

The Role and Impact of Digital and Traditional Information and Communication Pathways in Health Service Access and Equity

Report on a literature review for
Country Health SA Local Health Network's
Falls Prevention Project

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1. Executive Summary

This review of the literature was conducted by Flinders University (SA Community Health Research Unit and Southgate Institute for Health Society & Equity) to provide an overview of changing communications in health promotion to inform the Falls Prevention Project of Country Health SA's Local Health Network. The context is that falls health literacy information is being increasingly made available via digital formats, including the Internet. This is in line with healthcare around the world increasingly moving to e-health (the delivery or enhancement of health services through the Internet and related technologies). There are particular expectations that for rural Australians making health services and information available through digital formats will overcome existing problems with access and availability. Despite a large amount of activity in the area of e-health, there is a scarce evidence base on the equity impacts of e-health promotion.

A major challenge to the take-up and success of e-health solutions is the fact that access via the Internet or a mobile phone (and use thereafter) are fundamental prerequisites for consumers and health professionals, yet unequal Internet access and use exists among consumers. In rural Australia there are ongoing problems with lack of technical infrastructure, including basic connectivity and performance. Technology access and use (especially the Internet and mobile phones) is lower among rural Australians, and lower still among older rural Australians and remote Indigenous Australians, those with lower income levels and those with lower education. The development of e-health promotion therefore needs to be practically influenced by equity considerations, to avoid the likelihood that increased use of digital information and communication pathways will increase health inequities within and across groups and regions.

People are likely to continue to use a variety of information sources related to their healthcare, because information use is linked to differences in education, income, reading level and cultural background. Identifying and understanding how different groups receive health information is important in ensuring that e-health promotion is effective. Otherwise, as the communication environment changes, these groups may become (even more) 'hard-to-reach'. Low-users of information technologies may perceive that they are being stigmatised by services for not being 'connected' or for not communicating in the way the service prefers. Information format is also important, with reading levels being a key factor influencing how health information is obtained. It is especially significant that almost half of all Australian adults (aged 15-74) have reading levels below the minimum needed to meet the complex demands of everyday life and work. People with lower levels of education, basic literacy, or from a non-English speaking background prefer verbal and visual channels and formats for communication with service providers i.e. radio,

television and face-to-face. Websites need to be readable at a Year 7-8 education level, and incorporate standard readability/accessibility guidelines, more visual/verbal and sound options, and touch-screen alternatives which do not require computer navigation skills. Health services are therefore best placed if they develop communication strategies which combine mainstream/traditional communication with new technology options, rather than focusing on one main option. For those without Internet access or who have lower ability to manage online health information, the primary source of medical information remains the health professional.

There is a limited amount of research on e-health in the areas of falls prevention. Older people can successfully use websites for falls prevention activities, but the percentage of older rural people using the Internet limits the reach for country health services. To engage older people in falls prevention interventions it is still important for a health professional to initiate contact. To encourage increased use of falls prevention websites, websites should represent older people as 'empowered decision makers (not passive and inert), and must be positive, respectful and senior-friendly (eg readable text, using everyday language, using colour and graphics, and with 'talking' function alternatives). The information provided must have good coverage, high credibility, is best given in 'small doses', and must be kept up-to-date. Providing online tailored advice increases the likelihood that older people will act on the advice. Other technology-based falls health promotion includes strength and balance training using Wii Fit or interactive web-based (Internet) programs, and the use of real-life video clips in health promotion activities.

The computer and digital literacy of the rural health workforce is also important if they are to successfully implement e-health initiatives and support consumer use of e-health. Staff may increasingly need to play an "ICT brokerage" role, alongside their normal work, to assist consumers in using e-health (eg falls prevention websites). Staff may need specific training to use their own IT skills in this way, and management need to allocate time for training and brokerage. To be successful, it is also recommended that e-health initiatives include health workers in the design and ongoing development, and that e-health use must be incorporated in both formal rules and in the norms of organisational culture among workers.

The key messages in the literature are as follows:

1. Maintain investment in a diversity of health promotion channels, with online/e-health as an additional new option but not the only option, especially until the technical infrastructure and affordability for Internet and mobile phone use improve in rural Australia, and the target consumer groups demonstrate successful connection to and use of these technologies. For consumers without Internet access or who have lower ability to manage online health information, the primary source of medical information remains the health professional.

2. Evaluate the accessibility of online health information and e-health channels in falls prevention to identify which consumers the e-health options work for, so that these groups can maximise the benefits of this format. At the same time identify which consumers these formats do not work for and how to provide them with falls prevention information through channels and formats which support equal quality and usefulness of information.
3. Evaluate the quality and acceptability to users of information provided online versus that provided offline/face-to-face by health professionals and the appropriateness of content for particular users, including the Falls Prevention in SA Active Ageing website.
4. Investigate whether any/some/all consumers require assistance to access the e-health initiatives being developed by CHSA LHN (including the Falls Prevention in SA Active Ageing website) and what type of support they prefer.
5. Identify how CHSA LHN can design and develop e-health initiatives in ways which maximise health access for all users, and develop applications which match the diversity of rural consumers including cultural appropriateness for CALD and Aboriginal consumers.
6. Investigate the potential of proxy users (e.g. adult children of older people; falls prevention staff) in helping consumers access and understand online falls prevention initiatives.
7. Investigate the provision of appropriate hardware and social support for use for particular population groups or rural areas, including within community access points and the home.
8. Continue to work with and fund researchers to better understand access and equity issues in falls health promotion.
9. Follow up recommendations in the *Strategy for Planning Country Health Services in SA* (Government of South Australia 2008) which aim to adequately resource quality training for Falls Prevention staff and other Country Health SA LHN staff to ensure their effective use of information technology for their own work, and their ability to assist consumers.

2. Introduction to the Literature Review

This review of the literature was conducted for Country Health SA Local Health Network's Falls Prevention Project by the SA Community Health Research Unit (SACHRU) and the Southgate Institute for Health Society & Equity, at Flinders University. The purpose of the review is to provide an overview of changing communications in health promotion to inform the Falls Prevention Project as falls health literacy information is increasingly made available via digital formats (including the Internet), yet this may not be the modality that all consumers can access.

A rapid structured literature review process was adopted (UK Government, n.d) and conducted between May and August 2012. Searches were made for articles published since the year 2000, with an emphasis on review articles. Considering the rapidity of development and change in infrastructure, digital devices, and the population distribution of Internet uptake, articles from the last 5 years (ie since 2007) were given greater attention. Searches were conducted using major academic databases (e.g. Scopus) and Google Scholar. Google was also searched for 'grey literature' such as reports by governments, health organisations and communications organisations. Search terms included those relating to digital communication (e.g. Internet, digital, online, web, mobile phone), health promotion for particular groups (disadvantaged, vulnerable, older), and falls-specific use of communication and information technologies.

Additional searches were made for articles specifically about rural e-health and falls prevention online but these returned only a few items, despite including searching on a number of dedicated falls prevention websites. The reference lists of the located articles led to the identification of some additional relevant materials. Some studies reported findings only from online surveys, and these are obviously biased to only sampling and providing information about Internet users and say nothing about Internet non-users. It is also important to note that rural minority communities are generally under-represented in e-health research (Glueckauf & Lustria 2008).

3. Background: Health Services and e-Health

Healthcare around the world is increasingly moving to **e-health** - the delivery or enhancement of health services and information through the Internet and related technologies to improve or enable health and healthcare, with a particular focus on consumer-oriented technology (Cashen, Dykes & Geber 2004; Dansky, Thompson & Sanner 2006; Eng 2002). Australia's *National E-Health Strategy* specifically encourages the health system in this direction (Australian Health Ministers Conference 2008) as does the *E-Mental Health Strategy* (Department for Health &

Ageing 2012). In South Australia the *Strategy for Planning Country Health Services in SA* (Government of South Australia 2008:35) states that a critical contributor to the Strategy's success is that 'services in country SA have access to information technology which supports and facilitates the patient journey', including through enhancing 'people's capacity to access the best possible information to support prevention, simplify access to services and to self-manage care'. The Strategy also aims to support appropriate access to primary health care services, and to adequately resource 'quality training for clinicians and consumers... to ensure the effective use of information technology' (2008:13).

4. Benefits of Digital Communication in Health Services

Within healthcare and health services there is a widespread assumption that introducing digital communication – such as online health information and online self-management opportunities - will be beneficial. It is hoped that for consumers digital communication benefits will result from improved access to health care and improved quality of care, convenience, and timeliness of information and health access, and that for service providers it will save costs and resources, boost the quality and output of healthcare services and make the health sector more efficient (Griffiths et al 2006; European Commission 2012). For traditionally underserved populations, the Internet in particular is seen to potentially offer ways to unlock resources which could fundamentally improve health and wellbeing (Zarcadoolas et al 2002). In rural areas, particularly those experiencing health workforce shortages, e-health services could overcome some of the problems with healthcare accessibility and availability and could be a cost effective means of delivering some healthcare services (Bauer 2003). There is some evidence that patients and healthcare professionals are satisfied with e-health; however there is a need to establish adequate telecommunications infrastructure for rural areas and to remember that electronically-mediated clinician-patient relationships and services may fall short of clinical standards and ethical ideals of traditional face-to-face medical practices (Bauer 2003).

The Australian federal government sees digital communication (in particular via the new National Broadband Network - NBN) as holding the potential to overcome current barriers to healthcare access, such as geographic distance and physical accessibility (Conroy, Plibersek & Butler 2012). Particular benefits are expected for older Australians and those living in rural Australia. However, even by 2025 it is expected that 25% of Australian 'premises' will remain unconnected from the NBN (Perlgut 2011). The *National E-health Strategy* aims to 'empower consumers' by encouraging 'electronic access' to healthcare and by focusing on 'those segments of the population that interact frequently with the health system' (Australian Health Ministers Conference 2008). Yet decision-makers are not convinced that e-health can reduce costs,

improve service quality or enable equity (World Health Organisation 2012) and the pathways by which these improvements are supposed to be achieved are rarely made explicit.

Access to health services and information on the Internet, in particular, has been found to have widespread benefits, including improved information access and interactivity, information tailoring and anonymity, and empowering underserved groups (as long as they have adequate access to useable technology) (Cline & Haynes 2001; Masi et al 2003). Although there is a large amount of activity in the area of general e-health, there is **a scarce evidence base relevant to e-health promotion**, and e-health research makes little reference to the use of technologies in the promotion of health (Otte-Trojel 2011). Work in the EU has identified 16 representative e-health promotion applications (Otte-Trojel 2011; EuroHealthNet nd). These fall into 4 main categories:

- *Online information resources* (e.g. health information portals/websites, private health advice, shared health records);
- *Technologies to motivate behaviour* (e.g. Smartphone applications (iApps), mobile health services, e-health promotion tools, online self-help tools, sports gadgets);
- *Online health communities* (e.g. health forums, targeted social forums);
- *Health monitoring technologies* (e.g. online health assessment resources, personalised physical activity systems, body signal monitors, remote physical activity monitors).

Despite the anticipated benefits of e-health, a major challenge to the take-up and success of e-health solutions is the fact that access via a computer or mobile phone (and use thereafter) are fundamental prerequisites for consumers as well as health professionals, and unequal Internet access and use among consumers continues to exist (EuroHealthNet n.d). UK evidence shows that a digital underclass is forming, whereby those with lower education levels and no employment remain far behind other groups, even though they have experienced some improvement in access, skills and Internet use (Helsper 2011). As governments plan to make public services 'digital by default' these individuals will be unable to access them, not because of a lack of infrastructure but because of a lack of effective up-take and use of the available connections (Helsper 2011). Even with connectivity, some of the key challenges to Internet use include the navigation style of new technologies combined with poorly developed navigation skills among consumers, the poor quality of online health information, confusion among consumers over conflicting information from different sources, and difficulty for consumers in digesting and remembering what has been read (Chiu & Eysenbach 2011; Cline & Haynes 2001). Future e-health promotion development therefore needs to be practically influenced by equity considerations, to avoid the likelihood that increased use of e-health promotion will increase health inequities both within and across groups, countries and regions (Otte-Trojel 2011).

5. Equity Considerations in E-Health

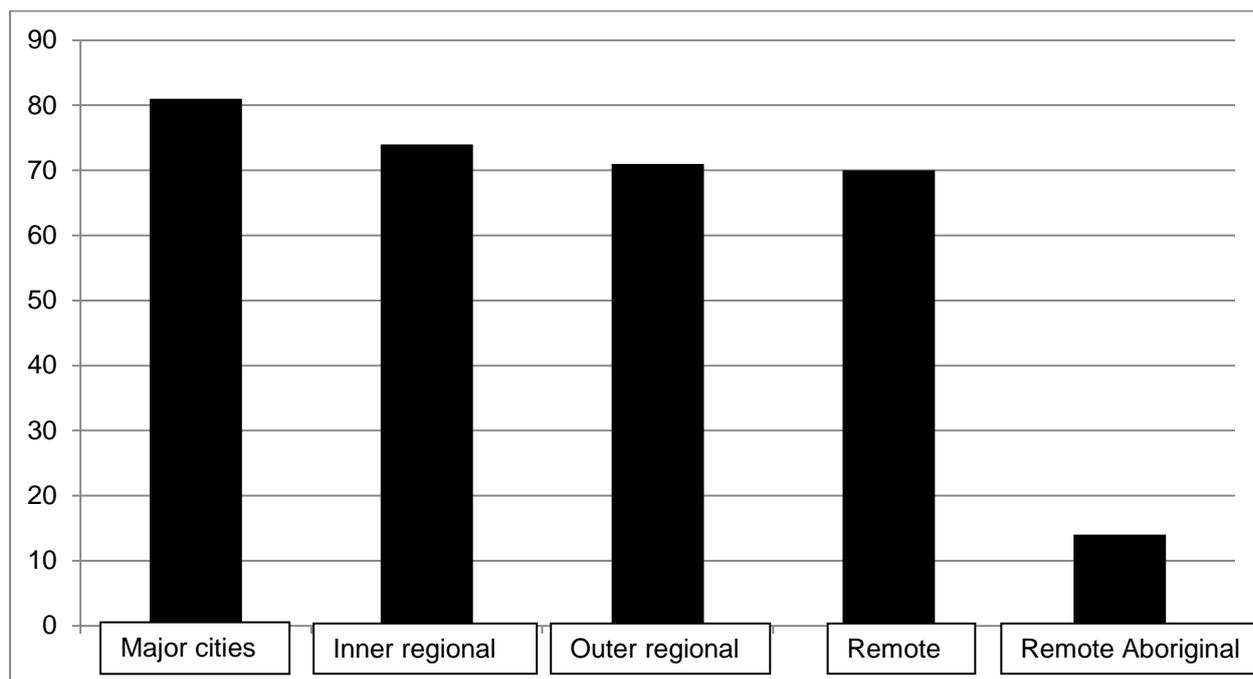
There has been little focus on the possible *health equity consequences of e-health*, with recent European research identifying an urgent need to investigate the health equity implications of using e-health for health promotion and disease prevention (Otte-Trojel 2011). Concerns have been expressed for over a decade that information technology is creating a new social inequality and that the use of digital resources in the health domain will create new gaps between health consumers (Eysenbach & Jadad 2001; Miller & West 2007; Newman, Baum & Biedrzycki 2012; Sassi 2005; Stevenson 2009). There appears to be no standardised mechanism to ensure equal access or potential consequent benefits for underserved population groups, to support healthcare managers and policymakers to develop new strategies or interventions to help underserved groups get access to information relevant to their healthcare (Lorence, Park & Fox 2006). There has also been little exploration of whether certain users need help from health services to be digitally included (Wei 2012).

In Australia there is a *digital gradient* which *mirrors the social gradient in health*, which means that those Australians with lesser or no Internet access are also likely to be the same people who have poorer health (Newman, Biedrzycki & Baum 2010). Health services need to acknowledge these issues if they are to introduce or expand digital communication in ways which do not inadvertently reduce access for some groups whilst increasing it for others (Newman, Baum & Biedrzycki 2012). It is also important to acknowledge that some people are 'digital drop-outs', persistent ex-users of ICTs, or intermittent users i.e. moving in and out of ICT use as their circumstances change and so are sometimes 'digitally included' and at other times are 'digitally excluded', which can affect the extent to which they can have successful contact in these ways with health services (Raban, 2007; Selwyn et al 2005; Helsper 2008).

There are a range of factors contributing to lack of use of the Internet and mobile phones, the most basic of which is lack of technical infrastructure. The recent Review of Regional Telecommunications in Australia shows that technical infrastructure to provide both Internet and mobile phone connection continues to be patchy outside of metropolitan areas and these areas will continue to be behind if they are not given serious attention (Department of Broadband, Communications & the Digital Economy (DBCDE) 2012; Sinclair 2012). Home Internet access is now the 'gold standard' for beneficial Internet use (Helsper 2008) but there is differential distribution of home Internet access by 'households' in different geographical areas of Australia, as shown in Figure 1 (over page).

Figure 1: Home Internet access by geographical region of Australia

(Source: compiled from ABS 2011 and McCallum & Papandrea 2009)



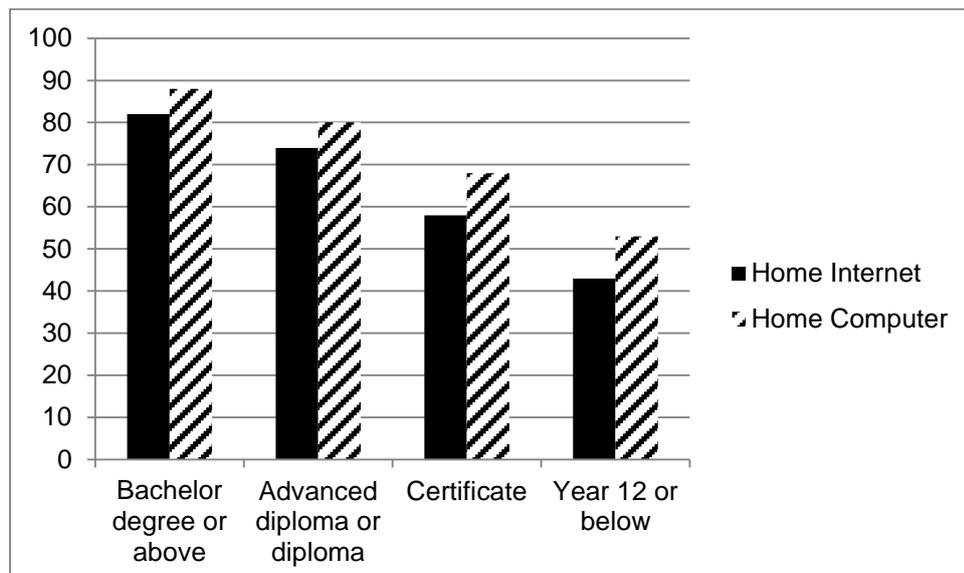
When disaggregated by different population groups, we see that inequities are even wider for some groups, so that Australians *without a home Internet connection* include the following (Australian Bureau of Statistics (ABS) 2011; McCallum & Papandrea 2009):

- 35% of rural households
- 51% of rural older Australians (aged 60+)
- 86% of remote Indigenous Australians

Among older Australians, 51% of older (age 60+) women and 42% of older men are without home Internet (ABS 2011). Figure 2 shows the unequal distribution of Home Internet and home computer among older Australians (who may be at greater risk of falls). This shows a clear gradient by education level, with 80% of those at the highest education level having home Internet connection, and a smaller percentage with home Internet as education level decreases, down to just over 40% for those with only Year 12 qualifications or less.

Education level also strongly contributes to the **Internet ‘use divide’**. Research has found that education is a key predictor of the ability to use the Internet to advantage and **readiness to engage in e-health**, whereby those with lower education levels who get online are able only to carry out basic functions, while those with higher education levels can undertake more advanced functions such as online information searching (van Deursen & van Dijk 2011). Among adults, there is less Internet use among those with lower education and lower health literacy, and among

Figure 2: Older Australians (aged 60+) with Home Internet & Home Computer 2010-11
 (Source: compiled from ABS 2011)



lower-income males and lower-income older people (Jensen et al 2010). Lower status groups also use the Internet more for entertainment, while higher status groups undertake activities which further increase their advantage, such as online education (Helsper & Galacz 2009). Simply having an Internet connection in the home does not mean that everyone in the household uses it, or can use it to advantage. Australian data shows that while 49% of older women (aged 60+) have the Internet at home, only 37% actually use it; the corresponding figures for older men are 58% and 47% respectively (ABS 2011). Contrary to popular belief, only 5% of older women and older men use a computer in a public library, and only 1-2% in a government shopfront (ABS 2011). Beyond accessibility and level of education, other barriers to use include motivation and cost. In Europe, among non-users of the Internet in 2008, 38% said they had no need of the Internet, the costs of buying a computer were too high (for 25%) and the costs of connecting were too high (21%), that they lacked the necessary skills (24%) and security concerns deterred them (5%), while in terms of e-health 14% said they simply did not want to use it (European Commission 2009).

6. Factors Influencing Consumer Participation in e-Health

Considering the above issues, online health information may simply be an efficient way to deliver more services to those already privileged with health (Gilmour 2007). Figures 3 to 5 show that moving communication from verbal/visual channels to written format, and to the Internet, reduces the percentage of people who obtain health information, with this strongly linked to literacy levels.

Figure 3: Information on health issues from Radio & Television (source: Kutner 2006)

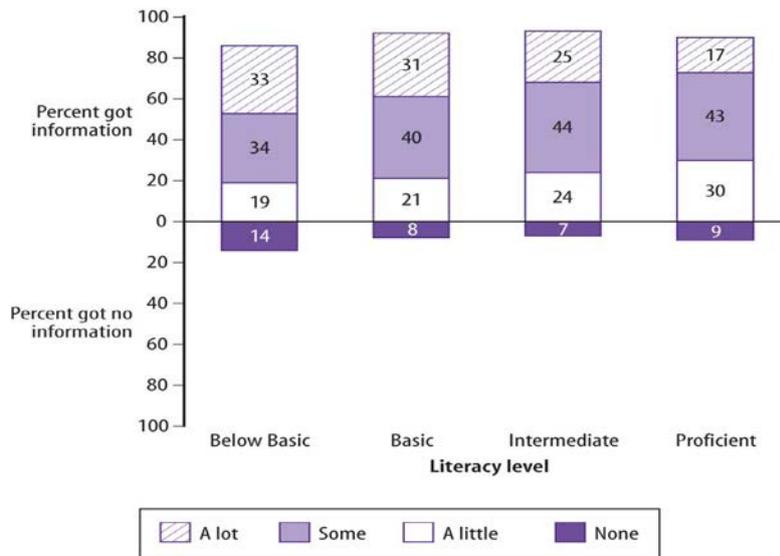


Figure 4: Health information from Books & Brochures (source: Kutner 2006)

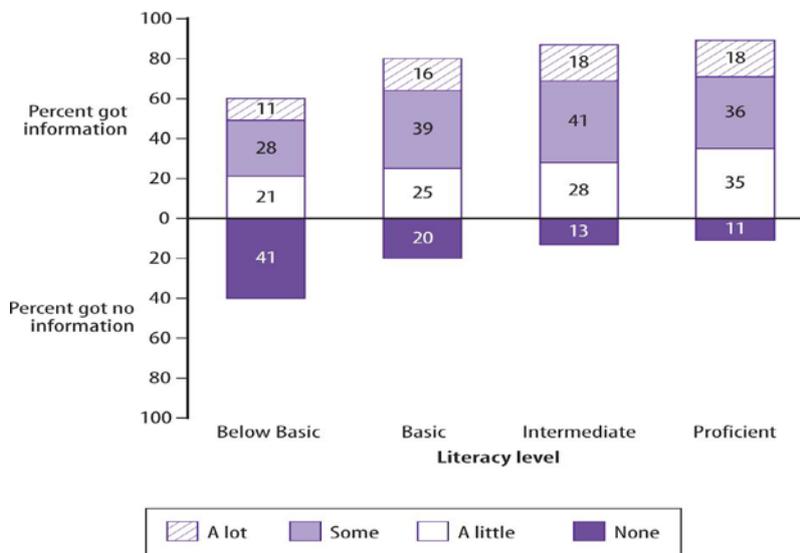
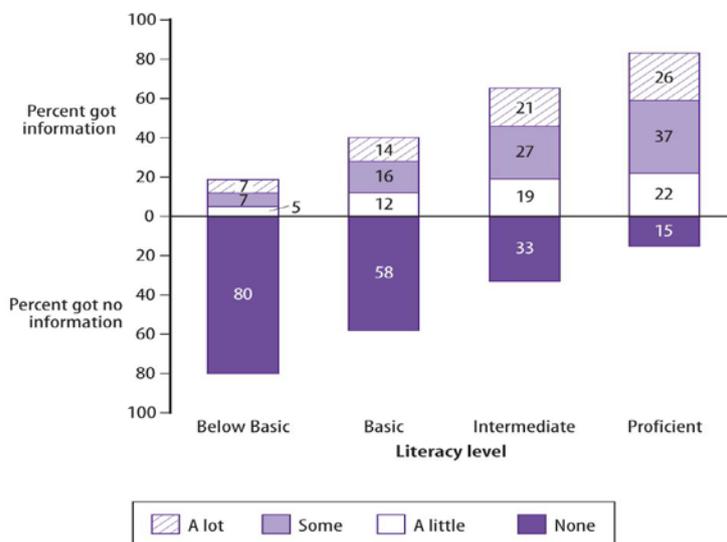


Figure 5: Health information from the Internet (source: Kutner 2006)



As Norman and Skinner (2006) point out, electronic health tools provide little value if the intended users lack the skills to effectively engage with and benefit from them, with literacy levels in various domains being a key factor in the ability to engage in the information-rich society, and the implications for e-health being considerable. These authors identify 6 types of literacy required to engage in e-health:

- *traditional literacy* – the ability to read text, understand written passages, speak and write a language coherently;
- *computer literacy* - the ability to use computers to solve problems, to adapt to new technologies and software (e.g. to transfer skills from a PC to a Mac, to learn Windows);
- *information literacy* - understanding of how knowledge is organised, how to find information, what potential sources to consult for particular topics, how to develop appropriate search strategies, ability to filter results to extract relevant knowledge, and how to use information in a way that others can learn from them;
- *media literacy* - ability to critically think about media messages and context;
- *health literacy* - the skills required to interact with the health system and engage in appropriate self-care, including the ability to perform basic reading and numerical tasks; includes the ability to read, understand and act on health care information;
- *scientific literacy* - understanding of the political and sociological nature of science, the limitations and opportunities that research presents.

Without these abilities, online health information may present a formidable challenge. Together these 6 literacies form a foundation of skills to optimise experiences with e-health. For consumers without 'moderate' skills across all these literacies, effective e-health engagement will be unlikely (Norman & Skinner 2006).

Supporting the evidence around the challenges facing certain population groups in accessing and benefiting from e-health, a US study of **low income, older people with long-term chronic health** issues and low health literacy found that those who were comfortable using computers offline nevertheless found Internet access unavailable or that Internet navigation was difficult or uncomfortable (Peterson, Dwyer & Mulvaney 2009). An older US study provided 13 low literacy adults (Year 3 to Year 8 reading levels) with specific problems to find online health information and found that participants did not use optimal search terms, had difficulty finding online information at appropriate reading levels, and were unable to successfully interpret online health information (Birru et al 2004). Another study of Internet users found that **those with poorer health status** and chronic conditions were more likely to be newcomers to the Internet than those with good health, and that clinicians and e-health developers needed to develop resources to meet the needs of this group (Houston & Allison 2002).

Nevertheless, some studies find that **those with poorer health** are *more* likely to participate in e-health services, hypothesising that they may already be better “hooked into” health systems (Beckjord et al 2007). A survey of Type 2 Diabetic patients who were Internet non-users showed that all groups of patients (regardless of race and education level) expressed strong interest in benefiting from technological means of information sharing with health professionals (Watson et al 2008). While patients with chronic disease have lower rates of technology access overall, those who do gain Internet access are then *more* likely to seek out online health information compared to those without a chronic condition (Fox 2007). This is possibly because, once online, those with poorer health are more extensive users of online health supports, including being ten to thirteen times more likely to participate in online support groups, which also results in more positive health outcomes (Huntington et al 2004). However, socio-demographic factors are also significant in influencing whether or not people use online support groups (White & Dorman 2001). The well-known Pew Internet & American Life project has found that once online and looking for health-related information, most people search for disease-specific information or disease-specific medical treatment; they are far less likely to search for general health information, nutrition or fitness topics (Lorence, Park & Fox 2006).

The **cultural relevance** of information also requires consideration, so that materials reflect specific cultural beliefs and practices related to health, and websites or pages labelled as ‘ethnically specific’ are more than generic pages which have been renamed, but are sites which are culturally reflective and preferably (re)developed with the communities of interest (Gilmour 2007; Greenstock et al 2012). One US paper recommends conducting a survey of minority patients to construct communication interfaces which are appropriate, and developing online culturally and linguistically tailored patient education materials via the Internet or text messaging (Lopez et al 2011). Non-English speakers are also less likely to find e-health resources which are understandable and meet their needs, considering that a significant proportion of the Internet’s content is usually in English (Global Reach 2005; Greenstock et al 2012). One US study found that Latino Americans often obtained health information from Spanish-language ‘health storytelling networks’ such as the mass media (Wilkin & Ball-Rockeach 2011).

7. Communication Preferences of Different Population Groups

People use a variety of information sources for health, including both interpersonal sources such as health professionals and family, and mediated sources such as television and the Internet (Rains 2007). The ‘knowledge gap’ hypothesis posits that as information is disseminated through the mass media, those with higher socioeconomic status receive and gain the knowledge at a faster rate than those of lower status (Wilkin & Ball-Rockeach 2011). However, these differences between groups may be the result of dissemination channels being used which are not part of a

particular group's way of receiving information. In order to reach those consumers who are traditionally considered 'hard-to-reach', it is therefore important to identify and understand the specific elements which influence the way they receive information (i.e. their 'health storytelling networks') which can inform the development of the best ways to communicate with these groups (Wilkin & Ball-Rockeach 2011). Otherwise, as the communication environment changes, these groups may simply become even more 'hard-to-reach'.

Studies have sought to identify which communication channels work best for communicating on health issues with particular population groups. It seems that individuals who feel that their communication with doctors is not satisfactory or patient-centred (e.g. the doctor does not understand their questions or their emotional stress) are more motivated to turn to alternative channels of communication, including the Internet (Hou & Shim 2010). However participants in the study in question were predominantly Anglo, well-educated, middle-aged Americans who have the means to access the Internet as an alternative information source. It is also possible that certain groups of people are more willing to make use of certain types of e-health applications than others, since higher educated groups are more likely to access information and use e-government services than those with lower education, yet the latter do spend significantly longer in online gaming, online chatting, music download/exchange and other entertainment (van Dijk 2008).

Non-users of ICTs dislike digital communication e.g. for physician contact (Grant et al 2005). Non-users in **lower income and disadvantaged** groups may also perceive that they are being stigmatised by services for not being 'connected' and both users and non-users may feel that they are being pressured to participate when they have neither the resources or confidence to undertake this type of communication (Newman, Biedrzycki & Baum 2010). As could be expected from Figures 3-5 previously, people with lower levels of education, lower basic literacy, or from a non-English speaking background prefer verbal/visual channels and formats for communication with service providers i.e. radio, television and face-to-face (Cheong 2007). For those without Internet access or who have lower ability to manage online health information, the primary source of medical information remains the health professional (Hou & Shim 2010).

Non-print media sources of health information are important for adults with lower education, and include health professional and community-based leaders or peer advisors telephoning or visiting individuals and 'reaching out' to people where they live (Cunningham et al 1999). Several US studies have found that for African Americans the most preferred and believable source of health information and advice is a personal GP, followed by television and popular magazines, dentists and religious organisations, and primary care clinics which offer culturally specific reading materials and address health problems specific to their community (Detlefsen 2004). A

recent Australian study of a CALD (culturally and linguistically diverse) community found overall low use of telecommunications for healthcare: 35% used landlines to find health information, 22% mobile phones, and only 16% used the Internet to find health information (Greenstock et al 2012). In this group, most (71%) reported that they do not use the Internet to find health information, and this reflected their generally low rate of home Internet connection.

Qualitative research in South Australia with a range of lower income and disadvantaged groups found that Internet contact with government services was deemed acceptable for standard queries (such as checking Centrelink payments), but that people preferred phone or face-to-face contact for more complex queries or problems (Newman, Biedrzycki, Baum 2010). Other barriers to using the Internet and mobile phones (beyond accepting incoming calls or sending simple text messages) include lack of trust in telecommunications companies, fears of 'bill shock' or 'being ripped off', lack of interest in being on the Internet, not knowing how to use the Internet, lack of confidence or experience with technology, fears that having a particular technology could make one a target for crime even among friends, and having no-one to provide technical or social support to 'get online' (Newman, Biedrzycki, Baum 2010; Fox 2005; Horrigan 2007; University of Southern California 2004).

Findings from research on social inequalities indicate that **even more targeted ways are needed to improve health communication**, so that people are not left disconnected from information that could help them make informed decisions and exercise autonomy and control (Baur 2010). US government assessments indicate that healthcare and health information systems are currently not designed to provide information which is usable by the average citizen (Baur 2008). US studies have found that the **readability of patient health information** often assumes 11-12 years of formal education, whereas several studies suggest that readability needs to be set at Year 7-8 level for the average patient (Gilmour 2007). A review of the readability of 25 health websites (albeit some time ago) providing information on breast cancer, depression, obesity and childhood asthma found that all English-language websites and 86% of Spanish websites required a reading level of high school or greater (Berland et al 2001). A more recent review found that US websites established by government agencies (.gov) or health agencies (.nhs) were most readable, compared with university sites (.edu), although websites on certain topics were harder to read than average (McInnes & Haglund 2011).

In Australia almost half of all adults (7 million or 46% aged 15-74) have scores at the lowest 2 levels of **proficiency in general reading** (out of 5 levels) (ABS 2008). **Level 3 is the minimum** level required for individuals to meet the complex demands of everyday life and work in the emerging knowledge-based economy (ABS 2008). Of those 7 million, only 40% used the Internet for email at least a few times a week and 33% use it for shopping at least a few times a month; by comparison among those with literacy at Level 3 or above, 79% used the Internet for email

and 64% for shopping (ABS 2008). Literacy levels are linked to education level and income, and decrease with age, so that **higher proportions of people in older age groups attain skill scores lower than Level 3** (ABS 2008). In terms of *health literacy* over half of all adult Australians (approximately 9 million or 60%) attained scores at only level 1 or 2, and very few (900,000 or 6%) were at Level 4/5 (ABS 2008). Access to online healthcare and health promotion is therefore requiring consumers to have a good level of *basic literacy* and *health literacy*, as well as new capabilities and resources in the area of *digital literacy*. People with low health literacy are also less likely to use the Internet (Shieh et al 2009).

On the basis of an assessment of website readability, the authors of one study conclude that health professionals need to work with public and specialised libraries to create and direct patients to high-quality, plain language health information in multiple languages (McInnes & Haglund 2011). **One successful approach** was adopted in a large US hospital serving vulnerable populations (Teolis 2010). The hospital worked with their medical library to develop an image-based touchscreen with audio options (and librarian assistance if needed) which patients could use to learn basic health information from 48 MedlinePlus interactive tutorials while waiting for appointments, all of which negated the need for computer or Internet navigation skills (Teolis 2010). The tutorials were designed to provide reliable, peer-reviewed information explaining a procedure or condition in simplified language, with animated graphics and with narration of content via headphones accompanying the text. A picture-based touch-screen was added to increase ease of navigation, since patients were thought to be familiar with these in grocery kiosks. With encouragement from both their physician and a dedicated librarian, patients reported finding answers to questions they had had for some time, finally understanding the difference between certain conditions, and finding information about their medications (Teolis 2010). Greenstock et al (2012) also conclude in an Australian study that the context of e-health and related initiatives is influential, and that e-health could be used in very different ways in rural and remote areas as compared with a metropolitan community health services hub.

Readability of health information is also improved in visual and comprehension terms by using large font, bulleted points repeating critical information, graphics and 'white space', sparing use of passive voice, a maximum of 10-15 words per sentence, and words of no more than 3 syllables (Gilmour 2007; see Aldridge 2004 and Baker & Gollop 2004 for more information on strategies to improve readability). The University of California (n.d) has developed *Low-Literacy Patient Education Handouts*, and the US National Center for Farmworker Health (n.d.) has developed near-pictorial *Patient Education Materials*. Furthermore, while many websites are dominated by text and hence requiring a certain level of reading skills, there is considerable potential to use sound and visual images (Norman & Skinner 2006).

The E-Health Literacy Scale (eHEALS) is one of the few available reliable measures that practitioners can use to test young patients' perception of their e-health literacy and whether they may benefit from referral to an e-health intervention or resource (e.g. knowledge of how to find helpful health resources online; knowledge of how to use and evaluate the information; confidence in applying the information to make health decisions) (Collins et al 2012). However, further research is needed to examine the applicability to other populations.

The health literature has been slow to emerge on the role of family support and proxy users in e-health access (Eynon & Helsper 2011). **Health professionals often act as mediators of health information**, and inexperienced Internet users may need health services and practitioners to assist them in making sense of the large amounts of online health information from different sources, which may be conflicting and hence confusing (Chiu & Eysenbach 2011). Other people may also act as proxy users or intermediaries to assist consumers with low IT skills to access the Internet and other technologies. In one US study, high school students supported elders in one of the poorest neighbourhoods in Washington DC. Through a neighbourhood-focused network the students were provided with laptop computers which had Internet access; they took these to the elders' homes to tutor them on filling out online forms, buying groceries online and setting up email accounts (Vastag 2001). The Royal District Nursing Society in South Australia established and paid for videophones and broadband connections to introduce virtual nurse visiting in clients' homes for home-based medication monitoring, which reduced the costs and need for nurses to make home visits (Wade, Izzo & Hamlyn 2009).

In a health-specific intervention, Chinese **caregivers of family members** with dementia received Internet-based information support and personalised email interventions (Chiu & Eysenbach 2011). The qualitative analysis found that three factors influenced use of the intervention: a) caregiver needs, including personal capacity, computer and language proficiency, and healthcare knowledge; b) ICT factors, including accessibility and perceived efforts to use the technology; and c) preference for using email or a customised website. The study identified two learner styles: reflective learners who prefer to directly read information on websites or newsletters for themselves, and interactive learners who prefer direct interaction with a practitioner (even if via email) who can assist and encourage them in differentiating and understanding the information. They also found that new caregivers preferred the interactive intervention, while more experienced caregivers preferred the reflective learning.

A recent US study concludes that health practitioners need to develop communication strategies which include both mainstream and new technology, rather than focusing only on one of these (Wilkin & Ball-Rockeach 2011). The consumer health librarian at the Library for Health Information at Ohio State University recommends that a variety of vehicles are important for

delivering the same health message because consumers have a wide range of reading abilities (Jones 2010). Since those with health problems seem less likely to obtain health information from health professionals (perhaps not even having a regular doctor), or from the Internet, mainstream TV or printed materials, it is recommended that to improve the targeting of health messages to this group health professionals need to find ways to become part of the 'storytelling networks' of these communities; these include the interpersonal networks of residents (micro-level), community organisations and local/ethnic media (meso-level), and large-scale institutions and organisations such as the mass media, and political, religious and other organisations (Wilkin & Ball-Rockeach 2011).

The use of SMS on **mobile phones** (short message system, or 'text messaging') has been reviewed as a fast, low cost and popular communication method among young people for sexual health, particularly for health reminders and communication between provider and consumer (Lim et al 2008). However, this review found that most uses of SMS in this field had not been evaluated. In Australia and the US lower income and disadvantaged groups are over-represented in the 'mobile-only' population i.e. those who have a mobile phone but no landline (Blumberg & Luke 2010; Holborn, Reevely & Jorn 2011). In the US the mobile-only constitute 25% of the population, with overrepresentation among a variety of groups including adults living with non-related adults (63% mobile-only) and adults in rental properties (43%, compared with 14% of homeowners), while mobile-only adults are more likely to have financial barriers to healthcare and have no usual medical service (Blumberg & Luke 2010). A recent study in Adelaide confirms that residents of affluent suburbs have multiple communication methods (email, landline and mobile phone), while residents of poorer suburbs have mostly only mobile phones (Browne-Yung, Ziersch & Baum 2012).

A study in central Scotland found that homeless people can successfully integrate the Internet and mobile phones into their daily lives, and that mobile use is far more common than Internet use for the homeless (Buré 2006). A recent study in Adelaide with people in disadvantaged and lower income groups found that all participants had a mobile phone which was Internet-capable, yet only a few used this capability; some had tried using it but had given up and only used their phone for incoming or outgoing voice calls (Newman & Biedrzycki 2009). There was also general lack of awareness of what the Internet on a mobile phone might offer and fear of 'billshock' or being 'ripped off' if they connected in the wrong way; other concerns about starting or continuing use included affordability, security/safety, and lack of skills and support (Newman & Biedrzycki 2009). Participants in the Adelaide study identified that they would be encouraged to try free Internet options or to increase use of the full Internet on their phones if they could become aware of how to access content relevant to their lives, knew how to do this so that allowance use and expenditure was transparent, and knew how to get support so that their experience was positive (Newman & Biedrzycki 2009).

To increase the use of Internet on mobile phones, participants suggested the need for local personalised support on a cost-free drop-in basis, in a place which is familiar, welcoming and easy to travel to, and where literacy problems, low income and lack of Internet-knowledge are not looked down upon (Newman & Biedrzycki 2009). These types of support could well be provided in community health locations as a way to move rural consumers into using online falls prevention services. It is unclear to what extent those in lower income or disadvantaged groups currently have the finances, skills or motivation to use the Internet on their mobile phones, although it is possible that this will become more viable as prepaid and plan contracts for mobile phones continually change to include more favourable pricing for Internet, call and text use.

8. Digital Communication in Falls Prevention

We located only a limited amount of research on e-health specifically in the area of falls prevention. Studies cover websites, an Internet-based strength program, video clips, and Wii Fitness. Nyman and colleagues at Bournemouth University (UK) have published several papers on **Falls Prevention Websites**. While older people can successfully use websites for falls prevention activities, the percentage of older people currently using the Internet limits the reach (Nyman & Yardley 2009). To engage **older people** in falls prevention interventions it is recommended to use a variety of forms of social encouragement, with an invitation to participate from a health professional being an important part of this (Yardley et al 2007).

Two studies have reviewed the content and appeal of falls prevention websites. A review of 33 English-language websites found that the representation of older people was often as passive and inert, although the image most likely to engage older people in falls prevention was that of older people as 'empowered decision makers' (Nyman et al 2011; NOTE includes names and web addresses of the 33 sites reviewed). The authors recommend that falls websites represent older people in a positive and respectful manner. Another review of 42 English-language falls prevention websites, including one of the same authors, found that coverage of falls information and credibility was generally poor, although sites scored high on senior-friendliness aspects (such as readability and easy-to-find information); few sites were up-to-date, and none provided individually-tailored advice or interactive features (Whitehead et al 2012; NOTE: includes names and web addresses of the 42 online falls prevention sites reviewed). The authors suggest that providing tailored advice increases the likelihood that older people will act on the advice. The authors refer to a Dutch-language falls prevention website (Alpay et al 2007) which was developed in conjunction with users and provides evidence-based information, but which they were unable to assess further.

A review of studies which sought to make websites more accessible for older Americans suggests using 'living room' language rather than medical terminology, using pictures to enhance recall, and limiting information to 'small doses' with frequent repetition of core concepts (Detlefsen 2004). The addition of a 'talking function' is also recommended which allows the text to be read aloud, or special buttons to enlarge the text. They recommend a website checklist *Making Your Website Senior Friendly*, (National Library of Medicine and National Institute on Aging (2002). Evaluation of the usability and acceptability of a falls prevention website with 16 older people (mainly white women) and 26 sheltered housing wardens found that older people selected balance-training activities for interest and enjoyment (e.g. Tai Chi) and added them to their current routine, while wardens promoted the website to their residents (Nyman & Yardley 2009). However participants found the website too formal and suggested that more colour and graphics would increase the attraction, also noting that the website's reach was limited since only a minority of older people are Internet-users (Nyman & Yardley 2009). Another article critiqued falls prevention websites for lacking in credibility and usability, and for having a presentation style which was not motivating for older people (Bond & Nyman 2010). A recent evaluation of the usability of a web-based personal nutrition management tool among users aged 22 to 60 found that usability problems related mostly to content, navigation and interactivity, and that 'being personal and private' (70%) and 'providing personal feedback' (60%) were the most appreciated characteristics of the tool (Bozkurt et al 2011). This study's findings also suggest that evaluating IT usability by conducting in-depth interviews with users is important in identifying problems with interface design.

One UK study specifically trialled the provision of tailored advice on SBT (strength & balance training) via an **interactive web-based (Internet) program** directly to 280 people aged 65-97 and found it to be a potentially cost-effective option for some older people (Yardley & Nyman 2007). However, since the recruitment was solely by email and Internet, participants were likely to already be successful Internet users with positive attitudes to web-based advice. The researchers suggested that the advice may need to be supplemented by other support, or would be better as a resource for those who work with older people, rather than directly to the older person.

A recent American study suggests that tailored falls prevention education is relatively absent from current research, even though this has been shown to encourage behaviour change which reduces falls risk (Schepens, Panzer & Goldberg 2011). A randomised trial showed that showing older groups short authentic, **real-life video clips** was a successful approach to increase falls knowledge and falls prevention behaviour because the resources were authentic, real and motivating. It is not clear whether this visual approach would also work via the Internet. However,

one study has found that video is significantly more effective than the Internet in educating participants about the benefits and risks of prostate screening (Frosch, Kaplan & Felitti 2003).

ICTs are also being used in a variety of formats to support falls prevention physical activity. The use of *Wii Fit* has been trialled with older people at the Repatriation Hospital in South Australia (mostly aged over 85, hospitalised and female) (Laver et al 2011). This study found that despite the widespread uptake of Wii Fit by rehabilitation units, the usefulness of Wii Fit as a therapy tool with hospitalised older people is limited both by the small proportion of older people who are able to use it, and by older people's preferences for traditional approaches to therapy (Laver et al 2011). A major new study in Europe (including \$0.5 million support from the Australian Government, and researchers at the University of New South Wales) will develop and implement ICT-based technologies to predict and prevent falls. The *iStoppFalls* program is intended to be integrated into daily life for older people living at home in order to provide continuous exercise training, falls risk assessment and appropriate feedback mechanisms (iStoppFalls Consortium 2011).

9. The Rural Health Workforce and e-Health

The above issues relating to digital access and literacy for consumers also apply to the health workforce and their ability to implement e-health initiatives, as well as their ability to encourage and support consumer use. Considering the age profile of Australia's rural health workforce, a significant proportion of older health workers may themselves not be proficient in computer and Internet use, let alone in a position to assist consumers. This is an important factor to consider, especially since health professionals often act as mediators of health information, and inexperienced Internet users may need health services and practitioners to assist them in making sense of the large amounts of online health information from different sources (Chiu & Eysenbach 2011).

Recent workshop-based research in South Australia for Country Health SA under the Health In All Policies program of the SA Government, which included older rural health workers, found that many participants felt that some forms of on-the-job training, particularly online training, were not adequately designed or accessible for them (Osborne & Newman 2012). Workers felt that such training assumed a level of IT skills that they did not necessarily have or had not received training in, and that access to computers at work to be able to complete such training was limited in some situations (Osborne & Newman 2012). An Australian study of 2,000 older workers (aged 45+) found that they require more equal access to training programs to enable them to update and enhance specific skills, including to keep up with developments in technology and especially in computing (Lundberg & Marshallsay 2007). The majority of these older workers surveyed

considered **computer skills training or updating of their computing skills** to be the most useful training in enabling them to continue working effectively past retirement age. However, the Australian literature on the subject of e-learning for mature age workers is not well developed (Bowman & Kearns 2007).

A review of several cases of health technology use among community health workers in India suggests that to be successful in the longer term any e-health initiative must include health workers in the design and ongoing development of the initiative and the technology, and not be purely driven by IT experts or health management. Without this, initiatives may be encouraged by management but leave workers without the motivation or commitment to be involved because the initiative is unworkable in daily life contexts and does not improve (or interferes with) work processes (Mushtaq & Hall 2009). The authors also point out that to be sustainable and maintain internal motivation, the use of information technology in health services must become institutionalised within the organisation, both through formal rules dictated by management and also in the informal rules or norms of organisational culture among the workers; this includes legitimising and contextualising use so that it works at the daily grass-roots level (Mushtaq & Hall 2009). To ensure equity of access to primary health care services, a fundamental principle is to also engage consumers in service design and evaluation (Freeman et al 2011).

A recent study in regional Australia found that staff in non-government organisations (NGOs) provide an **“ICT Brokerage role” alongside their normal work**, spending time assisting their disadvantaged and vulnerable clients with accessing online information, downloading and collating information (Notara 2011). The study found that few NGOs saw ICT brokerage as part of their job/service delivery, and highlighted a need for specific funding to train staff in IT skills and use, and allocation of time for community workers to use ICTs in their own work as well as in assisting clients (Notara 2011). Another recent Australian study also notes the emerging role of the health professional as broker and that this has considerable implications for job roles and training (Greenstock et al 2012).

Notara’s (2011) study also highlighted problems with ongoing lack of IT infrastructure in regional areas, including basic connectivity and performance. The recent Sinclair Review of Rural Telecommunications also noted that ‘while telehealth offers great potential in the delivery of healthcare in rural and remote areas, there are barriers to the systemic adoption of initiatives, and the work program of the National Digital Productivity Council of Experts in regional service delivery should include understanding and addressing possible barriers to telehealth adoption — such as access and technology limitations, interoperability, the need for a national telehealth directory, and the digital literacy of General Practitioners’ (DBCDE 2012:9).

10. Recommendations for CHSA LHN's Falls Prevention Project in the Digital Era

1. Maintain investment in a diversity of health promotion channels, with online/e-health as an additional new option but not the only option, especially until the technical infrastructure and affordability for Internet and mobile phone use improve in rural Australia, and the target consumer groups demonstrate successful connection to and use of these technologies. For consumers without Internet access or who have lower ability to manage online health information, the primary source of medical information remains the health professional.
2. Evaluate the accessibility of online health information and e-health channels in falls prevention to identify which consumers the e-health options work for, so that these groups can maximise the benefits of this format. At the same time identify which consumers these formats do not work for and how to provide them with falls prevention information through channels and formats which support equal quality and usefulness.
3. Evaluate the quality and acceptability to users of information provided online versus that provided offline/face-to-face by health professionals and the appropriateness of content for particular users, including the Falls Prevention in SA Active Ageing website.
4. Investigate whether any/some/all consumers require assistance to access the e-health initiatives being developed by CHSA LHN (including the Falls Prevention in SA Active Ageing website) and what type of support they prefer.
5. Identify how CHSA LHN can design and develop e-health initiatives in ways which maximise health access for all users, and develop applications which match the diversity of rural consumers including cultural appropriateness for CALD and Aboriginal consumers.
6. Investigate the potential of proxy users (e.g. adult children of older people; falls prevention staff) in helping consumers access and understand online falls prevention initiatives.
7. Investigate the provision of appropriate hardware and social support for use for particular population groups or rural areas, including within community access points and the home.
8. Continue to work with and fund researchers to better understand access and equity issues in falls health promotion.
9. Follow up recommendations in the *Strategy for Planning Country Health Services in SA* (Government of South Australia 2008) which aim to adequately resource quality training for Falls Prevention staff and other Country Health SA LHN staff to ensure their effective use of information technology for their own work, and their ability to assist consumers.

In summary, it is important to consider how any changes to communication formats impact on the 5 key elements of health access i.e. availability, accessibility, accommodation, affordability, and acceptability (Freeman, Baum, Lawless et al 2011; PENCHANSKY & THOMAS 1981). In considering e-health in rural areas, Bauer (2003) sees similar elements as essential: accessibility, availability, efficiency, quality and fairness, and argues that it may be necessary to make trade-offs among these elements, particularly in the face of rural health workforce shortages.

Country Health SA LHN may wish to consider recommendations by a national US congress organised by the American Medical Informatics Association that agencies should consider opportunities to advocate at a policy level for standards to support equity for consumers in the accessibility of health information and communication as communication increasingly moves online (Chang et al 2003). They also recommended that organisations could showcase best practice in providing relevant health information to vulnerable populations, could disseminate strategies for fostering best practices to policymakers, and could encourage working groups to provide leadership in evaluating current standards and development of additional standards for effective e-health communication with underserved populations. A user-centred approach is proposed that places the needs, preferences, capacities, values and goals of health consumers at the core rather than the periphery of e-health, where consumers are included in the design of e-health tools; diverse consumers contribute to evaluating, choosing and using e-health tools; organisations use the full range of e-health tools to engage and support diverse consumers; and alliances and partnerships facilitate sustained consumer access and use of e-health tools (US Department of Health & Human Services, in Baur 2010; Mushtaq & Hall 2009).

Baur & Deering (2006, in Baur 2010) also raise the following questions which could be considered by CHSA LHN:

- Does excitement about e-health possibilities obscure multiple access issues for those who do not have regular healthcare sources and who are not Internet users?
- Do healthcare organisations and professionals have an obligation to promote access to e-health systems for those who cannot afford to buy access themselves?
- What are the obligations of healthcare organisations who develop e-health applications that require high-end technologies to function (which consumers may not all have)?

Since certain e-health services may be more likely to benefit highly educated and younger people, they should not be favoured at the expense of existing frontline services unless equity issues can be addressed (EuroHealthNet n.d.). Since those groups in society which are least likely to have easy Internet access (i.e. older, rural, disabled or unemployed people) are also those likely to be more in need of health services, it should be a top priority to promote the accessibility of and benefit derived from e-health services to such groups and find ways to

support their successful participation (EuroHealthNet n.d.). For rural and regional services in Australia in particular, it should remain standard practice to provide alternatives to online access for people to receive information in hard copy, to communicate in traditional methods (ie speak to a person) and to not be forced into online services (Notara 2011).

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