
eHEALTH EQUITY: CURRENT PERSPECTIVES

Hamid Moghaddasi PhD, Masoud Amanzadeh MSc, Forough Rahimi PhD, Mahnaz Hamedan MSc

College of Paramedical Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Abstract

Health justice is something that every country in the world needs. However, the existence of health disparities among different social groups and geographical regions in various countries of the world is inevitable. These health inequalities are a major obstacle in achieving health justice. There are a number of factors affecting health equity such as socio-economic status, education level, age, religion, geographical position, racial and ethnical differences, gender minorities, environmental factors, accessibility level to healthcare services and resources, and also the quality of healthcare. Although eHealth has the potential of eliminating health inequalities leading to the establishment of health justice, it is essential that governments and health policy makers provide some measures to diminish major barriers facing the society members especially the elderly, poor, uneducated, and disabled people when implementing it. This can result in attaining the advantages of eHealth for establishing health equity.

Keywords: eHealth; health inequality; health equity; health justice.

Introduction

Health justice is demanded by all countries of the world.¹ However, health disparities are observed among different social groups and geographical regions in all developed and developing political and social systems.²⁻⁴ The existence of health inequalities is a major obstacle in achieving health justice and as such, is considered to be a main challenge of many low-income, developing and even developed countries.⁴⁻⁶ Health inequalities may have a natural cause and may not be derived from the health system. Some instances of typical disparities include emerging diseases in a specific gender, race, or socio-economic, ethnic or even age group.⁷⁻¹⁰ Moreover, health inequalities may be due to the negligence or the health policy; a case which is

considered as health inequity. In other words, health inequity is a kind of social injustice^{3,9,11} emphasising unequal disparities.⁷ Examples of this kind are unequal distribution of resources, disease incidence and status of health outcome in different parts of the society, and also different accessibility of various social groups to health services.^{9,12}

Although resolving all health disparities is the focus of attention of all health systems' activities, the elimination of health inequities is also one of their duties.¹²⁻¹⁴ Therefore, the World Health Organization (WHO) considers the fair distribution of services and resources as a major objective of all health systems.¹⁵ Fair distribution of resources leads to ease of access and providing an economic supporting mechanism results in a proper tariff for services. To this end, countries increasingly try to reduce and resolve health inequity and move toward solving the problem and achieving health justice by investments and taking carefully-planned policies.^{12,16}

For example, from 2000 to 2008, governments in sub-Saharan Africa doubled their health expenditure from an average of \$15 to \$41 per capita per annum. International health assistance was also increased from less than \$6 billion annually in the early 1990s to \$10.5 billion in 2000, and then escalated to nearly \$26.9 billion in 2010, increasing to 36.4 in 2015.¹⁷

The International Society for Equity in Health (ISEqH) has defined health equity as the absence of discrimination or unfair health disparities,^{11,18,19} and the WHO has defined it as minimising health disparities among groups of people who have different levels of underlying social advantage.^{10,19-21} Therefore, it can be maintained that health equity is the fair distribution of health resources and outcomes among various social groups regardless of the social standing of people.²² In fact, health equity means social justice in health.^{4,10,11,23}

Achieving health equity does not mean that resources should be equally shared; rather, it emphasises that different groups of people in a society attain equal health outcomes.⁷ In other words, equity is an ethical concept based upon the principle of

justice,^{5,7,20} the achievement of which can ensure that the resources allocated to each person meet his/her minimum health needs.⁷

A number of factors including socioeconomic status, education, geographic location, racial and ethnic differences, gender, access to healthcare and health resources, and the quality of healthcare affect the achievement of health equity.^{6,9,19,24} Health inequity arises because of social inequity⁷ resulting from poor or even malevolent programmes and policies of different countries^{6,12,21} which can be solved via principled policy making.¹²

Generally, it should be noted that there has been an increased attention to health equity among most governments and international organisations and it is considered as a basic principle of health organisations.^{10,16} To this end, Ontario Health Quality Council signified health equity as one of the nine attributes of an effective and efficient health system.²⁵ The Institute of Medicine (IOM) report "Crossing the Quality Chasm" has highlighted equity as a key pillar of quality.²⁶ Many governments and healthcare organisations have specified some solutions to attain health equity,^{9,16} the most important part of which is using information technology.^{27,28}

Kanter (2009) maintains that communications and computer technology improvements have caused substantial changes in the collection, distribution and utilisation of information by healthcare providers and patients.²⁵ The use of Information and Communication Technologies (ICT) for health, which is the WHO's definition of eHealth, has been associated with increased patient safety and improved personal decision-making, leading to improved quality and more efficient delivery of care.^{26,29-31} eHealth can be utilised in addressing the various factors influencing the occurrence of healthcare disparities.^{14,30,32} Research findings suggest that the application of electronic health records (EHR) not only has the potential of improving patient outcomes and managing chronic diseases, but also reducing health inequalities in deprived communities.³⁰ The nature of ICT makes it an important tool in resolving health inequalities.³⁰ eHealth can resolve health inequalities in a society, if planned and implemented precisely. Research has demonstrated that careful design and implementation of ICT has the potential to eliminate many health disparities.^{26,33} Most international health sectors put an emphasis on health information technology (HIT) as a tool to improve the

quality and efficiency of healthcare, and achieve health equity and justice.^{31,34-37}

The experiences of developed countries of using eHealth to address health inequalities, both positive and negative, can serve as significant and useful instructions for other countries, especially developing countries. The aim of this study was to investigate the application of eHealth in achieving health equity and its positive and negative impacts.

Methods

The present review is based on searches in PubMed using relevant search terms. Articles published in English from 1993 through 2016 were identified using the following search terms (eHealth, health equity, healthcare disparity, healthcare inequality, telemedicine, telehealth, mobile health and mHealth). Searches were not limited to words appearing in the title of an article. Information obtained from bibliographic searches (title and topic of article, information in abstract, study design, and key words) was used to determine whether to retain each article identified this way. In addition, the references of review articles were reviewed. Inclusion criteria were that the paper referred to information and communication technologies (eHealth) and health inequity.

Results

A total of 72 article citations were identified. After screening the abstracts or full texts of these articles, a total number of 16 studies on the impacts of eHealth on health equity were identified. Among these articles there were, four studies on telemedicine projects and programmes,^{40,42-44} five studies on mobile health,^{26,30,45-47} four studies on Internet-based health information systems,^{25,38,39,41} and three studies on the negative impacts of eHealth on health equity.^{36,48,49}

eHealth and health equity

Based on the findings of thirteen studies, an effective implementation and use of eHealth has many benefits such as patient empowerment,^{25,39,40} improved patient safety,^{25,39,42} better communication between care providers and patients,^{25,26,30,40} increased access to health information,^{25,26} better chronic disease management and prevention,^{25,26,30,40} and improved efficiency of healthcare system,^{38,39,42} improving access to scarce specialist skills for patients in rural areas,^{38,42-44}

reducing patient referrals and thus transport costs etc.,⁴²⁻⁴⁴ and tele-education which can overcome the shortage of expertise in a country or region.²⁵ As a result, eHealth is considered as an essential component for rearranging and restoring governments' and organisations' health systems.²⁹ In addition, some healthcare researchers and experts contend that eHealth tools can improve health equity in healthcare.²⁵

Numerous eHealth programmes and projects have been launched and run in some developed countries to increase health equity. It is expected that eHealth leads to health equity, although sometimes this may not be the case for a variety of reasons. eHealth has been used to address health equity or resolve problems related to health inequalities by using ICT in the following programmes.

The Comprehensive Health Enhancement Support System (CHESS) was developed by the Center for Health Systems Research and Analysis at the University of Wisconsin. It is an Internet-based consumer health informatics system that considers people with certain diseases such as cancer and HIV/AIDS. CHESS was found to lead to improved social support, better communication with doctors, better comprehension of health information and improved life quality for those patients suffering from these diseases. Weaker classes of the society, specifically women with lower education level and poor insurance coverage, benefitted more from CHESS and showed a greater tendency to use such eHealth tools.²⁵

MiVIA (Spanish for "My Way") is an electronic personal health record (PHR) developed to consider susceptible populations such as immigrants, the homeless and seasonal farm workers in Sonoma County, California. Research findings indicated that MiVIA develops health equity through involving marginalised or deprived groups (particularly migrant workers and the homeless) to deal with their own healthcare, by minimising the distance between those who have access to digital and information technology and those who do not, making easier access to healthcare and community services, clinics and libraries and stimulates health literacy.³⁸

The Client Access to Integrated Services and Information (CAISI) Project was intended to employ IT innovation to make health outcomes and quality of life of Toronto's homeless people better. The result was a better access of the homeless to medical services.³⁹

In April 2000, the Veterans Health Administration (VHA) implemented a broad telemedicine programme

in its Sunshine Network (covering veterans in Georgia, Florida, Puerto Rico and the U.S. Virgin Islands) called Community Care Coordination Service (CCCS). It was developed to improve veterans' self-management and health outcomes while reducing their costs. The programme provided different services including tele monitoring to its users. In addition to increasing veterans' satisfaction, it was effective in raising awareness about their chronic diseases which led to better management of diseases and improved relationships among doctors and patients.⁴⁰ In 2013, the number of patients managed using home telehealth technologies at the VHA for non-institutional care, chronic disease management, acute disease management, and health promotion and disease prevention was almost 70,000. Today, many thousands of Veteran patients are regularly using home tele-health devices to coordinate their care.⁴⁰

A 2010 national survey conducted by the California HealthCare Foundation reported that low-income and chronically-ill people benefited more from using a personal health record (PHR) than high-income individuals. In addition, low-income PHR users reported better communication with their doctor than higher-income users (60% of low income vs. 30% of high-income).⁴¹

One of the well-known telemedicine initiatives is the Alaska Federal Health Care Access Network (AFHCAN). It was designed to improve healthcare access for individuals living in rural Alaska. The findings of a comprehensive evaluation demonstrated that this programme improved the quality of care and played an effective role in patient education in remote areas.⁴²

The Open Door Community Health Center (ODCHC) Telemedicine Programme is another telemedicine programme implemented to provide medical services to those underserved individuals who are not under insurance coverage. Results of investigations signified that the existing barriers which restricted underserved people's access to healthcare services have been reduced.⁴³

The ECHO project is another telemedicine programme aimed at managing chronic diseases. This project was implemented in rural and underserved areas of New Mexico and results indicate that care services providers' knowledge and skills have improved.⁴⁴

mHealth programmes and projects play an important role in diminishing health inequities. mHealth and the applications of smart cell phones is a beneficial

mechanism for transferring health information, disease surveillance, and establishing a direct relationship with care providers which will lead to improving the quality of healthcare, managing chronic diseases and providing acute telemedicine care, e.g. cardiology, dermatology, burn management etc. Some studies indicate that mHealth services such as text messages have a positive impact on the management of chronic diseases such as diabetes mellitus, asthma, and blood pressure.^{26,30} The practical applications of eHealth applications are more effective for deprived low-income populations who have better access to mobile phones than the Internet.⁴⁵

Text4baby is a free eHealth service designed to promote maternal and child health. It provides pregnant women and low-income mothers who have new-borns with required to take care of their own health and that of their children.⁴⁶

Loring et al. investigated the relationship between the effect of mHealth on achieving health equity. The obtained results indicated that implementing and using mHealth in deprived countries such as Papua New Guinea will result in promoting health level and attaining health equity for people.⁴⁷

In spite of positive results of many studies conducted on eHealth and health justice, other studies maintain that this technology will not lead to health equity and may even worsen and increase health disparities and inequities among people in a society. In 2004, Cashen et al. recognised that existing eHealth tools at that time could not provide services based on different people's languages and cultural needs.³⁶ A more recent 2013 paper indicated that eHealth can intensify health inequities in European countries due to inequality in access to the Internet. Factors such as age, education level and geographical location were stated as basic reasons for this variation in Internet access.⁴⁸

Newman et al. argued that in remote areas of Australia, appropriate technology infrastructure does not exist and the accessibility to technologies such as the Internet and cell phone is lower among people living in these areas and also among the elderly. Additionally, people with lower levels of education and income have less access to these technologies. Therefore, it was concluded that if such points are not taken into account when implementing eHealth, it can increase health inequity among different groups and in different regions.⁴⁹

Discussion

Paying attention to potential problems of using ICT in the health domain is of crucial importance in achieving health equity. Therefore, a number of solutions are proposed to resolve potential detriments that may be caused by the implementation of eHealth.

How to deal with health inequity resulting from eHealth

Many factors can act as an obstacle to effective and efficient use of eHealth tools by susceptible populations, such as no meaningful access to the Internet, inadequate expertise, insufficient basic and health literacy, age and disabilities.²⁵ Some problems related to the implementation of eHealth and subsequent ways of solving its potential negative effects on health equity are as follow:

- Permanent availability of computer technology including hardware, software and Internet connections, is significant for the use of eHealth tools.^{48,49} In spite of fast growth of digital access for people of varied ages in different countries, there still exists a sharp digital detachment for susceptible populations. Research findings also illustrate that information technology consumers are notably high-income groups.^{25,34} Therefore it seems essential that all countries' health systems pay attention to this issue and provide the required measures for free access to eHealth for all people of the society.^{48,49} Although it is essential to accelerate physical access to the Internet and computers to minimise current inequities, it is not sufficient to merely ensure that eHealth resources are equally and fairly distributed. In order to increase the access and use eHealth tools desirably, it is necessary to provide appropriate facilities for Internet access and develop eHealth content that can be used correctly by individuals with different preferences and capabilities.²⁵
- Lack of required skills is one basic obstacle for effectively applying eHealth tools.^{48,49} For people to positively use eHealth tools they must be literate, and have basic health literacy and a level of IT literacy.^{25,34,50} Therefore, governments whose health systems are equipped with eHealth, should provide the necessary domains and facilities for educating all people of a society to develop such literacy.

- The elderly are more in need of healthcare services than the young. Therefore, policymakers should try increase use by the elderly of health information via the Internet and eHealth tools, to deal with their illnesses and interconnect with healthcare specialists. If this does not happen, the elderly and lower-income people will not be able use eHealth resources.^{25,49}
- People with disabilities are less likely to use eHealth tools because of both physical access barriers, as well as obstacles related to the design, content and distribution of electronic health information. Without specific facilities such as multimedia presentations, disabled people may not be able to use eHealth tools and will constantly experience significant health disparities. One method which can significantly ensure that eHealth enterprises can be advantageous for disabled or deprived people is to engage them in procedures of research studies and design of specific eHealth tools. This will ensure that the disadvantaged people of the society will use eHealth tools. This user-centred method should take into consideration the requirements, inclinations, abilities, beliefs and aims of different eHealth users as the central focus of eHealth programme.^{25,50}
- The variety of cultures, customs, ethnic differences, and languages are among other reasons that if not taken into account, can lead to problems for eHealth and subsequently health equity. Because variations in cultures have an impact on the way people access, process and use health information, eHealth tools must be designed based on cultural differences of different groups of people in a society.^{25,49}

This review shows that the effective use of eHealth tools has a positive influence on achieving health equity. However, unplanned and erroneous implementation of eHealth can potentially play a role in exacerbating disparities in healthcare quality and outcomes. If various groups of people in a society cannot equally use eHealth facilities and benefit from its uses, inequities will not diminish and may also become worse. Successful implementation of eHealth which benefits all people in a society and appropriate IT support depends on many factors such as the accessibility of all required technologies to all people, the existence of technical infrastructure, and people

having or acquiring the necessary technical health literacy skills.

Conclusion

eHealth has the potential to resolve health disparities, and as a result, lead to health justice. However, it is essential that governments and health policy makers provide some measures to diminish major barriers facing society, especially the elderly, the poor, the uneducated, and the disabled when implementing it. This can result in attaining the advantages of eHealth for establishing health equity. Moreover, it is important to ensure that eHealth is run in a proper disciplined manner, and all people of the society benefit from its advantages. The result would be the achievement of health equity. Therefore, eHealth equity should be defined as excluding discrimination and minimising unequal health disparities via benefiting from the advantages of information and communication technology in addition to resolving ICT-driven health inequalities to provide quality health services to different groups of people in a society. This definition will stand true until the information and communication technology penetrates equally in all peoples' lives and everybody in the world has an equal chance to access and use it.

.....

Corresponding author:

Hamid Moghaddasi
 Department of Health Information Technology and Management
 College of Paramedical Sciences
 Shahid Beheshti University of Medical Sciences
 Darband Street, Ghods Square (Tajrish),
 Post Code 19395
 Tehran, Iran
 eMail: Moghaddasi@sbmu.ac.ir

Conflict of Interest. The authors declare no conflicts of interest.

References

1. Morris S, Sutton M, Gravelle H. Inequity and inequality in the use of health care in England: an empirical investigation. *Soc Sci Med* 2005;60(6):1251-1266.

2. Whitehead M. The concepts and principles of equity and health. *WHO Regional Office for Europe* 2000.
3. Whitehead M, Dahlgren G. Concepts and principles for tackling social inequities in health: Levelling up Part 1. *WHO: Studies on social and economic determinants of population health* 2006; 2.
4. Nolen LB, Braveman P, Dachs JN, et al. Strengthening health information systems to address health equity challenges. *Bull World Health Organ* 2005;83(8):597-603.
5. Linares-Pérez N, López-Arellano O. Health equity: conceptual models, essential aspects and the perspective of collective health. *Soc Med* 2008;3(3):194-206.
6. Brown C, Harrison D, Burns H, Ziglio E. Governance for health equity. WHO Regional Office for Europe, 2013.
7. Royal New Zealand College of General Practitioners. Achieving health equity by eliminating health inequities position statement 2013.
8. Kawachi I, Subramanian SV, Almeida-Filho N. A glossary for health inequalities. *J Epidemiol Community Health* 2002;56(9):647-652.
9. Wikipedia. Health equity. Wikipedia, the free encyclopedia. Available at: https://en.wikipedia.org/wiki/Health_equity accessed 27May 2017.
10. Son HH. Equity in Health and Health Care in the Philippines. *ADB Economics Working Paper Series* 2009;(171).
11. Braveman P, Gruskin S. Defining equity in health. *J Epidemiol Community Health* 2003;57(4):254-258.
12. World Health Organization. Closing the health equity gap: policy options and opportunities for action. *WHO* 2013.
13. Braveman PA, Kumanyika S, Fielding J, et al. Health disparities and health equity: the issue is justice. *Am J Pub Health* 2011; 101(1):149-155.
14. Lee J. The impact of health information technology on disparity of process of care. *Int J Equity Health* 2015;14(34):1-7.
15. Hajimahmoudi H, Zahedi F. Justice in the healthcare system: payment and reimbursement policies in Iran. *IJME* 2013; 6(3):1-6.
16. GIH Bulletin. Issue Focus, what's in a name: untangling health disparities, the social determinants of health, and health equity 2010. Available at: http://www.gih.org/files/usrdoc/Issue_Focus_Whats_In_a_Name_3-22-10.pdf accessed 27May 2017
17. Gostin LO. A framework convention on global health: health for all, justice for all. *JAMA* 2012; 307(19):2087-2092.
18. Botero AM, Valencia MM, Carmona-Fonseca J. Social and health equity and equality—the need for a scientific framework. *Soc Med* 2012;7(1):10-17.
19. Braveman P. Health disparities and health equity: concepts and measurement. *Annu Rev Public Health* 2006;27:167-194.
20. Braveman P, Gruskin S. Poverty, equity, human rights and health. *Bull World Health Organ* 2003;81(7):539-545.
21. World Health Organization. Health systems, equity. Available at: <http://www.who.int/healthsystems/topics/equity/en/> accessed 27May2017.
22. Klein R, Huang D. Defining and measuring disparities, inequities, and inequalities in the Healthy People initiative. *National Center for Health Statistics Centers for Disease Control and Prevention*, 2010. Available at: http://www.cdc.gov/nchs/ppt/nchs2010/41_Klein.Pdf accessed 27 May 2017.
23. Benjamin GC. Health equity and social justice: a health improvement tool. *Grant Makers in Health Views from the Field*. 2015 May 19.
24. Brennan Ramirez LK, Baker EA, Metzler M. Promoting health equity: A resource to help communities address social determinants of health. *Centers for Disease Control and Prevention* 2008.
25. Kanter M. Realizing the equity potential of e-health: improving health promotion and self-management in Ontario. The Wellesley Institute 2009. Available at: http://www.wellesleyinstitute.com/wp-content/uploads/2011/11/EHealth_Through_and_Equity_Lens_FINAL_FORMATTED.pdf accessed 27 May2017.
26. López L, Green AR, Tan-McGrory A, King R, Betancourt JR. Bridging the digital divide in health care: the role of health information technology in addressing racial and ethnic disparities. *J Comm J Qual Patient Saf* 2011;37(10):437-445.
27. Custodio R, Gard AM, Graham G. Health information technology: addressing health

- disparity by improving quality, increasing access, and developing workforce. *J Health Care Poor Underserved* 2009;20(2):301-307.
28. Garvin JH, Odom-Wesley B, Rudman WJ, Stewart RS. Healthcare disparities and the role of personal health records. *J AHIMA* 2009.
 29. The Wellesley Institute. E health and health equity: Comments on Ontario's eHealth Strategy. *The Wellesley Institute, Policy Consultation* 2009.
 30. US Department of Health and Human Services. Understanding the impact of health IT in underserved communities and those with health disparities. Briefing Paper. NORC at the University of Chicago. 2010.
 31. Perot R, Davis R. *Health information technology: a tool for health equity and system transformation*. 2009.
 32. Farach N, Faba G, Julian S, et al. Stories from the field: the use of information and communication technologies to address the health needs of underserved populations in Latin America and the Caribbean. *JMIR Pub Health Surveill* 2015;1(1).
 33. The California Pan-Ethnic Health Network. Equity in the digital age: how health information technology can reduce disparities. 2013. Available at: <https://cpehn.org/resource/equity-digital-age-how-health-information-technology-can-reduce-disparities-0> accessed 27 May 2017.
 34. Kieschnick T, Raymond B. Can health IT promote health equity and patient-centered care? *The agency for healthcare research and quality, AHA, and the Kaiser Permanente Institute for Health Policy* 2011. Available at: <https://www.ama.org/sites/ama.org/files/Roundtable-Background-Paper-2011.pdf> accessed 27 May 2017.
 35. Eysenbach G. What is e-Health? *J Med Internet Res* 2001;3(2): e20.
 36. Cashen M. S. e-Health technology and internet resources barriers for vulnerable populations. *J Cardiovasc Nurs* 2004;19(3):209–214.
 37. Wikipedia. E-Health 2016. Available at: <https://en.wikipedia.org/wiki/EHealth> accessed 27 May 2017.
 38. Solomon C. “Using Technology to Improve Migrant Health Care Delivery” in Institute of Medicine, Health Literacy, e-Health and Communication: Putting the Consumer First: Workshop Summary. *The National Academies Press: Washington, D.C.* 2009. Available at: http://www.nap.edu/openbook.php?record_id=12474&page=47 accessed 27 May 2017.
 39. Gardner B. Health equity discussion paper. *Toronto: Toronto Central LHIN* 2008.
 40. Ryan P, Kobb R, Hilsen P. Making the right connection: matching patients to technology. *Telemed J e-Health* 2003;9(1):81-88.
 41. Udem T. Consumers and health information technology: a national survey. *California HealthCare Foundation* 2010. Available at: <http://www.chcf.org/~media/MEDIA%20LIBRARY%20Files/PDF/C/PDF%20ConsumersHealthInfoTechnologyNationalSurvey.pdf> accessed 27 May 2017.
 42. Carroll M, Cullen T, Ferguson S, et al.. Innovation in Indian healthcare: Using health information technology to achieve health equity for American Indian and Alaska Native populations. *Perspect Health Inf Manag* 2011;8.
 43. Moiduddin A, Stromberg S. Health information technology in California's rural practices: assessing the benefits and barriers. *Prepared for the California Health Care Foundation* 2009. Available at: <http://www.chcf.org/~media/MEDIA LIBRARY Files/PDF/R/PDF RuralHealthIT.pdf> accessed 27 May 2017.
 44. Hostetter M. Case Study: Project ECHO Expands Access to Specialty Care for Rural Patients. 2009. Available at: <http://www.commonwealthfund.org/publications/newsletters/quality-matters/2009/november-december-2009/case-study> accessed 27 May 2017.
 45. DRA Project. Cell phones and reducing health disparities. Report 06-02 2006.
 46. Belen L. HIMSS Latino and health it in the Latino community: leveraging collaborations, emerging technologies and consumer engagement to eliminate health disparities in the Latino community. *HIMSS Latino Community* 2012.
 47. Loring B, Friel S, Matheson D, et al. Reducing community health inequity: the potential role for mHealth in Papua New Guinea. *J Community Inform* 2013;9(2).
 48. Policy Précis Making the link: e-Health and health equity. *EuroHealthNet* 2013.
 49. Newman LA, Patel K, Barton E. The role and impact of digital and traditional information and communication pathways in health service access

and equity. *South Australian Community Health Research Unit* 2012.

50. Marschang S. Health inequalities and e-Health. *Report of the e-Health Stakeholder Group* 2014.