Information needs of public health practitioners: a review of the literature

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Abstract

Objective: To review published literature covering the information needs of public health practitioners and papers highlighting gaps and potential solutions in order to summarise what is already known about this population and models tested to support them.

Methods: The search strategy included bibliographic databases LISTA, LISA, PubMed and Web of Knowledge. The results of this literature review were used to create two tables displaying published literature.

Findings: The literature highlighted that some research has taken place into different public health subgroups with consistent findings. Gaps in information provision have also been identified by looking at the information services provided.

Conclusion: There is a need for further research into information needs in subgroups of public health practitioners as this group is diverse, has different needs and needs varying information. Models of informatics that can support public health must be developed and published so that the public health information community can share experiences and solutions and begin to build an evidence-base to produce superior information systems for the goal of a healthier society.

Keywords: access to information, information literacy, information management, information networks, information systems, information-seeking behaviour, medical informatics, public health

Key Messages

- Information specialists working to support public health practitioners must promote the use of, and enable access to, all types of public health information including evidence and grey literature.
- The lack of searchable databases for public health grey literature is a barrier to accessing this literature by public health practitioners. Public health information specialists should work to create a central repository of grey literature.
- Information specialists should work together to develop a recognised system of classification for public health which can be widely used to index both research and unpublished literature.
- Information specialists need to continue efforts to provide information literacy and search skills education for public health practitioners, to help these practitioners to recognise their information needs and provide them with the skills to act on those needs.
- There is an identifiable need for further research into the information needs of public health professionals, particularly in non-clinical areas such as chronic disease prevention and policy research.

Introduction and objectives

Research shows that there is a need to collate research on the information needs of public health practitioners. As will be shown by the literature review below, there is a lack of published information on this area currently available. Therefore, the aims for this article are

1. To build a richer picture of information needs in public health practitioners.
2. To identify and present published literature on public health practitioner’s information needs.
3. To identify and present (but not evaluate) the solutions that have been implemented to address public health information needs.
Evaluation of these solutions is beyond the scope of this paper.

It is agreed that public health practitioners are a difficult group to study, due to the diversity of disciplines potentially covered under this heading, and that little research has so far been carried out on the information needs of this group.3,7 The lack of a clear definition of who may or may not be classed as a public health practitioner has hindered efforts to assemble a body of evidence on the information needs of this group.1,2

The UK Faculty of Public Health defines the public health practitioner workforce as covering ‘wide cross-section of public health specialties in a wide range of settings, such as the NHS, local authorities and the voluntary and private sectors’.6

Draft definitions of public health practitioners based on research carried out by the Faculty of Public Health also exist:

‘Public health practitioners have responsibility for specific areas of work, continually develop their area of work and support others to understand it. Practitioners are likely to contribute to multi-agency/multi-disciplinary programs of work. Generally practitioners will work as part of a larger team led by someone working at a higher level.’5

‘Advanced public health practitioners have responsibility for and expertise in, areas of public health and provide leadership in their area of expertise. Practitioners will normally contribute to multi-agency programs of work.’7

The meaning of the term ‘information need’ has previously been defined as having two separate aspects to it: firstly, an information need is the awareness of an individual that they are experiencing an uncertainty which requires a ‘stimulus’, or piece of information in order to resolve that uncertainty, and secondly that the individual must be equipped to recognise the existence of their uncertainty. Put simply, information need can be defined as the requirement for a piece of information by an individual in order to carry out a task: the individual in question may or may not be aware that they need this piece of information, but the need still exists.

For the purposes of this study, we define information solutions as being any technological means of storing, retrieving and disseminating information.

Background

Early studies into the information needs of public health practitioners were carried out in Germany and the USA.10 Scheiber looked at the information needs of public health practitioners nationally in Germany.9 Most of the respondents (72%) to this survey were working in research institutions, with a further 10% working as healthcare providers. This skewing of the respondents to research institutions may have resulted in some biases in the results from this study and also means that a significant number of public health practitioners working in areas such as policy development may not have been represented in this survey. Additionally, it was not made clear in the research how public health practitioner had been defined, and therefore who was included in the survey. Scheiber looked at the use of databases by respondents and analysed the problems that they experienced. This research found that success in locating resources was often related to the level of training which the respondent had previously received in using that resource.9

O’Carroll10 reviewed two studies in the USA. The first used a series of telephone interviews with local public health department employees and asked interviewees about occasions where they had and had not been able to find information. The second looked at public health policy makers and analysts. This research looked at two subgroups within public health. The first group (public health department employees) included a range of job roles such as administrators, epidemiologists, nutritionists and nursing directors. Between them, these two studies looked at a broad range of public health practitioners including both front-line staff and policy makers. However, the research could have been improved by including a clearer definition of what is meant by a public health practitioner. The findings of the two studies demonstrate that different kinds of practitioner have very different information needs. Policy makers and analysts identified needs for research and statistical information and information on current health policy.

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Local public health department employees had varying needs, including needs for networking tools, scheduling information and information to support management and administrative tasks.

Both these studies are now approaching 15 years old. Given the rapid pace of technological change in the past 15 years (widespread use of broadband Internet connections in homes and offices, uptake of mobile and then smart phone technology, advent of social media tools), it is reasonable to assume that practitioner’s information needs and ways of meeting those needs may have changed considerably. If the two studies discussed above were repeated now, the results may be very different.

More recently, Rutland et al.³ looked at the information needs of the ‘front-line’ public health workforce, defining front-line as those who work in a primary care or community setting, including school nurses, practice nurses, midwives and district nurses. Reasons for carrying out this research included the lack of existing research on the information needs of public health practitioners in the UK, and the fear that practitioners’ information needs were not being met. This study also used interviews with a single representative from each role to gather data. In contrast to the O’Carroll study, Rutland et al.⁴ found that many of these front-line workers had similar information needs and concluded that these needs could be met by improved library services or improved strategic management and organisation of information resources.

Using a methodology comprised of focus group and individual review, Lee examined the information needs of the public health community of Tennessee in the USA.⁴ This community is spread over a mixture of urban and rural environments across the state. The research looked at participants’ job description, educational background and main language in combination with their access to IT resources (computer and Internet) as well as how they looked for information and what resources they used. This research highlighted some key points, including the diversity not only of public health practitioners themselves, but also their direct work environments.⁴ The size of the workforce involved in this study, across only a single state, was highlighted. Additionally in the results of this particular study, the mix of affiliations of different practitioners appears to create an inequality in access to information resources.⁵ Lee found that groups in regular contact with patients had limited time to familiarise themselves with information resources and that their information behaviour suffered as a result of this.⁶ Again, the authors cited a lack of existing research into the information needs of public health practitioners in their reasons for carrying out research.

Forsetlund focussed on the use of research or evidence-based information in public health in Norway.⁹ Focus groups were used as the method of data collection and Oslo city borough doctors and public health specialists were invited to attend the sessions.¹⁰ This study had a relatively narrow focus compared to some of the other studies discussed above, and looked only at the use of evidence or research-based information in public health, concluding that there was a greater potential for this kind of information to be used in public health.

In 2007, researchers in the United States set out to draw together all existing research into the information needs of public health practitioners, to create a new understanding of those needs.¹¹ Although this research was largely successful in bringing together existing papers on information needs, it is limited to a focus on US practitioners. Additionally, public health researchers in academic settings were excluded from the review, and the authors admitted that many of the information needs assessments included in their review focussed on practitioners working in clinical settings.

Information specialists researching public health information needs and use also complain about various inadequacies in current information provision. Concerns have been raised that in many cases information needs of practitioners are not being met.¹² There is also a need for better indexing of public health literature, specifically grey literature.¹³ Existing databases such as Medline do not include controlled vocabularies that can deal with the complexities of public health, specifically the interaction between health partner organisations, environment and health which is inherent in the field.²
Researchers investigating the information needs have commented on the lack of existing research. While some attempts to synthesise knowledge on public health practitioners’ information needs have been made, these attempts had limitations and in some cases excluded certain groups of the public health workforce. In other cases, research is over 10 years old and consequently at risk of being outdated due to the rapid pace of change in use of technology to organise and retrieve information in the last 10 years. Given the concerns expressed in the literature on the inadequacy of currently available information organisation retrieval systems for the use of public health practitioners, it was a logical progression to look not only at information needs of public health practitioners, but also at the information systems specific to public health which are currently in place.

There is a need to organise the knowledge on public health information needs and systems in order that others can build on it, and share more accurately what has been tried and tested: this is one of the aims of the present research. A more organised approach to learning from and sharing this research will improve the way in which we address gaps, so that public health benefits through well-supported public health practitioners. The present research set out to provide an updated synthesis of evidence on the information needs of public health practitioners, and existing systems meeting those needs, covering research from 2001 to 2011. This synthesis is presented in table form and provides an organised evidence-base for public health information specialists to draw on in their own investigations of information needs. The specific nature of the aims of this research is discussed in the next section.

**Methods**

A two-stage literature search was carried out. Stage one looked at the identified information needs of public health practitioners, as documented by previous research. Stage two looked at the solutions that have been devised to fill those gaps. The initial search for stage two of this review was very broad using search terms for methods of information dissemination. However, as the number of articles returned by this search was too large to be manageable, it was decided to narrow the search terms to focus on looking for whole information systems only, rather than including systems which may only be for information dissemination. Unfortunately, it was only possible to access a restricted range of databases to search due to limited financial resources. Listings of search terms used are given in Tables 1 and 2. Both searches were restricted to finding results published within the last 10 years (the search was carried out in January 2011).

Inclusion criteria for each search are also listed below. In both searches, one inclusion criterion was that the article must have a structured abstract, meaning an abstract with clearly defined sections such as aims, methods and results. This was used as an inclusion criterion as its use shows clearly that a piece of research has followed a rigorous method and also because it aided in understanding of the content of the article and therefore in the decision as to whether the article should be included in the present review. Without adding this limitation to include only articles with structured abstract, the selection process would not have been manageable.

**Literature review 1 – information needs**

LISTA, LISA, Web of Science and PubMed bibliographic databases were searched using the pre-selected search terms. In total, 47 records were identified (15 from LISTA, 4 from LISA, 25 from Web of Science and 3 from PubMed). Records were entered into Reference Manager bibliographic management database where de-duplication of records was carried out. Forty records remained after this stage of the search process. Records were then sifted by article abstract for eligibility. At this stage, any articles that were not available in English, or did not have an abstract, were automatically excluded. Fourteen articles remained after the eligibility review. The search strategy used was as follows: information need or information want or information access or information requires (articles without a structured abstract were automatically excluded because it was too difficult to determine the content and relevance of these articles during the eligibility review without this) AND public health or health practitioner or health professional.
Table 1 Published papers on information needs in public health practitioners

<table>
<thead>
<tr>
<th>Author</th>
<th>Information need</th>
<th>Topic</th>
<th>Geographical span</th>
<th>Setting</th>
<th>No. of participants</th>
<th>Year</th>
<th>Conclusion/summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpi</td>
<td>Literature searching</td>
<td>Public health</td>
<td>USA</td>
<td>Public health practitioners</td>
<td>n/a</td>
<td>2005</td>
<td>There are important differences between knowledge needed to act as an expert searcher in clinical healthcare and in public health. The lack of standardised subject vocabulary, lack of indexing of grey literature and breadth of the subject present challenges to anyone wishing to develop expert search skills in this field</td>
</tr>
<tr>
<td>Cogdill</td>
<td>Information behaviour</td>
<td>Primary care</td>
<td>USA</td>
<td>Nurse practitioners</td>
<td>300</td>
<td>2003</td>
<td>Importance of access to information resources in primary care – there is a need for outreach programmes to promote evidence-based decision making</td>
</tr>
<tr>
<td>Forsetlund</td>
<td>Research-based information</td>
<td>Public health</td>
<td>Norway</td>
<td>Public health practitioners</td>
<td>52</td>
<td>2001</td>
<td>The need for and use of evidence-based information is currently unrecognised among public health practitioners</td>
</tr>
<tr>
<td>Fourie</td>
<td>Emotion in information behaviour</td>
<td>Healthcare</td>
<td>South Africa</td>
<td>Healthcare professionals</td>
<td>n/a</td>
<td>2009</td>
<td>Difficulties experienced by healthcare professionals in expressing information needs are highlighted</td>
</tr>
<tr>
<td>Guindon</td>
<td>Transmission of evidence from research to practice</td>
<td>Healthcare</td>
<td>Low- and middle-income countries (various)</td>
<td>Healthcare providers</td>
<td>1499 providers</td>
<td>2010</td>
<td>Barriers to transmission of information from evidence to practice include the lack of Internet access. Locally published research has high impact on local practices, so increased investment in local research should be made</td>
</tr>
<tr>
<td>Khan</td>
<td>Situation awareness in emergencies</td>
<td>Public health</td>
<td>USA</td>
<td>Public health general</td>
<td>n/a</td>
<td>2010</td>
<td>Fusion of information from a variety of sources may provide opportunities to expand access, analysis and information exchange to inform public health action</td>
</tr>
<tr>
<td>Kostagiolas</td>
<td>Update knowledge and improve practices/skills</td>
<td>Pharmaceutical information</td>
<td>Greece</td>
<td>Community pharmacists</td>
<td>92</td>
<td>2010</td>
<td>Pharmaceutical associations could play a role as information providers</td>
</tr>
<tr>
<td>LaPelle</td>
<td>Evidence-based information, information on healthy risks and PH practices</td>
<td>Community health promotion, communicable disease control</td>
<td>USA – Massachusetts</td>
<td>State health department</td>
<td>19</td>
<td>2006</td>
<td>Critical needs of PH practitioners are not being met. Strategy of (i) promoting improvements in information delivery based on preferences of delivery system users; (ii) development and evaluation of models of information organisation and delivery is suggested</td>
</tr>
<tr>
<td>Author</td>
<td>Information need</td>
<td>Topic</td>
<td>Geographical span</td>
<td>Setting</td>
<td>No. of participants</td>
<td>Year</td>
<td>Conclusion/summary</td>
</tr>
<tr>
<td>-----------------</td>
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<td>-------------------------------------------------------------------------</td>
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<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Lee</td>
<td>Information behaviour</td>
<td>Public health</td>
<td>USA – Tennessee</td>
<td>Librarians, public health practitioners, informatics practitioners</td>
<td>571 responded</td>
<td>2003</td>
<td>The rural public health community studied experiences barriers to computer and Internet access which contribute to overall lack of use of available resources</td>
</tr>
<tr>
<td>Pakenham-Walsh</td>
<td>Information needs of healthcare workers in developing countries</td>
<td>Healthcare</td>
<td>Africa</td>
<td>Healthcare professionals</td>
<td>n/a</td>
<td>2009</td>
<td>The recognition that information and learning needs are fundamental and that we need to identify gaps in understanding information needs and provide the evidence based to raise awareness worldwide. We should map this knowledge gap of different regions in the world</td>
</tr>
<tr>
<td>Rambo</td>
<td>Information needs of professional teams</td>
<td>Public health</td>
<td>USA</td>
<td>Health sciences librarians</td>
<td>Not stated</td>
<td>2001</td>
<td>Approaches to information outreach vary and can be library-centric (promoting a library’s services to a new audience), or by viewing the target audience as central to planning the outreach, and integrating a librarian as a supporting member of the user team. ‘This requires the librarian to determine what the real information needs of the audience are and resolve how the needs will be met. Assessing needs is central to this approach.’</td>
</tr>
<tr>
<td>Revere</td>
<td>Information behaviour</td>
<td>Public health</td>
<td>USA</td>
<td>Public health practitioners</td>
<td>n/a</td>
<td>2007</td>
<td>There is need for digital knowledge management systems to reflect diversity of information required within public health. Public health information professionals can serve a significant role in helping practitioners to meet their info needs</td>
</tr>
<tr>
<td>Rutland</td>
<td>Information needs and barriers</td>
<td>Public health</td>
<td>UK</td>
<td>Various practitioners: midwife, DN, health visitor, practice nurse, school nurse</td>
<td>8</td>
<td>2010</td>
<td>Some information needs could be met by improvements to library access. However, barriers to meeting needs require action elsewhere in public health management structure</td>
</tr>
<tr>
<td>Twose</td>
<td>Literature searching and information behaviour</td>
<td>Public health</td>
<td>USA – Maryland</td>
<td>Public health practitioners (departments at Johns Hopkins)</td>
<td>20</td>
<td>2007</td>
<td>Licensed information is used infrequently, with a few resources being used more often than others. However, location of even small numbers of high-quality information sources such as meta-analyses has large impact on public health work</td>
</tr>
</tbody>
</table>

In some cases, the text from the conclusion column in this table comprises a direct quotation from the conclusion of the specified paper.
Inclusion criteria for this section of the study were as follows:

- Articles must have a structured abstract (articles without a structured abstract were automatically excluded because it was too difficult to determine the content and relevance of these articles during the eligibility review without this).
- Articles must be English language.
- Articles with a focus on information needs of healthcare practitioners were included. Initially, it was intended that this research would focus solely on locating literature examining the information needs of public health practitioners in non-clinical settings, as a counterbalance to earlier reviews of this nature. However, as few articles of this nature were located during the search, inclusion criteria were expanded to admit research focussed on practitioners in clinical settings.
- Articles must present research or a review into the information needs of practitioners. Single case studies and opinion pieces were not included.

Literature review 2 – gaps and solutions

LISTA, LISA, Web of Knowledge and PubMed databases were searched. Sixty-four records were identified from the search overall (10 from PubMed, 49 from Web of Knowledge, 5 from LISA and none from LISTA). As with the first search, records were imported into Reference Manager for de-duplication. After de-duplication, 60 records remained. The eligibility review was carried out based on article abstract, with non-English language papers and those without article abstracts being automatically excluded at this stage. Ten records passed the eligibility review. See Table 2 for search terms used. The search strategy used was as follows: ehealth or telehealth or information system or information service or eresources or elibrary of mobile app or mobile application and health informatics or public health or health professional or health practitioner. These terms were selected to find research relating to information services or systems generally while also including research on new innovations (hence the inclusion of terms for ehealth and telehealth and mobile applications).

There has been an increasing emphasis on the use of mobile applications in health in the UK, with terms such as mobile app being mentioned as new tools, so it was felt that it would be interesting to include these terms in the search.

Inclusion criteria for articles in this section of the study were as follows:

- Articles must have a structured abstract (articles without a structured abstract were automatically excluded because it was too difficult to determine the content and relevance of these articles during the eligibility review without this).
- Articles must be English language.
- Articles that presented the implementation or development of an original tool, database or information management or retrieval system were included.

Results

The papers discussing information needs of public health practitioners and the information solutions suggested are listed below in separate tables. Details of the findings from this research are given in the Discussion section of this paper. Objectives 2 and 3 to find and present research on information needs and information solutions for public health practitioners have been met through the construction of Tables 1 and 2 which display the articles found by the two searches carried out.

The information needs literature discovered by the first search spanned a range of geographical locations, although most had originated within the developed, English-speaking world (the USA and UK). Only two papers were located which gave information on information needs from developing countries such as Africa. Although it was initially intended to include papers on public health practitioners’ information needs, it was expected due to the aforementioned dearth of research in this area, that it would be a challenge to find many papers specifically focussing on the information needs of this group. This expectation was proved correct. Although several papers that clearly had a specific public health focus were found, papers that were informative on the information needs of public health as part of a wider primary care or healthcare discipline have also been included.

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<table>
<thead>
<tr>
<th>Author</th>
<th>Gap/solution</th>
<th>Topic</th>
<th>Geography</th>
<th>Setting</th>
<th>Participants</th>
<th>Year</th>
<th>Conclusions/summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patel</td>
<td>Transmit/communicate information electronically</td>
<td>Clinical care</td>
<td>USA</td>
<td>Clinical</td>
<td>328, 144</td>
<td>2011</td>
<td>Potential use preferences for health information exchange completed survey</td>
</tr>
<tr>
<td>Scotch</td>
<td>Bringing together different information sources into one system</td>
<td>Public health data systems</td>
<td>USA</td>
<td>Public health</td>
<td>n/a</td>
<td>2008</td>
<td>Grid computing approach to Web 2.0 is useful</td>
</tr>
<tr>
<td>Wilkinson</td>
<td>Current awareness for knowledge transfer and EBP</td>
<td>Clinical care – evidence-based medicine</td>
<td>UK (Wales)</td>
<td>Clinical</td>
<td>n/a</td>
<td>2009</td>
<td>Bulletins support practitioners and develop the role of information specialist</td>
</tr>
<tr>
<td>McCluskey</td>
<td>Evidence-based research database</td>
<td>Occupational therapy</td>
<td>Australia</td>
<td>Public health (community health)</td>
<td>n/a</td>
<td>2010</td>
<td>Illustrates how such a service can be used to locate and interpret research</td>
</tr>
<tr>
<td>Chanda</td>
<td>Telehealth to provide information to health professionals in rural Zambia</td>
<td>Clinical care</td>
<td>Africa (Zambia)</td>
<td>Community health</td>
<td>n/a</td>
<td>2010</td>
<td>Telehealth alone cannot solve health problems in Zambia, and there are barriers to implementation</td>
</tr>
<tr>
<td>Fitzpatrick</td>
<td>Organisation/practitioner contact database</td>
<td>Clinical care</td>
<td>USA</td>
<td>Clinical</td>
<td>n/a</td>
<td>2010</td>
<td>A resource database such as the US National Health Information Research Centre’s Health Information Resource Database can be a useful tool in locating health information when flexibility of search interface is provided</td>
</tr>
<tr>
<td>Boulos</td>
<td>Data mining from the social web to create a health information database for epidemiologists</td>
<td>Public health</td>
<td>UK/USA</td>
<td>Public health (epidemiology)</td>
<td>n/a</td>
<td>2010</td>
<td>Can provide health professionals with a vast supply of constantly updated user-generated content</td>
</tr>
<tr>
<td>Turner</td>
<td>Model for scanning and collecting public health grey literature</td>
<td>Public health</td>
<td>USA</td>
<td>Public health</td>
<td>30</td>
<td>2005</td>
<td>Grey literature in public health is a diverse and important information source and can best be described ‘using the concept of the public health problem and elements relating to interventions used to address that problem’</td>
</tr>
<tr>
<td>Johnson</td>
<td>Current awareness service based on RSS feeds</td>
<td>Generic – academics/professionals</td>
<td>USA</td>
<td>General</td>
<td>n/a</td>
<td>2009</td>
<td>As yet, this resource had not been formally evaluated at the time of writing. However, the resource received positive anecdotal feedback from users, and improvements to the portal are planned</td>
</tr>
</tbody>
</table>

(continued)
Several of the research papers found were literature reviews of information needs or behaviour rather than new active pieces of research involving some form of qualitative or quantitative analysis of new data. \textsuperscript{2,11,17,19} Many of the active research articles used qualitative techniques for data collection and analysis \textsuperscript{2,7,8} or combined qualitative and quantitative research using surveys and methods such as focus groups. \textsuperscript{16} Some of the research had a fairly narrow or specific focus within health information. For example, Forsetlund looked at information needs of doctors and public health specialists. \textsuperscript{8} Although they asked questions on general information needs, they also asked questions relating to specific instances or cases of information need. Similarly, Cogdill’s research focussed on the information needs and experiences of nurse practitioners. \textsuperscript{16} This included asking questions on experiences of specific information needs that had originated as a direct result of an encounter with an individual patient. Although this insight into the needs of these groups of practitioner may provide detailed information about their behaviours and needs in specific scenarios, this may make it difficult to apply their conclusions to a wider audience. This simply reflects the nature of qualitative research (to explore in detail the situations and experience of an individual or group of individuals) rather than any lack on the part of the research discussed here.

Information needs questions asked in studies included questions on computer and IT use, preferred methods for learning, use of print and electronic information, software proficiency, frequency of use of different types and formats of information\textsuperscript{4} and tasks requiring information, barriers to information access, desired enhancements to information access,\textsuperscript{1} and whether differences in type of information needed as a result of interactions with different groups of professional colleagues.\textsuperscript{16} Similarly to our first literature search for material on information needs of public health practitioners, the literature search for material on information solutions for public health again found that the bulk of literature had originated from the USA and UK, with developing countries being far less well represented. In this stage of the literature search, while the search did locate papers presenting information solutions for public health specifically,
as with the first search, there were also a number of papers that presented clinically focussed solutions which, however, still have some application in public health.

Discussion

Discussion of the research is presented in Table 1 (containing results of literature search for material on information needs) and Table 2 (containing results of literature search for material on information provision solutions).

The articles located by our search into the information needs of public health practitioners are listed in Table 1, meeting objective 2 of this study (to present a picture of information needs of public health practitioners). Table 1 draws out the key points from the literature which are discussed below, expanding on the information highlighted in the table and meeting objective 1 of this study (presenting the richer picture of public health information needs).

Each of the studies listed in Table 1 focuses on public health information in a general sense. Despite many of these articles referring to the diversity of public health professionals as a group making it difficult to pool information in a single place to meet all needs, it seems that there has been little or no attempt to research the information needs of individual subgroups within public health, such as nutritionists and dieticians. The emergence of new technologies will also impact on our knowledge of information needs in this area: as these new technologies are gradually adopted by the profession, information needs will change, with new needs, and new technologies to meet these needs constantly emerging. Therefore, a regularly updated programme of research into the information needs of public health professionals is advisable.

Several broad themes in the information needs of public health practitioners emerge from the studies included in Table 1:

1 Barriers to information access experienced by public health practitioners
2 A need for a wide range of information (due to the wide diversity of occupations which the field of public health encompasses), both evidence-based research and grey literature.
3 A need for an improved public health information architecture to facilitate access: this includes a need for better public health taxonomy, and improved access to support in the form of information technology and resource access.

Barriers to information access

Much of the previously published literature on public health information needs focuses as much on barriers to information access as on the information needs themselves, and the two are closely related. Identified barriers to access include the lack of information need awareness (where individuals are not aware what information they require in order to meet their need, or may not even be aware that they require information in order to facilitate their thought process) and lack of information literacy (appraisal skills). Information overload has also been identified as an issue and is likely to be related to a less widely recognised public health information need for problem-solving information, which can be taken to equate to a need for a single high-quality piece of information which is exactly appropriate to the problem at hand, rather than to a mass of evidence-based information which must be sifted and appraised by the information seeker. Clearly, any attempt to meet the information needs of this diverse workforce must also attempt to overcome some of the barriers to information access experienced by public health professionals.

Need for a range of information

On the basis that the principles of evidence-based healthcare suggest that all decisions in health should be based on the best available evidence, Forsetlund and Bjorndal theorised that, like any other health professional, public health practitioners would have a need for research information. These researchers set out to answer their hypothesis through interviews and questionnaires of public health practitioners in Norway. Their data suggested that this hypothesis was correct and that research information could be more widely used in their study group, although they admit the possibility of bias in their results due to the study setting.
Replicating this study across a wider and more varied setting (including a range of public health professionals) could provide more evidence to prove or disprove their theory. The authors of this study also pointed out that their data collection methods were only effective in gathering information on information needs that the practitioners were actually aware of. This implies that there may be occasions when research information would be useful to practitioners, but that they do not realise this.

Alpi’s exploration of expert searching in public health also highlights the number of different types of information relevant to public health, also mentioning research information. In particular, Alpi refers to the difficulty in accessing research information which is caused by its being spread over a wide variety of journals covering many disciplines. The importance of unpublished literature to public health is also discussed. The use of grey literature was also common in the group of Tennessee-based practitioners studied by Lee, Giuse and Sathe – 24% of respondents who completed their questionnaire stated that they used unpublished literature and policies on a daily basis.

Other common types of information from this study included directory information and internal communications information. Revere’s synthesis of public health information needs literature also highlighted grey literature as an important source, along with risk reports, information on new interventions and information on emerging practices in preventive behaviour and ‘best practice’ evidence-based resources. Six similar categories of information emerged from a study of employees in a US state health department: risk reports; reports on emerging practices; information on new interventions; synthesised information on health threats; research- and evidence-based guidelines.

Need for improved public health information architecture

The need for improved indexing of public health information was highlighted by Alpi, discussing the role of expert searching in public health information retrieval. Existing taxonomies such as the MeSH system used by PubMed/Medline are perceived as inadequate for indexing the breadth of public health literature and are seen to be too clinically focussed. There is also concern at the lack of systematic indexing of grey literature. Given that more than one study has highlighted the high level of use of grey literature by public health practitioners, this lack of indexing should be of real concern to public health information specialists and practitioners. LaPelle also found that participants in her research had experienced difficulties with search terms for public health which is indicative of the current inadequacy of public health indexing.

Objective 3: meeting information needs using tools and solutions

Articles located in our search for information tools and solutions are shown in Table 2. These articles highlight a range of information tools including current awareness services, grey literature indexing and social web applications.

Some of the solutions presented could be used to directly address the emerging needs disclosed by the papers listed in Table 1, for example the need for improved access to grey literature by better indexing. A lack of indexing of grey literature has been identified as a barrier by Alpi, and an indexing solution has been presented by Turner. Needs for evidence-based information and effectively summarised information were identified by Forsetlund and LaPelle and the ScHARR produced evidence bulletin outlined by Wilkinson may help to meet this need. A need to overcome barriers to information access caused by the lack of IT provision was suggested by many of the information needs studies listed in Table 1 – telehealth is suggested and utilised as a possible mechanism of overcoming this barrier in developing countries by Chanda and Shaw. Other solutions cannot be so easily matched to the needs expressed in Table 1, but are clearly powerfully effective tools for public health practitioners: Wipfli demonstrates the success of the use of an online communication and information network, GLOBA-Link, in facilitating the adoption of tobacco control measures internationally.

A common feature of all the articles listed in Table 2 of this paper is that they all either suggest a possible model for meeting a particular need, or
present a case study of how a model or tool has been developed or implemented. However, none of these papers includes a formal evaluation of the presented tool or model. Clearly, most of these papers present new solutions to information problems, and therefore, time in which these solutions can be tested and used must be allowed before any meaningful evaluation can be carried out. Although, as stated previously, evaluation is beyond the scope of the present paper, the lack of formal evaluation noted in the published literature cited here highlights an important point: there must be evaluation of these new tools in order to be certain that they are effective in meeting information needs and also to discover any new information needs that may actually be created by the use of these tools.

Other areas of information need which do not yet appear to have been addressed by the models and solutions presented in Table 2 include the need for a structured public health taxonomy and a need for information solutions for more specific groups within public health.

There has been some progress in indexing public health information by publication type, but this research has found no evidence that any work has been carried out to build a comprehensive subject taxonomy for public health analogous to clinical controlled vocabularies such as Medical Subject Headings (MeSH).

The need for information solutions specifically designed to meet the needs of subgroups in public health is noticeably lacking in the area of non-communicable chronic diseases (NCDs). As discussed above, there is a general lack of knowledge about the needs of specific subgroups within public health; however, despite this, there have been attempts to develop information solutions which lend themselves to the area of infectious disease: see Boulos and Scotch. McCluskey also presented a model for a database aimed at Occupational Therapists. The remainder of the information solutions presented appear to be more general in scope and may not meet all the needs of those engaged in the prevention of NCDs.

Limitations of this research

The search strategy included only articles from the last 10 years (2001–2011). This decision was made because of the rapid shift in technology that has occurred in the last 10 years. Information systems in use prior to this may not be comparable to those common today.

Lack of time and financial resources meant that only a small range of databases were searched to identify literature for this review. It is recognised that a wider search using more databases might locate other relevant articles which have been missed by this paper. The authors would welcome any attempts to improve on this research.

The investigation of information solutions to meet the needs of public health practitioners presented in this paper does not include any evaluation of those solutions. This is outside the scope of this paper and would generate enough material to warrant a separate piece of research: it would not be possible to do justice to such an evaluation here.

Conclusion

Our aim in carrying out this research was to determine which of the identified information needs in public health are met by information tools currently available and which needs are not being met. There are several information needs and barriers to information access which has not been addressed or overcome by any of the solutions listed in Table 2. The present paper has highlighted the continuing lack of a standard public health taxonomy used to index resources, and also the lack of knowledge of the information needs of subgroups in public health and more specifically the apparent lack of information need awareness and provision for practitioners working in NCD prevention. The need for clarity of knowledge about information needs of groups within public health is supported by findings of previous studies. Despite much comment in the published literature on the diversity of public health as a field making it difficult to ascertain needs of the group as a whole, it appears that there has been little attempt as yet to overcome this difficulty by carrying out more discipline-specific information needs research.

One of the barriers to public health information access which has yet to be overcome is the practitioner’s awareness of their own information needs. Improving awareness of information...
needs among public health practitioners will be fundamental in improving their access to information: no amount of databases, current awareness services or networks will meet the needs of health practitioners who are not stimulated to seek these information sources out by knowledge of their own information needs. There is a clear role for information specialists here in continuing effort to educate public health practitioners, so that they have the information literacy skills required to both recognise and act on their information needs. It is suggested that further research into unrecognised information needs be carried out, with a view to finding a way of improving awareness of information needs in public health practitioners (e.g. by embedding information skills training into formal public health education courses).

A comprehensive and long-term approach to further public health information needs research is also needed. Regularly updated research into information needs should be carried out in order to capture and perhaps even predict the changing needs of this group of professionals as methods of information provision develop with new technologies.

It is recommended that models of informatics that can support public health are presented and published, so that the public health information community can share experiences and solutions and build on this evidence-base to produce superior evidence-based systems for the goal of a healthier society. By building on existing research, duplication in effort is avoided and there is more opportunity for advancement in understanding information needs in public health. This evidence-base can stimulate new innovative ideas on how we can better deliver diverse public health information to those who need it. It also allows information professionals to work more closely together and share knowledge and expertise in delivering information.

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Received 13 January 2012; Accepted 14 August 2012