Muir Gray describes the problem well: “Busy clinicians are now caught in an information paradox—overwhelmed with information but unable to find the knowledge they need when they need it... The truth is that information cannot be dealt with by individuals alone. The organisation in which individual clinicians work has to manage knowledge as well as it manages its other resources” (1).

It may or may not be reassuring to know that medical information is but one part of a general phenomenon. The seminal tract of the digital era, Negroponte’s Being Digital (2), rejects the common assumption that information systems with unlimited capacity (i.e., bandwidth) will solve all problems related to information access. Rather, he says, the issue is specificity, or how well a system identifies what information is relevant at a particular time. This will sound familiar to those interested in evidence-based medicine. Failure to deliver appropriate information to clinicians is a critical barrier to getting research into practice (3), but what information is “appropriate”? Several strategies are available to address this. Formulating clinical questions in a structured way increases the yield of relevant information from the research literature (4). Learning critical appraisal skills allows clinicians to rate the validity, relevance, and generalisability of research (5). Using databases of methodologically rigorous evidence and developing the skills in searching needed to identify relevant information also help (6).

Unfortunately, these strategies require such disparate resources and skills that it is unrealistic to expect individual clinicians to achieve all of them (7). In the United Kingdom, for example, successful programmes have taught primary care practitioners the skills of critical appraisal (8). But, in a survey of 302 practitioners that revealed positive attitudes to evidence-based medicine, only 5% believed that “identifying and appraising primary literature and systematic reviews” was the appropriate way to move towards it (7).

“Evidence centres” that find and evaluate the best available evidence relevant to requests from clinicians provide an integrated solution to this problem (9). Several models exist in the literature (10, 11) and on the Internet (12). Monash University and the Southern Health Care Network, a public health care provider for approximately 1 million people, in Melbourne, Australia, jointly established the Centre for Clinical Effectiveness in February 1998. The centre is funded by a combination of grants from hospital and state government sources and by external research and contract funds for related projects. In addition to other programmes, we have operated an evidence centre since April 1998.

Three full-time staff members and a half-time director contribute to the work of the centre, which takes up approximately 40% to 50% of their time. Additional activities of the centre include teaching; specific research projects; and, inevitably, preparation of grant applications. The staff members each have core expertise in literature searching complemented by a range of additional skills, including experience in epidemiology; health informatics; information technology; clinical, population, and laboratory research; clinical trials; and psychiatry and psychology. These additional skills enable the staff to contribute an understanding of the clinical context of “evidence requests,” to consult with users about the best way to structure their questions, and to provide critical appraisal expertise. These 3 factors differentiate the evidence centre service from the restricted literature-searching facility offered by the local medical library.

Southern Healthcare Network hospital clinicians and policy makers submit questions to the evidence centre in a structured format that follows the recommendations of the Evidence-Based Medicine Working Group (13). To answer the structured question, users may request one of 4 grades of service, ranging from a literature search restricted to electronic information sources (1 to 2 weeks) to a complete topic review (8 to 12 weeks), which systematically retrieves relevant articles, critically appraises them, and then provides a detailed report of the findings. Introducing this system provided a useful means to prioritise the workload of the centre. We use a systematic search protocol that begins with databases of methodologically rigorous research information (e.g., Best Evidence, Cochrane Library), then moves to general databases searched with appropriate “methodological filters” (e.g., PubMed, PsycINFO, HealthSTAR, EMBASE/Excerpta Medica), before consulting specific Internet sites (e.g., Agency for Health Care Policy and Research, Centre for Evidence-Based Medicine CAT-Bank, special interest sites) and “unfiltered” database searches. Finally, we use such non-electronic sources as research bibliographies, “grey” literature, other published material, and on occasion specialist advice. Except when the service user requests a literature search alone, all reports assign the identified information to categories according to its susceptibility to bias (14). If we identify definitive information derived from research with acceptable methodological standards (e.g., uncontested findings from a systematic review), the search process stops. Otherwise the nominated time for the request determines the extent of the search.

In the first 11 months of operation, the service has received 77 “evidence requests” and completed 59 of them. The Table provides some representative examples of the questions we have received. For further information, we encourage readers to visit our Web site (15) where we post all our completed evidence reports. Our policy is to allow open access to and constructive criticism...
of our work, and we encourage collaborative ventures with other agencies.

Operating the service has allowed us to observe some interesting observations. Every user has required further consultation to clarify the nature of their request, which supports the comments of previous authors about the difficulty that clinicians have formulating questions that research can answer (4). Users come from a range of professional disciplines. 32% were doctors, 22% were nurses, and 14% were policy makers or service managers. Whereas 45% of users requested literature searches alone, the remainder requested services that provided additional interpretation of the identified information. 35% of users requested a complete topic review.

Of the 59 evidence requests completed up to April 1999, 86% of service users responded to a mailed evaluation exercise. On a 5-point Likert scale, 25% of them were "satisfied," and 73% were "very satisfied" with the information they received. With respect to timeliness, 33% of users were "satisfied," and 55% were "very satisfied" with the service. When asked how well the service answered their question, 38% of users replied "moderately well," and 48% replied "very well." There was a relatively high proportion of "repeat business": 19% of service users had submitted requests previously. We have completed 20 of the 27 requests for topic reviews to date. Of the 18 service users who responded, 4 reported that it was "likely" and 11 reported that it was "very likely" that the review would alter their future clinical practice. These data clearly have methodological limitations that restrict their interpretation. Besides sampling issues, for example, we cannot estimate how much clinicians base their current practice on good evidence. Nevertheless, the results suggest that users value the evidence centre and that it might have a clinical impact. They provide encouragement to continue the service and evaluate it in a more rigorous fashion over the next 12 months.

We feel that we provide the knowledge management infrastructure and associated support for an evidence-based clinical culture that offers a suitable treatment for the "information paradox," but we are aware that these are early days. In the future, we will increase our staff, extend our service, bring it closer to where clinicians and consumers meet, and improve our assessment of its effectiveness.

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References
1. Gray JA. Where's the chief knowledge officer? To manage the most precious resource of all. BMJ. 1999;317:832.

Typical questions received by the Evidence Centre at the Centre for Clinical Effectiveness

1. What evidence exists for predicting risk for falls in the community-dwelling elderly?
2. What is the evidence for the efficacy of endoluminal stenting in the treatment of abdominal aortic aneurysm?
3. What is the evidence for the cost-effectiveness of nutritional support?
4. In coronary artery bypass graft surgery, do arteries or veins provide better long-term patency and reduction of angina?
5. Does clomiphene citrate increase pregnancy rates in women who ovulate spontaneously?
6. Can pregnant women with premature rupture of membranes be managed at home?