

Parental health information seeking and re-exploration of the 'digital divide'

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Aim: To describe patterns of 'online' and 'offline' health information seeking in families with children under five years of age and living in five socially, economically and culturally disparate local authority (LA) wards in one inner-city area. **Background:** Earlier work analysed data from the five LA wards merged as one data set. A 'digital divide' in health information seeking was identified between parents who actively sought information from both internet websites and from 14 other health information sources (online health information seekers), and those who acquired information from a more limited range of sources excluding the internet. Of the two groups, the online health information seekers had higher levels of computer ownership and, therefore, internet access within the home. **Method:** Re-analysis of data (questionnaires $n = 224$; five focus groups; two interviews with service providers; two opportunistic conversations with service providers). Additional data were retrieved after the original data analysis and between 2005 and 2007. These data were from service user-led discussions ($n = 30$) held with parents in child health clinics, informal interviews ($n = 11$) with health visitors and semi-structured interviews ($n = 2$) with health visitors. Information was also retrieved from the Office for National Statistics data set. In the re-analysis, data were disaggregated at LA ward level in order to explore local influences on patterns of health information seeking. **Results:** Multiple layers of influence upon parental health information seeking emerged and revealed a non-digital second divide, which was independent of computer ownership and home internet access. This divide was based on preference for use of certain health information sources, which might be either 'online' or 'offline'. A spatial patterning of both digital and preferential divides was identified with an association between each of these and features of the physical, social, cultural and psychosocial environment, one of which was perceived access to primary health care. **Conclusion:** Complex patterns of health information seeking relate to each of the 'divides' – digital and preferential. Patterns of health information seeking reflect differing perceptions of information availability and usefulness as experienced by parents within their local physical, social, cultural and psychosocial worlds. Access to primary care services is a key component of this local environment.

Key words: inequalities; information seeking; internet; parents

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Introduction

The increase in smart phones and games machines throughout the United Kingdom, Europe and the United States has been accompanied by increased internet use, both for general purposes and health information [European Centre for Disease Prevention and Control (ECDC), 2011; Ofcom, 2011]. As a consequence of this, the internet has gained popularity as a potentially powerful tool for disseminating health messages especially to those population groups, which more traditional channels of health education have found it difficult to reach (Krepps and Neuhauser, 2010). In the United Kingdom, equitable access to health information for promoting child and family health is a key component of effective early health promoting (Marmot, 2010), and the use of the internet for health information is an important part of this.

Health information is one of the most commonly sought after topics on the internet; however, while the internet's potential to enhance an equitable distribution of health information has been identified, so also has its potential to reinforce established inequalities in access to health information. Long before the term 'digital divide' was used, there were concerns about the inequalities in computer and internet use and about the possible consequences that these may have (Sutton, 1991). Numerous authors including Katz and Aspden (1997), Eng *et al.* (1998), Howland (1998) and Eysenbach (2000) coined the term 'digital divide' and described the mechanism causing this disparity. More recently, the 'digital divide' has been seen as the 21st century's equivalent of Julian Tudor Hart's (1971) 'inverse care law', with those who use the internet being multiply advantaged in terms of health-care access and health outcomes, whereas non-internet users are multiply advantaged in relation to both.

Renahy *et al.* (2010) identified a clear 'digital divide' in their survey of French 3720 residents of internet use for adult health information with non-users being disadvantaged digitally, socially, economically and in terms of health status and outcome in comparison with internet users. Brodie *et al.* (2000) found a significant digital divide in the United States, with lower-income Black people especially affected. Plantin and Daneback's (2009) systematic literature review also found that parental

internet non-users were less likely to have computer access than internet users and also more likely to be socially and economically disadvantaged. Whereas Renahy *et al.* (2010) defined 'internet use' as 'going online', Plantin and Daneback (2009) distinguished between the different forms of internet use and identified differences in the population groups who might access these. Plantin and Daneback (2009) and Russell (2006), for example, reported equal access to parent support sites, as opposed to web-based information pages, by parents from all digital, social and economic groups.

Although the internet offers a form of information access that transcends local boundaries, information retrieval, comprehension and application occur within local environments and all are inevitably influenced by local social and cultural norms and practices (Zarcadoolas *et al.*, 2006; Nutbeam, 2008; Peerson and Saunders, 2009). The ability to retrieve and then to use health information from different sources has been described as 'health literacy' (Chinn, 2011), and the influence of the local physical, social and psychosocial environment upon variations in health literacy has been described by Nutbeam (2008) as a key contributor to the effectiveness, or otherwise, of health information messages.

In an earlier study, Malone *et al.* (2005) considered the impact of individual perceptions of self-efficacy and the influence of powerful others, such as general practitioners (GP), on the retrieval and use of health information. Within this study, computer ownership and using the internet at home were major predictors of internet use for health information; however, at a local level, other influences were also identified. Using descriptors of the physical, social and cultural environment, three districts, which were not co-terminous with local authority (LA) wards, were identified within the study site with a 'digital divide' evident in terms of the levels of internet use. One district (West) had significantly lower levels of internet use than the other two districts ('Central' and 'North East') in this analysis. In addition to their lower levels of internet use, respondents in the West also used fewer non-internet sources of health information. The dominant pattern of health information seeking in the West was described as 'assimilative' rather than 'active' (Malone *et al.*, 2005). In contrast, respondents in the Central and North East districts used numerous

sources of health information as well as the internet. In these two districts (Central and North East), patterns of active health information seeking and of 'information hunger' were described (Malone *et al.*, 2005). Levels of internet use were also higher in the Central and North East districts than in the West. Having home internet access increased the likelihood of internet use for health information six-fold and this, in turn, was closely associated with actively seeking health information from a variety of other (non-internet) sources.

In addition to home internet access, the qualitative data indicated that the GP and perceptions of the GP's attitude towards internet use were important influences upon use of the internet for health information. Across all three districts (West, Central and North East), GPs described their concerns that increased internet use among their practice populations that could promote patient autonomy beyond professionally and clinically desirable limits. Thus, home internet access, perceptions of self-efficacy in relation to internet use and health information retrieval and GPs' attitudes to internet use were associated with patterns of parental internet use for child and family health information, with local variations in these being especially apparent.

Decisions about how to get health information, from where it should be retrieved and how it should be used take place within the context of families and neighbourhoods, each of which may, through their particular characteristics, either promote or prevent effective information retrieval and subsequent use (Zarcadoolas *et al.*, 2006; Nutbeam, 2008; Peerson and Saunders, 2009). The variability in patterns of health information seeking between West, Central and North East districts, respectively, indicated that location or 'place' was also important in this case (Malone *et al.*, 2005). This paper reports a re-analysis of the data in the light of the impact of psychosocial factors upon local 'health literacy' as related to information access, usability, usefulness and relevance and both 'digital' and 'preference' divides.

Method

Study aim

To explore patterns of parental health information seeking and, in particular, to reconsider

relationships indicated in the previous study between uses of 'online' and 'offline' health information and the role of choice. The study also aimed to explore potential associations between health information seeking and local area characteristics, one of which was perceived access to primary care and general practice.

Approach to data re-analysis

Questionnaire survey data from 224 respondents using child health and welfare services, qualitative data from five focus groups and four informal interviews held with parents and service providers (GPs and health visitors) used within the original analysis. Three of the five focus groups were held with parents using a community centre (1) and children's centres (2) in LA wards 3 (children's centre), 5 (children's centre) and 6 (community centre). In total, 15 parents attended the three focus groups. Focus groups of service providers (GPs, health visitors, practice nurses and general practice administrative staff) were held in general practices in LA wards 1 and 5. The data collection aimed to gather as much information as possible about methods of health information retrieval and local service provision. The 'opportunistic conversations' took place with two service providers as they prepared for the beginning of their afternoon child health clinic. They provided an insight into local perceptions and local viewpoints, which more formal approaches may fail to identify. Data from the 'opportunistic conversations' were included within the final analysis for their ability to give this insight into local life.

These original data were supplemented by data retrieved (2005–07) from service user led discussions ($n = 30$) held with parents in child health clinics (in all LA wards), informal interviews ($n = 11$) with health visitors (LA wards 1, 2, 5 and 6) and semi-structured interviews ($n = 2$) with health visitors (LA wards 5 and 6). Information was also retrieved from the Office for National Statistics (ONS) data set. All data were re-analysed according to the LA ward in which they were gathered (LA) wards. Owing to the low number of respondents ($n = 4$) in one ward (LA ward 4), only five LA wards were entered within the final analysis (LA wards 3 and 5 = West; LA wards 1 and 2 = Central; LA ward 6 = North East). Table 1 sets out the numbers of questionnaire respondents for

Table 1 Total number of responses by LA ward

LA ward 1	LA ward 2	LA ward 3	LA ward 5	LA ward 6
24	37	68	50	76

each LA Ward. To accommodate differences in numbers of responses between the different LA wards, percentages were used to express findings at LA ward level (ie, 'computer ownership' in each LA ward was expressed as a percentage of respondents within that LA ward).

At the time of data retrieval, 'use of the internet' referred to retrieval of information from web-based information pages. Questions within the survey clearly identified this focus on web-based information retrieval rather than use of more interactive media such as Skype, chat pages or other discussion fora. In addition to their use of the internet, respondents were asked whether they used 14 other possible sources of health information, namely, the radio, the GP, advice centres, NHS Direct, TV, newspaper, health visitor, community centres, library, friends and family, magazines, the pharmacist, the hospital and the 'walk-in centre' for information on lifestyle, adult health, finding out about services or child health and answers to these questions informed identification of 'offline' patterns of health information seeking within the LA wards.

Using logistic regression analysis, 21 variables describing a health information-seeking behaviour were identified as having a significant relationship with use of online health information retrieval. The incidence of each variable was identified at LA ward level.

In addition, LA ward ONS data were used to describe socio-economic status: (i) the percentage of population in full-time employment; (ii) the percentage of population owning property (including those with mortgages and those who owned their property outright); and (iii) the percentage of population educated to degree level and these are indicated in the LA ward descriptors within Table 3. A co-efficient was also calculated for each LA ward to describe the relationship between these measures of social and economic status and online health information retrieval.

Finally, and to complement the previous two steps, other data describing local area characteristics

were also retrieved from the ONS and local informants and included perceptions of access to primary health care, LA public health reports and publications by local authors and local newspapers. Data from these and index of multiple deprivation scores were entered into a framework, based upon the work of Macintyre *et al.* (2002), and designed to permit analysis of the influence of various and different factors on health within socially, economically and culturally disparate locales. In this way, patterns of health information seeking and social, economic and cultural descriptors of the local area and markers of the psychosocial environment could be considered in juxtaposition with each other. Table 3 illustrates how data from the ONS, focus groups, service user-led discussions, interviews with service providers and opportunistic conversations and the questionnaire survey were combined to provide an overview of local social and cultural characteristics and norms for each of the LA wards and patterns of internet use and health information seeking. Local research ethics committee approval was granted for the original data collection.

Results

As Table 3 indicates, when data from the ONS, interviews, focus groups and other local information sources were entered into the analytical framework, an interesting pattern of difference and unexpected shared commonalities between the wards emerged. LA ward 1 was the most affluent (IMD 15.50 and child poverty index 14.71). LA ward 2 was less affluent than LA ward 1 (IMD 34.93 and child poverty index 35.65), but socially and culturally it had a number of features that were not identified within either LA ward 1 or, indeed, within any of the other LA wards. LA ward 2 was, for example, populated with well-known bookshops, cafes, bars and pubs and a fashionable cinema. In addition to this, LA ward 2

Table 2 Use of the internet by LA ward

	LA ward 1 (%)	LA ward 2 (%)	LA ward 3 (%)	LA ward 5 (%)	LA ward 6 (%)
Use of internet (health and illness)					
Yes	85	48	64	56	78% χ^2 2.174, 3 df, $P < 0.05$
No	15	52	36	44	22
Use of internet for health and illness					
Yes	48	63	63	48	69% χ^2 5.685, 4 df, $P < 0.05$
No	52	37	37	52	31

respondents described how their family had either lived within the area for several generations or, if they had moved there more recently, the friendship networks that they had established, which they found helpful and supportive to them. LA ward 2 respondents described their satisfaction with the local primary care provision in the form of general practice and health visiting, which was described as well established and affective in meeting local needs.

LA ward 3 was less affluent than LA ward 1 (IMD 30.62 and child poverty index score 40.99) and was characterised by an increasingly ethnically diverse population. LA wards 5 and 6 were similar in terms of relative affluence and deprivation. LA wards 5 (IMD 47.21, child poverty index score 47.09) and 6 (IMD 53.10 and child poverty index score 50.12) had the highest levels of deprivation among all the wards. LA ward 5 also had a profile of increasing inequality during the five years before the study. In LA ward 5, one area was characterised by rapidly increasing affluence, whereas the remainder was typified by spiralling deprivation (ONS, 2008). LA ward 6 was the most socially and economically disadvantaged ward of the five.

Patterns of health information seeking and internet use

There was no significant difference between the five LA wards in online activity either for health information seeking alone, or for any purpose, or for a combination of these two. There was, however, a clear spatial patterning of online and offline information seeking and unexpected differences were identified in internet use between the LA wards (Table 2). Of the 21 variables entered into the logistic regression, internet access at home increased the likelihood of seeking health

information online nearly six-fold. At LA ward level, two wards, which were similar in terms of home internet access, displayed very different levels of online information retrieval (Table 2). Although online retrieval health information was high, it was much lower in LA ward 2 compared with LA ward 1. LA ward 6 had a similar level of online health information retrieval as LA ward 1 but differed from it greatly in social, economic characteristics and home internet access. LA ward 5 had a similar profile in terms of social, economic characteristics and home internet access to LA ward 6 but a much lower level of internet use for health information seeking.

The two co-efficients showing (i) use of the internet at home and (ii) use of family and friends for health information also showed an interesting pattern of variability. The co-efficient describing the relationship between use of the internet for health information and use of family and friends for the same had a negative value in all the LA wards excepting one, namely, LA ward 6. A negative value indicated that, when respondents used family and friends for health information, they were less likely to use the internet. This was especially so in LA ward 2 ($B = -2.015$; exp. $B = 0.1333$), indicating that for LA ward 2 either family or friends or the internet were used for health information but not both. An increase in use of one would lead to a decrease in use of the other. However, in LA ward 6, a positive relationship between the use of family and friends and internet use ($B = 0.028$; exp. $B = 1.029$) indicated a symbiotic relationship between these two and suggested that an increase in the use of one of the sources would lead to an increase in use of the other.

In LA wards 3 and 5, different patterns of health information seeking emerged. In LA ward 3, parents used both online and offline sources of health information in equal measure; however, in

LA ward 5, reported access to all health information sources was low. LA ward 5 parents typically described their difficulties in accessing credible health information from any source (either online or offline, GP or health visitor). The internet was described as ‘confusing’ and with ‘too much information and difficult to understand’ and appointments with GPs were typically ‘impossible’ to obtain. The health visitor was described as lacking credibility because she ‘had no real experience of children’ and was ‘not a mother’. In LA ward 5, the respondents’ words were frequently vague and even contradictory when asked about the health information sources that they used. For example, a typical response to the question: ‘Where do you get health information from?’ was:

‘Oh, I don’t know. Everywhere really’

In LA wards 1, 2 and 6, responses to the same question were direct and focussed, for example, naming a health professional. LA ward 5 shared similar social and economic characteristics as LA ward 6, but parents living in LA ward 5 adopted a very different pattern of health information seeking from their neighbours in LA ward 6.

In LA ward 5, respondents, both in interviews and opportunistic conversations, described the break up of one large general practice that they associated with deterioration in primary care provision within the ward. LA ward 6 was the most deprived of all the LA wards; however, here respondents described good primary care services both in terms of the numbers and distribution of general practices and also in terms of access availability of appropriate services. In LA ward 6, a very different picture of general practice was presented compared with that presented for LA ward 5 with GPs in LA ward 6 typically described as well known and well established within the area. They offered both home visits and ‘stand by’ appointments, thus fulfilling the respondents’ desire for ‘face-to-face contact’ especially in relation to children’s health.

Discussion

Data relating to the socio-cultural characteristics of the LA wards (Table 3) and internet use by respondents within the LA wards indicated multiple

patterns of health information seeking and internet use within the study site. Respondents in LA ward 1 might be characterised as ‘affluent computer owning health information seekers using multiple information sources’. In LA ward 1, the respondents used the internet for health information as well as other sources. Service providers appeared to associate online information retrieval with material affluence, and in LA ward 1 this was the case.

In LA ward 2, respondents had the highest percentage of computer ownership within the study site, but levels of online information retrieval were relatively low. This group might be described as active multi-source networkers for health information. They had computer access but, at times, chose other sources of health information.

In the previous analysis, non-internet use, or ‘offline’ health information seeking, was associated with ‘information assimilation’ (Malone *et al.*, 2005). Non-internet users were described as ‘passive’ rather than ‘active’ in their acquisition of health information and less likely to actively seek health information from not only the internet but from any source. However, re-analysis of the data suggested that associations between ‘offline’ health information seekers and passive ‘information assimilation’ were more complex than this. Respondents in LA ward 2 were both ‘offline’ and ‘active’ health information seekers, that is, ‘information hungry’ but chose to satisfy their ‘hunger’ by accessing family, friends and, particularly, ‘insider’ friends, rather than online information retrieval from web-based information pages. Indeed, the data indicated that they not only actively searched for health information but also showed discernment both in the process of information retrieval and their evaluation of the information retrieved. In this sense, LA ward 2 respondents were health information literate (Nutbeam, 2008). Their health literacy facilitated choice and their preference was for information from ‘person’ or ‘people’, usually in non-internet-based face-to-face contacts, instead of, or at least in addition to, information on the web.

LA ward 6 respondents were also ‘active’ health information seekers using the internet, using both the internet and health care providers. Respondents in LA ward 6 could be described as ‘non-networked’ (although 64% of respondents did have computers at home) active health information seekers and internet users. The analytical

LA ward 6	Non-networked active health information seekers and internet users	8% residents own property	3% population educated to degree level	69% respondents have a computer at home
Urban regeneration funding				
Sure Start	31% residents in full-time employment		IMD 53.10 (rank 464)	80% use the computer at home or a place other than work
Community development funding	Play spaces sponsored by Industry		Child poverty index score 51.2	47% respondents use friends and family for health information
Opening 90 new business units				

IMD = index of multiple deprivation. An aggregate deprivation score provided for each LA ward. The higher the number, the higher the deprivation. Child poverty index = the percentage of children in an LA ward living in a household dependent on means tested benefits.

framework (Table 3) suggested some other unanticipated shared characteristics between LA wards 2 and 6, which were dissimilar in terms of their internet use for health information but appeared to be similar in their health literacy. In each ward, qualitative data indicated a positive perception of primary health-care access. Perceptions of health-care access and influence over health care have been identified as important contributors to individual and communal self-esteem (Hancock, 1993; Gulliford, 2004) and potentially, thereby, to enhanced health literacy within particular groups. Indeed, the importance of general practice and perceptions of the GP was recognised as a potentially important contributor health information retrieval in general and to online retrieval of health information in particular (Malone *et al.*, 2005).

Although the initial analysis suggested ambivalence, or even hostility, within general practice as to the usefulness of health information retrieved online, the re-analysis indicated that a different mechanism was at work with locally valued models of general practice and primary care delivery encouraging unanticipated patterns of health information seeking through enhanced self-esteem, as identified in the active health information seekers in LA ward 6. Thus, locally valued and locally appropriate models of general practice and primary care delivery may contribute to the type of socially and culturally framed health literacy described by Chinn (2011), Peerson and Saunders (2009) and Nutbeam (2008). GPs and health visitors are well placed not only to provide the ‘face-to-face’ consultations, which were favoured by respondents in the study, but also to promote ease of access to their services that appears to have a positive impact on health information seeking.

For the ‘networked’ and ‘non-networked’ active health information seeking respondents in wards 2 and 6, use of online information was associated with primary health care access and to obtaining and using online health information, but the mechanism was different for each. In LA ward 2, the internet was used to frame the consultation in general practice and sometimes to access friends and family who could provide the health information needed, whereas in LA ward 6 health information retrieved online was one of the many valued information sources. Given that ‘face-to-face’ contacts are those that were most valued by all the respondents, it might be hypothesised that

LA ward 2 had reached the summit of health literacy wherein the internet contributes to choice of information source and complements face-to-face and telephone contact to facilitate the preference for retrieving information from the most desired source, namely, a well-informed person.

In contrast to the active networkers and information seekers in LA wards 1, 2 and 6, the remaining LA ward 5 was characterised by negativity. Respondents reported poor access to primary care and little confidence in the interpersonal sources of health information available to them (eg, the GP and health visitor). Characterised by poor resources, this ward appeared to experience multiple disadvantages and inequalities, which were resistant to investment and change. Therefore, the data suggested that there were what might be termed local economic and cultural or 'eco-cultural determinants' of health information seeking, and that there was an association between these and retrieval of information online.

An eco-cultural model of health information seeking (Figure 1) may help explain patterns of health information seeking within the local environment or, within this study, the LA ward. Local area characteristics such as the perception of strong social and family networks and/or perceptions of availability of and access to essential primary care services may draw even materially disadvantaged families (as in LA ward 6) towards online health information retrieval and an 'active' search for health information. They may not have a computer or home access to the internet (as in LA ward 6), but they can negotiate access to the health information that they need by various means, one of which may be online.

On the other hand, when the same two forces (social and familial cohesiveness) and perceptions of control over essential health care services) work in the opposite direction, families may adopt a more 'passive' approach. In this case, even computer ownership (LA ward 5 had a higher level of computer ownership than LA ward 6) cannot counteract the downward trend. Therefore, the difference between 'active' and 'passive' approaches is represented by the force and direction of the support and motivation provided by familial networks and perceptions of access to primary care services. This provides an opportunity for GPs and, in particular, health visitors, who have a commitment to working with and sustaining local

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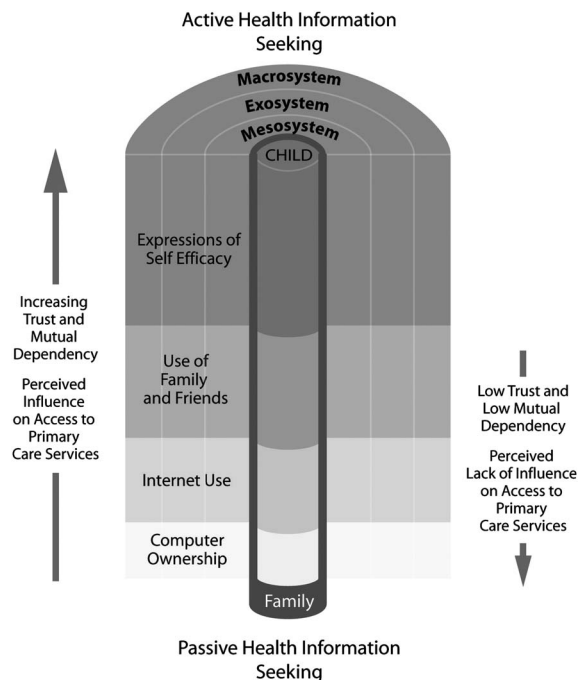


Figure 1 Eco-cultural determinants of health information seeking.

communities, to promote effective health information seeking within individual localities. Use of information retrieved online is a contributory factor, but its relative influence on health information seeking is locally determined by the relative force and direction of the other determinants, which also appear to have a direct influence on 'health literacy' with use of the internet as one, but only one, reflection of this.

Conclusion

The multiple layers of study data revealed a complex and multi-faceted pattern of information seeking, which is difficult to explain in terms of a single 'digital divide'. The study data suggested that there are spatial variations in the patterns of health information seeking within one inner-city area that relate to both the social, economic and cultural characteristics of the area, to use of online health information and to preference or choice. The social, economic and cultural characteristics

of LA ward 2 (Table 3) indicated that these inhabitants should have high levels of online health information retrieval, which was not the case. In LA ward 2, although the levels of internet availability were high, the preference was for health information retrieved from individuals, sometimes by email but usually face-to-face and in real time. Respondents in LA ward 2 expressed high levels of health literacy, which they used to make a choice of preferred health information source and that choice was not for online health information but rather for information from interpersonal sources.

In LA ward 6, social, economic and cultural characteristics indicated that levels of health information seeking should be low, but it was just the opposite. The respondents chose to use online sources of health information and appeared to have been encouraged to do this by favourable relationships with local primary care providers and, in particular, with local GPs, which engendered trust, self-confidence and the enactment of choice in relation to health information retrieval. In the case of LA ward 6, the preference was for retrieval of online information retrieval, despite low levels of home internet access.

Patterns of health information seeking are complex and multi-faceted. The divide between those who have internet access and those who do not, the 'digital divide' is only one influence on online health information seeking. The impact of the digital divide on online health information seeking must be judged in conjunction with other factors, which may either enhance or ameliorate the impact that it has. These include features of the local social, economic, cultural and psychosocial world. When these factors work together to produce a positive outcome, the result is parental choice of information source and parental ability to act on that preference.

Time and technology have moved on since these data were collected. Nonetheless, this study highlights the impact that professionals in primary health care and their services may have, both directly through providing information, and indirectly through access to primary health care. Access to primary health care including GPs and health visitors may have an impact on collective feelings of group efficacy and self-esteem, and thereby on local patterns of health information seeking

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