Public Health Informatics: Increasing Use and Access

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Abstract
The purpose of this research was to conduct an assessment in support of the facilitation of access to public health data and information in Nebraska. This was accomplished by surveying public health stakeholders on their data needs and priorities. Appropriate quantitative and qualitative statistical analyses were used to draw sound conclusions on respondents’ data needs and priorities. Most commonly-accessed sources of public health information, most needed health data resources, and most important data sets and corresponding data aggregates were identified and explored for opportunities to improve public health practice in Nebraska.

1. Introduction

The Centers for Disease Control and Prevention (CDC) published a report recommending individuals be able to effectively search electronic sources of information and that they should “leverage the power of modern information technology in the science and practice of public health.” [1]. State public health stakeholders and citizens can realize several benefits from improved access and use of public health data and information. Beyond immediate benefits of increased productivity and savings in program costs for public health organizations, the community as a whole will benefit from public health practitioners who routinely make their decisions based on research findings and current population health statistics. In considering the magnitude of change that can result from often simple changes in protocol, it is imperative that more needs to be done to make public health information more accessible to all.

Public health stakeholders, from health department administrators to policy makers, often have to search multiple and disparate data sources when they need information. A better understanding of the specific challenges that inhibit the effective use of these data sources will prove to be valuable to public health administrators in addressing this problem. Money, time, and perhaps even lives could be saved if the public health workforce consistently utilized the latest research findings and population health statistics in program design and implementation. For example, if health program planners in an urban health department have access to and consult the latest infant mortality data when making resource allocation decisions, prevention programs can be implemented among a targeted population resulting in a reduced infant mortality rate in the target area.

Today, open data accessibility and enhanced information technologies have made research findings, data, and other public health information more widely accessible to professional audiences, policy makers, and the general public [2]. In public health, practitioners must systematically use all available data and information in making decisions that affect health policy and programs. Pressing needs in public health are the abilities to access, aggregate, analyze, translate and disseminate public health information. Access to this information is especially critical when making decisions regarding programming, staff and resource allocation, personnel training and development and other related functions of public health administration.

This research will help set strategic directions in public health informatics. Effectively facilitating access to public health data and information requires an accurate assessment of current opportunities and challenges surrounding its use. The results of this study are especially important for practitioners, as they can help set the agenda for the widespread use of current public health data in public health organizations. Thus, the goal of this research is to identify public health stakeholder data needs and priorities.
2. Background Information

Information technologies have the potential to drastically improve population health. However, realization of this potential is possible only with a workforce competent in the use of information systems and web-based sources of data in the practice of public health. In a study of New York public health employees' informatics competencies, Cunningham, Ascher, Viola, & Visintainer [3] attempted to determine the status quo by surveying current levels of proficiency and relevance, and then identifying areas of needed training.

Cunningham et al. [3] found that public health employees did not consider traditional informatics competencies to be relevant to their work. According to Cunningham et al. [3], there needs to be a shift in emphasis that will recognize the promise of information technology in everyday work. Simply providing access to public health data and information does not alone improve population health. The public health community will need to be educated on the importance of regular and consistent use of this information in developing and implementing health programs.

To adequately prepare public health workers to combat population health issues, administrators should ensure their employees have access to, and know how to locate public health information and data. It was noted by the CDC in 2009 that the most timely and easily accessible information could be found on the World Wide Web [1]. That report suggested 13 core public health informatics competencies that are intended to reflect best practices and set expectations of knowledge for staff in this field [1]. These recommendations provide an excellent framework for public health administrators in employee training and development. The report stated that public health workers need to be competent in the following:

- Use of informatics standards
- Knowledge management
- Information security
- Use of informatics to integrate clinical health, environmental risk, and population health.
- Supportive of the development of strategic direction for public health informatics within the enterprise
- Supportive of information system development, procurement, and implementation that meet public health program needs.
- Evaluation of information systems and applications
- Communication with cross-disciplinary team members [1]

In addition to having an informatics-literate public health workforce, data and information should be easy to locate and organized for efficiency. To illustrate what difficulties exist for public health workers to find needed public health data and information, Aalai, Gleghorn, Webb, & Glover [4] set out to compare information found on two major information sources: Medline brings together authoritative information from the National Library of Medicine, the National Institutes of Health, and other government agencies and health-related organizations while CABI’s Global Health Database is the world-leading database covering agriculture, environmental and global health.

Aalai et al. [4] found that while the two resources included data or information on as much as 70% of commonly-searched public health concepts, many more sources were required when looking for evidence-based knowledge. Further, the authors noted that public health professionals are drawn from a variety of training backgrounds, and that both their information needs and approaches to searching tended to reflect their disciplines. For example, epidemiologists may primarily have more use for biostatistical data, while health program planners need access to program resources such as state/national benchmarks for health status indicators (i.e. BMI, percentage of adults who smoke) or health education curriculum. These types of public health data and information are found in a limited number of places and usually are not found by using only one resource. Therefore, it can be suggested that an interdisciplinary approach to facilitating access to needed public health data and information needs to be strengthened.

This is not to say that public health information is absent from web-based resources. In fact, the opposite is true! As noted by Avery, Lariscy and Sohn [5], health and medical information is more accessible now than at any time in history. But the public health community still faces major barriers in routinely accessing comprehensive, population-based data.

The issue of lack of access to public health information by different user groups has been addressed in Europe. Diverse public health experts there helped to launch a web-based system containing scientific data, with presentations (tables, interactive graphs and maps) as well as textual information. Van der Wilk and Verschuuren [6] noted two key issues to consider when publishing public health information: first, the quality of the data and second, a means of fiscally sustaining access to the system.

The emergence of information technology has been embraced around the world by leaders in
public health. According to Brownstein, Freifeld, & Madoff [7], information technologies such as wikis, social networks, and Web-based portals help facilitate communication and collaboration to accelerate the dissemination of reports of infectious diseases and aid in mobilizing a response. For instance, the International Society for Disease Surveillance has created the Distributed Surveillance Taskforce for Real-Time Influenza Burden Tracking and Evaluation (DiSTRIBuTE), a group of statewide and local health departments that use the Web to share, integrate, and analyze health data across large regions [7].

With the passing of the American Recovery and Reinvestment Act of 2009, the Federal government allocated funding for widespread investment in the health informatics infrastructure in the United States. The Health Information Technology for Economic and Clinical Health (HITECH) Act, part of the Recovery Act, designated funding to modernize the health care system by promoting and expanding the adoption of health information technology. HITECH supports the rapid adoption of health information technology by hospitals and clinicians through Medicare and Medicaid incentive payments to physicians and hospitals for meaningful use of electronic health records. It also authorizes grant programs and contracts that support HIT adoption by providing technical assistance to health care providers, training a HIT workforce, as well as developing standards for the standardization of electronic health record privacy and security [8].

In the state of Tennessee, a survey was distributed to 775 potential respondents (public health workers) as a means to “provide insight to understanding public health officials’ needs and promote access to data repositories and communication tools.” After review of the survey responses, Lee, Giuse and Sathe [9] determined that among the 571 survey respondents, 70% of urban and 78% of rural respondents never or seldom used or needed the Centers for Disease Control Website. Also, from the 232 different health professions represented in the survey responses, 72% never or seldom used or needed MEDLINE [9]. Most importantly, it was noted that the electronic resources used daily or weekly were email, Internet search engines, internal databases and mailing lists, and the Tennessee Department of Health Website [9]. This research identified a “clear trend of significant barriers to computer and internet access…which contributes to an overall limited use of existing electronic resources” thereby inhibiting evidence-based public health practice [9].

Being able to confidently state what data sets are needed most by state public health stakeholders is of high value. Also, understanding how access should be facilitated will strategically help IT professionals who are designing systems to provide data and information to public health stakeholders. This study brings together two key issues discussed in this paper and currently faced by public health practitioners. Two research questions guide the study: “What are the key data needs and priorities of public health stakeholders?” and “What are best practices in facilitating access to public health information?”

3. Study Design

Survey methodology was chosen to gather data. Because there are no secondary data sources that can provide the kind of subjective data needed by this study, the best approach to research the questions was to ask individual public health stakeholders their opinions.

This study is based on an earlier study conducted by the Eskind Biomedical Library at Vanderbilt University Medical Center [9] and was used with permission. An online questionnaire was developed consisting of 35 open and close-ended questions. Some of the questions from this existing survey instrument were used in this research because of the similarity in purpose and scope to this research. Changes were made to the wording of adapted questions to make them specific to Nebraska and to include newer resources developed since the initial survey was distributed.

Potential respondents were selected based on their employment and/or university affiliation with representation from most divisions of the local state Department of Health and Human Services. Data collection methods included sending 590 personal invitations to potential participants. As a result, 191 participants completed the survey with an overall participation rate of 31.8%.

To understand the needs of the public health workforce, the survey contained in-depth questions designed to ascertain what public health information and data are needed by public health stakeholders most often. Also, questions were designed to rate the level of importance of commonly-accessed public health resources in the state, and the rate of computer literacy among stakeholders.
4. Results

Background information about survey respondents included their work settings, job functions, and level of education and experience in public health. A majority of the 191 survey respondents represented state government (35.1%) and academic (33.0%) work settings. The remaining work settings included local (city and district) government (11.5%), health care (9.9%), and nonprofit organizations (7.3%). Survey respondents reported a wide variety job functions related to public health, as shown in figure 1. Thirty-eight respondents (20.0%) and 36 respondents (18.9%) identified themselves as either an educator or health educator/promoter respectively. Other public health job functions reported include health department administrator/director (13.2%), data analyst (10.0%), epidemiologist (9.5%), and nurse (6.8%). Fifty respondents indicated an “Other” job function with a limited relevance to public health practice ranging from students to attorneys to CEOs.

Respondents work and/or reside mainly in metropolitan cities (78.8%). There was little diversity in educational attainment and amount of experience working in public health among survey respondents. The majority (67.0%) of survey respondents possess an advanced degree, with 41.9% having a master’s degree and 25.1% having a doctorate. This distribution suggests that the public health workforce is highly educated. The largest category of respondents had 1-5 years (n=50) of public health work experience, followed closely by those with 6-10 years (n=46) and more than 20 years (n=46) of experience.

To understand the specific information needs of the public health workforce within the 4 primary categories, this survey also contained...
questions designed to determine which public health resources are relied upon to obtain interpreted information. 177 survey respondents indicated their responses (with options of daily, weekly, monthly, yearly, and never) based on 22 web-based sources of public health data. These categories included mostly State and Federal DHHS websites (cdc.gov, medlineplus.gov, Nebraska.gov, ahrq.gov, etc), in addition to general internet searches and a category for other. The ‘Other’ responses included not-for-profit national foundations, professional and trade associations, and public health law journals.

To better understand the specific data needs of the public health workforce, this survey also contained questions designed to rate the level of importance of specific datasets. These questions help to determine which public health datasets are found to be important to public health practice. 172 survey respondents indicated their responses on a five-point Likert scale that ranged from ‘Not Important’ to ‘Very Important’. Responses were based on 16 commonly sought after datasets, in addition to a category for other. Only the top 10 most frequently occurring responses are included in figure 2. Those survey respondents indicating an ‘Other’ response included datasets specific to minority populations, data on STDs, teen pregnancy, and risk behavior for youth, nutrition datasets, and substance abuse data.

Among the three largest stakeholder subgroups (state government employees, academics, and health care workers), demographic/census data was the most important data. The average rating of importance for demographic/census data was highest among health care workers, followed by academics and state government employees. The three key stakeholder groups responded similarly regarding their level of importance of comparison data for the local state with other states and national benchmarks. For morbidity/mortality data, the average rating of importance was highest among health care workers, followed by state government employees and academics.

Finally, as a means of determining the data aggregates most helpful to local state public health stakeholders, the survey contained questions that were developed to understand how important different aggregates are to public health practice. Table 1 illustrates the responses from ‘Information Use/Needs’, question 11: How important are the following data aggregates to your work? Response options were based on a five-point Likert scale that ranged from ‘Not Important’ to ‘Very Important’ and were grouped by frequency (not important vs. important). With ‘Neutral’ responses not included, all responses fell into one of the two frequency categories, Important and Not Important.

<table>
<thead>
<tr>
<th>Data Aggregate</th>
<th>Important</th>
<th>Not Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>County Level</td>
<td>67.5%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Health Department Service Areas</td>
<td>58.3%</td>
<td>24.4%</td>
</tr>
<tr>
<td>DHHS Service Regions</td>
<td>39.0%</td>
<td>37.8%</td>
</tr>
<tr>
<td>Behavioral Health Regions</td>
<td>34.4%</td>
<td>47.0%</td>
</tr>
<tr>
<td>Congressional Districts</td>
<td>29.2%</td>
<td>49.4%</td>
</tr>
<tr>
<td>Natural Boundaries (rivers, etc)</td>
<td>20.6%</td>
<td>60.6%</td>
</tr>
</tbody>
</table>

Table 1. Importance of data aggregates

5. Discussion

The results of the survey provide insight as to what public health data and information are deemed to be useful by the local and state stakeholders. Observations from the local and national level provide a necessary perspective of current trends in informatics. By utilizing the results of the survey and the assessment of the informatics landscape, public health administrators will have a solid foundation for providing relevant public health data and information that is useful in the local state.

In reviewing the survey responses, provided by public health workers, it is recommended as best practice that data access training initiatives be developed. Trainings should focus on developing informatics competencies in public health workers and be offered to the key stakeholder groups identified by this research. This research promotes the practice of evidence based public health, and highlights some of the key factors in the use and access of public health data. In addition to making sure the right data and information is available, the public health workforce needs emphasis on training and evaluating workforce competency in the use of information systems and web-based sources of data and information.

The public health stakeholder analysis indicates the majority of potential end users of using public health data work in the realm of public health
education/promotion and public health administration (including data analysts, epidemiologists, health program planners, health policy researchers, lab technicians.) which are commonly evidence-based job functions of public health. Demographic information from the participants of the questionnaire indicate potential end users are educated and have ample experience in public health with 94.8% of survey respondents having at least a bachelors degree and 69.0% having more than 5 years of work experience in public health.

The two most commonly accessed sources of public health information were contact information for divisions within the state Department of Health and Human Services and published academic literature. Local state DHHS data sets, CDC web-based sources of public health information, and the results of general internet searches were among the most needed health data resources and functions.

Among the datasets, demographic/census data, mortality/morbidity and a state comparison with other states and national benchmarks were regarded as the most important health data among survey respondents. Finally, survey results indicate county-level data and data organized by health department service areas are the most important data aggregates (>50% found these to be important).

In analyzing the responses among the three key public health stakeholder groups it was interesting to note the differences among the groups regarding their level of importance of the most important data sets. A cross tabulation of the top four most important data sets compared by stakeholders found the most important data set for state government employees is demographic/census data with 70.0% of this stakeholder group indicating so on the survey. For health care workers, their data set of highest importance is morbidity/mortality with 76.5% of the stakeholder group rating this data as important. For academic survey respondents, demographic/census data was their most important data set with 67.3% of the stakeholder group indicating the data set as important. These findings may correlate with the job functions of each respective stakeholder group. For example, health care workers typically work in a clinical capacity where morbidity/mortality data is more useful in their provision of health services, than is demographic/census data.

The identified data needs and priorities among the key stakeholder groups reflect the needs of each respective discipline. Public health administrators can help to facilitate access to public health data and information based on the end-user’s identified job function. By simply indicating their role in public health, a user can be displayed information that they will most likely deem to be useful. In facilitating access to public health data and information, public health administrators should ensure that these noted resources are made available.

6. Conclusions

The purpose of this research was to conduct an assessment in support of the facilitation of access to public health data and information in Nebraska. A survey was utilized to collect the responses from public health stakeholders. Best practices in facilitating access and promoting use of public health informatics has been identified both in terms of what data and information resources Nebraska stakeholders deem to be useful and that comprehensive training curricula/competencies need to be developed. These findings can be generalized to other states with similar geographic (urban/rural) and population (racial/ethnic, age, socioeconomic distributions) characteristics as exists in Nebraska.

Future research is recommended in the areas of formal and informal training for public health practitioners in their use of public health informatics. Specifically, there should be an emphasis on objective evaluation of public health data and information resources found on the World Wide Web. In other words, just because data is made available on a website, this doesn’t mean the data is current, accurate or relevant to the public health practitioner.

7. References


