Knowledge & Library Services (KLS) Evidence Briefing

What is the evidence around knowledge and library service provision and knowledge management to support global health, and disaster and emergency preparedness?

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Question

This briefing summarises the evidence around knowledge and library service provision and knowledge management to support global health, and disaster and emergency preparedness.

Document navigation

The included papers were organised using an EndNote Library, and screenshots are viewable in Appendix 1. A statistical overview of the results is available in Appendix 2. The search strategy can be viewed in Appendix 3, and a Bibliography is available at the end of the document.

Background

This evidence briefing aims to highlight ways that library, knowledge, and information professionals can provide support to disaster management and disease outbreak teams, and the general public during times of crisis. It looks at support at the point-of-need, and training that librarians can deliver pre-departure.

For the purpose of this evidence briefing, natural disasters include tsunamis, storms, floods, earthquakes, etc. and man-made disasters include off-shore oil drilling, wars, civil unrest, terrorism, etc. Outbreaks refer to disease outbreaks, pandemics, infections, etc. Out of all the papers, 19% of references were about any type of crisis, 19% about global health in general, 43% were about natural disasters, 7% about outbreaks, 4% about man-made disasters, and 7% did not specify what type of crisis they referred to. It is possible that they were more specific in the full-text, but this summary is based solely on the abstracts of the highly relevant references.

The references were divided in to the following themes:

1. Access to information
2. Knowledge management
3. Existing programmes/resources
4. Roles of libraries, librarians and knowledge brokers
5. Social media

Evidence briefings are a summary of best available evidence that has been selected from research using a systematic and transparent method.

What doesn't this briefing do?

The findings from research papers summarised here have **not** been quality assessed or critically appraised.

Who is this briefing for?

HIFA Working Group on Library and Information Services (LIS) and the Knowledge Management in Global Health Specialist Interest Group.

Information about this evidence briefing

This briefing draws upon a literature search of the six databases: CINAHL, Embase, Global Health, LISTA, Medline, and PubMed, and Google.

Out of a total of 130 references, **68 highly relevant citations were used to produce this evidence briefing**. 14 additional papers were considered to be 'of interest' and details can be obtained on request.

A further 11 papers about the creation of disaster plans for libraries were retrieved, and while this was not in scope for this work, they may be of interest, and therefore a list of references is available on request.

The National Library of Medicine has produced a bibliography on library roles in disaster preparedness, response, and recovery, which is available here: https://disasterinfo.nlm.nih.gov/dimrc/bibliographydisaster.html

PHE employees may request papers. referred to in this briefing, from libraries@phe.gov.uk

Disclaimer

The information in this report summarises evidence from a literature search - it may not be representative of the whole body of evidence available. Although every effort is made to ensure that the information presented is accurate, articles and internet resources may contain errors or out of date information. No critical appraisal or quality assessment of individual articles has been performed. No responsibility can be accepted for any action taken on the basis of this information.

Key messages

Access to information

Open access to health information is growing, and health literacy skills can impact on health and development (1). 24/7 access to information is increasingly available to health professionals and the general public via digital technologies, such as the Internet, smart phones, and social media (2). However, in times of crisis, power can fail and loss of access to this vital information provides significant challenges to emergency services who need uninterrupted access to inform decision-making (3). Access to timely, accurate, and quality health information for disaster teams is essential, (3, 4), but there is a digital divide with regards to access to this content (2). Free or low-cost Internet-based initiatives can improve access to the medical literature in low income countries, and open access journals are essential to supplying biomedical research at the point of need (5), but information skills training is also required (6). Two academic health sciences libraries describe their experiences of providing emergency electronic journal access to teams during a natural or man-made disaster (7).

Knowledge management

Knowledge management (KM) has proven to be effective in business, but models tend to be process driven, with less focus on outcomes, and therefore are less applicable to global health scenarios (8). However, the potential for KM to support global health is there (9). For example, the Knowledge Management for Global Health (KM4GH) Logic Model is a tool that helps global "*health professionals plan KM activities with the end goal in mind*" (8). Effective data sharing is vital in environments facing crisis, such as disease outbreaks (10). However, in disadvantaged populations, there is often "*limited awareness, uptake, and use of knowledge to inform*" health improvement actions (11). Knowledge brokering (KB) describes the role of an intermediary who connects people who have information/knowledge/skills with someone who does not, so that expertise can be shared, and gaps in knowledge filled. It can play a key role in supporting data sharing, and common elements of KB approaches focus on "*acquiring, adapting, and disseminating knowledge and networking*" (12). It can be difficult bringing scientific evidence to health workers and decision-makers, but empirical research has demonstrated that KB is an effective method of facilitating access to information (13). Librarians are knowledge brokers who can help negotiate the transfer of knowledge and information to disaster teams so that they can make effective decisions and work together with the evidence and produce a more relevant document to inform others (14). In Burkina Faso, West Africa, Canadian and African researchers successfully applied a KB strategy and held two one-day workshops to explore the issues of low research use and develop a strategy to support the Burkinabe context (15). There are "*existing knowledge to action models/frameworks that can help guide knowledge translation to support action*" in less advantaged areas (11). Knowledge

management systems (KMS) have proven to be effective in disaster planning and response, but their success is dependent on acceptance by users of the system, and the availability of resources to maintain the system (16). Members of an emergency response management community of practice used a system of social tagging and social recommender system to facilitate the management and sharing of information resources (17, 18).

Existing programmes/resources

This part of the briefing highlights programmes and resources that are already available to people who are operating in crisis situations, such as natural disasters, man-made disasters, and disease outbreaks.

In the UK, health librarians are volunteering to become involved in international development activities in low income countries, sharing their information skills with librarians (19).

Projects to improve access to information operating in Saharan Africa include Book Aid International (www.bookaid.org/), Health Information for All (www.hifa.org/), INASP (www.inasp.info/en/), Information Training and Outreach Centre for Africa (www.itoca.org/), Phi (Partnerships in Health Information), Health Books International (www.talcuk.org/ - formerly Teaching-aids At Low Cost), Tropical Health and Education Trust (www.thet.org/), and Research4Life (www.research4life.org/) (19).

Evidence Aid (www.EvidenceAid.org) was established after the Indian Ocean tsunami of December 2004. The aim of this resource is to provide a single source of evidence to help inform decision-makers preparing for and responding to disasters (18, 20).

The National Library of Medicine (NLM) "*has a long history of providing health information, training and tools in response to disasters*", but in 2008, they launched their Disaster Information Management Research Center (disaster.nlm.nih.gov/), to help libraries and librarians are trained and prepared to respond to information needs following disasters. This resource includes Disaster Lit®: the Resource Guide for Disaster Medicine and Public Health; a database of open access links to disaster medicine and public health documents available on the Internet at no cost (21-27). In addition to this resource, NLM has also "*joined forces with the Pan American Health Organization/World Health Organization, the United Nations International Strategy for Disaster Reduction, and the Regional Center of Disaster Information for Latin America and the Caribbean (CRID)*". Together, they aim to support libraries and information centres in Central America, and improve access to health and disaster information, by developing the Central American Network for Disaster and Health Information (www.cridlac.org/ing/proyecto_ing.html) (28).

Another initiative from NLM and health sciences publishers is the Emergency Access Initiative (EAI) (eai.nlm.nih.gov/docs/captcha/test.pl?url=), which was set up following the experiences of libraries struggling "*to provide relief workers with health information resources and services*". This service is provided to healthcare professionals and libraries following a disaster affecting a region of the United States or throughout the world. It is only active when a disaster event is named and the access period specified (29).

The International Federation of Library Associations and Institutions (www.ifla.org) drafted the "*Principles of Engagement* (*to be used by IFLA and its members in library-related activities of disaster risk reduction and in times of conflict, crisis or natural disaster*" www.ifla.org/publications/ifla-principles-of-engagement-in-library-related-activities-in-times-of-conflict-crisis) (30).

In 2004, the collaboratively written web-based encyclopaedia, Wikipedia formed a group called WikiProject Medicine, which aims to improve Wikipedia's health-related entries. Health professionals are encouraged to edit the medical content on Wikipedia, "*with the goal of providing people with free access to reliable, understandable, and up-to-date health information*" (31).

In other areas, wiki spaces have be used to create portals linking to housing disaster news, and information resources (32).

Roles of libraries, librarians, and knowledge brokers

Twelve per cent of papers looked at the role of libraries, librarians, and knowledge brokers, in supporting disaster management teams.

Global health crises give rise to new information needs, and librarians have the necessary skills to support those needs (33, 34). Public libraries, in particular, are in a position to be able to provide access to essential health information and technology, and therefore they should be encouraged to prepare robust disaster plans so that they can support the public in times of crisis (35).

Some academic health sciences actively build collaborative partnerships with other libraries to support their institutions' global health activities (36). The role of a Global Health Informationist includes provision of relevant information skills training and supporting material to students prior to their departure to overseas global health projects. "*Predeparture training gives the informationist and the library the opportunity to provide awareness of a broader field of global health information resources*" (37, 38).

However, providing information services in emergency settings requires awareness of local context, such as cultural sensitivities, fears, insecurities, and inequity in literacy levels within the affected community (39). Following a catastrophic natural

disaster, one medical school library developed a disaster and emergency planning outreach workshop, focussing on selected databases of the National Library of Medicine, such as (Haz-Map®, Household Products®, Toxtown®, Toxmap®, and MedlinePlus®), and development of personal disaster plans (40).

Librarians and information professionals can participate and provide support to local citizens and disaster teams in various ways, including, but not limited to, information provision.

"*Disasters can and do happen anywhere, and library clients' information needs change suddenly during community-wide disasters*" (41). Public libraries are community institutions which can contribute to community resilience (42). They are well situated to partner with emergency management and other agencies to meet community needs pre and post disasters (43). During times of disaster, in addition to information provision, they can also provide practical services, such as being a charging station, warming centre, and meeting point (44, 45).

In times of disaster, access to the necessary information can be restricted, and lead to failure in rescue attempts (46). Usual practices can often not be applied due to numbers of people requiring assistance, and barriers to resources (6, 47). Librarians can also be on hand to provide practical support, particularly within hospitals, where additional physical support and/or pastoral care can relieve some of the pressures faced by disaster teams (48, 49).

Within health libraries, the Disaster Information Specialist is a new role that is emerging. It is not just about preserving and protecting collections, and ensuring continuity of service following disasters. It is about "*providing information services to emergency managers and other disaster workers*", and being involved in disaster planning activities (50, 51).

Another area where librarians can support disaster management is communication. Responsible communication is vital during periods of disruption, and libraries have the resources and networks to communicate effectively to the masses (45, 52-54).

With adequate training in disaster planning, information professionals can become valuable members of a disaster management team (55-57). Librarians can teach information literacy skills (58), ensuring that public health professionals are equipped to make evidence-based decisions in emergency situations.

Social media

Social media, such as blogs, social networks, Twitter, Facebook, collaborative workspaces, and other online communities, play a key role in sharing and communicating vital information about natural disasters and other public crises (59-61). There are three particular ways by which social media can be used effectively in

global health protection: information dissemination, disease surveillance, by monitoring real-time data (62, 63), and communicating with the general public (64).

Evidence shows that Twitter is an effective resource for disseminating information about global health crises, such as climate change, natural disasters, and oil drilling (65). Health professionals use Twitter to fight the battle against antimicrobial resistance in Africa. They "*network and connect with worldwide experts, obtain real-time news from medical conferences, participate in live Twitter chats conducted by experts or medical organisations, or participate in international journal clubs*" (66).

Conclusion

Library and information centres have a very important role to play in terms of providing support during, and after disasters, disease outbreaks, and general global health (67). Not only from a practical point of view, by providing a safe place for rescued citizens, but also by supporting disaster teams, providing them with the best evidence to inform decision-making, and acting as knowledge brokers to ensure relevant knowledge and information is being shared effectively. By providing quick and easy access to those looking for reliable information about what to do in an emergency, libraries can demonstrate their position as a primary and valuable source of trustworthy information (68). To ensure effectiveness in this supporting role, information professionals may benefit from training in disaster planning, and management of disease outbreaks (41).

What is the evidence around knowledge and library service provision and knowledge management to support global health, and disaster and emergency preparedness?

Appendix 1: Endnote Library matrix showing the highly relevant papers with key information

Author	Year	Title	Main theme	Crisis type	Geographical location
Leidig, M.; Teeu...	2015	Quantifying and mapping global data poverty	Access to information	Natural disasters	UK
Seppanen, H.; Vir...	2015	Shared situational awareness and information quality in disaster management	Access to information	Natural disasters	Finland
Doughty, K.; Rot...	2010	Low-income countries' orthopaedic information needs: challenges and opportunities	Access to information	Global health	Low and middle-income countries
United Nations E...	2010	Health literacy and the Millennium Development Goals: United Nations Economic and Social Council (ECOS...	Access to information	Global health	Not specified
Young, Chris; Law...	2009	Providing Access to Electronic Journals in the Face of a Natural Disaster: The Experience of Two Libraries	Access to information	Natural disasters	USA
Lindberg, D. A.; H...	2008	Rising expectations: access to biomedical information	Access to information	Any	USA
Cheeseborough, ...	2015	Getting involved in international development activities: UK initiatives and hidden benefits	Existing programmes/resources	Not specified	UK
Allen, C.	2014	A resource for those preparing for and responding to natural disasters, humanitarian crises, and major heal...	Existing programmes/resources	Natural disasters - tsunami	Indian Ocean
Lalla, N. J.	2014	NLM Disaster Information Management Research Center	Existing programmes/resources	Natural disasters	USA
Love, Cynthia B.; ...	2014	National Library of Medicine Disaster Information Management Research Center: Achieving the vision, 20...	Existing programmes/resources	Natural disasters	USA
Mallery, Mary	2014	Tech Services on the Web: Disaster Information Resources for Libraries http://nnlm.gov/mar/emergency....	Existing programmes/resources	Natural disasters	USA
Love, Cynthia B.; ...	2013	National Library of Medicine Disaster Information Management Research Center: Establishment and grow...	Existing programmes/resources	Natural disasters	USA
Schell, Mary Beth	2013	Disseminating Disaster Health Information: Three Trial Projects	Existing programmes/resources	Natural disasters	USA
International Fed...	2012	IFLA principles of engagement in library-related activities of disaster risk reduction and in times of conflic...	Existing programmes/resources	Any	Not specified
Heilman, J. M.; K...	2011	Wikipedia: a key tool for global public health promotion	Existing programmes/resources	Global health	Canada
Moore, Mary; Bu...	2011	Libraries and Publishers Respond to Disaster with Groundbreaking Collaboration	Existing programmes/resources	Natural disasters	Several
	2010	NLM® resources support information needs of Haiti earthquake medical response	Existing programmes/resources	Natural disasters - earthqu...	Haiti
Koustova, Helen	2010	Disaster Information Management Research Center (DIMRC): A Gateway to Disaster Information Resources	Existing programmes/resources	Natural disasters	USA
Clarke, M.	2008	Evidence Aid - from the Asian tsunami to the Wenchuan earthquake	Existing programmes/resources	Natural disasters	Several
Hochstein, C.; Ar...	2008	Selected resources for emergency and disaster preparedness and response from the United States Nation...	Existing programmes/resources	Any	USA
Arnesen, S. J.; Cid...	2007	The Central American Network for Disaster and Health Information	Existing programmes/resources	Natural disasters	USA
Chretien, J. P.; Ri...	2016	Make Data Sharing Routine to Prepare for Public Health Emergencies	Knowledge management	Outbreaks	Several
Van Eerd, D.; Ne...	2016	Knowledge brokering for healthy aging: a scoping review of potential approaches	Knowledge management	Global health	Canada
Dagenais, C.; So...	2015	Collaborative development and implementation of a knowledge brokering program to promote research ...	Knowledge management	Global health	Africa
Davison, C.; Ndu...	2015	Critical examination of knowledge to action models and implications for promoting health equity	Knowledge management	Global health	Not specified
Ohkubo, Saori; H...	2015	Conceptualising a New Knowledge Management Logic Model for Global Health: A Case-Study Approach	Knowledge management	Global health	Several
Reyers, B.; Nel, J....	2015	Navigating complexity through knowledge coproduction: Mainstreaming ecosystem services into disaster ...	Knowledge management	Natural disasters	South Africa
Sullivan, T. M.; Li...	2015	Leveraging the power of knowledge management to transform global health and development	Knowledge management	Global health	Asia
Raman, Murali; K...	2014	Knowledge Management Systems and Disaster Management in Malaysia: An Action Research Approach	Knowledge management	Natural disasters	Malaysia
Hamel, N.; Schre...	2011	Unpacking capacity to utilize research: A tale of the Burkina Faso public health association	Knowledge management	Global health	Low and middle-income countries

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Author	Year	Title	Main theme	Crisis type	Geographical location
Turoff, Murray; ...	2008	Assessing the health information needs of the emergency preparedness and management community	Knowledge management	Any	Not specified
Tu-Keefner, Feili;...	2017	Health Information Services and Technology Access during and after a Disaster: Lessons Learned by Public ...	Role of libraries	Natural disasters - flooding	USA
Varheim, Andreas;	2017	Public libraries, community resilience, and social capital	Role of libraries	Not specified	Sweden
Garvey, Maureen...	2015	Serving A Public Library Community After A Natural Disaster: Recovering From "Hurricane Sandy"	Role of libraries	Natural disasters	USA
Thatcher, Andre...	2015	An investigation into the impact of information behaviour on information failure: The Fukushima Daiichi n...	Role of libraries	Man-made disasters	Japan
Devereaux, A. V.;...	2014	Engagement and education: Care of the critically ill and injured during pandemics and disasters: CHEST con...	Role of libraries	Any	USA
Hagar, C;	2014	The US public library response to natural disasters: A whole community approach	Role of libraries	Natural disasters	USA
Lackey, M.; Swog...	2014	Building capacity in a health sciences library to support global health projects	Role of libraries	Not specified	USA
Rana, G. K.	2014	Information empowerment: Informationist-led training for University of Michigan's predeparture students	Role of libraries	Global health	USA
Rana, Gurpreet K.	2014	Information empowerment: predeparture resource training for students in global health	Role of libraries	Global health	USA
Donahue, Amy E.;...	2013	New roles for hospital librarians: a benchmarking survey of disaster management activities	Role of libraries	Natural disasters	USA
Marcella, Rita; Pir...	2013	The information seeking behaviour of oil and gas industry workers in the context of health, safety and em...	Role of libraries	Man-made disasters	UK
Rattan, Pardeep	2013	Role of Library and Information Centres In Disaster Management	Role of libraries	Any	Not specified
Featherstone, Ro...	2012	The Disaster Information Specialist: An Emerging Role for Health Librarians	Role of libraries	Natural disasters	Canada
Swanson, Joe; W...	2012	Disaster and Emergency Planning Outreach Workshops: National Library of Medicine Consumer Health Dat...	Role of libraries	Natural disasters	USA
Kanyengo, Brend...	2011	Information Provision in Emergency Settings: The Experience of Refugee Communities in Zambia	Role of libraries	Man-made disasters	Zambia
Zach, Lisl	2011	What Do I Do in an Emergency? The Role of Public Libraries in Providing Information During Times of Crisis	Role of libraries	Any	Not specified
Murphy, M. W.; I...	2010	Postdisaster health communication and information sources: the Iowa flood scenario	Role of libraries	Natural disasters - flooding	USA
Wilson, Virginia	2010	Public Libraries Can Play an Important Role in the Aftermath of a Natural Disaster	Role of libraries	Natural disasters	USA
Zach, Lisl; McKni...	2010	Innovative Services Improvised During Disasters: Evidence-Based Education Modules to Prepare Students...	Role of libraries	Natural disasters	USA
Murphy, J.	2009	Global health: Where are things heading? and what does this mean for health information professionals?: I...	Role of libraries	Global health	UK
Cobus, L.	2008	Integrating information literacy into the education of public health professionals: roles for librarians and t...	Role of libraries	Global health	USA
Cretikos, M.; East...	2008	Household disaster preparedness and information sources: Rapid cluster survey after a storm in New Sout...	Role of libraries	Natural disasters - storms	Australia
Featherstone, R. ...	2008	Library roles in disaster response: an oral history project by the National Library of Medicine	Role of libraries	Any	USA
Murphy, J.	2008	Globalization: implications for health information professionals	Role of libraries	Not specified	UK
Oelschlegel, Sandy	2008	Emergency Preparedness and the Role of Information Services	Role of libraries	Any	USA
van der Haar, S.; ...	2008	Towards a model for team learning in multidisciplinary crisis management teams	Role of libraries	Any	Netherlands
Cretikos, M. A.; ...	2007	Mitigating the health impacts of a natural disaster - The June 2007 long-weekend storm in the Hunter reg...	Role of libraries	Natural disasters - storms	Australia
McKnight, Miche...	2007	Choices in Chaos: Designing Research into Librarians' Information Services Improvised During a Variety of ...	Role of libraries	Natural disasters	USA
O'Sullivan, T. L.; ...	2007	Are we ready? Evidence of support mechanisms for Canadian health care workers in multi-jurisdictional e...	Role of libraries	Outbreaks	Canada

Thomas, Tracey L...	2016	Providing Health Consumers with Emergency Information: A Systematic Review of Research Examining S...	Social media	Any	USA
Cody, E. M.; Reag...	2015	Climate change sentiment on Twitter: An unsolicited public opinion poll	Social media	Any	Not specified
Goff, D. A.; Van ...	2015	Twitter: A tool to improve healthcare professionals' awareness of antimicrobial resistance and antimicrobi...	Social media	Outbreaks	Africa
Wukich, C.	2015	Social media use in emergency management	Social media	Not specified	USA
Yates, Christine; ...	2015	Citizens and social media in times of natural disaster: exploring information experience	Social media	Natural disasters	Australia
St Louis, C.; Zorlu...	2012	Can Twitter predict disease outbreaks?	Social media	Outbreaks	UK
Yates, Dave; Paq...	2011	Emergency knowledge management and social media technologies: A case study of the 2010 Haitian earth...	Social media	Natural disasters	USA
Chew, C.; Eysenb...	2010	Pandemics in the age of Twitter: Content analysis of tweets during the 2009 H1N1 outbreak	Social media	Outbreaks	Not specified

This EndNote library can be obtained on request.

Appendix 2: Statistical overview of papers

Type of crisis	No of papers	% of papers
Any	13	19
Global health	13	19
Man-made disasters	3	4
Natural disasters	30	43
Not specified	5	7
Outbreaks	5	7

Theme	No of papers	% of papers
Access to information	6	9
Existing programmes/resources	15	22
Knowledge management	10	15
Roles	29	43
Social media	8	12

Appendix 3: Example search strategy

1   exp Global Health/

2   global health.tw.

3   world health.tw.

4   exp Disasters/

5   exp Civil Defense/

6   disaster*.tw.

7   emergency preparedness.tw.

8   or/1-7

9   exp Information Services/

10   information cent*.tw.

11   exp Libraries/

12   library.tw.

13   libraries.tw.

14   librarian*.tw.

15   exp Library Services/

16   exp Librarians/

17   knowledge manager*.tw.

18   knowledge broker*.tw.

19   exp Information Dissemination/

20   or/9-19

21   exp Access to Information/

22   exp Knowledge Management/

23   exp Information Literacy/

24   exp Library Science/

25   patient information.tw.

26   exp Consumer Health Information/

27   knowledge translation.tw.

28   knowledge transfer.tw.

29   knowledge intermediar*.tw.

30   or/21-29

31   8 and 20 and 30

32   limit 28 to (english language and yr="2007 -Current")

References

1. United Nations Economic and Social Council. Health literacy and the Millennium Development Goals: United Nations Economic and Social Council (ECOSOC) regional meeting background paper (abstracted). Journal of Health Communication. 2010;15 Suppl 2:211-23.

2. Leidig M, Teeuw RM. Quantifying and mapping global data poverty. PLoS ONE. 2015;10 (11) (no pagination)(e0142076).

3. Lindberg DA, Humphreys BL. Rising expectations: access to biomedical information. Yearbook of Medical Informatics. 2008:165-72.

4. Seppanen H, Virrantaus K. Shared situational awareness and information quality in disaster management. Safety Science. 2015;77:112-22.

5. Doughty K, Rothman L, Johnston L, Le K, Wu J, Howard A. Low-income countries' orthopaedic information needs: challenges and opportunities. Clinical Orthopaedics & Related Research. 2010;468(10):2598-603.

6. Devereaux AV, Tosh PK, Hick JL, Hanfling D, Geiling J, Reed MJ, et al. Engagement and education: Care of the critically ill and injured during pandemics and disasters: CHEST consensus statement. Chest. 2014;146:e118S-e33S.

7. Cheeseborough J, Godbolt S, Grant MJ. Getting involved in international development activities: UK initiatives and hidden benefits. Health Information & Libraries Journal. 2015;32(1):1-4.

8. Young C, Lawrence JC, Robinson-Bontrager K. Providing Access to Electronic Journals in the Face of a Natural Disaster: The Experience of Two Libraries. Journal of Electronic Resources in Medical Libraries. 2009;6(1):49-54.

9. Turoff M, Hiltz SR. Assessing the health information needs of the emergency preparedness and management community. Information Services & Use. 2008;28(3/4):269-80.

10. Allen C. A resource for those preparing for and responding to natural disasters, humanitarian crises, and major healthcare emergencies. Journal of Evidence-Based Medicine. 2014;7(4):234-7.

11. Ohkubo S, Harlan SV, Ahmed N, Salem RM. Conceptualising a New Knowledge Management Logic Model for Global Health: A Case-Study Approach. Journal of Information & Knowledge Management. 2015;14(2):-1.

12. Sullivan TM, Limaye RJ, Mitchell V, D'Adamo M, Baquet Z. Leveraging the power of knowledge management to transform global health and development. Global Health: Science and Practice. 2015;3(2):150-62.

13. Chretien JP, Rivers CM, Johansson MA. Make Data Sharing Routine to Prepare for Public Health Emergencies. PLoS Med. 2016;13(8):e1002109.

14. Davison C, Ndumbe-Eyoh S, Clement C. Critical examination of knowledge to action models and implications for promoting health equity. International Journal for Equity in Health. 2015;14(49):(29 May 2015)-(29 May).

15. Van Eerd D, Newman K, DeForge R, Urquhart R, Cornelissen E, Dainty KN. Knowledge brokering for healthy aging: a scoping review of potential approaches. Implementation Science. 2016;11(1):140.

16.   Hamel N, Schrecker T. Unpacking capacity to utilize research: A tale of the Burkina Faso public health association. Social Science & Medicine. 2011;72(1):31-8.

17.   Dagenais C, Some TD, Boileau-Falardeau M, McSween-Cadieux E, Ridde V. Collaborative development and implementation of a knowledge brokering program to promote research use in Burkina Faso, West Africa. Global health action. 2015;8:26004.

18.   Raman M, Kuppusamy MV, Dorasamy M, Nair S. Knowledge Management Systems and Disaster Management in Malaysia: An Action Research Approach. Journal of Information & Knowledge Management. 2014;13(1):1450003-1--15.

19.   Reyers B, Nel JL, O'Farrell PJ, Sitas N, Nel DC. Navigating complexity through knowledge coproduction: Mainstreaming ecosystem services into disaster risk reduction. Proceedings of the National Academy of Sciences of the United States of America. 2015;112(24):7362-8.

20.   Clarke M. Evidence Aid - from the Asian tsunami to the Wenchuan earthquake. Journal of Evidence-based Medicine. 2008;1(1):9-11.

21.   Love CB, Arnesen SJ, Phillips SJ, Windom RE. National Library of Medicine Disaster Information Management Research Center: Achieving the vision, 2010-2013. Information Services & Use. 2014;34(1/2):149-70.

22.   Love CB, Arnesen SJ, Phillips SJ. National Library of Medicine Disaster Information Management Research Center: Establishment and growth, 2008-2010. Information Services & Use. 2013;33(4):273-98.

23.   Lalla NJ. NLM Disaster Information Management Research Center. Choice: Current Reviews for Academic Libraries. 2014;51(12):2219-20.

24.   Mallery M. Tech Services on the Web: Disaster Information Resources for Libraries http://nnlm.gov/mar/emergency.html. Technical Services Quarterly. 2014;31(1):82-3.

25.   NLM® resources support information needs of Haiti earthquake medical response. NLM Technical Bulletin. 2010(372):39-40.

26.   Koustova H. Disaster Information Management Research Center (DIMRC): A Gateway to Disaster Information Resources. Journal of Electronic Resources in Medical Libraries. 2010;7(4):326-35.

27.   Hochstein C, Arnesen S, Goshorn J, Szczur M. Selected resources for emergency and disaster preparedness and response from the United States National Library of Medicine. Medical Reference Services Quarterly. 2008;27(1):1-20.

28.   Arnesen SJ, Cid VH, Scott JC, Perez R, Zervaas D. The Central American Network for Disaster and Health Information. Journal of the Medical Library Association. 2007;95(3):316-22.

29.   Moore M, Burrows S, Collins M, Roderer N. Libraries and Publishers Respond to Disaster with Groundbreaking Collaboration. Journal of Electronic Resources in Medical Libraries. 2011;8(1):54-62.

30.   International Federation of Library Associations and Institutions. IFLA principles of engagement in library-related activities of disaster risk reduction and in times of conflict, crisis or natural disaster. Den Haag: The Netherlands: 2012.

31.   Heilman JM, Kemmann E, Bonert M, Chatterjee A, Ragar B, Beards GM, et al. Wikipedia: a key tool for global public health promotion. Journal of Medical Internet Research. 2011;13(1):e14.

32.   Schell MB. Disseminating Disaster Health Information: Three Trial Projects. Journal of Hospital Librarianship. 2013;13(3):291-7.

33.   Murphy J. Global health: Where are things heading? and what does this mean for health information professionals?: International perspectives and initiatives. Health Information and Libraries Journal. 2009;26(4):336-40.

34.   Murphy J. Globalization: implications for health information professionals. Health Information & Libraries Journal. 2008;25(1):62-8.

35.   Tu-Keefner F, Liu J, Hartnett E, Hastings SK. Health Information Services and Technology Access during and after a Disaster: Lessons Learned by Public Librarians in South Carolina. Journal of Consumer Health on the Internet. 2017;21(1):26-39.

36.   Lackey M, Swogger S, McGraw KA. Building capacity in a health sciences library to support global health projects. Journal of the Medical Library Association. 2014;102(2):92-5.

37.   Rana GK. Information empowerment: Informationist-led training for University of Michigan's predeparture students. Annals of Global Health. 2014;80 (3):175.

38.   Rana GK. Information empowerment: predeparture resource training for students in global health. Journal of the Medical Library Association. 2014;102(2):101-4.

39.   Kanyengo BK, Kanyengo CW. Information Provision in Emergency Settings: The Experience of Refugee Communities in Zambia. Behavioral & Social Sciences Librarian. 2011;30(4):246-58.

40.   Swanson J, Welmaker RB, Arango XE. Disaster and Emergency Planning Outreach Workshops: National Library of Medicine Consumer Health Databases and Disaster Preparedness. Journal of Consumer Health on the Internet. 2012;16(2):170-9.

41.   McKnight M, Zach L. Choices in Chaos: Designing Research into Librarians' Information Services Improvised During a Variety of Community-Wide Disasters in order to Produce Evidence-Based Training Materials for Librarians. Evidence Based Library & Information Practice. 2007;2(3):59-75.

42.   Varheim A. Public libraries, community resilience, and social capital. Information Research. 2017;22(1).

43.   Hagar C. The US public library response to natural disasters: A whole community approach. Open Journal Systems. 2014;21(1).

44.   Garvey MM. Serving A Public Library Community After A Natural Disaster: Recovering From "Hurricane Sandy". Journal of the Leadership & Management Section. 2015;11(2):22-31.

45.   Wilson V. Public Libraries Can Play an Important Role in the Aftermath of a Natural Disaster. Evidence Based Library & Information Practice. 2010;5(3):59-61.

46.   Thatcher A, Vasconcelos AC, Ellis D. An investigation into the impact of information behaviour on information failure: The Fukushima Daiichi nuclear

power disaster. International Journal of Information Management. 2015;35(1):57-63.

47. Marcella R, Pirie T, Rowlands H. The information seeking behaviour of oil and gas industry workers in the context of health, safety and emergency response: a discussion of the value of models of information behaviour. Information Research. 2013;18(3):2-.

48. Donahue AE, Featherstone RM. New roles for hospital librarians: a benchmarking survey of disaster management activities. Journal of the Medical Library Association. 2013;101(4):315-8.

49. O'Sullivan TL, Amaratunga CA, Hardt J, Dow D, Phillips KP, Corneil W. Are we ready? Evidence of support mechanisms for Canadian health care workers in multi-jurisdictional emergency planning. Canadian Journal of Public Health Revue Canadienne de Sante Publique. 2007;98(5):358-63.

50. Featherstone RM. The Disaster Information Specialist: An Emerging Role for Health Librarians. Journal of Library Administration. 2012;52(8):731-53.

51. Featherstone RM, Lyon BJ, Ruffin AB. Library roles in disaster response: an oral history project by the National Library of Medicine. Journal of the Medical Library Association. 2008;96(4):343-50.

52. Murphy MW, Iqbal S, Sanchez CA, Quinlisk MP. Postdisaster health communication and information sources: the Iowa flood scenario. Disaster Medicine & Public Health Preparedness. 2010;4(2):129-34.

53. Cretikos M, Eastwood K, Dalton C, Merritt T, Tuyl F, Winn L, et al. Household disaster preparedness and information sources: Rapid cluster survey after a storm in New South Wales, Australia. BMC Public Health. 2008;8:195.

54. Cretikos MA, Merritt TD, Main K, Eastwood K, Winn L, Moran L, et al. Mitigating the health impacts of a natural disaster - The June 2007 long-weekend storm in the Hunter region of New South Wales. Medical Journal of Australia. 2007;187(11-12):670-3.

55. Zach L, McKnight M. Innovative Services Improvised During Disasters: Evidence-Based Education Modules to Prepare Students and Practitioners for Shifts in Community Information Needs. Journal of Education for Library & Information Science. 2010;51(2):76-85.

56. Oelschlegel S. Emergency Preparedness and the Role of Information Services. Tennessee Libraries. 2008;58(2):1-3.

57. van der Haar S, Jehn KA, Segers M. Towards a model for team learning in multidisciplinary crisis management teams. International Journal of Emergency Management. 2008;5(3-4):195-208.

58. Cobus L. Integrating information literacy into the education of public health professionals: roles for librarians and the library. Journal of the Medical Library Association. 2008;96(1):28-33.

59. Thomas TL, Schrock C, Friedman DB. Providing Health Consumers with Emergency Information: A Systematic Review of Research Examining Social Media Use During Public Crises. Journal of Consumer Health on the Internet. 2016;20(1/2):19-40.

60. Yates C, Partridge H. Citizens and social media in times of natural disaster: exploring information experience. Information Research. 2015;20(1):298-314.

61. Yates D, Paquette S. Emergency knowledge management and social media technologies: A case study of the 2010 Haitian earthquake. International Journal of Information Management. 2011;31(1):6-13.

62. St Louis C, Zorlu G. Can Twitter predict disease outbreaks? BMJ (Online). 2012;344 (7861) (no pagination)(e2353).

63. Chew C, Eysenbach G. Pandemics in the age of Twitter: Content analysis of tweets during the 2009 H1N1 outbreak. PLoS ONE. 2010;5 (11) (no pagination)(e14118).

64. Wukich C. Social media use in emergency management. Journal of Emergency Management. 2015;13(4):281-94.

65. Cody EM, Reagan AJ, Mitchell L, Dodds PS, Danforth CM. Climate change sentiment on Twitter: An unsolicited public opinion poll. PLoS ONE. 2015;10 (8) (no pagination)(e0136092).

66. Goff DA, Van Den Bergh D. Twitter: A tool to improve healthcare professionals' awareness of antimicrobial resistance and antimicrobial stewardship. South African Medical Journal. 2015;105(5):427-30.

67. Rattan P. Role of Library and Information Centres In Disaster Management. Library Philosophy & Practice. 2013:1-10.

68. Zach L. What Do I Do in an Emergency? The Role of Public Libraries in Providing Information During Times of Crisis. Science & Technology Libraries. 2011;30(4):404-13.