Being evidence based in library and information practice
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Being evidence based in library and information practice

Edited by
Denise Koufogiannakis
and Alison Brettle
Contents

List of figures and tables..................................................................................vii
Contributors .......................................................................................................ix

PART 1  BACKGROUND AND MODEL ...............................................................1
  1 Introduction ..................................................................................................3
      Denise Koufogiannakis and Alison Brettle
  2 A new framework for EBLIP .................................................................11
      Denise Koufogiannakis and Alison Brettle
  3 Articulate ....................................................................................................19
      Alison Brettle and Denise Koufogiannakis
  4 Assemble ....................................................................................................27
      Denise Koufogiannakis and Alison Brettle
  5 Assess ........................................................................................................45
      Alison Brettle and Denise Koufogiannakis
  6 Agree ..........................................................................................................59
      Denise Koufogiannakis and Alison Brettle
  7 Adapt ..........................................................................................................71
      Alison Brettle and Denise Koufogiannakis
PART 2 EBLIP IN ACTION .................................................................79
  8 Practitioner-researchers and EBLIP ..............................................81
      Virginia Wilson
  9 Academic libraries ......................................................................93
      Mary M. Somerville and Lorie A. Kloda
 10 Public libraries .........................................................................105
      Pam Ryan and Becky Cole
 11 Health libraries .........................................................................121
      Jonathan D. Eldredge, Joanne Gard Marshall, Alison Brettle,
      Heather N. Holmes, Lotta Haglund and Rick Wallace
 12 School libraries .........................................................................133
      Carol A. Gordon
 13 Special libraries .........................................................................151
      Bill Fisher
 14 Conclusion ..............................................................................165
      Denise Koufogiannakis and Alison Brettle

References ......................................................................................171

Index ................................................................................................205
Figures and tables

Figures
2.1 Bringing the evidence sources together .................................................................13
2.2 A cyclical illustration of EBLIP ..............................................................................14
2.3 Key questions a practitioner should ask ..............................................................16
6.1 Influences on effective decision making .............................................................60
12.1 The learning-centric school library .................................................................135
12.2 Evidence-based practice in school librarianship ..............................................138
12.3 The action research cycle ..................................................................................145
12.4 The collaboration spiral .....................................................................................145
12.5 Model of the information search process .........................................................146
12.6 The 3D library learning site ...............................................................................146

Tables
2.1 Elements of the EBLIP process ............................................................................15
3.1 PICO question formulation ...............................................................................21
3.2 SPICE question formulation ..............................................................................22
4.1 Types of research evidence ...............................................................................31
4.2 Types of local evidence ......................................................................................34
4.3 Types of professional knowledge ....................................................................39
4.4 Methods for gathering evidence ......................................................................42
5.1 LIS example of the TAPUPAS assessment of evidence .....................................55
VIII  BEING EVIDENCE BASED IN LIBRARY AND INFORMATION PRACTICE

6.1  Choo’s four modes of organizational decision making (2006) ..................66
7.1  Stages for changing and maintaining information literacy practice ........77
8.1  Practitioner-researcher process compared to EBLIP process ................88
Contributors

Alison Brettle BA(Hons) MSc PhD is a Reader in Evidence Based Practice and Director of Post Graduate Research in the School of Nursing, Midwifery and Social Work Research at the University of Salford, UK. She has specialist expertise in literature searching, systematic review methodology, evidence based practice and the evaluation of health information services; pioneering the use of systematic reviews in library and information practice. Most recently she has published a systematic scoping review on the value, effectiveness and impact of trained library and information professionals on behalf of CILIP. She has over 20 years’ experience of health, social care and library related research and teaching environments, and has led and supported a wide range of projects, published extensively and developed a PhD by Published Works Programme at the University of Salford. She has been involved with the open access professional journal, Evidence Based Library and Information Practice, since its inception ten years ago, and is on the International Programme Committee of the International EBLIP Conference series. As an active member of CILIP, she leads awards and prizes on behalf of the Library and Information Research Group.

Becky Cole BA (Hons) MLitt MA PhD is a Learning Partnerships Coordinator at Northumbria University in the UK. She has a specialist interest in evidence based practice and the evaluation of public library services developed during seven years working at Newcastle Libraries. After reading English Literature at Newcastle University where she achieved a BA (Honours), MLitt and PhD, she began her LIS
career in 2008. In 2010 she was appointed to the post of Trainee Library and Information Officer – the only dedicated role of its kind in the UK – and in the same year gained an Information & Library Management MA from Northumbria University with distinction. In 2012 she began working as a Library and Information Officer at Newcastle where she was asked to create an Evaluation Toolkit to collect, store and present rich evidence of impact. Her work in this area is documented in CILIP Update (June 2014) and Evidence Based Library and Information Practice (Vol. 9, No. 4, 2014). In 2013 she was appointed Project Officer: Digital Inclusion at Newcastle City Council and in 2014 secured a research bursary from the CILIP Information Literacy Group to pursue her work. In 2015 she presented her research at the LILAC, CILIP and i3 Conferences; published a project report in the Journal of Information Literacy (Vol. 9, No. 1, 2015) and was nominated for the UKeiG Early Career Award. She is a member of the Program Committee for the 9th International EBLIP Conference (2017).

Jonathan D. Eldredge BA (Hons) MLS MA PhD is an Associate Professor at the University of New Mexico. His primary appointment is in the Health Sciences Library and Informatics Center with a secondary appointment in the Department of Family & Community Medicine, with the administrative title of Evidence Based and Translational Sciences Collaboration Coordinator. He received his BA with Honors from Beloit College in Wisconsin, his MLS from the University of Michigan’s School of Information, and his MA and PhD in public policy analysis from the University of New Mexico. For years he has enjoyed the challenges of tackling increasingly complex projects. Most of these challenges relate to applied research for the benefit of practitioners with their making informed decisions. Jon has an active research program with over 40 articles published in peer reviewed journals. He led a team that conducted two Delphi studies that defined the Medical Library Association's research agenda; his team subsequently coordinated the pursuit of 15 systematic reviews. He has conducted six randomized controlled trials to date. In 1998 he created and then taught the MLA continuing education course on Evidence Based Library and Information Practice 27 times. At the University of New Mexico he co-directs the three-year longitudinal Evidence Based Practice course for all medical students and co-teaches required courses related to EBP for clinical research, public health, and physician assistant graduate students.

Bill Fisher PhD is a professor with the School of Information at San Jose State University. His teaching areas include management, leadership and the collection/use of specific resources (e.g. business/economics and sports/recreation). He is also an Adjunct Professor at Queensland University of Technology and supervises doctoral students in the joint SJSU/QUT Gateway PhD program.
Carol A. Gordon  MEd MLS EdD is Principal of Gordon Consulting, an international consultancy with a mission to support initiatives that empower educators to develop creative 21st century learning environments and experiences. Her consultancy seeks to bridge research and practice across public, school, and academic libraries. She is Project Researcher for the IMLS Grant, Empowering Public Libraries to become Community Science Centers and she serves as a Faculty Fellow and member of the Advisory Board for an IMLS grant held by the School of Education at Granite State College. She is currently research advisor to a commission created by the Massachusetts legislature to determine the status of school libraries in the Commonwealth. Carol has worked as a secondary school teacher of English, a school librarian, an academic librarian, and a library administrator in public and private schools and universities in the USA and abroad, and as professor of Education at Boston University and professor of Information and Library Science at Rutgers, The State University of New Jersey. She has authored several books, over seventy journal articles, and delivered more than 250 keynotes, presentations, and workshops across the USA and worldwide. Her focus is to optimize teaching and learning through information and technology while building a strong foundation for the development of multiple literacies and knowledge construction. Her approach to reflective practice aims at continuous improvement of teacher and student performance through evidence-based practices.

Lotta Haglund MLIS is Head of Library and Archive at the Swedish School of Sport and Health Sciences, in Stockholm, Sweden since 2012. She has a masters degree in Library and Information Science, and has worked in health sciences libraries since 1992. She is currently the Vice President of the European Association of Health Information and Libraries (EAHIL). Her professional interests include library management, professional development, marketing and communication, as well as evidence-based practice. She was involved in introducing the concept of EBLIP to Swedish librarians, and was responsible for organizing the 5th Evidence Based Library and Information Practice Conference in Stockholm 2009. She has served as an evidence summaries writer, together with David Herron, for the Evidence Based Library and Information Practice Journal for four years.

Heather N. Holmes MLIS AHIP is the Associate Director of Libraries with a faculty appointment of Associate Professor at the Medical University of South Carolina. She received her Master of Library and Information Science degree from the University of Pittsburgh in 1998. She has presented at several international meetings including MLA and the Alliance for Continuing Medical Education (ACME) and was invited to the International Congress on Medical Librarianship (ICML) in Brisbane, Australia, in 2009. She is a 2010 recipient of the National Library of Medicine’s biomedical...
informatics fellowship held in Woods Hole, MA, as well as one of Library Journal's 'Movers & Shakers' for 2011. She is also a Distinguished Member of the Academy of Health Information Professionals and the 2014 recipient of the Lois Ann Colaianni Award for Excellence and Achievement in Hospital Librarianship. She has a vested interest in evidence based library and information practice, and has had an active role in developing and furthering the research behind MLA's research agenda. She is also passionate about clinical librarianship and continues to mentor others who are just breaking into the specialization.

**Lorie A. Kloda** MLIS PhD is Associate University Librarian for Planning and Community Relations at Concordia University in Montreal, Canada. Her interests include the information needs of health professionals, expert searching for systematic reviews, library assessment, and evidence-based practice. Recently, her research has investigated the value of journal club participation by academic librarians and the research output of Canadian library and information studies faculty. Lorie is the Editor in Chief of the open access journal, *Evidence Based Library and Information Practice*.

**Denise Koufogiannakis** MA MLIS PhD is Associate University Librarian at the University of Alberta in Edmonton, Alberta, Canada. In 2013 she received her PhD in Information Studies from Aberystwyth University, Wales, UK. Denise co-founded the open access journal *Evidence Based Library and Information Practice* and has held several editorial positions since the journal's inception in 2006, including Editor-in-Chief from 2009 to 2011. Denise has contributed numerous research papers to the scholarly literature of EBLIP, and has served on the Program Committee of the international EBLIP conference series since 2003. In 2007, Denise was named a 'Mover and Shaker' by Library Journal for her contributions to the evidence based librarianship movement.

**Joanne Gard Marshall** MLS MHSc PhD spent 16 years as a medical librarian before becoming a faculty member at the University of Toronto in 1987. In 1999, she became Dean of the School of Information and Library Science at UNC Chapel Hill. Since 2005 she has been a Distinguished Professor at the University of North Carolina where she has taught courses in health information and research methods and pursued her research interest in health information seeking and use and evidence-based practice. She was principal investigator of the Value of Health Library and Information Services in Patient Care Study funded by the US National Library of Medicine. She is a past president of the Medical Library Association and has received multiple awards from both the Medical Library Association, the Special Libraries Association and the Canadian Health Libraries Association.
Pam Ryan MLIS is the Director, Service Development & Innovation at Toronto Public Library. Previously, she held Director positions at Edmonton Public Library and was an academic librarian at the University of Alberta, most recently as Head, Cameron Science and Technology Library. She has served as President of both the Library Association of Alberta and the Canadian Association of College and University Libraries, and she has been involved in supporting the Evidence Based Library and Information Practice journal since its inception, initially as Production Editor. She is a Sessional Instructor at the School of Library and Information Studies at the University of Alberta, teaching Leadership and Management in the Information Professions, and holds an MLIS from the same institution.

Mary M. Somerville PhD serves as University Librarian for University of the Pacific Libraries in Sacramento, San Francisco, and Stockton, California. Her leadership approach combines participatory design and action research to create workplace learning systems and professional information practices. Information sharing and knowledge creation activities foster informed action and reflective evaluation exercised within co-designed communications systems for using information to learn. Guiding theory and best practices for Informed Systems leadership and collaborative evidence processes are described in Informed Systems: organizational design for learning in action, published in 2015 by Chandos Press, a subsidiary of Elsevier. She also serves as Adjunct Professor in the School of Information Systems, Science and Engineering Faculty, at Queensland University of Technology, in Brisbane, Australia.

Rick Wallace MA MDiv MAOM MPH MSLS EdD AHIP is a Professor and Associate Director at the Quillen College of Medicine Library at East Tennessee State University in Johnson City, Tennessee. He is the author of 24 peer reviewed publications and 113 papers and posters presented at regional and national conferences. He was listed as a ‘Mover and Shaker’ in Library Journal’s first ‘Mover and Shaker’ awards presented in 2002. He has won 10 research awards for posters and papers at professional conferences. He was noted as Academic Librarian of the Year by the Southern Chapter/Medical Library Association in 2003, and in 2013 was awarded the Michael E. DeBakey Library Services Outreach Award for Outstanding Service to Rural or Underserved Communities, a national award presented by the Friends of the National Library of Medicine (FNLM). He won the Project of the Year from the Consortium of Biomedical Libraries of the South (CONBLS) in 2005 and 2011. He was awarded the Exemplary Project of the Year from the Rural Health Association of Tennessee in 2002 and was inducted into Delta Omega, the honorary society of Public Health in 2014. He has received $475,000 in grants and awards and is active in multiple professional groups. He has crafted creative programs with smartphone/PDAs in which 325 PDAs...
were delivered to rural clinicians with training; outreach to rural health professionals that has delivered over 30,000 journal articles; and a consumer health information outreach that trained the public library workforce throughout Tennessee.

**Virginia Wilson** MA MLIS is the Director of the Centre for Evidence Based Library and Information Practice (C-EBLIP) at the University Library, University of Saskatchewan (U of S), Canada. C-EBLIP supports librarians as researchers, promotes evidence based library and information practice, and provides avenues for librarians who conduct research to communicate, collaborate, and share. Her MA in English is from the University of Toronto and her MLIS is from the University of Alberta. She was one of the inaugural co-convenors for the Canadian Library Association's Evidence Based Librarianship Interest Group and created a toolkit on evidence based library and information practice for public libraries. She has written evidence summaries and the EBL 101 column for the journal *Evidence Based Library and Information Practice* and currently writes the Research in Practice column for that journal. She chaired the planning committee for the 7th International Evidence Based Library and Information Practice conference which was held in 2013 at the University of Saskatchewan. She has established a program of research focusing broadly on evidence based library and information practice and conducts research as a faculty member at the U of S. As a working librarian who also conducts research, she strongly believes that practising librarians should be involved in conducting and using research to inform their own practice.
Health libraries

Jonathan D. Eldredge, Joanne Gard Marshall, Alison Brette, Heather N. Holmes, Lotta Haglund and Rick Wallace

Introduction
The historical evidence suggests that the health professions might never have developed EBP had it not been for the development of sophisticated research tools such as PubMed/MEDLINE and the Cochrane Library for identifying authoritative evidence (Eldredge, 2008a). By working with health professionals in using these tools, health librarians were pivotal figures in the development of Evidence Based Medicine (EBM) and the broader EBP movement. From supporting health professionals in EBP, health librarians have gone on to develop and use evidence within their professional practices – EBLIP. This chapter will provide a context for health librarian’s work, describe EBLIP within the health library field and the state of the evidence base, and discuss the types of evidence used by health librarians. Two case studies show how EBLIP has been translated into practice and demonstrate how health librarians continue to push the boundaries of EBLIP. Finally, the future directions for research and EBLIP practice will be considered within a health library context.

The health library context
Health librarians often collaborate with other health professionals in a fast-paced environment that demands high levels of accountability for the accuracy of their work. Any mistakes can result in missed diagnoses, inappropriate treatments, incorrectly trained health professionals (Maggio et al., 2015) or misguided research projects. Many health librarians take years to establish credibility for their expert skills among other
health professionals (Hannigan and Eldredge, 2014). With increasing frequency, health librarians work outside of physical libraries in roles as embedded colleagues, liaisons, clinical librarians, informaticists and informaticians; therefore, throughout this chapter the term health librarian will be used to describe all of these roles.

The context in which health librarians work is continuing to change (Funk, 2013). At one time, the majority of health librarians worked in hospital libraries. Now, in the USA many librarians work in centralized academic health-science centre libraries that co-ordinate access to electronic databases for their users, including health professionals and staff in affiliated hospitals. The National Library of Medicine in the USA co-ordinates outreach and other centralized functions. In the UK, health librarians work in hospitals, academic institutions and, increasingly, throughout other NHS organizations. Collections for NHS staff are centralized and health libraries are monitored and supported by a national Library and Knowledge Service. Health librarians, whether located in hospitals or in academic institutions, play an important collaborative role in health professional education at the undergraduate and graduate levels, as well as providing continuing education for both health librarians and healthcare providers. Some often provide enhanced support for health professionals and researchers, including expert search services.

The changes in the context of librarians’ work are also being prompted by the availability of computers in clinical settings and the rapid adoption of the electronic patient record. Convenient access to technology and the continuing emphasis on evidence-based practice has provided librarians with the opportunity to provide evidence-based information resources at the point of care (Eldredge et al., 2016; Connor, 2007; Alper et al., 2005; Oak and Gegg, 2008). New systems are being created to allow health professionals to access evidence-based resources both inside and outside their institutional settings. Librarians are also playing an important role in linking evidence-based resources to the electronic patient record, with the support of the U.S. National Library of Medicine.¹

Health librarians have taken advantage of the changing context of healthcare provision by forging new roles in varied settings (Brettle and Urquhart, 2012). These include new roles in healthcare quality improvement; as ‘embedded librarians’ or information specialists in particular areas of clinical practice or healthcare research; in collaborations with health professionals and researchers in fields that use information technology to transform healthcare; and in research such as medical informatics, nursing informatics, public health informatics and genomics. Librarians working as subject and technology specialists in particular areas are often called ‘informationists’ or ‘informaticians’. One of the common characteristics of these new roles and settings for librarians is that they all require the librarian to make their own practice decisions, either individually or in groups in an evidence-based manner.
Health librarians and EBLIP

Health librarians are influenced heavily by their context and they have integrated many of the norms, values and standards held by their health professional colleagues, such as EBP, into their practice. Health librarians hold the distinct position among librarians that they not only engage in their own variation of EBP but also provide the evidence sources and the services to make EBP possible for the health professions. As noted in Chapter 1, EBLIP began in health libraries, and a brief, four-page article was published in 1997 in the journal Hypothesis (Eldredge, 1997). Much of the early debate regarding EBLIP and what it was (or wasn’t) was driven forward by health librarians such as Eldredge, who proposed a framework (2000), and Booth, who proposed a definition (2000). As noted in Chapter 5, the framework was heavily modelled on EBM, which is not surprising, given the health-sciences experience of the author of the 1997 article. A later adaptation of the framework sought to help librarians to select the best type of evidence to use, depending on the questions asked (Eldredge, 2002a), and described three research methods employed by health librarians that overlap with most of the other health professions’ higher forms of evidence: cohort studies, RCTs and systematic reviews.

As well as pioneering the notion of EBLIP, health librarians have been key in moving debates about EBLIP forward (although not just in the health field). In the Health Information and Libraries Journal, Booth (2009b) proposed an adaptation of the EBLIP model to one that incorporates wider types of evidence for decision making, and also noted that librarians often make decisions in groups, a model that was taken forward by Koufogiannakis (2013a) and subsequently has been used throughout this book. In her Janet Doe Lecture presented at the 2013 MLA meeting, Joanne Gard Marshall used this model to note the differences between the practice of medicine and librarianship and how EBP is evolving (Marshall, 2014). The research knowledge base in librarianship is smaller with fewer replicated studies than in medicine, making it difficult to apply the same levels of evidence criteria. The nature of the research questions differs as well (Eldredge, 2002a; Eldredge, 2008a). Whereas individual clinicians are using evidence to care for a specific patient, librarians are often dealing with the broader challenges of providing information and library services. Eldredge continued to contribute to the conversation about EBLIP by exploring the deeper potential purposes of EBLIP beyond the obvious one of decision making (Eldredge, 2013a). He also explored how EBLIP can play a key role in renewing librarians’ professional identity (Eldredge, 2014). Brettle examined the roles that health librarians play both within EBP, supporting health professionals, and as evidence-based library and information practitioners (Brettle, 2009a; 2012c; 2013). She expressed disappointment that, despite over 10 years of the evidence-based movement, the majority of health librarians were still focused on supporting EBP within healthcare
through searching and training), rather than on developing their own evidence base for practice or expanding their role into the health domain by using their professional skills among teams of healthcare professionals (Brettle, 2013). An explanation for this was put forward by Spring (2013), who found that when health librarians were asked about their barriers to doing research they reported that they did not know what research questions to ask. Alternatively, if they had research questions, they did not think to engage with the literature or believed that there was no evidence to answer them (Spring, 2013). The examination of the evidence base in the next section, however, suggests that this may be changing.

The EBLIP movement has been supported and is being driven forward by key English-language journals aimed at health librarians. Most appear to have increased their methodological rigour and are emphasizing applied research to support practitioners. For example, the new editor of the *Journal of the Medical Library Association* recently changed the categories of published articles to enable readers to more quickly assess the kinds of evidence that they need (Cooper, 2015). Previously, she had introduced an explicit peer-review process for both research methods articles and brief research reports for *Hypothesis* (Cooper, 2014). *Health Information and Libraries Journal* also has a long history of publishing research articles and has regular columns for systematic reviews and promoting EBLIP. A 2013 editorial celebrated EBLIP by linking it to practice (Wilson and Grant, 2013). The *Journal of the Canadian Health Libraries Association/Journal de l’Association des Bibliothèques de la Santé du Canada (JCHLA/JABSC)* has also begun to categorize its content into ‘Research Articles’, ‘Program Descriptions’ or ‘Review Articles’, which helps practitioners to quickly assess the kinds of evidence provided by each genre of article. Finally, editions of the *Journal of the European Association of Health Information and Libraries* have begun to emphasize and promote applied research (Napolitani, 2015). For many years the more specialized journal *Medical Reference Services Quarterly* has emphasized applied research that practitioners can use in their everyday work. This recent trend of greater amounts of applied rigorous research reports certainly sets the stage for health library literature, providing greater support for EBLIP as well as suggesting that health librarians are becoming more active in the creation of evidence, rather than playing a supportive role (Brettle, 2009a; 2012a).

In the USA, the MLA has long been a supporter of research and EBP by promoting professional competencies (Medical Library Association, 2005a, 2005b), research policies (Grefsheim et al., 2008), research agendas (Eldredge, Harris and Ascher, 2009; Eldredge et al., 2012) and research training. Its research papers and posters are posted online, since many of these projects remain in the realm of grey literature, due to a lack of incentives to publish (Alberani and Pietrangeli, 1995; Chesniak, 2015; Harvey and Wandersee, 2010). In the UK, the Health Libraries Group and CILIP have widely
promoted and supported EBLIP, and EAHIL (European Association for Health Information and Libraries) has supported the movement throughout Europe as well. Sweden hosted the fifth EBLIP conference, and EBLIP has developed within other Nordic countries (Haglund 2010; Haglund et al., 2012), although it has been noted that there may be language barriers preventing a wider spread across Europe (Declève, 2010). EBLIP has also spread to developing countries, including Asia (Eldredge and Ye, 2000; Sakai et al., 2014) and Latin America (Anonymous, 2001; Booth, 2008; Booth and Eldredge, 2010).

The evidence base in health librarianship

While EBP was initially promoted as an opportunity for health librarians to demonstrate their expertise (Medical Library Association, 2005b) and expand their role (Falzon and Booth, 2001; Harris, 2005; McGowan and Sampson, 2005; Palmer, 1996; Scherrer and Dorsch, 1999), through EBLIP, health librarians have developed a strong evidence base to support their own library practice.

Training, literature searches and library services

Systematic reviews by Brettle (2003; 2007) identified the effectiveness of providing training to clinicians, while highlighting a need for more rigorous methods of evaluating the effectiveness of training, such as those later conducted by Gardois et al. (2011), Eldredge et al. (2013a) and Eldredge et al. (2016). Ayre et al. (2015) demonstrated the continued effectiveness and impact of training provision on clinician knowledge and patient care, using post-test surveys across 60 hospital sites in England. A significant body of evidence exists to support the effectiveness, impact and value of performing searches and providing library services to clinicians. This includes systematic reviews (Brettle et al., 2011; Perrier et al., 2014; Wagner and Byrd, 2004; Weightman and Williamson, 2005; Winning and Beverley, 2003), RCTs (McGowan et al., 2008; Mulvaney et al., 2008; and Eldredge et al. 2016) and mixed methods studies (Bartlett and Marshall, 2013; Brettle et al., 2006; Brettle et al., 2007; Marshall et al., 2013; 2014a; 2014b; Urquhart and Hepworth, 1995; Wallace et al., 2014). A systematic scoping review suggests that health librarians impact on clinical decision making by improving patient-centred care, the quality of patient care, risk management and safety, health service development and delivery and the costs and continuing professional development of clinicians (Brettle and Maden, 2015a).
Searching within systematic reviews

Although health librarians may conduct systematic reviews to inform their own practice, more commonly they conduct the searches within systematic reviews for healthcare. Health librarians have been keen to develop the evidence base in this area so that the searching within systematic reviews is built on a strong evidence base. Earlier studies focused on using quantitative techniques to develop and test search filters (Boynton et al., 1998; Brettle et al., 1998; Haynes et al., 1994; Jenkins, 2004; McKibbon et al., 2008; White et al., 2001), while later studies used simple statistical techniques to examine optimum sources to search for systematic reviews (Brettle and Long, 2001; Golder et al., 2008; McDonald, Taylor and Adams, 1999; McNally and Alborz, 2004; Ogilvie et al., 2005a and 2005b). These studies provide an example of health librarians performing a dual role within EBP, where they engage in EBLIP to provide evidence about their practice in EBP.

Types of evidence

Among library sectors, health librarians perhaps retain the closest links with an evidence hierarchy, possibly due to the need to provide evidence in a way accepted by the professionals with whom they work. Health librarians have certainly embraced and are leading the way in conducting systematic reviews. In a review of systematic reviews across LIS, Koufogiannakis and Brettle (2015) identified that 50 out of the total of 82 systematic reviews found were related to health topics, suggesting that health librarians are increasingly undertaking systematic reviews of their own practice. Furthermore, as noted in Case Study 11.1 below, there are a large number of additional health library-related systematic reviews under development (Eldredge et al., 2015b). A systematic scoping review which looked at the impact and effectiveness of health librarians found eight systematic reviews on the topic, so there are some areas where a critical mass of research is being achieved (Brettle and Maden, 2015a).

Use of quantitative study designs goes back much further than the beginning of EBLIP. Health librarians pioneered the cohort study for librarianship, beginning in the 1940s (Postell, 1946), and it became more common among health librarians as a research method for generating needed evidence (Eldredge, 2002b; Eldredge, 2008b). Marshall and Neufeld (1981) pioneered the RCT for librarianship over 35 years ago. A review by Perrier et al. (2014) found 12 RCTs demonstrating the effects of services provided by health libraries, suggesting that this method is becoming increasingly common for providing health librarians with evidence for answering certain types of questions. Other study designs used by health librarians include cohort design, economic analysis, rapid review, content analysis, prospective observational study, longitudinal studies, surveys, and mixed methods (Eldredge, 2004; Brettle and Maden, 2015a).
Mixed methods are increasingly being used (as shown in Case Study 11.2 below) to provide evidence not only of the impact of health library services, but of how the impact is actually made (Brettle, Maden and Payne, 2016). Once the impact has been demonstrated on a wide scale, health librarians are beginning to use the tools developed to collect local evidence routinely for ongoing quality assurance, benchmarking and advocacy (Dalton, 2012; Dunne et al., 2013; Edwards and Ferguson, 2015). The use of quantitative designs and an increasing number of systematic reviews in the health library field is due to the health context in which health librarians operate, where experimental studies are considered the gold standard. However, quantitative designs are not always appropriate to answer the question at hand (or provide the evidence needed). The critical incident technique (CIT) has been widely used in impact studies (Brettle, Maden and Payne, 2016; Marshall, 1992; Marshall et al., 2013; Urquhart et al., 2010), as it can provide specific evidence on how information is being used. Weightman and Urquhart (2008) recommended the use of the CIT in interviews to provide more in-depth evidence on how clinicians were using information that had been provided by the library. More recently, Bradley, Getrich and Hannigan (2015) conducted a qualitative study on rural practitioners’ use of clinical information resources and an action research study was conducted on library instruction (Eldredge et al., 2013b).

**EBLIP in action**

The following case studies demonstrate how EBLIP continues to develop and push new boundaries within health librarianship.

**Case study 11.1 Enhancing the evidence base through systematic reviews**

Systematic reviews are an essential tool for bridging the gap between research and practice and, as shown above, health librarians play a key part in systematic reviews for other health professionals. One way that systematic reviews have been taken forward among health librarians is by using a ‘hive’ approach, where a review is led by an expert who shares the knowledge and skills to build capacity among the remainder of the review team (Woods and Booth, 2014). This approach was first used in the UK to further develop the evidence base and research and critical appraisal skills of a group of clinical librarians (Brettle et al., 2011; Brettle and Maden, 2015b), and then developed into an impact project (Brettle, Maden and Payne, 2016) to ensure that the evaluations conducted by the clinical librarian group continued to be evidence based.

Under the auspices of the MLA, health librarians in the USA (and internationally) have significantly up-scaled the hive approach to developing systematic reviews. The initial step
was the employment during 2008 of the Delphi method for identifying the most important and answerable EBLIP questions facing the profession. The US team surveyed the MLA leadership and researchers through multiple iterations to identify the top-ranked questions (Eldredge, Harris and Ascher, 2009; Eldredge et al., 2012). In 2012, Ascher, Holmes and Eldredge organized over 200 volunteers into 15 teams charged with conducting systematic reviews on the best available evidence on answering those top-ranked 15 questions (Eldridge, Ascher and Holmes, 2015a; 2015b). The teams have reached various points of completion, ranging from publication or reporting results at MLA annual meetings (Anderson et al., 2014; Eldridge, Ascher and Holmes, 2015a; 2015b; Glynn et al., 2014; Swanberg et al., 2016) to earlier formative stages (Holmes, Ascher and Eldredge, 2015). The questions included the following:

- What is the evidence that health librarians make a difference to patient care?
- What is the role of the health librarian in improving health literacy?
- What are the information needs of practising physicians?
- What is libraries' role in informatics?
- How is it best to objectively document impact on the bottom line?
- What is the impact of the health librarian on long-term information-seeking behaviours?
- What are effective teaching methods for evidence-based practice?
- What skills and knowledge do health librarians need for data mining?

Most systematic reviews are still ongoing, but their publication should significantly facilitate use of the evidence base for health librarians.

Case study 11.2 The Value of Library and Information Services in Patient Care study

Examining the value and impact of health library and information services on patient care has long been one of the top research questions for health librarians, who need to demonstrate their value to their clientele and the administrators who fund library services. While many small-scale value and impact studies had been conducted in single institutions or with specific groups of health professionals, we did not have evidence from a multi-site study that demonstrated more widespread impact.

The ‘Value Study’ (Dunnet et al., 2009; Marshall et al., 2013; Marshall et al., 2014a; Marshall et al., 2014b), as it has been called, reflects a general trend in health research towards large-scale, multi-site studies that involve many collaborators. Computerized data collection and analysis are making it possible for researchers to collect large amounts of data and to employ multivariate statistical analysis to compare groups within larger datasets. Previously, the time and costs of such data collection and analysis were prohibitive.
Funded in part by the US National Library of Medicine, the Value Study used a web-based survey and a critical incident methodology to gather information about library resource use by physicians, residents and nurses at 56 library sites serving 118 hospitals in the USA and Canada. Value and impact measures were based on an earlier study on the value and impact of the hospital librarian on patient care conducted in the Rochester, New York area (Marshall, 1992). Over 16,000 health professionals responded to the survey and reported positive changes in patient care outcomes as a result of using the library resources. The changes included: the advice given to patients, choice of drugs or other treatments, as well as diagnosis or choice of tests. Three-quarters of the respondents said that they definitely or probably handled some aspect of the patient care situation differently as a result of the information obtained through the library.

The Value Study research team followed up by giving guidance on how health librarians could use the Value Study results for library advocacy. PowerPoint presentations and downloadable data for the full study, particular groups such as nurses, physicians and residents, and geographical areas continue to be available on the study website. Since a wide range of types and sizes of libraries in different geographic settings participated in the study, the evidence was valid for both participating and non-participating libraries. The participating sites were able to use their own ‘stories’ from users to frame their own quantitative results or the results for the full study.

Ways in which libraries used the study results included the following:

- Making presentations to the institution’s leadership team, or at strategic planning sessions
- Publicizing the results in an institutional newsletter or research day
- Sending a message to patient safety officers in the institution highlighting the avoidance-of-adverse-events data, which included a reduction in patient length of stay in hospital
- Assisting a regional library council to make a strong case against a hospital library closure
- Calculating dollar value of time saved, based on the study results. Annual estimates ranged from US$466,420 in a smaller library to almost US$2 million.

The large amount of data from the study also led to additional analyses and use at national and local levels. This has included:

- An examination of the specific impact of using the library, librarian and library-provided databases on changes made to patient care and avoidance of adverse events (Marshall et al., 2014a; Marshall et al., 2014b) and the role of PubMed/Medline in the health information infrastructure (in progress)
Availability of the full dataset, survey questions and instructions on the study website and in a public social science data archive known as the Dataverse.

Distribution to each of the 56 participating sites of a copy of their own data for further analysis and access to the full study date for benchmarking.

Creation of an online guide to data curation for library and information researchers.

In summary, the project has provided evidence of the value of health libraries for patient care on a large scale, as well as providing local resources for advocacy and the means to continue collecting evidence in a standardized way in the future. A replicable model for conducting further value study research in the future has been established.

**Future directions**

In the future, librarian researchers and practitioners will be likely to employ a variety of methodologies and approaches as they continue to build a culture of creating and using evidence in their professional practice. This continuing emphasis on seeking, creating and using the best possible external evidence will help health librarians to meet the needs of their users as well their own needs and increase the size and quality of their library research base. This ongoing activity will also allow health librarians to play and further develop important roles in their institutions in critical appraisal and quality filtering of the literature (Beaven and Lane, 2012; Booth, 2012; Eldredge, 2008a); in leading EBP teaching; in fully participating in systematic reviews in health and social care (Brettle, 2012a; Jerome et al., 2012); and in managing and co-ordinating research projects for effective and efficient health services (Seeley, 2012). Health librarians can also play important roles in creating standards for EBP and quality improvement at the national and international levels as policies and standards are created.

In order to fulfil their potential, health librarians need to continually improve their research skills, particularly in research design, implementation, statistics and analysis. Higher and continuing education opportunities that develop research skills at national, local and regional levels will become even more important in helping to meet these needs. Finding ways to acknowledge health librarians for their efforts in research and EBP at the institutional and national levels will also be important. Professional associations and licensing bodies need to play a strong role in these endeavours. As our research expertise grows, it will be important to conduct research that includes both smaller-scale and larger-scale studies that have greater generalizability. The collaborative approach taken by the Value Study, and its methods (Marshall et al., 2013) and by Brettle, Maden and Payne (2016) should be replicated. This will ensure that institutions have access to useful,
unbiased local-level data and standardized methodology and data collection instruments as well as access to datasets. Health librarians need to develop and pursue these approaches in their own research and share their expertise with librarians in other branches of the profession. In this way, health librarians will continue to be at the forefront of EBLIP, since their roles in healthcare, with its rigorous research standards, will continue to be reflected in the research activities of the health library profession.

Conclusion
EBLIP continues to play a prominent role in health librarianship that appears likely to continue into the future. Health librarians began their own EBP by trying to adopt the levels (Eldredge, 2002a) of evidence approach used in EBM; however, the types of evidence used by health librarians are developing, as in other library sectors.

Other allied health professions such as nursing and occupational therapy have faced similar challenges. Over time, modified versions of the original EBM model have emerged that are more diverse and flexible about the types of evidence that can be used to make decisions and what constitutes acceptable evidence. Furthermore, EBM itself now has re-emphasized the integration of the individual clinical expertise of physicians and the best external evidence to make decisions that are suitable for the particular patient and situation (Greenhalgh et al., 2014).

Health librarians have actively encouraged practitioners in other types of information practice settings to adopt an evidence-based approach. There has long been an interest in linking research to practice in the library profession as a whole. The EBLIP movement has helped to move research and its application into the practice realm. Research has become more accepted as an activity that is appropriate and relevant to practitioners. Health librarians will, no doubt, continue to pursue EBP in a way that includes the priorities and approaches common to the health settings in which they work.

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Notes
2  https://nnlm.gov/mar/about/value.
3  https://nnlm.gov/mar/about/value.