



Digital Health – Standardizing Terminologies

Submission to
World Health Organization



Team Members

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FOREWORD

Digital Health has now become the default operating system for healthcare. As we move towards mass adoption, one major challenge is talking about digital health in multiple terminologies. To some extent, the long-drawn evolution of digital health is the culprit, and also, academicians have played their role in coining their random terms starting with 'Television Medicine' (Telemedicine), then eHealth, virtual health, telehealth, online health, mhealth and so on. Today, there are so many terminologies in vogue, and they are confusing the end-user. It is the right time we address this fundamental issue and take a dispassionate look at the evolution pre-COVID and revolution post-COVID and agree on the standard definition of Digital Health, Digital Consultations and other constituents.

This paper/report is a compilation of the journey of Digital Health over the past three decades, and towards the end, I have made a recommendation about the probable definition of Digital health and Digital Consultations.

This document should serve as a good primer for debate and work toward standardizing terminologies in Digital Health. Special thanks to Mr. Salim Azzabi Zourag from WHO, for his valuable time and inputs. My team deserves appreciation and thanks for the hard work.

Dr. Rajendra Pratap Gupta, PhD.
Founder
Health Parliament
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METHODOLOGY

The aim of this project is to formulate universally accepted (standardize) definition for digital health terminologies. The eight most well-known and overlapping terms have been covered. All the definitions are taken directly from global organizations or relevant medical journals. We have included key applications and remarks for each term. The application provides the definition's context, and we have added our observations in the remarks. We covered from the earliest to most recent definitions for each terminology to demonstrate the evolution. We have proposed a comprehensive definition of 'Digital Health' covering all the dimensions.

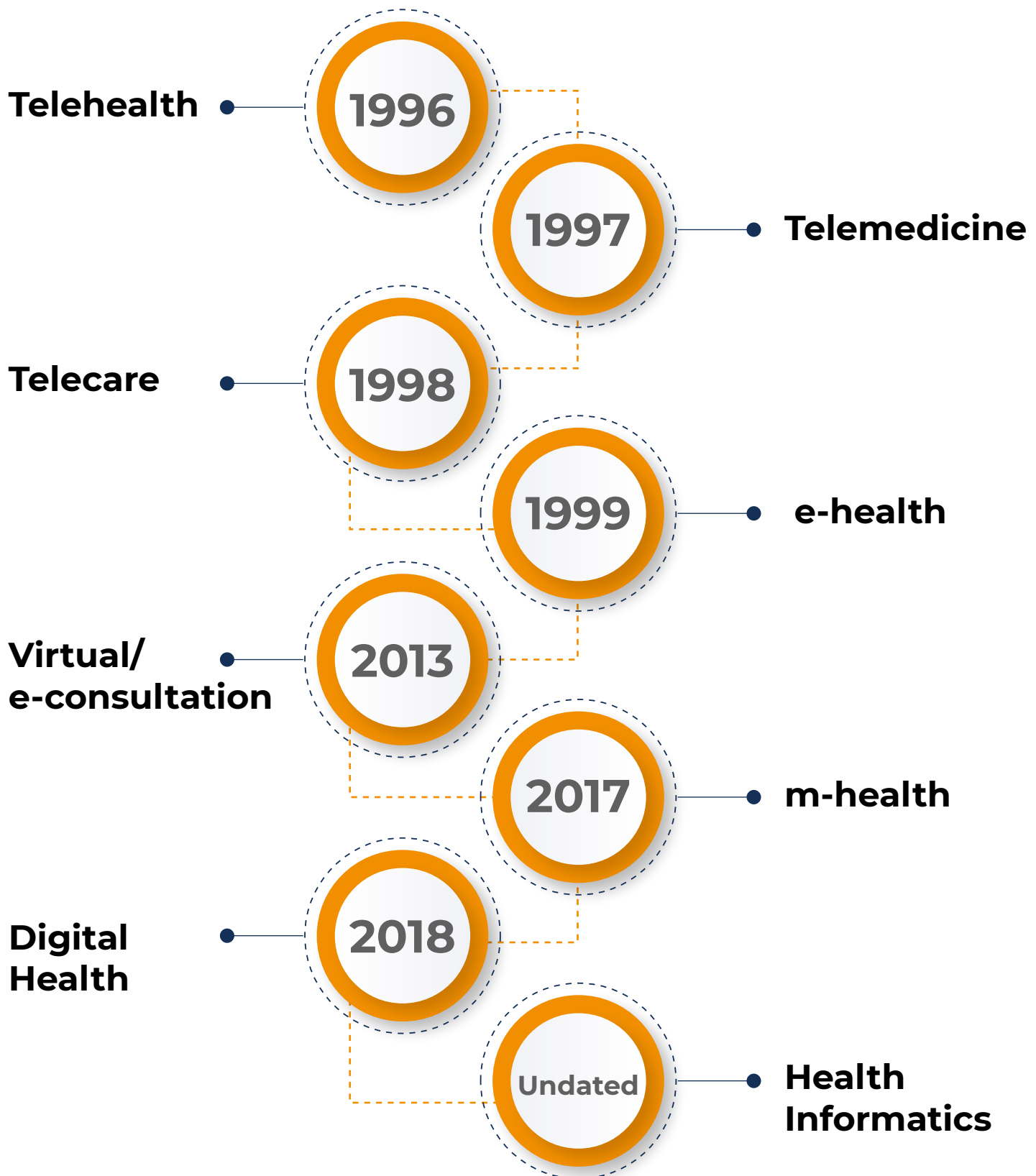
A frequency table is created based on the data on which the analysis has been performed. We have listed the most common and recurring applications and dimensions across all the terms. The frequency table shows the number of definitions of each term covering a particular application or dimension. E.g., out of seven definitions of telemedicine, two cover information and communication technology (ICT) as an application or dimension. In the frequency table, each terminology's name is followed by the number of definitions that were cited.

Further, to formulate a universal definition for each terminology, we have also built individual pie charts that illustrate the percentage of all dimensions that each term covers. The pie charts will help us decide which aspect to emphasize as we create a comprehensive definition.

The Venn diagram illustrates the scope of a terminology in terms of definitions covered. For instance, Digital Health covers most dimensions, followed by eHealth, so eHealth falls under Digital Health. A bar chart depicts the frequency of the most common and overlapping dimensions among all the terms.



Timeline of Terminologies



Telehealth (1996)

Definition:

[ACDHFS/1996] The application of information technology and telecommunications for diagnostic and treatment services, educational and support services and the organization and management of health services (including health information management and decision support systems).

Application/Context

No context

Remarks

No remarks

References

ITU

https://www.itu.int/en/ITU-T/studygroups/2017-2020/16/Pages/ehealth_terminology.aspx#e-health

Telehealth (2001)

Definition:

[USDHHS/2001] The use of electronic information and communication technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration.

Application/Context

No context

Remarks

No remarks

References

ITU

https://www.itu.int/en/ITU-T/studygroups/2017-2020/16/Pages/ehealth_terminology.aspx#e-health

Telehealth (2017)

Definition:

Telehealth, a term used interchangeably with telemedicine, has been defined as the use of medical information that is exchanged from one site to another through electronic communication to improve a patient's health.

Application/Context

No context

Remarks

No remarks

References**American Telemedicine Association (ATA)**

Tuckson, R., Edmunds, M., Hodgkins, M., (2017, Oct 19). N Engl J Med

PubMed.gov

Telehealth - PubMed (nih.gov)

Telehealth (2020)

Definition:

Telehealth is the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health related education, public health, and health administration.

Application/Context

Telehealth involves the use of telecommunications and virtual technology to deliver health care outside of conventional health-care facilities, for example, a virtual home health care, where patients such as the chronically ill or the elderly may receive guidance in certain procedures while at home.

Remarks

No remarks

References

Association of Accredited Public Policy Advocates to the **European Union**

Telehealth (2020)

Definition:

Telehealth effectively connects individuals and their healthcare providers when in-person care is not necessary or not possible. Using telehealth services, patients can receive care, consult with a provider, get information about a condition or treatment, arrange for prescriptions, and receive a diagnosis.

Application/Context

Telehealth can increase access to care for rural communities, underserved and vulnerable patient populations, and to individuals unable to secure in-person care, ensuring that everyone has access to safe, effective, and appropriate care when and where they need it.

Remarks

The most commonly used approaches in telehealth include: Virtual Visits, Chat-based Interactions, Remote Patient Monitoring and Technology-Enabled Modalities.

References**American Telemedicine Association**

<https://www.americantelemed.org/resource/why-telemedicine/>

Telehealth (undated)

Definition:

Telehealth is similar to telemedicine but includes a wider variety of remote healthcare services beyond the doctor-patient relationship. It often involves services provided by nurses, pharmacists or social workers, for example, who help with patient health education, social support and medication adherence, and troubleshooting health issues for patients and their caregivers.

Application/Context

The terms used to describe these broadband-enabled interactions include telehealth, telemedicine and telecare. "Telehealth" evolved from the word "telemedicine."

"Telecare" is a similar term that we generally use in Europe. All three of these words are often – but not always – used interchangeably.

Remarks

No remarks

References**Federal Communications Commission**

<https://www.fcc.gov/general/telehealth-telemedicine-and-telecare-whats-what>

Telemedicine (1997)

Definition:

The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities.

Application/Context

Telemedicine is a discipline that involves the use of information and communication technology (ICT) to provide remote medical services.

Remarks

No remarks

References**World Health Organization (WHO)**

<https://ww1.issa.int/analysis/telemedicina-buenas-practicas-en-america-latina>

Telemedicine (2017)

Definition:

Telemedicine is defined as “the use of medical information exchanged from one site to another via electronic communications to improve a [specific] patient's clinical health status.

Application/Context

No context

Remarks

No remarks

References

American Telemedicine Association

<https://www.sciencedirect.com/topics/psychology/telemedicine>

Telemedicine (undated)

Definition:

Telemedicine can be defined as using telecommunications technologies to support the delivery of all kinds of medical, diagnostic and treatment-related services usually by doctors.

Application/Context

Telemedicine includes conducting diagnostic tests, closely monitoring a patient's progress after treatment or therapy, and facilitating access to specialists that are not located in the same place as the patient.

Remarks

No remarks

References**Federal Communications Commission**

<https://www.fcc.gov/general/telehealth-telemedicine-and-telecare-whats-what>

Telecare (1998,1999)

Definition:

1998 - Telecare is the use of telephone intervention every week from a caring caller (cc)

1999 - Telecare: real-time, interactive video via an analogue videophone was used for patients in their own home to obtain nursing support from a nurse located at a distant base station.

Application/Context

No context

Remarks

No remarks

References

(1998) - Strawn et al.

(1999) - Mair et al

Telecare (2000,2003)

Definition:

2000 - Telecare involves the application of telecommunication and computer technologies to deliver care in the home.

2003 - Home telecare, the use of distance communications technologies by nurses or other ancillary providers to deliver healthcare services.

Application/Context

In common usage, most people apply the term 'home telecare' to real-time video interaction between patient and providers, using the term 'distant monitoring' for other potentially valuable but less intensive approaches, such as store and forward transmission of data (e.g. glucometer readings)

Remarks

No remarks

References

(2000) - Agrell et al.

(2003) - Jerant et al.

Telecare (2004)

Definition:

Telecare consist largely of services delivering care services from a distance to elderly patients living at home, some of whom are living in rural areas. Thus, they involve a range of services including virtual visiting, reminder systems, home security, and social alarm systems with the overall aim to avoid hospitalization and aiding ageing in place.

Application/Context

No context

Remarks

No remarks

References

Magnusson et al.

Telecare (2005, 2006)

Definition:

2005 - Telecare is defined as the use of ICT to help deliver health and social care directly to people in their homes.

2006 - Telecare is advocated as a means of effectively and economically delivering health and social care services in people's homes, using technology that can monitor activities and safety, provide virtual home visiting, activate reminder systems, increase home security and convey information.

Application/Context

No context

Remarks

No remarks

References

(2005) - Barlow et al.
(2006) - Percival and Hanson

Telecare (2007)

Definition:

Telemonitoring is defined as an automated process of the transmission of data on a patients' health status from home to the representative healthcare settings. When telemonitoring is used in conjunction with the health professional feedback and advise, it is referred as telecare.

Application/Context

No context

Remarks

No remarks

References

Jaane and Pare (2007)

Telecare (2009)

Definition:

Home telecare refers to the use of telemedical equipment in the houses of eligible patients, to enable distant monitoring of relevant parameters.

Application/Context

Telesphygmomanometers, blood glucose meters, digital scales, ECG devices and video conferencing systems.

Remarks

No remarks

References

Berg et al. (2009)

Telecare (2010)

Definition:

Telecare is the remote or enhanced delivery of health and social services to people in their homes by means of telecommunications and computerized systems.

Application/Context

Telecare includes, equipments and detectors that provide continuous, automatic, and remote monitoring of care needs, emergencies, and lifestyle changes, using information and communication technology (ICT) to trigger human responses, or shut down equipment to prevent hazards.

Remarks

No remarks

References

Beale et al. 2010.

e-health (1999)

Definition:

[Mitchel/1999] The combined use in the health sector of electronic communication and information technology (digital data transmitted, stored and retrieved electronically) for clinical, educational and administrative purposes, both at the local site and at a distance.

Application/Context

No context

Remarks

No remarks

References

ITU

https://www.itu.int/en/ITU-T/studygroups/2017-2020/16/Pages/ehealth_terminology.aspx#e-health

Telecare (2011)

Definition:

Telecare is defined as the use of information and communication technology to facilitate health and social care delivery to individuals in their homes.

Application/Context

No context

Remarks

No remarks

References

Rogers et al. (2011)

e-health (2001)

Definition:

“e-health is a very broad term that encompasses many different activities related to the use of the Internet for healthcare. Many of these activities have focused on administrative functions such as claims processing or records storage.”

Application/Context

Administrative functions, patient and clinical care.
However, there is an increasing use of e-health related to patient and clinical care.

Remarks

No remarks

References

American Telemedicine Association

e-health (2001)

Definition:

[Eysenbach/2001] “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 health care locally, regionally, and worldwide by using information and communication technology.”

Application/Context

No context

Remarks

No remarks

References

ITU

https://www.itu.int/en/ITU-T/studygroups/2017-2020/16/Pages/ehealth_terminology.aspx#e-health

e-health (Undated)

Definition:

e-health is a new term used to describe the combined use of electronic communication and information technology in the health sector OR is the use, in the health sector, of digital data transmitted, stored and retrieved electronically-for clinical, educational and administrative purposes, both at the local site and at a distance.

Application/Context

Clinical, educational and administrative purposes, at the local site and at a distance

Remarks

No remarks

References

World Health Organization. E-health in the Eastern Mediterranean.: WHO Eastern Mediterranean Regional Office URL: <http://www.emro.who.int/his/ehealth/AboutEhealth.htm>

Virtual Consultation (2013)

Definition:

Virtual consultations, where there is no direct contact between the specialist and patient, are used to access specialist advice in a more expedient fashion.

Application/Context

Successfully implemented a highly satisfactory e-consultation service that has the potential to improve access to specialty services through rapid response rate and reduction in the need for face-to-face consultations. E-consultation has tremendous potential for improving access to specialist advice in a much more timely manner than the traditional referral-consultation process.

Remarks

No remarks

References

Keeley, E., Liddy, C., Afkham, A., (2013, OCTOBER,19) Utilization, benefits, and impact of an e-consultation service across diverse specialties and primary care providers - **PubMed (nih.gov)**

e-consultation (2015)

Definition:

We define electronic consultations (“e-consults”) as asynchronous, consultative, provider-to-provider communications within a shared electronic health record (EHR) or web-based platform.

Application/Context

e-consults are intended to improve access to specialty expertise for patients and providers without the need for a face-to-face visit. e-consults are feasible in a variety of settings, flexible in their application, and facilitate timely specialty advice.

Remarks

No remarks

References

Vimalanand,V., Gupte, G., Seraj, S., Orlander, J., Berlowitz ,D., Fincke, B., Simon, S. (2015, May,20) Electronic consultations (e-consults) to improve access to specialty care: a systematic review and narrative synthesis. PubMed.gov Electronic consultations (e-consults) to improve access to specialty care: a systematic review and narrative synthesis - **PubMed (nih.gov)**

Virtual Consultation (2018)

Definition:

A virtual consultation is a process of getting a medical opinion without visiting the specialist in person, which is the only difference from a traditional medical consultation.

Application/Context

Includes facilitating access to healthcare to both privileged and underprivileged populations, providing faster, cheaper and better communication for treatment, follow-up by experts and to store records. It helps remove geographical barriers to healthcare, especially by reaching distant areas poorly connected by any means of transport.

Remarks

No remarks

References

Ateriya, N., Saraf, A., Mesheam, V., Setia, P., (Jul-Aug 2018). Telemedicine and Virtual Consultation: The Indian Perspective. PubMed.gov Telemedicine and virtual consultation: The Indian perspective - **PubMed (nih.gov)**

Online Medical Consultation (2018)

Definition:

Online medical consultation (OMC) is the term utilized as a part of this paper to allude to web-based remote patient- specialist (consumer-provider) medicinal discussions.

Application/Context

No context

Remarks

No remarks

References

Singh, A., Josh, H., Singh, A., Agarwal, M., Kaur, P., (2018, March 23). International Journal of Community Medicine and Public Health Online medical consultation: a review | Semantic Scholar

e-consultation (2021)

Definition:

E-consults, also known as electronic consultations or interprofessional consults, are communications between health care providers.

Application/Context

Providers can use e-consults in the emergency department to get recommendations for complicated conditions from providers in other locations with additional expertise. Increased care coordination, increased access to high-quality, specialty care, accelerate consultation response time, reduce the need for unnecessary referrals, increase provider knowledge by learning from specialty experts.

Remarks

No remarks

References

E-consults | [Telehealth.HHS.gov](https://www.hhs.gov/telehealth)

m-health (2017)

Definition:

“Medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices.”

Application/Context

Individuals have adopted mHealth devices as self-management aids.

Remarks

No remarks

References

World Health Organization Frequently asked questions on Global Task Force on digital health for TB and its work. [2017-02-27]. <http://www.who.int/tb/areas-of-work/digital-health/faq/en/> website.

Healthcare Informatics (undated)

Definition:

Encompass the rapidly evolving discipline of using computing, networking and communications – methodology and technology – to support the health related fields, such as medicine, nursing, pharmacy and dentistry.

Application/Context

Healthcare informatics support the healthcare fields such as medicine, nursing, pharmacy and dentistry.

Remarks

No remarks

References

World Health Organization.

https://www.who.int/health-topics/digital-health#tab=tab_1

Digital Health (2018)

Definition:

The term 'digital health' refers to the use of digital technologies in health programming and financing.

Application/Context

Digital health interventions can include various technologies, such as mobile applications, short messaging service (SMS), interactive voice response, health management information systems, mobile diagnostic devices, wearables, drones and big data analytics.

Remarks

No remarks

References

United Nations Children's Fund (UNICEF)
UNICEF's Approach to Digital Health.

<https://www.unicef.org/innovation/media/506/-file/UNICEF%27s%20Approach%20to%20Digital%20Health%E2%80%8B%E2%80%8B.pdf>

Digital Health (2018)

Definition:

Digital health can be defined as “the use of digital, mobile and wireless technologies to support the achievement of health objectives. Digital health describes the general use of information and communication technologies for health and is inclusive of both mHealth and eHealth”

Application/Context

No context

Remarks

No remarks

References

World Health Organization(WHO)

<https://www.unicef.org/innovation/media/506/-file/UNICEF%27s%20Approach%20to%20Digital%20Health%E2%80%8B%E2%80%8B.pdf>

Digital Health (2020)

Definition:

Digital health is an umbrella term. It is the use of telecommunications technologies to collect, share and manipulate health information to improve health and healthcare. These health tools include a wide variety of technologies and applications like email, smartphones, tablet computers, as well as video-conferencing, cardiac monitors, and other remote sensors.

Application/Context

Some digital health tools are used primarily by doctors or healthcare professionals — like Electronic Medical Records. Other digital health tools help patients and doctors collaborate. For example, a patient with a digital glucometer could monitor her blood sugar levels at home and then hit "send" to transmit that information to her healthcare provider at their office or hospital.

Remarks

No remarks

References**Federal Communications Commission**

<https://www.fcc.gov/general/five-questions-you-can-ask-your-doctor-about-digital-health>

Digital Health (undated)

Definition:

"The term digital health evolved from the concept of e-health, of which mobile health (m-health) is a subset. The term digital health can then be understood as "a broad umbrella term encompassing e-health (which includes m-health), as well as emerging areas, such as the use of advanced computing sciences in 'big data', genomics and artificial intelligence".

Application/Context

No context

Remarks

No remarks

References

ITU

<https://www.itu.int/en/ITU-T/e-Health/Pages/default.aspx>

Digital Health (undated)

Definition:

Digital health technologies use computing platforms, connectivity, software, and sensors for health care and related uses. These technologies span a wide range of uses, from applications in general wellness to applications as a medical device.

Application/Context

The broad scope of digital health includes categories such as mobile health (mHealth), health information technology (IT), wearable devices, telehealth, telemedicine, and personalized medicine.

Remarks

No remarks

References

US Food and Drug Administration(FDA)

<https://www.fda.gov/medical-devices/digital-health-center-excellence/what-digital-health#:~:text=Digital%20health%20technologies%20use%20computing,applications%20as%20a%20medical%20device.>

Healthcare Informatics (Undated)

Definition:

The American Medical Informatics Association (AMIA) has defined clinical informatics as the application of informatics and information technology to deliver healthcare services.”

Application/Context

Delivery of healthcare services.

Remarks

No remarks

References

American Medical Informatics Association.

“Clinical Informatics.” <http://www.amia.org/applications-informatics/clinical-informatics>.

Analysis Table

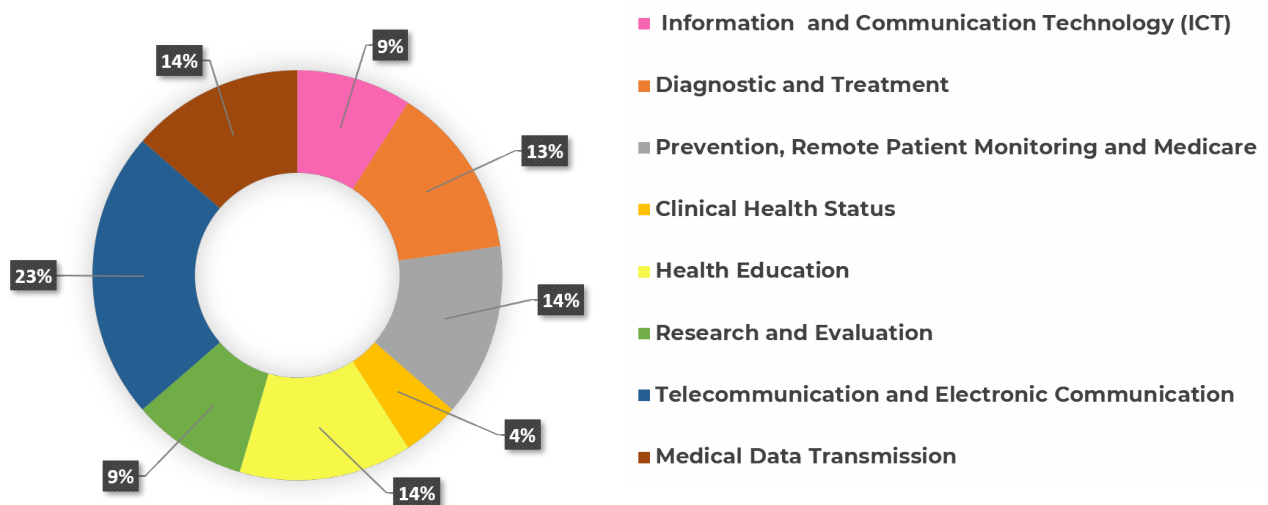
- The number against each terminology indicates the number of definitions covered.
- The number against each row indicates the number of definitions covering each dimension or application.

For e.g. Telemedicine (7) and the column below indicates that the following dimension 'Information and Communication Technology (ICT)' appeared in two definitions of telemedicine out of seven.

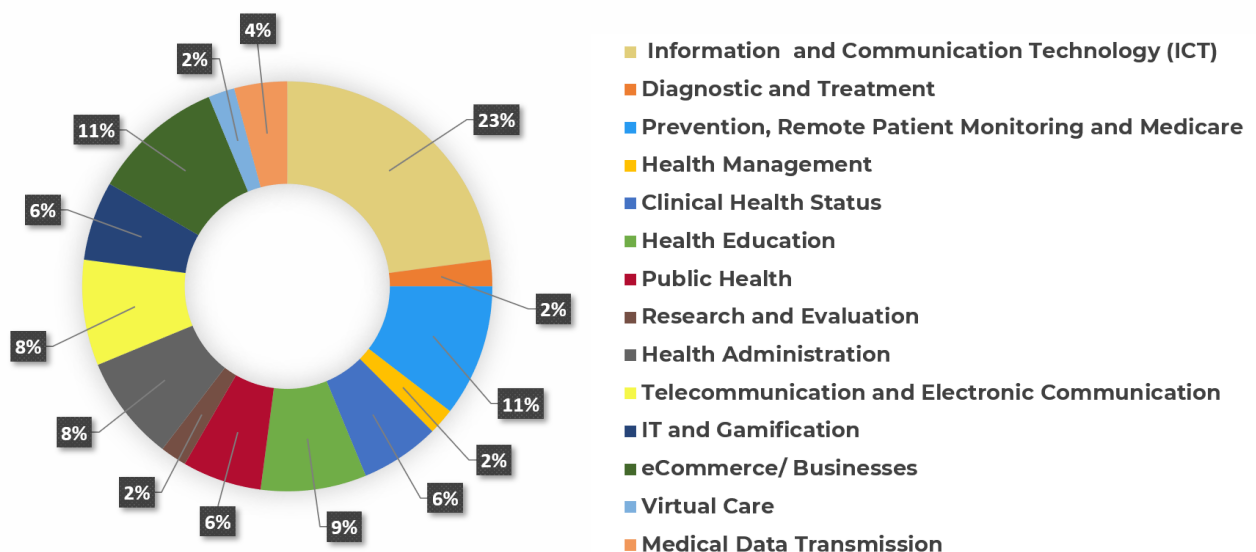
Terms Applications / Dimensions	Telemedicine (7)	eHealth (17)	mHealth (4)	Telehealth (12)	Virtual Consultation/ eConsultation (5)	Health Informatics (6)	Digital Health (7)	Telecare (11)
Information and Communication Technology (ICT)	2	11	2	4	3	5	3	5
Diagnostic and Treatment	3	1		3		1		
Prevention, Remote Patient Monitoring and Medicare	3	5		6		1		8
Health Management		1	2	1		3		
Clinical Health Status	1	3		2		2		
Health Education	3	4		5		1		
Public Health		3	1	1		1		
Research and Evaluation	2	1				1		
Health Administration		4		2				
Telecommunication and Electronic Communication	5	4	4	7	2		4	2
Personalized medicine				2			1	
Artificial Intelligence, Big Data Analytics							2	
IT and Gamification		3				5	2	
eCommerce/ Businesses		5						
Virtual Care		1		1		4		2
Medical Data Transmission	3	2		2			1	1
Health Programming and Financing							1	

Analysis of terminologies demonstrating the percentage of applications or dimensions covered

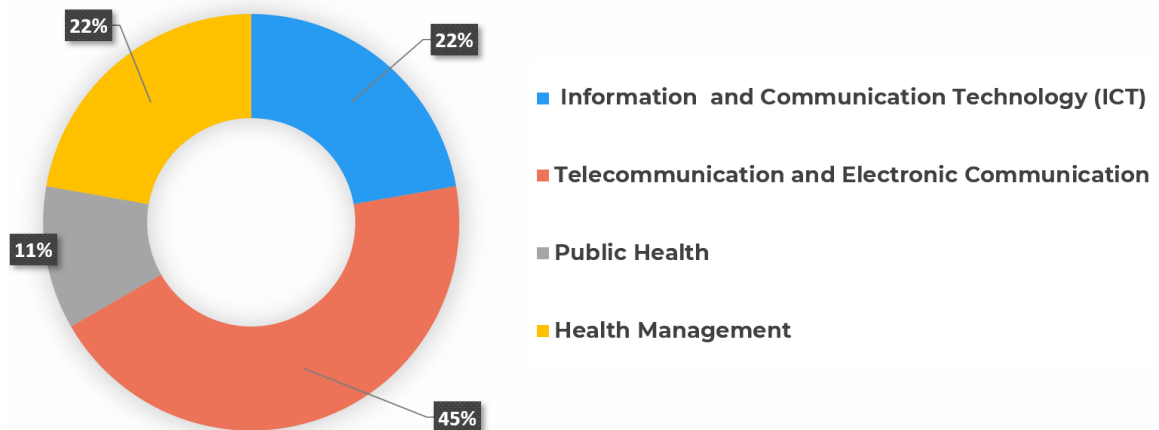
Telemedicine



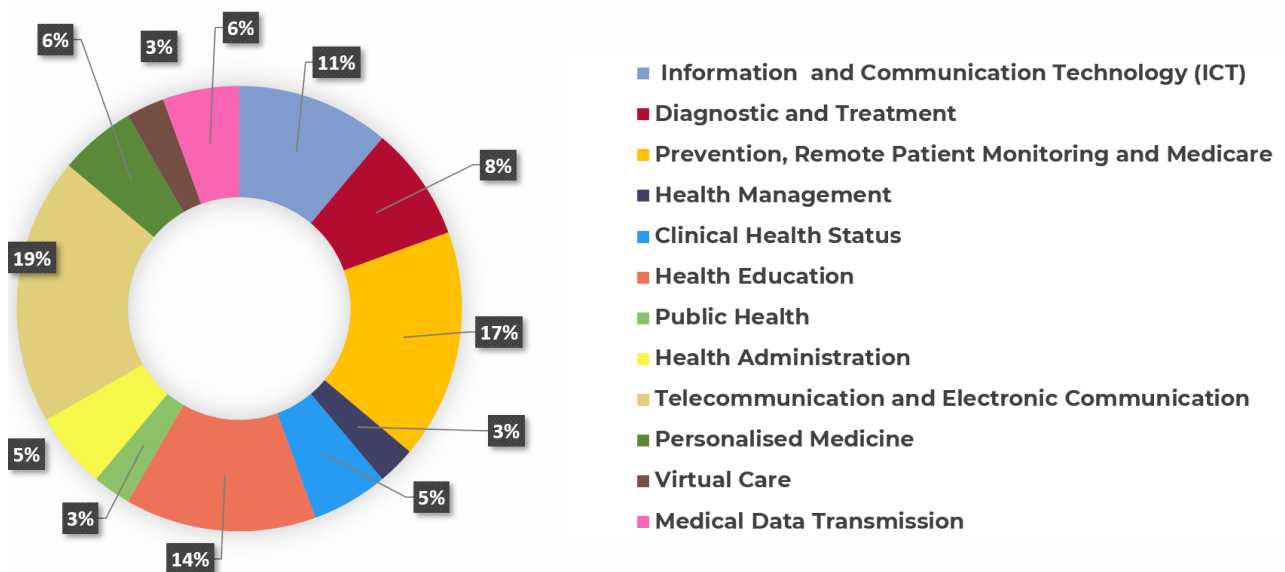
eHealth



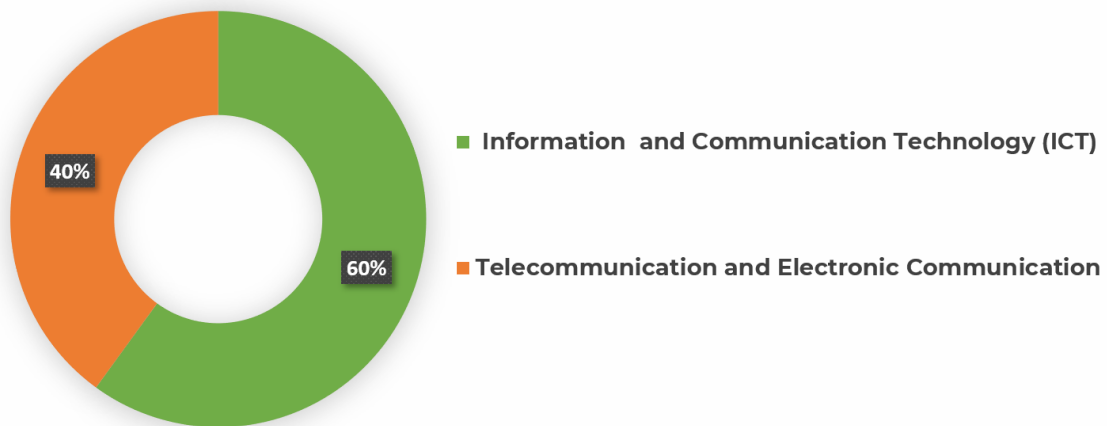
mHealth



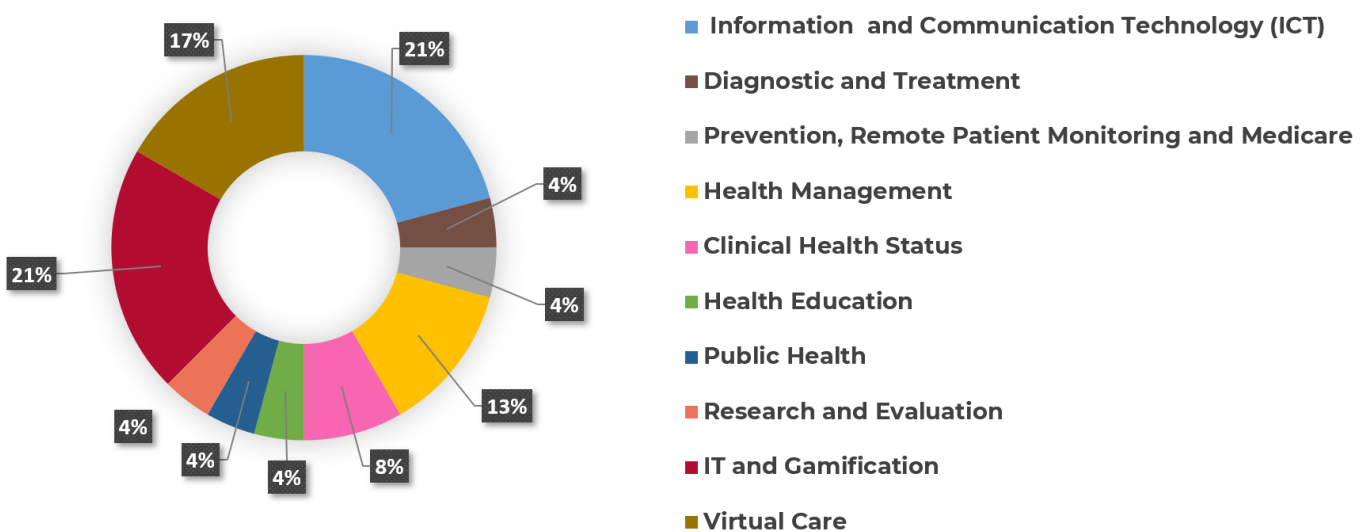
Telehealth



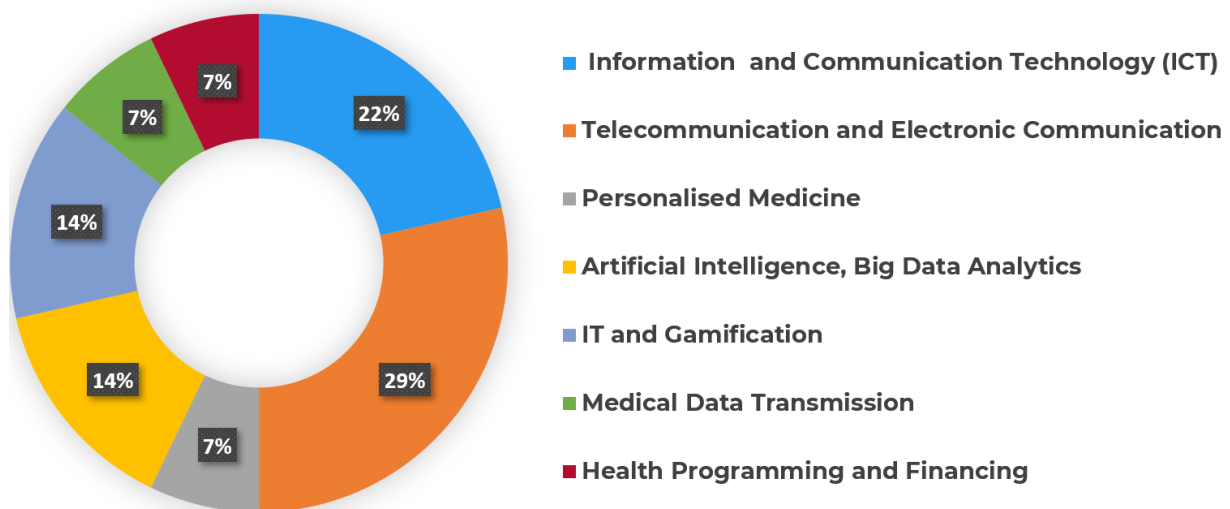
eConsultation



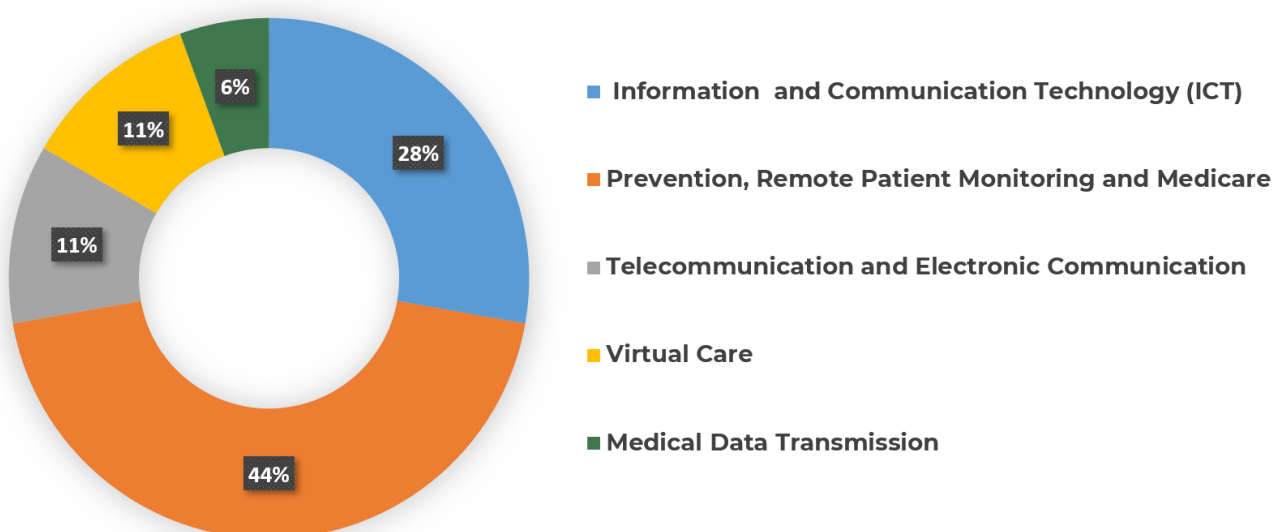
Health Informatics



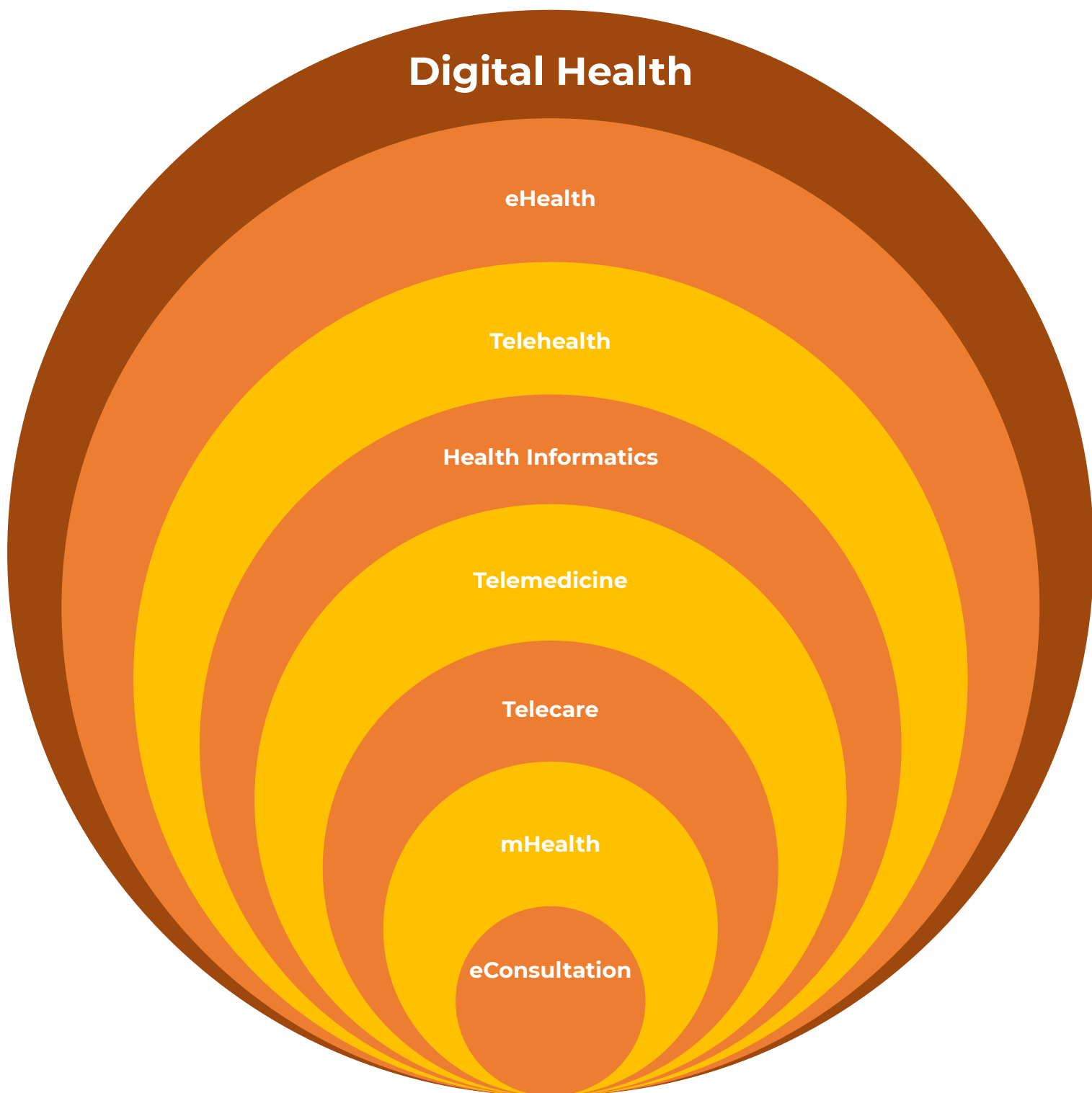
Digital Health



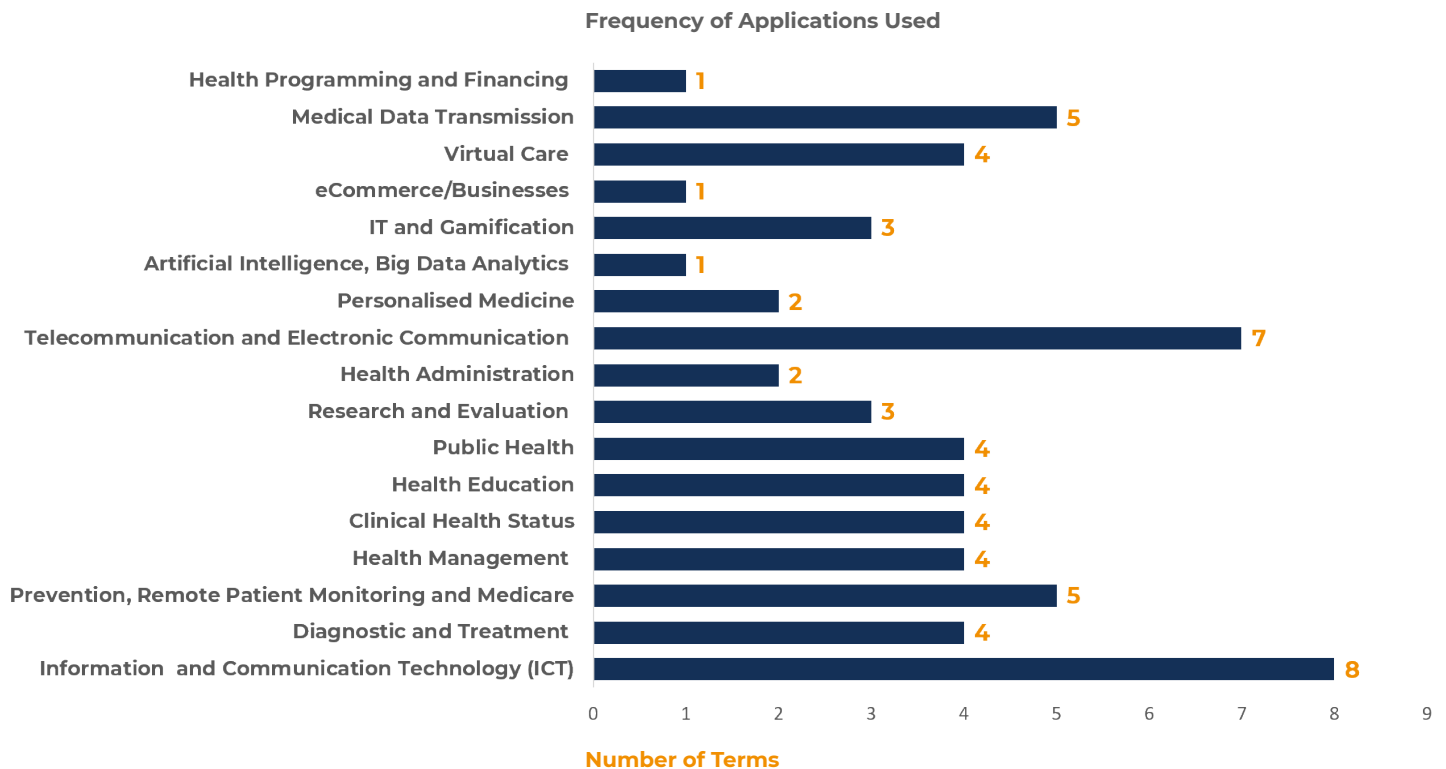
Telecare



Digital Health: The Umbrella Term



Most Common and Overlapping Applications or Dimensions



“ Proposed Definition Digital Health

Digital Health is an umbrella term which includes the use of technology across life sciences, healthcare and its associated domains. This includes the following but is not limited to; digital consultations or digital consults, which are any technology-enabled consultation between a care seeker and care provider (healthcare organizations, clinicians and allied healthcare professionals) or between clinicians, or any consultation for health-related services including education & training, digital monitoring which includes self-monitoring using POC (Point of Care) devices or wearables, and remote patient monitoring including home-based care.

- Dr. Rajendra Pratap Gupta,
Digital Health Academy

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Instagram: globaldigitalhealth



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Twitter: TaskForce4HLTH
Instagram: accountable_healthcare