The Internet and Health in Brazil

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Editors

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Challenges and Trends

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This book is dedicated to Bia, Rafael, Pedro, and Gabriela, who closely followed the pain and delight of this dream that becomes reality.

The book is also dedicated to Lucas who is a true digital native.

Foreword: Internet and e-Health Care – An Interdigital Field of Study

Introduction

The use of the Internet for health-related purposes has reached overall massive proportions, although local national realities still largely differ one from the other around the world. The Internet, with its open design allowing communication among current and future technology, and the World Wide Web open architecture, enabling easy access and popular participation, need no presentation: their importance can hardly be overstated. But, as this chapter illustrates, e-health – or health-related Internet-based technology – and the implications associated to its diffusion go well beyond the technological scale, to include multidimensional means of connecting, accessing, and delivering health care and well-being from multiple agents. Nowadays, more and more people and things are connected to one another than at any other point in human history. The implications of the broad adoption of the Internet and the web are so important that we are living in a new phase of the digital era: an "Internet-based digital" or interdigital era (Murero 2012, 2018a). Information and communication technologies (ICTs), and in particular the Internet, have been supporting the development of unprecedented practices for accessing, receiving, providing, and seeking health care.

What Is Health?

Most popular accounts focus on an overgeneralization of the concept of health as simple absence of disease. In truth, health is a multidimensional concept. It is not only a physical condition related to the absence of disease but also a status of mental and social well-being.

Given its multidimensionality, health is not only a physical status, or the simple absence of sickness; it includes mental and social well-being. In other words, health equates to well-being.

The World Health Organization (WHO), a United Nations specialized agency that is concerned with international public health and represents hundreds of Member States, including Brazil, offers a multidimensional definition of health in its constitution. Since 1948, the definition of health guides WHO's policies and programs, affecting Member States and their Ministry of Health systems:

> […] Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. (WHO 2018)

What Is Health Care?

What role are new technologies playing in the development of current scenarios, and in this context, what is health care? When considering health from a well-being perspective, as I am proposing in this chapter, health care results from multiple determinants affecting both patients and health-care providers. In this context, health care is mainly concerned with the maintenance or restoration of a multidimensional state of physical, mental, and social well-being by trained and licensed providers. Therefore, health care becomes the result of multiple variables that include, but are not limited to, the use of high-tech diagnostic instruments, professional skills, effective medical treatments, but also prevention. Moreover, health care determining factors may also include education, the quality of the environment, personal lifestyle, genetics, nutrition, family culture and values, available resources, online information, and more. The socioeconomic determinants of health are the conditions in which people live, grow, work, and receive health care. Socioeconomic conditions are mainly responsible for health status, equities, and inequities between countries. These conditions are largely affected by the economy of distribution of the resources available at the local, regional, national, and international levels. In this context, the availability of information and communication technologies (ICTs) to access information and care, maintain, and restore health is becoming an essential dimension affecting the quality of individual and social well-being.

The majority of the world's health-care systems are mainly concerned with treating and preventing diseases rather than promoting well-being. When observing how users of ICTs meet their health-care needs online, a definition closer to the concept of well-being, rather than the notion of "absence of sickness," emerges (Murero and Rice 2006).

From e-Health to e-Health Care

E-health is a broad term encompassing a wide variety of technologies and socio-communicative practices used by health-care providers, patients, and "health seekers." The academic literature shows that there is no general consensus on a

standardized terminology for defining the field of the Internet and health: this is due, in part, to the dynamic of a rapidly evolving field both in terms of new tools, applications, and online practices (Eysenbach 2001; Oh et al. 2005; Murero and Rice 2006). Current popular terms include e-health or eHealth, Medical Informatics, Consumer Health Informatics, Medicine 2.0, Digital Health, mHealth, Health 2.0, and more. While each of these terms defines specific aspects of Internet-mediated access to health practices, they may overlap only in part. Some scholars focus on the technological dimensions of the phenomenon, some on the sociological aspects, and others offer an interdisciplinary approach, like the one I am developing in this chapter. Internet-based technologies consist of a wide variety of telecommunication infrastructures, architectures, protocols, platform services, and smartphone-based apps. The popularization of the Internet and the invention of the World Wide Web date only to the early 1990s.

Historically, several macro-factors have contributed to the popularization of the Internet and the revolutionary access to health-care information and knowledge, particularly for the nonmedical population.

Early computerized systems for processing information and code-breaking signed the beginning of computer science during the 1940s (Hodges 2014). After World War II, rapid developments in computing applications offered unprecedented opportunities to public health-care analysis, particularly during the 1950s and the 1960s. For example, in early epidemiologic applications (like in the 1950s), mainframe programs were able to identify the variables causing diseases according to age, gender, and location (Shortliffe 2001). Later on, the development of the first personal computer and the diffusion of digitalization contributed to the informatization of society during the 1970s and the 1980s. For the first time in history, the use of information technology for health-care management made possible not only the use of digitalization for archiving information on a computer but also for retrieving and distributing digitalized medical data, in a large majority of the world's health-care systems, including Brazil.

From a purely technological point of view, the increase in speed, memory, and mass data storage (e.g., servers) played a crucial role in the development of unprecedented opportunities for early health-care management systems. In the last 30 years, the exponential proliferation of digitalized network infrastructures and telecommunication, allowing the communication and exchange of large amounts of data among computers – thanks to the Internet – was a crucial passage not only for archiving patient's records on digital supports and exchange them over the net but also to deliver new forms of health-care treatments through early telemedicine solutions; these made the provision of health care in remote areas of North America and Australia at the beginning of 2000s possible (Heaton 2006; Murero and Rice 2006).

Internet-mediated technology, social platforms, and mobile applications currently support and affect online practices such as searching, exchanging, and receiving health-care information and also others' opinions about medical treatments, products, and services. More recently, body sensors technology for remote body monitoring, Internet of Things (IoT), and artificial intelligence (AI) solutions are offering new perspectives to e-health and particularly to health care (Murero 2018a).

In this chapter, I specifically focus on e-health care. Although I will analyze multiple technological solutions available to patients, caregivers, and "health seekers," it is important to keep in mind that the availability of smart and advanced technological devices is only one side of the current e-health phenomenon. One of the most interesting developments in the field of the Internet and health accounts for what millions of agents do with new technologies over time and what needs they are satisfying, thanks to 24/7 accessibility and use. I would like to emphasize this central concept, as it contributes to the definition of the health-related, Internet-based technology, or e-health, as a field of study.

As I mentioned at the beginning of the chapter, it is important to differentiate the current phase of the digital era from its origin, in the 1970s, when the first digital calculators and the personal computer became available to the public for the first time. Today our multimedia smartphones and wireless tablets are thousands of times faster and powerful than the first stand-alone personal computer, which by the way had no Internet connection – besides those networked computers available to a few lucky users in limited academic environments.

Becoming Interdigital: The Internet-Mediated Digital Era

Compared to the early beginning of the digital era, the current phase of digitalization presents a completely different scenario from every perspective, not only from a technological standpoint but more interestingly for the adoption of new socio-communicative practices among millions of Internet-connected people around the world, which have affected every sector of society, including health care. The current digital era is interdigital or Internet-mediated digital society (Murero 2012). Online interdigital agents of course use the Internet and web-based digitalized platforms for communicating and staying connected.

In the context of using the Internet for health-related purposes, interdigital agents may include the following:

- *Health-care providers (hospital, medical care centers, pharmaceutical companies, etc.).*
- *Health-care receivers (patients).*
- *Health-care seekers (actively search information for themselves or on behalf of someone else; may include family members, friends, caregivers, or significant others).*
- *Computerized agents (software programs, chatbot, robots). Nonhuman agents connected to the Internet (interdigital agents) (Murero 2012) are programmed to perform specific tasks online, such as publishing, receiving, and analyzing information through the Internet; to interact via chatbot; and more.*

It is important to remark that the uses of health-related Internet-based technologies and their implications are interdisciplinary and broad. For example, thanks to the Internet, patients can access vast information about a specific disease, stay in

touch with other patients via social media, share their treatment experiences, keep up with a diet via an app, engage in a chatbot conversation with a computerized agent, and even diffuse wrong information about a disease or a medical condition.

Why ICT Always Matters

Technology plays a facilitating role in the development of socio-communicative dynamics and relations for e-health. At the current stage, some of the most interesting challenges are happening in the field of mobile health-care applications (mHealth).[1] For example, millions of people in South America and all over the world have the possibility to control their sleep habits on their smartphone, follow a yoga course or a diet via an app, and even share with friends their running performances through online social platforms. The use of mobile solutions for personal health care has grown exponentially in any field of medicine, from birth control to heart failure. Moreover, thanks to ICTs, health-care providers can offer remote monitoring and tele-counseling and new means to access reliable medical education and new research findings for the scientific community.

As previously stated, the field of Internet and health does not only refer to technological tools and platforms supporting health care but also to socio-communicative practices that agents exchange online. The use of new technology plays a facilitating role in platform-mediated communication exchange that overcomes space, time, and costs barriers. Human communication happens more and more via new media platforms. The amount of data – big data – that millions of agents are generating online every single day, over time, are creating new challenges and debates regarding their use. Millions of agents using ICTs for e-health generate large quantities of data and facilitate the development of new forms of online power and control where such social production and exchange occur. These have the potential to affect not only the characteristics of platforms where social media communities for mutual support meet or offline patient-doctor relations but also the socioeconomic dynamics of the health-care and well-being sectors, including their regulation. Internet-mediated practices and their implications are currently challenging the field of health-care provision in many countries, including Brazil. From experimental telemedicine systems to massive education courses, the debate on the future uses of ICTs for e-health affects every aspect of the phenomenon and its specific characteristics, including policymakers.

In the current international scenario, expensive solutions and low-cost applications for remote patient care coexist. For example, patients and their families living in Western countries, particularly in North America, may benefit from complex and costly technology for remote home care management. Advanced e-health solutions combine telemedicine, tele-homecare, wearable sensors, multiple databases such as Electronic Health Records (EHR), clinical information, picture archiving and

[1] This aspect is discussed in Chap. 17, which addresses the topic of mHealth.

communication system (PACS), and even nonclinical applications (system administration, doctor's payroll, etc.).

On the other hand, an emerging trend shows that when hospitals do not offer efficient, rapid, and expensive solutions for rapid and convenient patient's care management, do-it-yourself e-health systems for instant messaging communication emerge, mainly via WhatsApp (Murero 2012).

Current Trends and Challenges in e-Health Care

WhatsApp is an instant messaging multiplatform app for smartphone – and computer desktop – that offers inexpensive ways of communicating and exchanging multimedia data. The recent popularization of instant messaging applications like WhatsApp tends to facilitate the exchange of patients' medical information via smartphone (RX pictures, lab test results, diagnostic videos, text, emoji, recorded audio) for medical decision-making (Follis et al. 2012). Based on end-to-end encrypted technology, WhatsApp is becoming a pretty popular and easy-to-use mobile application, allowing for instant communication of multimedia contents (RX pictures, audio, video) over the Internet and supporting rapid interaction by overcoming space limitations. Small groups of caregivers using their private smartphone and Internet connection can exchange information via WhatsApp and communicate urgent orders regarding patient treatment. Examples include, but are not limited to, diagnosis and decision-making in emergency care, orthopedics evaluation, or acute heart disease. When a medical emergency occurs, and a patient's sensible data need to be evaluated by a group of experts, some of which might not be physically present in the hospital, smartphone-based systems of communication may offer an efficient alternative to make immediate professional consultations, send multimedia contents, and increase efficiency in decision-making. Once patient data is digitalized, multimedia contents can be conveniently exchanged over the Internet including blood test results, X-ray pictures, videos, and diagnostic reports. The exchange of medical information via smartphone becomes a convenient alternative to overcome space or time limitations. Moreover, the use of multiplatform solutions like WhatsApp is also reported in doctor-patient interaction or doctor-patient's caregiver interactions, particularly when an urgent medical need emerges. Also, instant messaging helps co-workers and medical professionals to engage and keep in touch with their peers.

The use of WhatsApp as a local-made telemedicine communication system among small groups of health-care professionals and collaborators is still a little-investigated phenomenon (Murero 2018b). However, its rapid diffusion may be due to a number of partially related reasons. For example, Brazil is the country where free messaging services like MSN Messenger and Orkut, one of the oldest online social networks in the world, both became largely popular, while telecommunication companies kept charging telephone users for sending SMS. Moreover, the increased availability of personal smartphones constantly connected to the Internet

among health-care professionals, the popularization of easy-to-use mobile applications for messaging, and social networking that is already in use for communicating with family and friends are other factors that facilitated the rapid adoption of WhatsApp not only in private but also in professional settings. In particular, the convenience of exchanging diagnostic pictures among professionals and coworkers, like X-rays, in a relatively safe and rapid manner contributes to the emergence of new forms of interaction that are free and convenient. These emergent practices of e-health may support the daily routine of medical practice.

The trend is not limited to communication among health-care providers. For example, the literature shows that more and more physicians, physiotherapists, and mental health professionals use WhatsApp all over the world to directly communicate with patients and their caregivers, exchange information, and offer rapid feedback and medical indications as needed.

Sensible Data Exchange, Security, and Electronic Health Records (EHRS)

Controversial limits regarding privacy and security of patients' sensitive data do not appear to be a matter of concern for caregivers interacting via WhatsApp. Health caregivers may take and circulate pictures of patient's lab results or X-rays that often do not show personal data (patient's name) but sensitive information that may be available in the patient's Electronic Health Records (body lab tests and screening results, previous diseases, and more). Electronic Health Records or electronic medical records consist of patient's digitalized information usually collected by points of health care – like hospitals – that collect demographic data, previous medical history, medical lab reports, body images or video taken for diagnostic purposes, vital signs monitoring, financial and administrative information, and other sensitive information.

When Electronic Health Records are digitally available, data can be used to acquire, analyze, process, archive, and communicate information to a variety of other information-keepers over the Internet, including the Ministry of Health or any other third parties. Data privacy and security are crucial issues when safeguarding patient information in a distributed system. Other issues may include regulation of access to different levels of data confidentiality and information at each point of care (secretary, nurse, doctor, commodification of data, etc.), difficulties for physicians doing EHR data entry, and challenges in integrating different databases into a central information system from each point of care.

The use of EHRs has several advantages. For example, newly admitted patients, especially those who may be unresponsive as a consequence of a trauma, may largely benefit from a central system providing previous medical records. Also, people unable to provide valid medical information or who are impaired may benefit from convenient portability of their medical history, reliable and precise medical

information, and protections against data loss as well as data durability over time once digitalized and easy duplicability of records. Health organizations accessing EMR EHRs may have the possibility of conducting medical studies on a large population to assess the quality of a treatment provided, the evaluation of a clinical trial, etc. Policymakers may also benefit from public health epidemiologic analysis, health data analysis for policy decision-making, and improved quality of care.

From Telemedicine to Tele-Homecare

Citizens living in underdeveloped areas of the world experience shortages in health-care professionals. Exchanging digitalized medical information among distant points of care in order to evaluate single cases and provide access to adequate medical care is crucial for remote diagnosis. In particular, telemedicine and tele-homecare solutions have been relying upon complex systems of health-care management that requires challenging maintenance of and investments in infrastructure. Telemedicine consists in the remote provision of health care through specific ICTs architectures and platforms that rely on fast and high-quality Internet connection for video communication and multimedia data exchange. For example, patients might receive a real-time dermatological visit while sitting hundreds of kilometers away from the hospital that provides the service. Practical examples include several medical practices, from psychiatrics and dermatology to radiology.

Early telemedicine pioneering systems tested the possibility of delivering emergency telesurgery care via robot to astronauts in space (Kilpatrick 2004). Nowadays, telemedicine encompasses several clinical applications in wealthy nations. For example, it is useful in supporting the medical decision-making process based on remote imaging exchange (like high-quality pictures of the derma, X-ray evaluation in an orthopedic emergency, psychiatric and psychological consultancy, etc.). Whenever professional expertise is missing at the point of care, even within a large city area, telemedicine systems may be useful to provide access to patient records, evaluation, and care. Because telemedicine architectures may offer multiple forms of communication in a single virtual point of care, several health providers and the patients can simultaneously audio-video interact and access and exchange data, all from different physical locations. Telemedicine systems may offer virtual visits and several other services through a sophisticated Internet-based, two-way communication system. Benefits associated with telemedicine systems are very valuable for patients and doctors, although only a minority of health-care facilities are able to offer such complex services, since they require large investments over time in management, staff education, and high-cost maintenance and administration.

While telemedicine manly offers remote assistance if expert consultations is locally missing, or because an acute problem emerges, a specific branch of telemedicine, tele-homecare, seeks to offer continuous health-care assistance to patients with chronic conditions at their home, by monitoring their vital signs remotely. Chronically sick patients, who may suffer from diabetes, acute health failure, or

severe asthma, do not need hospitalization. They need to follow their doctor's instructions in terms of lifestyle and medication at their home. However, chronic patients need to be regularly checked to make sure their health is fine. If early signs of deterioration occur, these patients may need immediate professional evaluation and, if it is the case, even hospitalization. Tele-homecare devices are installed in the patient's house. Tele-homecare may alert an urgent medical treatment by combining Internet-based telemedicine technology, continuous home monitoring through sensor-based technology, and remote analysis of body signs, even without a patient's knowledge. When the tele-homecare system records an abnormal situation, it alerts the point of care over the Internet. Also, according to the specific situation, the health-care provider may contact the patient to receive more information and evaluate the case and decide the type of treatment needed.

By exchanging information and checking symptoms as well as vital signs in real-time, complex systems for tracking patient health over the Internet can help doctors provide medical evaluations and assist with treatments in areas where expertise and services are unavailable. Tele-homecare may prevent health deterioration and improve patients' quality of life through accurate data analysis protocols and life-saving procedures.

Advanced Integrated Systems for Interdigital Health Care

In advanced e-health care contexts, particularly in North America, significant investments allowed for the development of complex systems of information management for health-care organizations, like hospital chains. These integrated systems use Internet-based technology to gather, process, integrate, and archive multiple sources of data and applications for managing health-care services. Since the 1990s, the early information system for handling hospital's financial matters and billing patients have drastically improved to include more and more areas of organizational health management, integrating both clinical and nonclinical solutions to the point of care. Examples of multiservice systems of interdigital health management include the following:

- *Applications providing different levels of security for accessing patient's information and EHRs (e.g., transcribed diagnostic reports, blood lab results, X-ray archiving, internal communication systems, and PACS)*
- *Physicians' orders (e.g., adding and consulting other's orders, ordering of medical materials and drugs for hospitalized patients)*
- *Monitoring patients' vital signs, inside and outside the hospital, through an Internet-based system of patient surveillance, including systems for sensors' activity, digital devices, and applications*
- *Creation of internal databases for conducting medical research, academic activity, clinical trials, and international collaborations*

- *Hospital administrative management (e.g., purchase and inventory of materials, patient information and payment management, internal auditing to verify the quality of treatments and procedures provided, access security and financial management systems, including managing payrolls and payments of internal staff)*
- *Technological devices to internal staff like smartphones, ad hoc application for care provision, office automation programs (e.g., word, excel)*
- *Internal systems providing access to mandatory online continuing education and scholarly information (e.g., drug information database, scientific medical literature)*

The health-care technology industry and policymakers should consider that the lack of sufficient resources from health-care providers may ultimately result in maintaining old technology rather than embracing innovative e-health solutions that may largely benefit patients and their families – like tele-homecare. In the last two decades, information and communication technology and health information systems (HIS) have been offering new challenges for in-house and remote clinical applications to benefit patients and their families. However, because technology evolves very fast when new solutions become available, policymakers and health-care institutions are faced with the continuous need to anticipate future demands and provide for adequate hardware investments and resources, also in educational terms. It is important to keep in mind that the availability of smart and advanced technological devices is only one side of the current e-health phenomenon. Although the focus of this chapter is to define e-health care in the context of multiple technological solutions available to patients, caregivers, and "health seekers," it is important considering what millions of interdigital agents do with new technologies over time and what platforms they use to satisfy what types of needs. Moreover, what third parties do with user data is a matter of concern given limited regulation on the topic.

Past, Present, and Future of e-Health

In the last 20 years, e-health advantages and disadvantages, barriers, and facilitators have been a matter of study, concern, and debate. For example, online health-care optimists have been claiming that investing in new ICTs can reduce costs, provide access to an immense range of information and practices, and improve efficiency and quality of care. On the other side, there are concerns over liability, security, privacy, and confidentiality of sensitive data and their use (big data), as the chapters of this book show. When observing how the use of the Internet has affected millions of people around the world, including both health-care providers and patients, advantages and disadvantages emerge. For example, when patients educate themselves about their disease online, the use of the Internet can potentially empower patients and help doctors better manage health-care processes and challenges; patients can better participate to the decision-making process. On the other hand,

assessing the quality and the sources of online health contents is still a major issue for the nonmedical population because anyone can potentially publish online content without following any particular regulation. Even when a country has regulation in place, the distributed nature of online information may allow exceptions. This is a matter of concern because according to academic evidence, online info affects the health decision-making process of the nonmedical population. The HONcode logo guarantees online users that health-care information is safe and reliable. The Health On the Net Foundation (HON),[2] a not-for-profit organization based in Genève, issued a code of conduct (HONcode) for websites that publish health-related content.

A Pew survey indicated that artificial intelligence and robotics are expected to have enormous implications on e-health in the next 10 years (Smith and Anderson 2014). The rapid introduction of new ICTs devices like smart assistive robotics for disabled and seniors, artificial intelligence (AI) supporting medical diagnosis and care, and new tools to remotely manage patients with chronic conditions may offer unique opportunities. However, they also generate new challenges related to access and provision of e-health. Huge challenges are expected to impact crucial sectors of society, like work, governance, education, socio-communicative practices, and of course health and well-being. Among these challenges, the Internet of Things (IoT) is expected to largely impact the field of health in the next three decades because an enormous number of medical objects connected via the Internet and communicating with each other are expected to grow exponentially from embedded smart sensors for remote monitoring to smart medical devices for home integration and fitness activities. The diffusion of intelligent mobile devices for health care and social robots companions for patients needing home assistance and care will pose new challenges particularly to hospital's IT facilities in terms of securing privacy of sensitive data, managing the enormous quantity of data they collect, and constant surveillance.

The commodification of huge amounts of sensitive data and their use by companies providing techno platforms and Internet services is still a challenge that is expected to grow in future years and is currently lacking adequate regulation from policymakers. In fact, the ability to generate, transmit, and capture huge amounts of personal data (big data) through sensors, webcams, smartphones apps, and wearable devices is an ongoing reality. Analytical models that evaluate big data for public health purposes have the potential to expand government's capabilities in terms of disease prevention campaigns, health-care provisions, and rationalization of scarce resources. But, the need for adequate regulation to address current disadvantages, threats, and barriers on the one hand and to develop benefits and facilitators, on the other hand, is likely to face additional challenges in years to come.

Health is a multidimensional concept. It is not only a physical condition related to the absence of disease but also a status of mental and social well-being. The implications of the broad adoption of the Internet are so significant that we can define a phase of the digitalization era, an "Internet-based digital" or interdigital era

[2] Health on the Net Foundation (HON): https://www.hon.ch/

(Murero 2012, 2018a). Nowadays, more and more people – and things – exchanging trillions of data are connected technologically to one another. In this context, the use of the Internet for health-related purposes and well-being has reached overall massive proportions, although local national realities differ one from the other. But as this chapter illustrates, e-health – or health-related Internet-based technology – and the implications associated to its diffusion go well beyond the technological scale, to include multidimensional means of connecting, accessing, and delivering health care and well-being from multiple agents.

When analyzing how e-health stakeholders meet their needs online and the controversial effects related to emerging online e-health behaviors, certain patterns emerge. A major point in the international debate is that while the provision of health care within hospitals and points of care is highly regulated by governments all over the world, e-health is still largely unregulated. Health data collection, security, protection, and different levels of access to sensitive information still require government and international debate and regulation.

While innovative technologies try to conquer e-health consumers, inadequate regulation of online practices remains common in many countries. For example, the implications of exchanging personal health information through online platforms and their commodification from third parties are still a matter of debate with little action taken by industry stakeholders, policymakers, and academics. Online virtual environments and home care sensor-based technology, Internet of Things, and artificial intelligence are rapidly evolving. The gap between industry innovation for e-health and regulation is still a challenge. As per the provision of health care within hospitals and points of care, that is, currently highly regulated by governments all over the world, innovative tech-based solutions for e-health such as companion robotics and even do-it-yourself instant telemedicine should be regulated and safeguarded to guarantee the fundamental right to health to anyone.

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Acknowledgments

This book began to be conceived in May of 2016. From that moment, we began organizing its structure and invited some of the most important Brazilian authors who study the different interfaces of the social phenomenon of the Internet and health. We knew some authors in person; others we did not. In the case of the latter, we made contact through the Internet/email. After Springer approved the project, we began the process of producing this work. During the year 2017, some authors had to exit the endeavor for different reasons. Other authors were immediately contacted to fill the space they left. Since the beginning, we aimed to have a book with 20 chapters in order to cover the varied set of questions and perspectives on the subject.

Practically all the chapters were initially written in Portuguese – the native language of the contributors. As the book's editors, we reviewed the chapters individually to determine whether the contents fit within our criteria and scope. We also invited outside referees to provide additional feedback. After the authors incorporated our suggestions, we gave them permission to translate their work into English. We then reviewed the English translations to guarantee uniformity across chapters and ensure quality and readability for both experts in the field and new-comers interested in the topic. To crown our project, we invited two internationally renowned scholars to write the foreword and the afterword. Here it is. A book that analyzes different trends and challenges of the Internet and the phenomenon of health in Brazil.

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