derailed effective interaction and consultation amongst and between stakeholders, including healthcare providers and policy makers, in regard to telehealth. Such feelings have been voiced for at least two decades, reported by Shannon conveying discussion from the Atlantic Rim Telemedicine Summit in 1997 [17]. That report stated "belief was expressed that, rather than being merely an issue of semantics, revised terminology could very well lead to an improved environment for cooperation and collaboration among all players in the healthcare system, including consumers / patients".

A critical process in developing common terminology is the process of creating definitions. A *definition* can be considered a statement of the meaning of a word, phrase, or term. Over decades a world of varied and variable terminologies, taxonomies, and glossaries have been created within telehealth. Much of the process has been *ad hoc* and

strongly influenced by the prevailing organisational culture and practice of those who created the terms and defined them. Little heed has been paid to either basic pragmatic or linguistic principles, or what occurs globally. Since definitions are tools upon which all should depend, it is incumbent on those who would create definitions to use specified principles to develop them. Solli et al. promoted an approach that shunned logical principles in favour of *pragmatic principles* (based primarily on practical concerns rather than ideological notions) and *linguistic principles* (abstract rules and grammar applicable to a language) [18]. This approach has been adopted here in selecting and recommending the terminology in Appendix 1.

Linguistically, the type of definition considered here has two parts, the *definiendum* (the word or phrase to be defined) and the *definiens* (word or group of words that defines it). For example, in; 'e-Health is the use of Information and Communication Technologies (ICT) for health' the word e-Health is the *definiendum*, and everything after the word "is" is the *definiens.* Pragmatically, a good definition would be one that is simple, succinct, sufficient, and specific. Simple in using language that is easy to understand, succinct in being focussed (neither too wide nor too narrow in context and content), sufficient in providing the essential attributes of the *definiendum*, and specific in being suitably precise and focussed that it is impossible for the definition to refer to any other entity than the *definiendum*. It is also preferable that definitions not be circular (e.g., stating 'Calgary is in Canada' may be a true statement, but offers no evidence that is distinct from the conclusion) or negative (e.g., defining health as 'not sick').

Even differentiating between 'describing' and 'defining' is important at this early stage of development of a cohesive taxonomy and terminology. A *description* is a textual representation of the nature and characteristics of something. In contrast, a *definition* is a statement of the meaning of a word, phrase, or term that serves to differentiate it from related concepts. The former is looser. Without consensus and common application it might be premature to suggest some terms can be adequately defined.

A final consideration is recognising and differentiating *stipulative* definitions (those that provide a meaning the writer intends to impose upon it) from *descriptive* definitions (those that provide the meaning that a term bears in general use). Most literature definitions are stipulative. It is instructive to consider some published e-Health examples.

After almost 20 years in use, the term e-Health is still debated. Pagliari et al. performed extensive work examining the term e-Health, grounding their work in potential e-Health areas and issues, an opportunistic and iterative search of the literature, and 36 definitions of e-Health garnered from the literature (Table 4 in their paper) [19]. Their work was heavily influenced by the perspective of medical informatics, and they concluded by supporting the definitions of Eng and a slightly modified version of one offered by Eysenbach [20, 21].

Eysenbach suggested in 2001 that e-Health be defined as: "e-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve healthcare locally, regionally, and worldwide by using information and communication technology" [21]. A simpler definition was provided by Eng also in 2001, e-Health is "the use of emerging information and communications technology, especially the Internet, to improve or enable health and healthcare" [20]. However, neither of these references are satisfactory, failing to meet the desirable pragmatic characteristics of simple, succinct, sufficient, and specific. Furthermore, the

use of terms such as 'the Internet' or 'emerging' immediately stale-date a definition and render it of little lasting value - the implication would be that all alternate or preceding use of ICT for health would no longer fit the definition and be excluded.

Often overlooked is the definition of e-health first applied by the WHO in 2005: "e-Health is the use of Information and Communication Technologies (ICT) for health" [1]. This remains the simplest and most accurate definition of e-health available, meeting both pragmatic and linguistic principles. Although itself debated [22] the common definition of 'health' (formulated in 1948 and supported in the Alma-Ata Declaration of 1978) is that of the WHO: health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" [23]. With the advent of 'e' (electronic means provided through use of ICT), the above WHO definition for e-Health follows naturally. However, this definition remains very underutilised. Indeed, Showell and Nøhr [24] suggested "There is no useful definition for eHealth; …" and Moghaddasi et al. [25] stated "developing a clear definition of e-Health is needed", both as recently as 2012.

Another group involved in establishing or embedding terminology, often indirectly, are 'standards' organisations, of which many exist both nationally and internationally. International organisations include the International Standards Organisation (ISO), the International Telecommunications Union (ITU), and the European Committee for Standardization (CEN). These and other standards organisations, often led by health informaticians, began their consideration of telehealth under the rubric of Health Informatics. This reveals historical bias; towards subsuming telehealth and telemedicine under health informatics or medical informatics (rather than telehealth and health informatics being independent branches under e-health), and a focus on data exchange and data manipulation (i.e., computing). Given this focus, an intent of many of these standards organisations is to achieve semantic interoperability for unambiguous data exchange between computer systems. However, evidence shows standards organisations either accept the discordant and *ad hoc* situation, add to the confusion by providing other stipulative definitions or descriptions of a term, or - most commonly - by using prior, flawed definitions. For example, the ITU [26] applies the definitions for e-Health of Mitchel [27] and Eysenbach [21], and not the definition provided by the WHO [1].

4. Towards a Telehealth Terminology

Terminology is considered a discipline, and is context specific; thus there can be military terminology, policy terminology, scientific terminology, technical terminology, and certainly telehealth terminology. To this point in time, *ad hoc* terminology has been prevalent within telehealth; a more systematic telehealth terminology is needed. According to Wikipedia, terminology as a discipline is based on its own theoretical principles and the following aspects [28]:

- analysing the concepts and concept structures used in a field or domain
- identifying the terms assigned to the concepts
- in the case of bilingual or multilingual terminology, establishing correspondences between terms in the various languages
- compiling the terminology, on paper or in databases
- managing these terminology databases
- creating new terms, as required.

This understanding (together with pragmatic (simple, succinct, sufficient, specific) and linguistic principles) provides important guidance in terms of how to move forward. These principles were used as touchstones when selecting or developing the proposed terminology listed in Appendix 1.

Conclusion

The literature is clear that taxonomy and terminology in the broader field of e-health (including telehealth and telemedicine) is largely *ad hoc* at this time, and that this lack of clarity causes issues for all stakeholders related to basic understanding, research, implementation, and strategy and policy development. Proponents working in or aligned with telehealth must develop and agree upon a clear and accurate telehealth terminology to stop this abuse of terms, and ensure clear, concise, and precise communication in the concept, design, and application of telehealth globally.

A clear and standard terminology is needed that uses natural language to define or describe concepts. Creating any standard requires unanimous agreement of all partners involved which, given differing legal, cultural, and practice settings, is a tall order. However, the value to the telehealth domain would be immense.

This paper proffers pragmatic definitions or descriptions for common elements within the field of telehealth (Appendix 1). Their widespread adoption, active use, and citation is encouraged. With the support of the telehealth community - that is, with ***your*** support - these could form the basis for a globally accepted standard terminology for telehealth.

Appendix 1. Definitions / Descriptors for Proposed Common Telehealth Terminology

i) Fundamental Descriptors and Definitions

e-Health (Definition): The use of Information and Communication Technologies (ICT) for health [1].

Health (Definition): A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity [23].

Telehealth (Definition and Descriptor): A component of e-Health that uses Information and Communication Technologies (ICT) to deliver health and health related services (*Definition*). These services can be clinical, educational, administrative, or research based. Telehealth is different from telemedicine because it refers to a broader scope of ICT facilitated health and health related services than telemedicine (*Descriptor*).

Telemedicine (Definition): A component of Telehealth that uses ICT to deliver clinical services.

ii) Telehealth Infrastructure Descriptors

Telehealth Unit (Descriptor): The related group of elements (hardware and software, including peripheral devices) that comprises a distinct and functioning apparatus that can be used to perform a specific *Telehealth Activity, Application, or Service* [see definitions below]. A *Telehealth Unit* may be static, mobile, or handheld, and includes units for off-site and personal use.

Telehealth Facility (Descriptor): A discrete and identifiable physical location (e.g. dedicated room, or dedicated space within a room) from which telehealth related pursuits are

provided or received. A *Telehealth Site* (see below) may have more than one *Telehealth Facility*.

Telehealth Site (Descriptor): A discrete and identifiable geographic location (e.g. healthcare facility, clinic, campus) from which one or more *Telehealth Activities, Applications, or Services* are provided or received. This will include 'client' homes and other more mobile locations as home and personal telehealth activities expand.

iii) Telehealth Service Provision Definitions and Descriptors

Telehealth Session (Definition): A period of time set aside or used for a telehealth-related activity.

Audioconference (Definition): A telephone meeting conducted between two or more separate callers in which participants can only hear one another.

Videoconference (Definition): A meeting conducted between two or more separate callers in which the participants can hear and see still or motion video images of each other or recorded material.

Teleconference (Definition): A generic term for a meeting held virtually or 'at a distance'. The term would include both audio- and video-conferences.

Consultation (Definition): A meeting with an expert in order to seek advice. In the clinical setting the expert would be a healthcare provider.

Teleconsultation (Definition): A consultation provided remotely using some form of ICT to facilitate the process.

Telehealth usage (Definition): The rate at which telehealth services are accessed; measured as 'consultations per site per week (c/s/w) [29].

Telehealth uptake (Definition): For a given user population, the percentage change in usage of telehealth services month over month.

User satisfaction (Descriptor): The degree to which the user's needs were met through the telehealth experience. "User" is relative and may refer to any consumer of telehealth (i.e., provider, patient, citizen etc.).

iv) Descriptors of Functional and Maturing Telehealth Implementations

Telehealth Activity (Descriptor): A telehealth mediated pursuit, at the *experimental, pilot, or formative evaluation* stage.

Telehealth Application (Descriptor): A traditional or novel healthcare related pursuit (clinical, administrative, research, or educational) at the *summative evaluation* stage or demonstrated through sustained application (> 1 year) to be *effectively facilitated* through the use of telehealth.

Telehealth Service (Descriptor): A specific and proven *Telehealth Application* offered routinely between *Telehealth Sites*, ideally within a *Telehealth Programme* [e.g.; Forensic Telemental Health Assessment; Pre-catheterisation Teleassessment; Home Telemonitoring].

Telehealth Programme (Descriptor): A distinct, appropriately conceived, designed, staffed, managed, and funded set of *Telehealth Services* orchestrated under a common theme and common administrative structure [e.g.; Telemental Health Programme; Telecardiology Programme; Home Telehealth Programme]. Ideally a telehealth programme will be accredited.

Telehealth Network (Descriptor): An aggregation of *Telehealth Programmes* and / or *Applications* linked to one another through some form of common communications and administrative structure [e.g.; the Ontario Telemedicine Network (OTN), Veterans Administration (VA) Telehealth Services].

Telehealth Setting (Descriptor): A distinct type of facility at which a *telehealth session* is performed (e.g.: hospital, community health centre, community health facility (Long Term Care facility / residential care facility), general practice, specialist practice, home, or other).

Telehealth Integration (Definition): The degree to which telehealth is seamlessly integrated within the existing healthcare system.

v) Administration and Scheduling Related Descriptors

Differentiating sending and receiving sites:

- For clinical telehealth activities (Definitions).
  Note: In practice, a clinician will 'refer' or 'send' a patient to another more experienced or specialised clinician who 'receives' the request; therefore:
  - Receiving site is that site at which the specialist or clinician who 'receives' the request is located (to whom the request is referred).
  - Sending site is that site at which the clinician who refers (and / or the patient) is located (from whom the request is sent).
- For administrative meetings facilitated via telehealth (Descriptor).
  - No distinction is made between any sites as delivering or receiving. Each site is considered to be participating on an equal footing.
- For educational telehealth activities (Technology Enabled / Enhanced Learning) (Definitions and Descriptor):
  - Sending site is that site at which the primary presenter is located.
  - Receiving site(s) is that/are those site(s) at which the learners are located.
  - Hybrid sessions may occur, where sessions are delivered from 2 or more sites.

vi) Governance Related Definitions and Descriptors

Telehealth Policy (*Definition*): A set of statements, directives, regulations, laws, and judicial interpretations that direct and manage the life cycle of telehealth [30].

e-Health Strategy (Descriptor): An evidence- and needs-based document that describes where and why an entity (healthcare facility, region, country) requires specific e-health options to address identified health needs [31]. Designed and prepared correctly, the e-health strategy aligns with related strategies (e.g., Health Strategy, Education Strategy, Communications Strategy) and is agnostic to technology, invoking e-health only when other solutions to the health need(s) are shown to be inappropriate.

References

[1] World Health Organisation. eHealth - http://www.who.int/topics/ehealth/en/ accessed August 2016.
[2] Sood, S., Mbarika, V., Jugoo, S., Dookhy, R., Doarn, C.R., Prakash, N., Merrell, R.C. What is telemedicine? A collection of 104 peer-reviewed perspectives and theoretical underpinnings. *Telemedicine and e-Health* **13** (2007), 573-590.
[3] Oh, H., Rizo, C., Enkin, M., Jadad, A. What is eHealth (3): a systematic review of published definitions. *Journal of Medical Internet Research* **7** (2003), e1.
[4] Doarn, C.R., Pruitt, S., Jacobs, J., Harris, Y., Bott, D.M., Riley, W., Lamer, C., Oliver, A.L. Federal efforts to define and advance telehealth—a work in progress. *Telemedicine and e-Health* **20**(2014), 409-418.
[5] Friesen, E.L., Theodoros, D., Russell, T.G. Assistive technology devices for toileting and showering used in spinal cord injury rehabilitation – a comment on terminology. *Disability and Rehabilitation: Assistive Technology* **11** (2016), 1-2.
[6] Reynolds, H.N., Rogove, H., Bander, J., McCambridge, M., Cowboy, E., Niemeier, M. A working lexicon for the tele-intensive care unit: we need to define tele-intensive care unit to grow and understand it. *Telemedicine and e-Health* **17** (2011), 773-83.
[7] Ingenerf, J. Telemedicine and terminology: different needs of context information. *IEEE Transactions on Information Technology in Biomedicine* 3 (1999), 92-100.
[8] Ludwig, W., Wolf, K.H., Duwenkamp, C., Gusew, N., Hellrung, N., Marschollek, M., von Bargen, T., Wagner, M., Haux, R. Health information systems for home telehealth services–a nomenclature for

sensor-enhanced transinstitutional information system architectures. *Informatics for Health and Social Care* **35** (2010), 211-25.
[9] Santana, F., Schulz, S., Campos, A., Novaes, M.A. Towards a Formal Representation of Processes and Objects Regarding the Delivery of Telehealth Services: The Telehealth Ontology (TEON). *Studies in Health Technology and Informatics* **216** (2014), 1108.
[10] Colucci, M. Communication technologies through an etymological lens: looking for a classification, reflections about health, medicine and care. *Medicine, Health Care and Philosophy* **18** (2015), 601-606.
[11] Bashshur, R., Shannon, G., Krupinski, E., Grigsby, J. The taxonomy of telemedicine. *Telemedicine and e-Health* **17** (2011), 484-94.
[12] Vincent, A., Cusack, C.M., Pan, E., Hook, J.M., Kaelber, D.C., Middleton, B. A New Taxonomy for Telehealth Technologies. AMIA Annual Symposium proceedings / AMIA Symposium. AMIA Symposium 2006 Dec (pp. 1145-1145).
[13] Tulu, B., Chatterjee, S., Maheshwari, M. Telemedicine taxonomy: a classification tool. *Telemedicine and e-Health* **13** (2007), 349-58.
[14] Canada Health Infoway. Benefits evaluation indicators technical report. 2006. Available at https://www.infoway-inforoute.ca/en/component/edocman/184-benefits-evaluation-indicators-technical-report/view-document?Itemid=101 accessed June 2016.
[15] Canada Health Infoway. Benefits evaluation indicators report version 2.0. 2012. Available at https://www.infoway-inforoute.ca/en/component/edocman/450-benefits-evaluation-indicators-technical-report-version-2-0/view-document?Itemid=101 accessed June 2016.
[16] Scott, R.E., McCarthy, G.F., Jennett, P.A., Perverseff, T., Palacios, M., Rush, B. *N*ational *T*elehealth *O*utcome *I*ndicators *P*roject [*NTOIP*] - Project Information Document and a Synthesis of Telehealth Outcomes Literature. Health Telematics Unit, University of Calgary, March 2003.
[17] Shannon, G.W. The Atlantic Rim Telemedicine Summit. *Telemedicine Journal* **3** (1997), 269-96
[18] Solli, H., Bjørk, I.T., Hvalvik S, Hellesø R. Principle-based analysis of the concept of telecare. *Journal of Advanced Nursing* 68 (2012), 2802-2815.
[19] Pagliari, C., Sloan, D., Gregor, P., Sullivan, F., Detmer, D., Kahan, J.P., Oortwijn, W., MacGillivray, S. What is eHealth (4): a scoping exercise to map the field. *Journal of Medical Internet Research* **31** (2005), e9.
[20] Eng, T.R. The eHealth landscape: a terrain map of emerging information and communication technologies in health and health care. Princeton, NJ: Robert Wood Johnson Foundation; 2001 Nov 9.
[21] Eysenbach, G. What is e-health? *Journal of Medical Internet Research* **3** (2001), e20.
[22] Huber, M., Knottnerus, J.A., Green, L., van der Horst, H., Jadad, A.R., Kromhout, D., Leonard, B., Lorig, K., Loureiro, M.I., van der Meer, J.W., Schnabel, P. How should we define health? *BMJ* **343** (2011), d4163.
[23] Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948.
[24] Showell, C., Nonab, C. How Should We Define eHealth, and Does the Definition Matter? In: *Quality of Life Through Quality of Information*: Proceedings of MIE2012; Mantas J, Anderson SK, editors. Amsterdam, Netherlands: IOS Press; 2012. 881-884
[25] Moghaddasi, H., Asadi, F., Hosseini, A., Ebnehoseini, Z. e-Health: a global approach with extensive semantic variation. *Journal of Medical Systems* **36** (2012), 3173-3176.
[26] ITU-T SG 16 Work on E-health - Definition of some terms related to e-health technologies. http://www.itu.int/en/ITU-T/studygroups/2013-2016/16/Pages/ehealth_terminology.aspx accessed August 2016.
[27] Mitchell, J. From telehealth to e-health: The unstoppable rise of e-health. Canberra: National Office for the Information Economy. Department of Communications, Information Technology and the Arts. 1999.
[28] Wikipedia. Terminology. https://en.wikipedia.org/wiki/Terminology accessed August 2016.
[29] Mars, M., Scott, R.E. Telemedicine service use: a new metric. *Journal of Medical Internet Research* **14** (2012), e178.
[30] Scott, R.E., Chowdhury, M.F., Varghese, S. Telehealth policy: looking for global complementarity. *Journal of Telemedicine and Telecare* **15** (2002),55-57.
[31] Scott, R.E., Mars, M. Principles and framework for eHealth strategy development. *Journal of Medical Internet Research* **5** (2013), e155.