TITLE
Approaches to evaluating clinical librarian services: a systematic review

SPEAKERS
Alison Brettle, University of Salford, Salford, UK and Anne Webb, Christie Hospital, Manchester, UK

AUTHORS
UK North West Clinical Librarian Systematic Review Group (Lucy Anderson, Bury PCT; Alison Brettle, University of Salford; Michelle Maden-Jenkins, Edgehill University; Rosalind McNally, National Primary Care Research and Development Centre, University of Manchester; Tracey Pratchett, University Hospitals of Morcambe Bay NHS Trust; Jenny Tancock, University Hospitals of Morcambe Bay NHS Trust; Debra Thornton, Blackpool, Fylde and Wyre NHS Foundation Trust, Anne Webb, The Christie NHS Foundation Trust)

ABSTRACT
Introduction: Surveys in the UK have established a wide variability in clinical librarian (CL) service models\(^1\) and previous systematic reviews have suggested that there is little evidence of effectiveness or limited evidence of impact\(^2,3,4\). The evidence that exists is mainly descriptive and comprises poor quality studies. To improve the evidence base and demonstrate the value of clinical librarian services, it is essential that more rigorous evaluations are undertaken. This is in line with a recent UK policy report that recommends evaluating the impact of NHS library services\(^5\).

However what is the best way of evaluating clinical librarian services? Given the various models of service provision, there is unlikely to be a “one model fits all” approach? A systematic review will be undertaken to examine these issues and provide guidance for future evaluations.

Methods: Systematic review methodology comprising a search of 21 electronic databases will be used to determine:

- What models of CL services have been evaluated
- What outcomes have been measured and what outcome measures have been used
- Whose perspective has been measured
- The quality of the measures used

Each relevant paper will be critically appraised by 2 members of a team of 8 librarians.

Results and Conclusions: The results will be tabulated and presented as a narrative synthesis in order to draw conclusions about the methods of evaluation used in previous studies and suggest an evidence based way forward for future evaluations.
INTRODUCTION
Professor Peter Hill’s article, “Darzi and future roles for health librarians” raises important questions about the challenges facing health librarians. Embedding librarian roles within organisational structures is by no means a new approach to meeting information needs and applying skills to a particular context. Developing our own understanding of what it means to use evidence in practice and acting to influence policy on roles, structures and ways of working to support this, is needed. This will help build on the existing evidence-base from the library sector and wider organisational science.

The expectation that we will do this, within UK NHS libraries, is implicit in the Hill Report. It is recommended that contribution to evaluation at local and national levels should be in all job descriptions and for greater interaction between stakeholders to adapt the vision of NHS Evidence successfully to the many organisational settings of the NHS. Rigorous evaluations of clinical librarian services will demonstrate their value and improve the evidence base of the profession.

This paper reports on the progress of a systematic review conducted by a group of UK health librarians in clinical librarian, or similar, roles, in an attempt to provide evidence regarding the evaluation of clinical librarian services.

Related research
Three systematic reviews have previously examined the effectiveness of clinical librarian (CL) services. Winning & Beverley attempted to build upon an earlier selective review of clinical librarianship aiming to determine whether CL services are used by clinicians, have an effect on patient care and/or clinicians’ use of the literature in practice and/or are cost-effective. Sixteen evaluative studies were located and included in the review. While they found that CL services were well used and liked by clinicians there was little evidence of the impact of CL services on patient care and clinicians’ use of the literature and no cost-effectiveness studies existed. They found that 11 studies examining the effect on patient care reported only instances of indirect impact. Furthermore 3 studies that reported more in-depth impact on the choice of treatment or tests were flawed in their methodology.

The review highlights the poor quality of reporting in the studies, especially the inadequate information provided on sample size, response rates, measures of service usage, data collection instruments (e.g. provision of a copy of the questionnaire) as well as deficiencies in the evaluation methodologies including, small sample sizes and response rates, failure of those evaluating their own service to acknowledge researcher bias and non-use of reliable and valid measures.

The reviewers commented on the difficulty in comparing studies due to differences in author’s terminology regarding ‘improved patient care’, ‘improved patient management’, ‘positive effect’. They also state that in order to measure patient impact, a definition of what is meant by impact is required.

“Impact may be interpreted as affecting a range of factors, such as diagnosis,
course of treatment, length of stay, complication and infection rates.” 2 (p19)

They note that the majority of studies merely ask if the information provided had impacted on patient care. However they recognise that actually measuring a direct impact on patient care is “difficult if not impossible to do”2 (p19).

Despite pointing out the previously used selective approach7, Winning & Beverley2 only examined the literature from 1982 onwards, thus omitting a number of relevant studies located in another systematic review3. In 2004 Wagner & Byrd undertook a comprehensive systematic review to determine the effectiveness of clinical medical librarian services3. Thirty-five CL studies published between 1974 and 2002 were included that used some form of formal quantitative or qualitative evaluation methods.

The review confirmed Winning and Beverley’s findings2, concluding that while there is evidence to suggest that CL services are well liked and used, the quality of the methodology used to evaluate CL services is poor3. Wagner & Byrd highlight the fact that only four of the thirty-five studies included in the review used any form of rigorous evaluation methodologies (using historically controlled before-and-after methods or comparison control groups) with others mostly relying on descriptive (e.g. usage statistics) or qualitative data noting that “comparative quantitative research methods or carefully and systematically constructed qualitative research methods have been used very rarely”3 (p30).

Wagner & Byrd report that 20 studies outlined 40 ways in which the service affected patient care and attempt to synthesise the results3. Notwithstanding the fact that cumulative evidence from 12 studies showed that 65% (weighted average) valued the CL services for patient care, Wagner & Byrd point out that this was based largely on unverified user opinions, rather than actual data relating to patient outcomes, “no study to date has attempted to measure the direct or indirect impact of CML [clinical medical librarian] services on the outcomes of patient care (such as hospital length of stay, patient mortality, adverse drug effects, etc)...No study provides more than unverified opinions of healthcare professionals and students about those potential impacts. Objective evidence for the positive impact of CML services at this level is still missing”3 (p30).

The final systematic review examined the impact of library services as a whole on patient care and time saved by health professionals but also included a sub-analysis of clinical librarian studies4. Of the 124 clinical librarian studies included, 9 studies had previously been reviewed3 and 3 studies were published post 2001. Unlike the two previous systematic reviews2,3, the authors note there were indications of CL services directly benefiting patient care, yet the methodology invariably used within individual studies involved

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4 Weightman & Williamson4 applied crude quality measures to the inclusion criteria and an inclusion criteria of at least one outcome measure relating to patient care, hence the discrepancy with the total number of studies included in previous systematic reviews
the subjective reporting of results by clinicians. As before the reviewers found it difficult to compare individual studies due to different terminology. The reviewers also state that 4 studies suggest that the CL saved clinicians time, however in 3 of the studies the effect was unquantifiable and 2 studies showed that the CL services provided were cost-effective with estimates of cost savings provided.

Weightman & Williamson also commented on the poor quality standards and a lack of quantifiable data collected citing a number of weaknesses within the individual studies, the most common one cited as desirability bias, i.e. the CL who provided the service is also the one evaluating it. They also recognise (as did Winning & Beverley) that evaluating impact on patient outcomes is difficult and discuss a recent taxonomy to assess the value of library services to hospitals which suggested there was no valid way of measuring the direct impact of the library on patient care. The reviewers suggest that due to the difficulty in collecting data on the library’s impact on patient care that other important outcomes ought to be considered, including the impact on professional development, key decision-makers, preparation of local guidelines and time-saving aspects. They conclude that in designing impact studies multi-methods (i.e. both quantitative and qualitative methods) should be employed, in doing so, the validity of the results can be strengthened. In particular they suggest the use of the critical incident technique to collect data relating to specific instances where use of the library services has had an impact in some way.

The three systematic reviews highlight a range of weaknesses in previous evaluations of CL services. These include poor reporting, bias and a lack of reliable or valid evaluation methods (box 1). Furthermore they set out a number of recommendations for future evaluations (box 2) including a need to improve the rigor of evaluations and consideration of health and cost effectiveness outcomes as part of the evaluation. Different models of CL services and comparisons of CL services with other library services should also be conducted.

| Summary of CL evaluation weaknesses identified in previous systematic reviews |
|---------------------------------|-----------------|
| Small sample size               |                 |
| Low response rate               |                 |
| Response bias                   |                 |
| Poor reporting/inadequate info  |                 |
| Non-specific patient care       |                 |
| Non-use of reliable/valid methods |             |
| Subjective reporting of results |                 |
| Results less likely to be      |                 |

Box 1
Summary of recommendations

Winning & Beverley (2003)²

- All services should attempt to evaluate their performance in relation to predetermined aims and objectives (e.g. time taken to respond to queries)
- Independent external evaluation of CL services
- Identification of tangible direct impact measures of the effect of CL services on patient care
- Investigation of the preferred format of information provided to clinicians (e.g. bibliographies, summaries, etc), relevance of the literature and extent to which it meets the needs of the clinician
- Investigation of the implementation and dissemination of the literature provided by the CL to clinicians (e.g. by tracking results from initial request to subsequent implementation of results)
- Determine the most effective model of clinical librarianship
- Establish cost-effectiveness of CL services

Cimpl Wagner & Byrd (2004)³

- Consistent data-gathering and analysis methods
- Comparable cost-benefit data
- Standards for measuring patient care impacts and program value

Weightman & Williamson (2005)⁴

- Future studies should attempt to reduce sources of bias
- Qualitative approaches to evaluation should be considered in addition to quantitative
- Questions covering the effect of information on other outcomes should be developed with the input of library users
- Responses should be on the basis of a specific and recent incident of library use (critical incident technique)
- Different user groups should be considered separately
- A core set of questions to measure impact of clinical and traditional librarian services should be developed
- Studies comparing traditional v CL services v searches carried out by health professionals should be conducted
- Cost effectiveness (time saved) and health outcomes should be measured
- Models of CL services should be compared

Box 2

One of the outcomes of the Weightman & Williamson systematic review⁴ was the development of a set of quality standards for a user survey approach to assessing the impact of library services on patient care⁵. These standards, drawn from the results of the authors’ review⁵ and previously developed survey tools include a survey instrument consisting of a questionnaire and interview schedule designed to reduce bias, increase response rate, focus greater detail on patient care outcomes and provide consistent terminology to allow easier comparisons. The interview schedule follows the critical incident
technique format to allow respondents to recall specific instances where library services have impacted on their professional practice. While yet to be validated the survey provides a standardised approach to conducting impact studies and fulfills a number of recommendations suggested by the three systematic reviews (Box 3).

Suggestions for a practical, but 'low-bias' impact study for health libraries9b

- Appoint researchers who are independent of the library service
- Ensure that all respondents are anonymous and that they are aware of this.
- Survey all members of chosen user group(s) or a random sample; consider those who decline at invitation as non-respondents
- Agree a set of questions that are objective (e.g. changed drug therapy), well used in previous research, and developed with input from library users.
- Ask respondents to reply on the basis of an individual case of specific and recent library use/information provision rather than library use in general. This is known as the critical incident technique.
- Combine a questionnaire survey with a smaller, but also random sample of follow-up interviews.

To maximize the response rate:

- Personalise the request, stressing the importance of the survey and assuring confidentiality
- Send at least one, and ideally two or even three reminders
- If you amend the questionnaire keep it brief
- Consider the use of an incentive such as a lottery draw

Box 3

Since the publication of the systematic reviews highlighted above, a significant number of clinical librarian evaluations have been published to merit an update. Furthermore in order to comply with Hill’s recommendations5, UK CLs need guidance on evaluating their services. Given the various models of service provision, there is unlikely to be a “one model fits all” approach. To this end a systematic review is being undertaken by the UK North West Clinical Librarian Systematic Review Group which will update previous research and provide guidance for future evaluations. The remainder of the paper outlines the approach taken and the results to date. More up to date results will be presented at the ICML conference.

OBJECTIVES

- To determine which models of clinical librarian services have been evaluated

b Used with permission from the authors9
• To determine whose perspective has been evaluated when evaluating clinical librarian services
• To determine the quality of the measures used to evaluate clinical librarian services
• To determine what outcome measures have been used to evaluate clinical librarian services

Objective 1: To determine which models of clinical librarian services have been evaluated
The review aims to build on the models (e.g. literature services, information skills training, ward rounds, etc.) of clinical librarianship that have previously been identified for evaluation purposes. The review does not aim to provide a complete overview of all models of clinical librarian service delivery, this work is being undertaken elsewhere (Harrison, Loughborough University). However the review will examine whether it is possible to define a clinical librarian in relation to the UK setting and if this is different to other settings

Objective 2: To determine whose perspective has been evaluated when evaluating clinical librarian services
The review will examine whether the evaluation is undertaken from a clinical, patient, or organizational perspective.

Objective 3: To determine the quality of the measures used to evaluate clinical librarian services
The review will examine the quality of the methodologies employed in the evaluation of clinical librarian services and whether recommendations from previous systematic reviews have been implemented.

Objective 4: To determine what outcome measures have been used to evaluate clinical librarian services
The review will aim to identify the performance vs impact measures used in the evaluation of clinical librarian services and to investigate whether recommendations from previous systematic reviews regarding outcome measures have been implemented. In particular, the reviewers are interested in outcomes relating to patient care.

METHODS

Overall the methods have followed the approach of traditional systematic review, that is employing “a rigorous methodology for searching, research, retrieval, appraisal, data extraction, synthesis and interpretation.”

However the review is being undertaken by a team of librarians interested in Clinical Librarianship as part of continuing professional development. Therefore each step in the process has been undertaken in a collaborative manner, allowing each member of a team of 8 to participate, contribute and gain experience of each element of the systematic review process. This has provided a unique opportunity to share experience, gain knowledge and skills and generate debate within the team.
Search strategy
The search strategy encompassed multiple methods in an attempt to locate both published and unpublished English language clinical librarian evaluations from 2001 onwards. This date was chosen to reflect the cut-off period of previous systematic review searches and to allow for a small overlap in the event of any delay in records being added to the databases.

A comprehensive search of twenty databases was undertaken which included the main Library and Information databases LISA, Library Literature & Information Science Full Text and Library & Information Science Technology Abstracts as well as key healthcare databases including Medline, Cinahl and Embase. All searches were run during Summer 2008.

The search terms were based on a single concept, that is, terms to identify studies of the Clinical Librarian or similar roles. No methodological terms were employed to limit the studies retrieved to a particular type of method. Terms for roles perceived as similar to that of the Clinical Librarian were included because previous systematic reviews have concluded that the varied ways in which Clinical Librarian role occurs across organisations make definition and application of inclusion and exclusion criteria problematic. The search terms were identified using a variety of sources, including an examination of previous systematic reviews of the topic, brainstorming within the project team and an examination of database thesaurus'. This resulted in an agreed final list of free-text search terms. The list of search terms was then used to devise search strategies for 20 different bibliographic databases and sources adding in relevant thesaurus terms specific to each database.

References of included publications were also scanned to identify additional studies not retrieved by other methods, recent editions of 2 key journals in the field (Health Information and Libraries Journal, Journal of the Medical Library Association) were scanned for relevant articles not yet indexed in the databases above and several known Clinical Librarianship bibliographies were also consulted. In addition a search of Google was undertaken, experts in the field were contacted to identify possible references for inclusion and a call for studies was made via UK professional library media and various email discussion lists. A copy of all the search strategies and full search details is available from the authors on request.

Filtering and article selection
All references identified were loaded onto Refworks (Refworks, ProQuest LLC). This database software was used to track and maintain an audit trail of all studies as they passed through the review process. One member of the group conducted an initial filtering of all references in order to exclude obvious irrelevant references located in the database searches. The excluded references were checked by a second member of the group to ensure no relevant references had been excluded at this point. From the remaining 456 references, 50 were chosen at random and distributed to each member of the group. Each member then scanned each of the 50 references to ensure consistency in the selection of relevant papers for consideration for including in the review. The titles and abstracts of the remaining 406 references were
independently scanned by at least two reviewers to determine their relevance to the review and any disagreement was settled by discussion. Full papers were obtained for those that appeared to be relevant. Each of these papers were checked against the inclusion criteria (see Box 5) by team members working in pairs to ensure consistency.

**Definition of Clinical Librarian**
Before establishing a set of inclusion and exclusion criteria, it was essential to reach consensus regarding definitions of a clinical librarian. Various definitions of a Clinical Librarian are described in the literature but following a discussion, the group agreed use the “Hill definition” since the Hill Report\(^5\) had been the impetus for the undertaking of the review.

Hill defines a Clinical Librarian as one who seeks “to provide quality assured information to health professionals at the point of need to support clinical decision making”\(^5\). However, this definition is quite broad and open to interpretation at a number of levels, for example, what is ‘point of need’? In debating this definition the group sought to clarify various aspects, including ‘health professional’, ‘point of need’, ‘quality assured information’ and ‘clinical decision making’ (see box 4).

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**Clarification of the Hill definition\(^5\) of a Clinical Librarian**

**Health professionals**  
Any professional who provides services to support patient care (this can include any clinician, nurse, allied health professional, manager or social care professional)

**Point of need**  
The place where the healthcare professional first requested support. Studies in any setting, both acute, primary care and community trusts, teaching hospitals (or US/Canada – academic medical centre). *This could be within or outside the library or via a computer system.*

**Quality Assured Information**  
Broadly defined to include evidence-based clinical resources such as Cochrane Library, systematic reviews, National Library of Health, plus original peer-reviewed journal articles and books. Includes the librarian being involved in the process of supporting others to quality assure their own information through journal clubs, training and critical appraisal. This includes training in quality assured resources such as those listed above. This also includes the librarian filtering information in some way, either by critical appraisal, reducing information overload to increase relevance or appropriateness for the decision scenario, or abstracting the information into a format or system for more effective integration into patient care.

**Clinical decision making**  
Studies where the main focus of the service was supporting patient care
directly through clinical services or to managers whose decisions were about clinical care.

**Box 4**

**Inclusion/exclusion criteria**

Following agreement regarding the definition, a set of inclusion/exclusion criteria was identified from the aims of the study and the initial scoping of the literature. These were discussed, refined and agreed by members of the group. Box 5 outlines the inclusion and exclusion criteria.

**Include**
- Studies that meet the Hill definition (as interpreted above)
- Studies which are described as outreach but the focus is to support patient care as defined above
- Studies which describe services whose main focus is the provision of patient information, but the evaluation includes at least one outcome measure relating to patient care
- Published post 2001
- Reports evaluation methodology
- English language

**Exclude**
- Outreach which is purely about training and does not have a support patient care element
- Outreach which involves the provision of a remote library service with no specific link to patient care
- Studies where purely a training focus is this not the same as above?
- Descriptive article – no mention of evaluation methodology
- Health science librarians providing a general hospital library
- Non-English language

**Box 5**

**Assessment of study quality and data extraction**

There are no established criteria for assessing the quality of evaluation studies, therefore an amended version of a Mixed Method data extraction template developed by the Health Care Practice R&D Unit at the University of Salford (http://www.fhsc.salford.ac.uk/hcpardu/critical-appraisal.htm) will be used together with the criteria for an impact study set out by Weightman et al9. Current work within the group is focused around refining this tool to meet the needs of this systematic review. Once this is complete details from each study will be extracted and independently critically appraised by at least 2 reviewers from of the group of 8. Any discrepancies will be resolved by discussion.
Results and Conclusions
Following the search and filtering process, $30^c$ studies have been identified for inclusion in the review. The results will be tabulated and presented as a narrative synthesis in order to draw conclusions about the methods of evaluation used in previous studies and suggest an evidence based way forward for future evaluations. The presentation at ICML will provide an up to date summary of the results gleaned from the papers at that time and interim conclusions will be drawn.

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References

$^c$ includes studies described in more than one paper and grey literature