Effectiveness of Clinical Information Services

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**Executive Summary**

**Background:** There is increasing interest in finding ways of helping clinicians use the best available evidence in clinical practice. One method is the use of clinical information services (CISs). These can be defined as separate services providing answers for clinicians from the literature, with some interpretation of the literature, rapidly (≤ 14 days).

**Aim:** To study the use of clinical information services.

**Methods:** We searched the literature to find reports of CISs. We also emailed three electronic bulletin boards to find others not reported. We combined information published about the services together with responses from direct approaches to the personnel running them.

**Results:** We identified 12 CISs that met our definition. Most were experimental (with limited funding designed with evaluation rather than long-term service in mind). Four are still running. Australia had 6 services; the UK 4, and New Zealand and Germany one each. Funding came mostly from government health services. Users were mostly primary care doctors (general practitioners), but also hospital paediatricians, other hospital clinicians, nurses, and allied health professionals. Training in the use of evidence-based practice was provided in the majority. A mixture of clinicians, other scientists and librarians, most of whom were specially trained, ran individual services. The material was reported back in a variety of ways, usually in summary form, describing the search strategy, and sometimes providing the references, as well as a summary of the findings. Six services provided a summary of reports as an electronic bank for others to use. Formal evaluation was undertaken by 10 services, all of which reported users self-reported changes in clinical management, as well as general satisfaction. About half of the possible users actually used the service at least once, among those 8 services that could estimate the denominator of potential users. There was a crude range of 1-125 person-days to answer one question, the modal range being about 2-3. This translates into a crude estimate of typically 20 person-days from the service to change a single clinical decision.

**Conclusions:** Clinical Information services are expensive in personnel (at least). Their value may be greater than this in terms of education and influence in matters not measured.
Introduction

One barrier to using evidence in clinical practice is the difficulty of rapidly accessing relevant research at the point of clinical decision-making. Two strategies that have been employed to try and overcome this barrier are the provision of clinical information services and clinical librarian services.

Literature search services have provided clinical information to clinicians in several feasibility studies (Brassey, Elwyn, Price, & Kinnersley, 2001; Del Mar, Silagy et al., 2001; Hayward et al., 1999). One of these delivered information to clinicians in the UK. (Del Mar, Silagy et al., 2001) The feasibility studies were successful and provided much information of interest both to the clinicians asking for it (who reported changes in clinical decision as a consequence) and also to the wider clinical community, where the information often stimulated debate (Del Mar & Glasziou, 2001, 2002; Del Mar, Glasziou, Spinks, & Sanders, 2001a, 2001b, 2001c, 2001d, 2001e, 2002; Del Mar, Glasziou, Spinks, Sanders, & Hilton, 2001, 2002).

Clinical medical librarian services have been instituted in the UK, USA, Canada and Netherlands and evaluations of these services have been published (Alper, Stevermer, White, & Ewigman, 2001; Davidoff & Florance, 2000; Dodson, 1996; Honeybourne & Ward, 2000; Honeybourne, Ward, & Verschuere, 2002; Killingsworth, 2000; NHMRC, 2000; Urquhart & Davies, 1997; Ward, Honeybourne, & Harrison, 2001; Winning & Beverly, 2001). Further projects are in the process of being conducted (including one funded by NICS).

What is a Clinical Information Service (CIS)?

Clearly there is a wide spectrum of ways in which the literature can be harnessed to help clinicians. These range from clinicians helping the patient looking up information themselves, through to scientists summarising the latest research in a meta-analysis: from library services supplying research papers (and even undertaking literature searches) through to the scientists undertaking the primary research. Somewhere in the middle of these extremes lies a service that has independently evolved in several places in which the literature is searched for a clinician to find a specific answer to a clinical question. To distinguish clinical information services from health care workers own evidence searching or librarians providing lists of references, for the purposes of this review we will define a clinical information services as incorporating the following three features:

1. The personnel providing the service are separate from the clinical service (health care providers) using it.
2. There is a fast response (≤ 14 days).
3. The service must include not only a search for information but also a distillation/interpretive phase.

Review Methods

We conducted a search of electronic databases, grey literature, and reports
relevant to this review.

**Literature Searches**

The following electronic databases were searched: Medline; The Cochrane Library; SUMSearch; EMBASE; CINAHL; AMI, APAIS and Web of Science from 1995 onwards.

The search strategies are detailed in Appendix A. The citations retrieved by the search strategy were assessed for relevance to the review and according to the above 3 criteria.

All available records were scanned and the abstracts of those relevant to the subject were read. Articles appearing to contain information relevant to the review were obtained and examined. Reference lists of those articles were checked for further sources of pertinent information. The review process is summarized in Table 1 for each of the electronic databases.

**Email Questionnaires**

We decided to undertake a ‘snowballing’ technique to flush out any other services that might not have been published. To that end we contacted members of three email bulletin boards as follows:

1. The EBM bulletin Board [EVIDENCE-BASED-HEALTH@JISCMAIL.AC.UK](mailto:EVIDENCE-BASED-HEALTH@JISCMAIL.AC.UK)
2. The UK Medical Library List Server list [LIS-MEDICAL@JISCMAIL.AC.UK](mailto:LIS-MEDICAL@JISCMAIL.AC.UK)
3. The USA Medical Library List Server list [MEDLIB-L@LISTSERV.BUFFALO.EDU](mailto:MEDLIB-L@LISTSERV.BUFFALO.EDU)

We asked the following:

1. Do you provide a CIS? (like Brassey and Del Mar?)
2. Are you aware of any CIS?
3. Do you know of any publications regarding CIS?

A number of responses were received. From these we gleaned information on other CISs and a number of citations. These were retrieved if possible. Then we sent another message to each of the respondents we had thereby identified (that is, identified themselves as having provided a CIS, or we found from a citation or other respondent that they had done so). This message was an extensive survey. For those who had published information about a CIS, the data were extracted from the reference and the survey was completed with the available information. The pre-filled survey was then sent to the respondents who were then asked to fill in any gaps or add further comments.

The general questionnaire is contained in Appendix B.
Results

1. General description

We identified 12 CISs that met our definition. Most were experimental (with limited funding designed with evaluation rather than long-term service in mind). Four are still running.

<table>
<thead>
<tr>
<th>Name of Service</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Hayward’</td>
<td>(Hayward et al., 1999)</td>
</tr>
<tr>
<td>QUEST</td>
<td>(Del Mar, Silagy et al., 2001)</td>
</tr>
<tr>
<td>AQUA</td>
<td>(Del Mar, Silagy et al., 2001)</td>
</tr>
<tr>
<td>EBM Fellow</td>
<td>(Coulthard &amp; Callaghan, 2001)</td>
</tr>
<tr>
<td>Clinical Evidence Researcher Service (CERS)</td>
<td>Survey</td>
</tr>
<tr>
<td>Joanna Briggs Institute (JBI)</td>
<td>Survey</td>
</tr>
<tr>
<td>Imperial College Clinical Informaticist Project</td>
<td>(Greenhalgh et al., 2002; Swinglehurst, Pierce, &amp; Fuller, 2001)</td>
</tr>
<tr>
<td>ATTRACT</td>
<td>(Brassey et al., 2001)</td>
</tr>
<tr>
<td>Merline GP Information (Merlin)</td>
<td>(Walton, Henderson, Hollings, &amp; Lawrenson, 2000?)</td>
</tr>
<tr>
<td>Clinical Effectiveness Enquiry Service (CEES)</td>
<td>Survey</td>
</tr>
<tr>
<td>‘Charite’</td>
<td>(Juche, Euler, Bruggenjurgen, Willich, &amp; Kunz, 2002)</td>
</tr>
<tr>
<td>New Zealand Health Technology Assessment Unit (NZHTA)</td>
<td>Survey</td>
</tr>
</tbody>
</table>

The distribution is interesting:

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>6</td>
</tr>
<tr>
<td>UK</td>
<td>4</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1</td>
</tr>
<tr>
<td>Germany</td>
<td>1</td>
</tr>
</tbody>
</table>

This may reflect a bias in identifying services. However we took steps to avoid ‘missing’ any.

Funding came mostly from government health services. In one case funding came form one country (UK) to Australia (Del Mar, Silagy et al., 2001) for part of the service.

Users were mostly primary care doctors (general practitioners). However also hospital paediatricians, other hospital clinicians, nurses, and allied health professionals were users. Users were offered training in the use of evidence-
based practice in the majority.

A mixture of clinicians, other scientists and librarians, most of who were specially trained, ran the services.

The material was reported back in a variety of ways, usually in summary form, describing the search strategy, and sometimes providing the references, as well as a summary of the findings. Six services provided a summary of reports as an electronic bank for others to use.

Formal evaluation was undertaken by 10 services, all of which reported users self-reported changes in clinical management, as well as general satisfaction. About half of the possible users actually used the service at least once, among those 8 services that could estimate the denominator of potential users. There was a crude range of 1-125 person-days to answer one question, the modal range being about 2-3. This translates into a crude estimate of typically 20 person-days from the service to change a single clinical decision.
Do clinical information services improve the use of evidence in clinical practice?

Published papers have not reported whether people are more likely to use evidence in practice if a CIS is available. The only way to answer this question would be to survey the actual people who have access to such a service, not only those who are using it.

For those who have access to a CIS, there are two subsidiary questions:

- Do people with access to a CIS use it?

About half of the possible users actually used the service at least once, among those 8 services that could estimate the denominator of potential users. Since in many cases the users were self-selected, or selected in some other way by interest or skill, it is likely that the proportion of users would be smaller.

There was a crude range of 1-125 person-days to answer one question, the modal range being about 2-3. This translates into a crude estimate of typically 20 person-days from the service to change a single clinical decision.

- Does use of a CIS change clinical behaviour?

Only self-report is available, and probably biased towards those who asked questions. But adding up those who said they were influenced at least to some extent towards a change in clinical decision and the denominators, about half said they were influenced.

2. Who were served by the CISs?

The predominant consumers of the services were GPs but also included other clinicians, specialists, nurses and allied health professionals. Some were clearly aimed at one clinical group. For example, the Joanna Briggs Institute is focused on nurses. Another service called an EBM Fellow was located within a children’s hospital. It was available to registrars and consultants but excluded surgical staff.

Generally, users of the services had no formal training in evidence-based medicine or critical appraisal. An exception was the QUEST service where all participating GPs had done an EBM workshop previously. Some services tried to assist the users, particularly in the formulation of questions, but this remained largely informal. Some institutions provided training in EBM or other library courses but these were not part of the service.

The majority of services were funded. Some services were pilot schemes designed to operate for a limited time, for example a service in Adelaide (Hayward, et al, 1999) and one in Berlin (Juche et al., 2002).

The staff employed in the services ranged from one part-time to a staff of 12 equivalent full-time people (NZHTA). In the case of Merlin GP Information 4 staff
were employed: a GP, clinical manager, a consultant in public health medicine and a public health information specialist. However, the Merlin team was only engaged in the service for about one day per week.

3. Searching Process

The turn around time (i.e. the time from receipt of question to dispatch of answer) varied markedly among the services from hours to a fortnight (the cut-off used in our definition). Services for GPs generally aimed to answer questions in under a week or so. Some services, such as ATTRACT, EBM Fellow, Charite and CERS succeeded in having answers dispatched within a day. Most services would respond to urgent requests, which were dealt with more promptly than ‘regular’ requests.

A number of services reported that they had to go back to the person requesting information for clarification of the question. This would, of course, have delayed response intervals. Two services (Hayward and QUEST) reported the time it took to research the answer to the question, which was, on average, a few hours. Del Mar reported that the average time was 3 hours 32 minutes and the maximum amount of time spent on one question was 23 hours 30 minutes.

Most services had various modes for receipt of questions which included post, phone, fax, email, website, in person and even pathology courier (QUEST).

Most of the services had medically trained staff (including GPs and nurses) with training in EBM. A few services had research assistant staff and/or librarians. The Merlin service reported a process of searching and preliminary appraisal by the informaticist with the appraisal completed by a consultant in public health medicine. The final response was also checked by a GP for clinical relevance before being sent out to the requester. It seemed that many of the services were run on part-time basis with varying inputs from different staff. One service with 12 equivalent full-time staff (NZHTA) had staff trained in all aspects mentioned.

All but one service reported a formal and explicit search cascade for literature searching. The SEQS service reported no formal cascade search technique. Most search cascades involved Cochrane Library (CL; including the Database of Abstracts of Reviews of Evidence, DARE), Clinical Evidence (CE), Best Evidence (BE), PubMed (Clinical Queries; CQ), ACP Journal Club (ACP); TRIP and other assorted databases and EBM websites. Some services also consulted pharmaceutical information sources, guidelines and textbooks.

The majority of services offered literature at only the highest level of evidence. For example, if there was a Cochrane Review regarding a particular question then there was no further searching done. Some services provided evidence at all levels but one service indicated that what it provided depended on what the client requested (NZHTA).
4. Service Output

All but one service provided a summary of the research findings and critical appraisal of the literature. The exception was the Clinical Effectiveness Enquiry Service in London, which was essentially a Clinical Librarian Service. Most services made available the search strategy, the abstracts of references and/or a list of references. Some services gave an appraisal of validity, applicability and strength of evidence (Hayward and Charite).

Eight out the 13 services attempted to ‘reuse’ the information from the answered questions for the wider use of interested parties. Six of the services used a website with two more planning to use one in the future. One service used a local intranet website. The other main avenues of dissemination of findings were newsletters or copies to others on ward rounds (CERS).

5. Evaluation

All but one of the services had been formally evaluated. Nine of these evaluations had been published. The CERS service will be evaluated in January 2003.

The number of consumers that each service was available to varied considerably from 31 GPs in the QUEST service to approximately 1700 GPs in Wales (ATTRACT) and an unknown clientele for the NZHTA. This service is available to any non-client staff willing to pay the fee for information. It appeared that all other services were offered freely. Indeed, a service may have been offered in a particular health setting (e.g. hospital, primary care district, etc) so it was hard to gauge exactly how many potential consumers there were.

The actual use of the services by potential consumers was also difficult to ascertain in some cases. Some services were able to report both the potential consumers and the actual users. The approximate use ranged from 2.3% of clinicians (Charite) to nearly two-thirds (EBM Fellow, ICCIP and Merlin). In general, however, the use of the services was rather low given the potential consumer base.

Some services asked consumers about the impact of the service. Those who were surveyed indicated that, overall, the service was useful, quick, of sufficient quality and would be used again. The possibly more important indicator was whether use of the service had influenced clinical management. Nine services evaluated this aspect. Some consumers indicated that the answer changed their clinical practice or confirmed their current practice.
6. Other Aspects

6.1 Types of question

Some services evaluated the types of questions that were posted (Table 2). The experiences among the different services were similar: the majority (55.6%) were intervention questions (‘treatment’ and ‘therapy’); 12.6% were diagnostic and screening questions; 8.5% were aetiological; and only 2.6% were prognostic; (20.6% were ‘other’).

6.2 Proportion of questions that could be answered

Some services also provided data that enabled an estimate of the number of questions answered to be made (Table 3). Most questions (83%) could be answered.

6.3 Quality of the evidence

One service provided a classification of the strength of the evidence for its service’s answers. Most questions (47%) yielded ‘limited’ or ‘weak’ evidence only, and only 41% ‘high quality’ or ‘moderate’ (Table 4). Another service (Charite) also rated evidence sources.

6.4 Person time

It is of interest to estimate the human resource required to provide such services. To this end we undertook estimates to the extent the data allowed. We undertook this by the following formula:

\[
\frac{(\text{Duration} \times \text{no. of staff} \times \text{staff involvement})}{\text{no. of questions}}
\]

For example, for Merlin, this was

5 years \((5 \times 365 \text{ days})\) \(\times\) 4 staff \(\times\) 0.2 \((1 \text{ day/week})\) / 500 questions = 2.92 person days/question

We have crudely tabulated this in Table 5. In addition it is possible to estimate the human resources required to change a single clinical decision

\[
\frac{(\text{Duration} \times \text{no. of staff} \times \text{staff involvement})}{\text{no. of altered decisions}}
\]

This is also tabulated, Table 10.
**Question 2**

How widespread are clinical information services?

There were six services reported within Australia. Two are ongoing in Adelaide: the first a NICS funded project – Clinical Evidence Researcher Service; the other at the Joanna Briggs Institute, which aims to foster a collaborative approach to the evaluation of research and integration into nursing practice.

Seven overseas services were identified: four in the UK; one in Germany; and one in New Zealand. Two ran for 2-4 years. Four are currently running.

This seems a modest level of service for the world.

There are, of course, probably many clinical library services, but that was outside the scope of this review.

**Question 3**

Do clinical information services change practitioners’ clinical decisions and management?

To answer this question adequately, a study would need to measure patient outcomes, or at least measure clinical behaviour directly. However, the only outcomes that attempted this have looked at self-reported behaviour by the users of the service. These have reported changes in behaviour (Table 9).

One interesting finding was that the services were often used to *confirm* rather than simply provide new information. Thus one outcome of such services may be in the greater confidence clinicians have in their use of information and knowledge about decisions.

Independent evaluation of the services’ questions were made in some services: these confirmed that some questions were highly relevant to other clinicians (that is, were not so specific as be not useful to others).

Many services used their answers so that others could make use of them. Clearly there is great potential for a very much greater number of people to be influenced. There seems to be little evaluation of this aspect of use, however.
Other services outside the scope of this review

A number of other clinical information services were found during the course of this review. However, each failed to meet all of the three criteria required for inclusion in this review. For the sake of completeness, we have noted these as ‘excluded studies’. The details are summarized in Table 11.

1. Centre for Clinical Effectiveness (Australia)
   Monash University, Melbourne

This service was established by the CCE in conjunction with the Southern Healthcare Network in Melbourne as an “evidence centre”. Hospital clinicians and policy makers submit queries in a structured format with four grades of service available (Anderson, Burrows, Fennessy, & Shaw, 1999).

Reason for Exclusion: This service provided four grades of service for evidence requests, ranging from a literature search restricted to electronic information sources (1-2 weeks) to a complete topic review (8-12 weeks). The topic review systematically retrieved relevant articles, critically appraised them and then provided a detailed report of the findings. Although the literature search service is within the time frame for this review, it was not clear that evidence from the literature review was critically appraised (as per the complete topic review).

2. Clinical Enquiry Service (UK)
   Faculty of Family Planning and Reproductive Health Care; Royal College of Obstetricians and Gynaecologists, UK

The CES for faculty members and diplomates will be based on a structured evidence-based approach that aims to give a clear answer to the question and inform members on the process of developing the answer.

Reason for Exclusion: To our knowledge, this service is not yet running. In addition, it appears that the service will only be for members of the faculty and hence most questions will be concerned with contraceptives and reproductive health.

3. Clinical Informatics Consult Service (US)
   Vanderbilt University Medical Centre, Tennessee

This program is based in a university medical centre and brings information specialists directly into the clinical intensive care setting, where they provide just-in-time, patient-specific information. In response to questions from clinical teams, CICS librarians provide searching and synthesis of the literature that may
take up to several hours to complete.

*Reason for Exclusion:* There was no published information on this service and we were unable to elicit a response to the survey despite a number of attempts. Information contained in Table 11 was extracted from information at the website.

4. **Doctorline (Italy)**
Doctorline is an independent, unbiased, toll-free medical information service that provides information on clinical, pharmacologic, and toxicologic issues; bibliographic searches; full-text articles; public and private clinics; details of forthcoming congresses; and legislative documentation. Staff members are physicians trained in communication techniques, literature evaluation methodologies, and computerized database use (Nobili et al., 1998).

*Reason for Exclusion:* Could not ascertain whether the information was critically appraised before it was delivered to consumers either online or offline.

5. **South Essex Question Service (UK)**
Individual nurses and doctors working in primary care were approached, encouraged to think about their clinical behaviour and to identify topics where they thought they might like to have more evidence wither to justify their current clinical practice or to stimulate change. The personal approach was labour-intensive but seemed to provide a good yield in questions. The project took two years and the informaticists have tackled over 125 topics.

*Reason for Exclusion:* This service fitted two of the criteria but the turn around time was in excess of our cut-off of ≤ 14 days. This service aimed for a turn around time of a month but initially took 2-3 months. This service was published alone (Martin & Kauser, 2001) and also compared against the ICCCIP project in a published paper (Greenhalgh et al., 2002; Martin & Kauser, 2001).
Table 1. Summary of the search of the electronic databases

<table>
<thead>
<tr>
<th>Step in process</th>
<th>Medline</th>
<th>CINAHL</th>
<th>APAIS-Health</th>
<th>AMI</th>
<th>EMBASE</th>
<th>Cochrane Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potentially relevant identified and screened</td>
<td>1459</td>
<td>636</td>
<td>7</td>
<td>117</td>
<td>298</td>
<td>128</td>
</tr>
<tr>
<td>Citations excluded after the title/abstract reviewed</td>
<td>1427</td>
<td>607</td>
<td>7</td>
<td>116</td>
<td>298</td>
<td>127</td>
</tr>
<tr>
<td>Citations excluded after the full text reviewed</td>
<td>27</td>
<td>28</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Studies included in the review</td>
<td>5</td>
<td>1 (^a)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) This article was already found in Medline.
Table 2. Classification of clinical questions answered by different services

<table>
<thead>
<tr>
<th>Service</th>
<th>Treatment / Therapy</th>
<th>Aetiology</th>
<th>Prognosis</th>
<th>Diagnosis &amp; Screening</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUEST/AQUA</td>
<td>104</td>
<td>27</td>
<td>21</td>
<td>8</td>
<td></td>
<td>160</td>
</tr>
<tr>
<td>Hayward</td>
<td>32</td>
<td>1</td>
<td>3</td>
<td>9</td>
<td></td>
<td>45</td>
</tr>
<tr>
<td>ATTRACT</td>
<td>124</td>
<td>5</td>
<td>0</td>
<td>15</td>
<td>49&lt;sup&gt;a&lt;/sup&gt;</td>
<td>193</td>
</tr>
<tr>
<td>Imperial College</td>
<td>40</td>
<td>6</td>
<td>0</td>
<td>14</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Juche</td>
<td>24</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>31</td>
</tr>
<tr>
<td>Merlin</td>
<td>222</td>
<td>42</td>
<td>0</td>
<td>78</td>
<td>154&lt;sup&gt;c&lt;/sup&gt;</td>
<td>500</td>
</tr>
<tr>
<td>Pooled</td>
<td>550</td>
<td>84</td>
<td>26</td>
<td>125</td>
<td>204</td>
<td>989</td>
</tr>
</tbody>
</table>

<sup>Pooled (%)</sup> 55.6 8.5 2.6 12.6 20.6 100

<sup>a</sup> Other included: harm (23), general, organizational and guidelines
<sup>b</sup> Side effects
<sup>c</sup> General information, risks/associations (non-drug), alternative therapies, non-clinical, cost-effectiveness/rationing and evidence base for time honoured practices.
Table 3. Proportion of questions that were answered by service

<table>
<thead>
<tr>
<th>Service</th>
<th>Total number of Questions</th>
<th>Could be answered, or evidence found</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quest</td>
<td>116</td>
<td>85</td>
<td>73%</td>
</tr>
<tr>
<td>AQUA</td>
<td>44</td>
<td>37</td>
<td>84%</td>
</tr>
<tr>
<td>ICCIP</td>
<td>60</td>
<td>57</td>
<td>95%</td>
</tr>
<tr>
<td>‘Charite’</td>
<td>34</td>
<td>31</td>
<td>91%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>254</strong></td>
<td><strong>210</strong></td>
<td><strong>83%</strong></td>
</tr>
</tbody>
</table>

Table 4. Hayward's classification of evidence sources

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>No. of sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>****</td>
<td>High quality</td>
<td>3</td>
</tr>
<tr>
<td>***</td>
<td>Moderate</td>
<td>21</td>
</tr>
<tr>
<td>**</td>
<td>Limited</td>
<td>18</td>
</tr>
<tr>
<td>*</td>
<td>Weak</td>
<td>10</td>
</tr>
<tr>
<td>NR</td>
<td>Not Rated</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>59</strong></td>
</tr>
</tbody>
</table>

(Also ‘Charite’ rated evidence sources)
<table>
<thead>
<tr>
<th>Name of service</th>
<th>Information Source</th>
<th>Location</th>
<th>Date of operation</th>
<th>No. of staff</th>
<th>Funding</th>
<th>Funding Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Hayward’</td>
<td>Reference</td>
<td>Adelaide</td>
<td>Nov-98 (1 month)</td>
<td>2 GPs and 1 info. specialist</td>
<td>Yes</td>
<td>UK/NHS</td>
</tr>
<tr>
<td>QUEST</td>
<td>Reference and Personal Communication</td>
<td>Queensland</td>
<td>Feb - Oct 1999</td>
<td>1 Research Assistant</td>
<td>Yes</td>
<td>Commonwealth Government of Australia</td>
</tr>
<tr>
<td>AQUA</td>
<td>Reference and Personal Communication</td>
<td>Victoria</td>
<td>Feb - Oct 1999</td>
<td>1 Research Assistant</td>
<td>Yes</td>
<td>Commonwealth Government of Australia</td>
</tr>
<tr>
<td>EBM Fellow</td>
<td>Ref and Survey</td>
<td>Royal Children's Hospital, Brisbane, Daw Park, Adelaide</td>
<td>May 1999 - Nov 1999</td>
<td>1</td>
<td>Yes</td>
<td>RCH Clinical Research Fellowship</td>
</tr>
<tr>
<td>Clinical Evidence Researcher Service (CERS)</td>
<td>Survey</td>
<td>Daw Park, Adelaide</td>
<td>July 2002 – January 2003</td>
<td>0.5</td>
<td>Yes</td>
<td>National Institute of Clinical Studies (Australia)</td>
</tr>
<tr>
<td>Joanna Briggs Institute (JBI)</td>
<td>Survey</td>
<td>Adelaide</td>
<td>07/97 – present</td>
<td>4</td>
<td>Yes</td>
<td>Membership</td>
</tr>
<tr>
<td>Imperial College clinical informaticist project (ICCIP)</td>
<td>Reference and Survey</td>
<td>London: 2 10 care groups Fulham and Hammersmith</td>
<td>11/98 - 10/00</td>
<td>1.5</td>
<td>Yes</td>
<td>NHS Executive</td>
</tr>
<tr>
<td>ATTRACT</td>
<td>Reference and Survey</td>
<td>Wales</td>
<td>01/97 - present</td>
<td>2.5</td>
<td>Yes</td>
<td>Primary care Budget</td>
</tr>
<tr>
<td>Merlin GP Information (Merlin)</td>
<td>Ref and Survey</td>
<td>East Surrey Health Authority</td>
<td>10/96 -2002</td>
<td>4</td>
<td>Yes</td>
<td>East Surrey &amp; Regional Health Authorities</td>
</tr>
<tr>
<td>Clinical Effectiveness Enquiry Service (CEES)</td>
<td>Survey</td>
<td>London (Royal Free &amp; Univ. College medical School)</td>
<td>04/02 - ongoing</td>
<td>1</td>
<td>Yes</td>
<td>NHS</td>
</tr>
<tr>
<td>‘Charite’</td>
<td>Reference</td>
<td>Charite Medical Centre, Berlin</td>
<td>08/01 -12/01 (6 weeks?)</td>
<td>2</td>
<td>Not stated</td>
<td>Not stated</td>
</tr>
<tr>
<td>NZ Health Technology Assessment Unit (NZHTA)</td>
<td>Survey</td>
<td>Christchurch, NZ</td>
<td>06/97 - present</td>
<td>12 EFT</td>
<td>Yes</td>
<td>NZ Ministry of Health (10 source)</td>
</tr>
<tr>
<td>Name of service</td>
<td>Users of service</td>
<td>Were users trained in evidence-based practice?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>-----------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘Hayward’</td>
<td>GPs</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QUEST</td>
<td>GPs after EBM workshop</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQUA</td>
<td>GPs in 2 divisions of GP</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBM Fellow</td>
<td>Registrars &amp; Consultants (not surgical staff)</td>
<td>No formal training (some advice on framing questions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CERS</td>
<td>Clinicians; Specialists - any doctor associated with Repat Gen Hospital Depts of Resp Med; Sleep Disorders, Rheumatology</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JBI</td>
<td>Clinicians; Specialists; Nurses; Midwives; Allied Health Profs</td>
<td>Yes: workshops on clinical effectiveness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICCIP</td>
<td>GPs nurses, allied health</td>
<td>Yes: some help to formulate questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATTRACT</td>
<td>GPs, nurses, Allied Health</td>
<td>No, not as part of service</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merlin</td>
<td>GPs, nurses, public health nurses, Allied health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEES</td>
<td>GPs, clinicians, nurses, allied health: all Hampstead NHS staff</td>
<td>Yes; question formulation; Library courses available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘Charite’</td>
<td>Clinicians; specialists</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZHTA</td>
<td>GPs; nurses; clinicians; allied health; non-clients for fee</td>
<td>Yes; training workshops available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 7. Searching process and other aspects of clinical information services

<table>
<thead>
<tr>
<th>Name of service</th>
<th>Time to research</th>
<th>Turn around time</th>
<th>Question delivery</th>
<th>Training of staff</th>
<th>Search cascade</th>
<th>Level of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>'Hayward'</td>
<td>2.5h (1.0 - 7.4)</td>
<td>3 days (1 - 12)</td>
<td>Post/fax/email/</td>
<td>2 GPs with training in critical appraisal; 1 info. specialist</td>
<td>CL, BE, Primary literature search</td>
<td>Highest only</td>
</tr>
<tr>
<td>QUEST</td>
<td>3 h 32 m (2.67 - 3.97)</td>
<td>1 week (urgent more quickly)</td>
<td>Fax/email/Pathology courier then fax/phone/in person</td>
<td>BSc (Pod), Training in searching &amp; critical appraisal</td>
<td>PubMed (CQ), Medline, CL, SUMsearch, BE, Inforetriever, CATbank, Bandolier</td>
<td>Highest level only</td>
</tr>
<tr>
<td>AQUA</td>
<td>3 h 32 m (2.67 - 3.97)</td>
<td>1 week (urgent more quickly)</td>
<td>Fax/email</td>
<td>BSc, GradDipLIS</td>
<td>PubMed (CQ), Medline, CL, SUMsearch, BE, Inforetriever, CATbank, Bandolier</td>
<td>Highest level only</td>
</tr>
<tr>
<td>EBM Fellow</td>
<td>3.1 ± 1.65 h</td>
<td>~24 hours</td>
<td>Request form (in person?)</td>
<td>Medical: trained in information retrieval Librarian; EBM (MPH)</td>
<td>CL, BE, PubMed (CQ)</td>
<td>All levels</td>
</tr>
<tr>
<td>CERS</td>
<td>~24 hours</td>
<td>In person on wards rounds (majority)</td>
<td>Phone; email</td>
<td>Nursing; EBM Medical, EBM</td>
<td>CL, BE, TRIP, Bandolier, CE, EBM websites, Medline, other</td>
<td>Highest Level</td>
</tr>
<tr>
<td>JBI</td>
<td>130 min (25-450)</td>
<td>2 weeks</td>
<td>Phone/email/in person</td>
<td>Nursing; Librarian EBM</td>
<td>Yes</td>
<td>Highest</td>
</tr>
<tr>
<td>ICCIP</td>
<td>9 days</td>
<td>Phone; fax; email; post</td>
<td>Naval, Librarian EBM</td>
<td>Medical, EBM</td>
<td>CL, TRIP, CE, PubMed, Embase, Google</td>
<td>All levels</td>
</tr>
<tr>
<td>ATTRACT</td>
<td>3 levels: =6h, 2-3 days, 5-10 days</td>
<td>Phone; fax; email; post</td>
<td>Naval, Librarian EBM</td>
<td>Medical, EBM</td>
<td>CL, TRIP, Medline, Embase, other EBM sites, Guidelines, Textbooks</td>
<td>Highest level</td>
</tr>
<tr>
<td>Merlin</td>
<td>10 days (2-3 days)</td>
<td>Phone; fax; email; post in person</td>
<td>Librarian, EBM</td>
<td>Medical, EBM</td>
<td>CE, CL, PubMed (CQ), TRIP</td>
<td>All levels</td>
</tr>
<tr>
<td>CEES</td>
<td>2 days (urgent/non-urgent)</td>
<td>7 h (3-32)</td>
<td>Email</td>
<td>Medical; EBM Medical, Nursing, Librarian, EBM and other*</td>
<td>CE, CL, ACP, TRIP, PubMed Medline, CL, Embase, PubMed, CC, Web of Science</td>
<td>Not stated</td>
</tr>
<tr>
<td>'Charite'</td>
<td>Hours-weeks: depends on complexity of request</td>
<td>7 h (3-32)</td>
<td>Phone; fax; email; post in person</td>
<td>Medical; EBM Medical, Nursing, Librarian, EBM and other*</td>
<td>CE, CL, ACP, TRIP, PubMed Medline, CL, Embase, PubMed, CC, Web of Science</td>
<td>All - depends on clients</td>
</tr>
<tr>
<td>Name of service</td>
<td>Summary of results</td>
<td>Format of report</td>
<td>Reuse of information</td>
<td></td>
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<tr>
<td>-----------------</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>‘Hayward’</td>
<td>Yes</td>
<td>Narrative, citations, appraisal of validity, applicability, strength (1-4*)</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QUEST</td>
<td>Yes</td>
<td>Comment, applicability, quality of evidence, search strategy, abstracts of citations</td>
<td>Yes, Website at each site - CAT bank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQUA</td>
<td>Yes</td>
<td>Comment, applicability, quality of evidence, search strategy, abstracts of citations</td>
<td>Yes, Website at each site - CAT bank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBM Fellow</td>
<td>Yes</td>
<td>Summary, search strategy, abstracts of citations</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CERS</td>
<td>Yes</td>
<td>Summary, references</td>
<td>No, permission sought for website; copies to group on ward rounds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JBI</td>
<td>Yes</td>
<td>Summary, search strategy, references, data extract or synthesis or meta-analysis</td>
<td>Website, CAT bank, incorporated into Practice Manual Development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICCIP</td>
<td>Yes</td>
<td>Summary, references</td>
<td>Project website, newsletter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATTRACT</td>
<td>Yes and crude appraisal</td>
<td>Written summary and references (search strategy via website)</td>
<td>Yes: Websites: BMJ &amp; ATTRACT; Newsletter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Merlin</td>
<td>Yes</td>
<td>Written summary, reference list</td>
<td>CAT bank; Local intranet; website in future</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEES</td>
<td>No</td>
<td>Search Strategy, references (Print and email, full text if electronic)</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‘Charite’</td>
<td>Yes</td>
<td>Summary, appraisal, search strategy, original question, classification. of evidence</td>
<td>Not stated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NZHTA</td>
<td>Yes</td>
<td>Summary, search strategy, references, (other depends on client)</td>
<td>Website, newsletter, hard copies available for purchase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of service</td>
<td>Formal evaluation</td>
<td>Ref</td>
<td>No. available to service</td>
<td>No. used service</td>
<td>No. questions</td>
<td>Impact of service</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------</td>
<td>-----</td>
<td>-------------------------</td>
<td>-----------------</td>
<td>--------------</td>
<td>------------------</td>
</tr>
<tr>
<td>‘Hayward’</td>
<td>8/21; 1 declined</td>
<td>Y</td>
<td>31</td>
<td>9</td>
<td>20 enquiries</td>
<td>Useful in CDM</td>
</tr>
<tr>
<td>QUEST</td>
<td>73% response rate</td>
<td>Y</td>
<td>71</td>
<td>41</td>
<td>45 questions</td>
<td>Reliable, prompt, easy to use, influential</td>
</tr>
<tr>
<td>AQUA</td>
<td>76% rr</td>
<td>Y</td>
<td>17?</td>
<td>17</td>
<td>44</td>
<td>See QUEST (same evaluation)</td>
</tr>
<tr>
<td>EBM Fellow CERS</td>
<td>January 2003</td>
<td>N</td>
<td>All doctors at RGH</td>
<td>Not evaluated</td>
<td>Not evaluated</td>
<td>Mean user satisfaction 8.4/10</td>
</tr>
<tr>
<td>JBI</td>
<td>No</td>
<td>N</td>
<td>All members: corporate, individuals</td>
<td>20-30 per year</td>
<td>20-30 per year</td>
<td></td>
</tr>
<tr>
<td>ICCIP</td>
<td>17/22 = 77%</td>
<td>Y</td>
<td>100 invited, 34 registered</td>
<td>22</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>ATTRACT</td>
<td>42/50 = 84%</td>
<td>Y</td>
<td>~1700 GPs (~500 practices); GPs 90% queries</td>
<td>~1/3 of practices</td>
<td>193 in 13 months; ~15-20/week</td>
<td>Useful, quick, would use again</td>
</tr>
<tr>
<td>Merlin</td>
<td>34/139= 24%</td>
<td>Y</td>
<td>225 GPs (1996-2000)</td>
<td>139</td>
<td>500 (96% from GPs)</td>
<td>Good or adequate quality</td>
</tr>
<tr>
<td>CEES</td>
<td>Yes</td>
<td>N</td>
<td>Unknown</td>
<td>~85 at 10/02</td>
<td>162 (1.4.02 - 31.10.02)</td>
<td></td>
</tr>
<tr>
<td>‘Charite’</td>
<td>Yes</td>
<td>Y</td>
<td>All clinicians at a university hospital</td>
<td>2.3% of clinicians</td>
<td>34</td>
<td>Answers were good, comprehensible and transparent</td>
</tr>
<tr>
<td>NZHTA</td>
<td>Yes (internal by NZ MoH)</td>
<td>N</td>
<td>NZ health professionals; purchasers; policy makers</td>
<td>Unknown</td>
<td>30-40 in depth/year, other reference enquiries</td>
<td></td>
</tr>
</tbody>
</table>
Table 10. Efficiency and other aspects of clinical information services

<table>
<thead>
<tr>
<th>Name of service</th>
<th>Duration (days)</th>
<th>No. of questions</th>
<th>Person days/question</th>
<th>Person days/ altered decision</th>
<th>Other aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Hayward’ QUEST</td>
<td>1 month (30 days)</td>
<td>45</td>
<td>2</td>
<td>8 (4/20)</td>
<td></td>
</tr>
<tr>
<td>AQUA</td>
<td>9x 30.4 days = 274</td>
<td>116</td>
<td>2</td>
<td>18 (15/26)</td>
<td>Concordance of answers between 2 services</td>
</tr>
<tr>
<td>EBM Fellow</td>
<td>7 x 30.4 = 213 days</td>
<td>41</td>
<td>5</td>
<td>43 (5/26)</td>
<td>Concordance of answers between 2 services, Critical appraisal journal club - CAT bank on website</td>
</tr>
<tr>
<td>CERS</td>
<td>7 x 30.4 days</td>
<td>Not evaluated yet</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>JBI</td>
<td>5 years, 3 mo = 1916 days</td>
<td>20-30 per year (131)</td>
<td>59</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>ICCIP ATTRACT</td>
<td>23 months = 700 days</td>
<td>60</td>
<td>18</td>
<td>47 (15/54)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13 mo x 30.4 = 395 days</td>
<td>193 in 13 months;</td>
<td>5</td>
<td>16 (24/42)</td>
<td></td>
</tr>
<tr>
<td>Merlin</td>
<td>5 years x 365 = 1825 days</td>
<td>500</td>
<td>3</td>
<td>42 (44/139 enquirers = 32%) change greatly; 24 (75/139 = 54%) change some extent; 15 (119/139) any change</td>
<td></td>
</tr>
<tr>
<td>CEESS</td>
<td>7 months x 30.4 = 213 days</td>
<td>162 (1.4.02 – 31.10.02)</td>
<td>1</td>
<td>Not evaluated</td>
<td></td>
</tr>
<tr>
<td>‘Charite’</td>
<td>6 weeks x 7 = 42 days</td>
<td>34</td>
<td>3</td>
<td>No; minimally or not at all</td>
<td></td>
</tr>
<tr>
<td>NZHTA</td>
<td>5 years, 4 mo = 1947 days</td>
<td>30-40/year, (187)</td>
<td>125</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

NA – Not available
Table 11. Summary of characteristics of excluded services

<table>
<thead>
<tr>
<th>Name of service</th>
<th>Centre for Clinical Effectiveness</th>
<th>Clinical Enquiry Service</th>
<th>Clinical Informatics Consult Service</th>
<th>Doctorline</th>
<th>South Essex Question Service</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. General Aspects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source</td>
<td>Reference</td>
<td>Website</td>
<td>Website, survey – no response</td>
<td>Reference</td>
<td>Ref and Survey</td>
</tr>
<tr>
<td>Location</td>
<td>Melbourne &amp; Southern Healthcare Network</td>
<td>FFPRH; FROG - UK</td>
<td>Vanderbilt University Tennessee, US</td>
<td>Italy</td>
<td>South Essex (3 cities ~ 700 000 population</td>
</tr>
<tr>
<td>Date of operation</td>
<td>April 98 – present (3 + 0.5 director) x 0.45</td>
<td>Current</td>
<td>Current</td>
<td>1991 – present (?)</td>
<td>12/98 - present 0.4 GP, 0.2 nurse</td>
</tr>
<tr>
<td>No. of staff</td>
<td>(3 + 0.5 director) x 0.45</td>
<td>Not stated</td>
<td>7</td>
<td>17 part-time (12 h/wk each), 1 full-time director</td>
<td></td>
</tr>
<tr>
<td>Funding</td>
<td>Yes</td>
<td>Assumed</td>
<td>Not stated</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Funding Source</td>
<td>Hospital, state, external, contracts</td>
<td>FFPRH, RCOG</td>
<td>Not stated</td>
<td>Pharmaceutical companies - but independent advice</td>
<td></td>
</tr>
<tr>
<td><strong>2. Consumers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Users of service</td>
<td>SHN hospital clinicians and policy makers</td>
<td>Members and diplomats, FFPRH</td>
<td>Clinical teams Vanderbilt University</td>
<td>GPs, specialists, hospital physicians, pharmacists, librarians</td>
<td>Mostly GPs – All primary care workers including administrators</td>
</tr>
<tr>
<td>Users trained in EBM</td>
<td>No</td>
<td>Aim to inform members on process of developing an answer</td>
<td>No. Aim to make local users proficient.</td>
<td>No</td>
<td>No. Aim to make users proficient. Local courses available.</td>
</tr>
<tr>
<td><strong>3. Searching process</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn around time</td>
<td>1-2 weeks (lit review)</td>
<td>7 days during development phase; aim for 48-72 h in early 2003</td>
<td>Several hours</td>
<td>Online telephone or offline – further searching</td>
<td>Aim for 1 month (initially 2-3 mo)</td>
</tr>
<tr>
<td>Question delivery</td>
<td>Structured format</td>
<td>Telephone, fax, email, post</td>
<td>Not stated</td>
<td>Toll-free telephone</td>
<td>Post; website</td>
</tr>
<tr>
<td>Training of staff</td>
<td>All literature searching others: clinical, IT, epidemiology, etc</td>
<td>Not stated</td>
<td>Information specialists (clinical library)</td>
<td>Clinical, specific training for service – up to 9 weeks</td>
<td>GPs, Nurses, Librarians</td>
</tr>
</tbody>
</table>

...continued
<table>
<thead>
<tr>
<th>Name of service</th>
<th>Centre for Clinical Effectiveness</th>
<th>Clinical Enquiry Service</th>
<th>Clinical Informatics Consult Service</th>
<th>Doctorline</th>
<th>South Essex Question Service (Basildon)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search cascade</td>
<td>BE, CL, PubMed, PyChinfor, HealthSTAR, Embase, other websites</td>
<td>Evidence based search</td>
<td>RCTs; prospective controlled studies; guidelines;</td>
<td>Online: Medline, Micromedix CCIS Offline- bibliographic search (sent email/fax)</td>
<td>No formal</td>
</tr>
<tr>
<td>Level of evidence</td>
<td>Highest</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Highest</td>
<td>All levels</td>
</tr>
<tr>
<td>4. Output Appraisal</td>
<td>Summary of results</td>
<td>Yes</td>
<td>Yes</td>
<td>Not clearly stated</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Format of report</td>
<td>Literature search restricted to electronic information sources</td>
<td>Concise written summary, references</td>
<td>Online – answer</td>
<td>Summary, appraisal, list of references</td>
</tr>
<tr>
<td></td>
<td>Reuse of information</td>
<td>Website</td>
<td>Website</td>
<td>Website and updated every 6 months</td>
<td>No. Questions filed for database management</td>
</tr>
<tr>
<td>5. Evaluation</td>
<td>Formal evaluation</td>
<td>86% response rate, first 11 months</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Published</td>
<td>Anderson et al, 1999</td>
<td>Not stated</td>
<td>Ref # x</td>
<td>Ref # x</td>
</tr>
<tr>
<td></td>
<td>No. available to</td>
<td>SHN staff, Members and Diplomates of FFPRHC, RCOG, UK.</td>
<td>Clinical teams Vanderbilt University Medical Centre</td>
<td>52 181 during Jan 94 – Dec 96</td>
<td>150+ practices</td>
</tr>
<tr>
<td></td>
<td>No. used service</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>8817 (16.9%); 34% GPs</td>
</tr>
<tr>
<td></td>
<td>No. questions</td>
<td>59 completed out of 77 requests</td>
<td>Not stated</td>
<td>65 258 for 1991-1996, 46 per day</td>
<td>~100</td>
</tr>
<tr>
<td></td>
<td>Impact of service</td>
<td>Users satisfied with information and timeliness, repeat business.</td>
<td>Not stated</td>
<td>Not evaluated. Future direction.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Influence clinical management</td>
<td>4/18 likely, 11/18 very likely to alter future practice</td>
<td>Not stated</td>
<td>Not evaluated. Future direction.</td>
<td>Not evaluated, now ask it</td>
</tr>
<tr>
<td></td>
<td>Evaluation of clinical relevance of questions</td>
<td>No</td>
<td>Not stated</td>
<td>Quality control of random sample of on- and off-line answers.</td>
<td>Not stated</td>
</tr>
<tr>
<td>6. Other</td>
<td>4 grades of service: complete topic review (8-12 wks)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Glossary

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACP</td>
<td>ACP Journal Club</td>
</tr>
<tr>
<td>AQUA</td>
<td>All Questions Answered</td>
</tr>
<tr>
<td>ATTRACT</td>
<td>Ask TRIP To Rapidly Alleviate Confused Thoughts</td>
</tr>
<tr>
<td>BE</td>
<td>Best Evidence</td>
</tr>
<tr>
<td>CC</td>
<td>Current Contents</td>
</tr>
<tr>
<td>CDM</td>
<td>Clinical Decision Making</td>
</tr>
<tr>
<td>CE</td>
<td>Clinical Evidence</td>
</tr>
<tr>
<td>CIS</td>
<td>Clinical Information Service</td>
</tr>
<tr>
<td>CL</td>
<td>Cochrane Library</td>
</tr>
<tr>
<td>CQ</td>
<td>Clinical Queries (PubMed)</td>
</tr>
<tr>
<td>EBM</td>
<td>Evidence-Based Medicine</td>
</tr>
<tr>
<td>EBP</td>
<td>Evidence-Based Practice</td>
</tr>
<tr>
<td>NA</td>
<td>Not Available</td>
</tr>
<tr>
<td>QUEST</td>
<td>Queensland University Evidence Search Trial</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomised Controlled Trial</td>
</tr>
<tr>
<td>TRIP</td>
<td>Turning Research Into Practice</td>
</tr>
</tbody>
</table>
References and Reports

Included Clinical Information Services

‘Hayward’:
2. Survey sent – no response.

QUEST:
2. Personal Communication

AQUA:
2. Personal Communication

EBM Fellow:
2. Survey

Clinical Evidence Researcher Service (CERS):
1. Survey – Ruth Sladek

Joanna Briggs Institute (JBI):
1. Survey - Craig Lockwood

Imperial College Clinical Informaticist Project (ICCIP):
3. Survey – T Greenhalgh, D. Swinglehurst
**ATTRACT:**
2. Survey

**Merlin GP Information:**
2. Survey

**Clinical Effectiveness Enquiry Service (CEES):**
1. Survey – Laura Tucker

‘Charite’:
2. Survey sent – no response.

**New Zealand Health Technology Assessment Unit (NZHTA):**
1. Survey – Ray Kirk

**Excluded Clinical Information Services**

1. **Centre for Clinical Effectiveness (Australia):**

2. **Clinical Enquiry Service – Faculty of Family Planning and Reproductive Health Care: Royal College of Obstetricians and Gynaecologists, UK:**

3. **Clinical Informatics Consult Service (US)**
URL: http://www.mc.vanderbilt.edu/biolib/services/cics.html (Accessed 11.12.02)

4. **Doctorline (Italy):**

5. **South Essex Question Service (UK):**


**Doctorline (Italy):**

**All Published References**


Appendix A

Search Strategies

**APAIS – Health (1995-)**
- ((EVIDENCE-BASED) or (evidence or literature)) and ((INFORMATION-SERVICES) or (apprais* or summar* or distil*))
- (INFORMATION-SERVICES) or (apprais* or summar* or distil*)
- apprais* or summar* or distil*
- 'Information-Storage-and-Retrieval' / all subheadings
- 'Databases-Bibliographic' / all subheadings
- 'Decision-Support-Systems-Clinical' / all subheadings
- INFORMATION-SERVICES
- (EVIDENCE-BASED) or (evidence or literature)
  - evidence or literature
  - EVIDENCE-BASED

**AMI (1995-)**
- ("Evidence-Based-Medicine" / all subheadings) or (evidence or literature) and ("Decision-Support-Techniques" / all subheadings) or ("Information-Services" / all subheadings) or ("Databases-Bibliographic" / all subheadings) or ((apprais* or summar* or distil*) and (PY=1995-2003))
- ("Decision-Support-Techniques" / all subheadings) or ("Information-Services" / all subheadings) or ("Databases-Bibliographic" / all subheadings) or ((apprais* or summar* or distil*)
- (apprais* or summar* or distil*)
- 'Databases-Bibliographic' / all subheadings
- 'Information-Services' / all subheadings
- 'Decision-Support-Techniques' / all subheadings
- ("Evidence-Based-Medicine" / all subheadings) or (evidence or literature)
  - evidence or literature
  - 'Evidence-Based-Medicine' / all subheadings

**Medline (1995-)**
- ((explode "Information-Services" / organization-and-administration, supply-and-distribution, utilization in MIME,MJME) or (INFORMATION-SERVICES) or (explode "Decision-Support-Systems-Clinical" / organization-and-administration, utilization in MIME,MJME) or (INFORMATION- STORAGE-AND-RETRIEVAL) or (explode "Databases-Bibliographic" / utilization in MIME,MJME) or (QUALITY-ASSURANCE-HEALTH-CARE)) and ((literature or evidence) or ("Evidence-Based-Medicine" / all subheadings in MIME,MJME))
  - (literature or evidence) or ("Evidence-Based-Medicine" / all subheadings in MIME,MJME)
  - (explode "Information-Services" / organization-and-administration, supply-and-distribution, utilization in MIME,MJME) or (INFORMATION-SERVICES) or (explode "Decision-Support-Systems-Clinical" / organization-and-administration, utilization in MIME,MJME) or (INFORMATION- STORAGE-AND-RETRIEVAL) or (explode "Databases-Bibliographic" / utilization in MIME,MJME) or (QUALITY-ASSURANCE-HEALTH-CARE)
  - 'Evidence-Based-Medicine' / all subheadings in MIME,MJME
• (literature or evidence)
• (apprais* or summar* or distil* or recommend* or assess*)
• (quer* or question or questions)
• QUALITY-ASSURANCE-HEALTH-CARE
  • explode 'Databases-Bibliographic' / utilization in MIME,MJME
• INFORMATION-STORAGE-AND-RETRIEVAL
  • explode 'Decision-Support-Systems-Clinical' / organization-and-administration
    ,utilization in MIME,MJME
• INFORMATION-SERVICES
  • explode 'Information-Services' / organization-and-administration ,supply-and-distribution ,utilization in MIME,MJME

CINAHL (1995-)
• ((quer* or question or questions) or (appraise* or summar* or distil*)) or
  DECISION-MAKING-PATIENT or DECISION-MAKING-CLINICAL or
  INFORMATION-SERVICES) and (explode 'Professional-Practice-Evidence-Based' /
  all topical subheadings / all age subheadings in DE)
• ((explode 'Professional-Practice-Evidence-Based' / all topical subheadings / all
  age subheadings in DE) or evidence)
  • evidence
  • (explode 'Professional-Practice-Evidence-Based' / all topical subheadings / all
    age subheadings in DE)
• (quer* or question or questions) or ((appraise* or summar* or distil*) or
  DECISION-MAKING-PATIENT or DECISION-MAKING-CLINICAL or
  INFORMATION-SERVICES)
• INFORMATION-SERVICES
• DECISION-MAKING-CLINICAL
• DECISION-MAKING-PATIENT
• (appraise* or summar* or distil*)
• (quer* or question or questions)

Embase (1995-)
• ("evidence-based-medicine" / all subheadings) or ((evidence or literature)) and
  ("decision-support-system" / all subheadings) or ("health-care-quality" / without-
  subheadings) or ("information-service" / without-subheadings) and (LS=ENGLISH)
• ("decision-support-system" / all subheadings) or ("health-care-quality" / without-
  subheadings) or ("information-service" / without-subheadings)
• 'information-service' / without-subheadings
• 'health-care-quality' / without-subheadings
• (apprai* or summar* or distil*)
• 'decision-support-system' / all subheadings
• ("evidence-based-medicine" / all subheadings) or (evidence or literature))
• (evidence or literature)
• 'evidence-based-medicine' / all subheadings
Cochrane Library
• #1 EVIDENCE-BASED-MEDICINE single term (MeSH)
• #2 (evidence or literature)
• #3 (#1 or #2)
• #4 INFORMATION SERVICES explode tree 1 (MeSH)
• #5 INFORMATION SYSTEMS explode tree 1 (MeSH)
• #6 INFORMATION STORAGE AND RETRIEVAL explode tree 1 (MeSH)
• #7 DECISION SUPPORT SYSTEMS CLINICAL explode tree 1 (MeSH)
• #8 (inform* next service*)
• #9 (apprai* or summar* or distil*)
• #10 (#4 or #5 or #6 or #7 or #8)
  #11 (#3 and #10)
Appendix B

Second Email Questionnaire

Survey of Clinical Information Services
Centre for General Practice, School of Population Health, University of Queensland,
Herston 4006 QLD Australia

Please could you spare a little time to fill out the following survey? It should take 6 minutes to complete. You can complete online or fax it back to us at: +61 7 3365 5130.
We will send you a copy of the final report if you want. Yes  No

1. General Aspects
1.1. Name of service (if relevant)________________
1.2. Where was the service located?(e.g. city/area)________________
1.3. When did your service operate?  From: mm/yy  To: mm/yy
1.4. How many people worked in the service (staff)?  ________  (use decimals for part-time)
1.5. Were you independently funded?  Yes  No
1.6. If Yes, from what source? __________________

2. End Information Users
2.1. Which of the following groups could use your service? (Mark all that apply)
a) GPs   Yes  No
b) Clinicians/Specialists  Yes  No
c) Nurses  Yes  No
d) Allied Health Professionals  Yes  No
(eg Physiotherapists)
e) Other (please specify):________________
2.2. Did end users receive any training in evidence-based medicine, question formulation, searching strategies, etc?  Yes  No
If Yes, please specify: _______________________

3. Searching Process
3.1. What was the average time from receipt of query to sending an answer?_________ hours; _______ days; _______ weeks
3.2. What were the modes in which questions were delivered to the information service? (Mark all that apply)
a) Phone  Yes  No
b) Email  Yes  No
c) Fax  Yes  No
d) Post  Yes  No
e) Other (please specify):________________
3.3. What was the training or background of the information service staff or searchers? (Mark all that apply)
a) Medical  Yes  No
b) Nursing  Yes  No
c) Librarian  Yes  No
d) Training in EBM  Yes  No
e) Other (Please specify):_____________
3.4. Did you have an explicit cascade process for literature searching (e.g. Cochrane review, non-Cochrane systematic review, best single randomised trial, cohort study, etc)?

Yes  No

Optional: If yes, then please describe your search process or algorithm:

3.5. Did you provide literature at only

the highest level of evidence?  Yes  No
the highest and second highest levels of evidence?  Yes  No
all levels of evidence?  Yes  No

4. Output

4.1. Was there any summary or interpretation of the search findings?
(i.e. critical appraisal, distillation, summary)  Yes  No

4.2. What was the format of the output? (Mark all that apply)

Written summary  Yes  No
Search strategy  Yes  No
References  Yes  No
Other (please specify):________________

4.3. Was there a method of ‘reusing’ the information from the questions for general use?
(Mark all that apply)

Posted on website  Yes  No
Critically Appraised Topics bank  Yes  No
Newsletter  Yes  No
Other (please specify)_____________________

5. Evaluation of Service

5.1. Was there a formal evaluation of the service?  Yes  No
If Yes, then

5.2 Were the evaluation results published?  Yes  No
If Yes, then please list citation. _________________

What was amount of use of the service?
Estimated number of people the service was available to ________
Actual number of people who used the service ________
Number of questions generated ____________
Impact of the evaluation:
a) Were the users’ decisions influenced by the results from the information service?
   Yes  No  Not evaluated
b) Was there an independent evaluation of the relevance of the clinical questions to
   practice?  Yes  No  Not evaluated

6. Other Comments

If you have any other comments please feel free to note them here.

Thank you for taking the time to answer this survey on clinical information services.
Chris Del Mar  MD FARCGP  c.delmar@cgp.uq.edu.au
Professor of General Practice  (phone) +61 7 3365 5381
University of Queensland
Appendix C

Clinical Information Services Websites


Commonwealth Department of Health & Aged Care - General Practice Evaluation Program (GPEP)

Project Title:
A rapid literature summary service to enhance evidence based clinical decisions in general practice

Brief background:
This 12-month project followed on from a short feasibility study that was successfully carried out in Adelaide in 1998.

Synopsis:
Clinical care in general practice would be improved by making more use of research already shown to be effective. However, it is difficult for GPs to find such information at the time they need it, that is, when they are making clinical decisions. We will determine whether it is possible to set up a service that achieves this.


Clinical Effectiveness Enquiry Service:  (11 Dec 2002)
http://www.rfc.ucl.ac.uk/campus%20services/library/Latest_news/Latest_News.htm

Other CIS websites

Clinical Effectiveness

The Faculty’s Clinical Enquiry Service for Members and Diplomates

The Faculty of Family Planning and Reproductive Health Care provides an enquiry service for Members and Diplomates, which operates through the Clinical Effectiveness Unit (CEU).

The majority of enquiries received by the Unit are about:

- Contraceptive options for women with recognised contraindications or complex medical conditions;
- Drug interactions with contraceptive steroids;
- Follow-up care procedures and standards;
- The availability and quality of the evidence base to support existing practices, and/or;
- Management of unusual situations in family planning and reproductive health care

The CEU’s first concern when prioritising enquiries and planning how to research the response is “do we have all the information we need?” For enquiries about the care of an individual client this would usually include data summary of:

- Relevant personal history and family history
- Current health status, drugs used and planned medical or surgical interventions
- Current contraceptive use and relevant history associated with previous contraceptive use

Clinical Informatics Consult Service

Clinical Informatics Consult Service

Coordinator:
Rebecca Jerome, MLIS

Clinical Information in Context: Enabling Informed Decisions

The Clinical Informatics Consult Service (CICS) was developed from VUMC’s innovative Clinical Medical Librarianship (CML) program. This program brings information specialists directly into the clinical intensive care setting, where they provide just-in-time, patient-specific information when and where it is needed for effective clinical decision-making and evidence-based practice.

In response to questions from clinical teams, CICS librarians provide searching and synthesis of the literature in response to the more complex