Managing knowledge in occupational health care
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Chapter 1

General introduction
Quality in occupational health care

Physicians have the responsibility to keep up-to-date with developments in their field in order to guarantee a high level of quality of health care. It is no longer regarded as sufficient, when physicians rely only on the knowledge from their professional education and on the practical experience gained afterwards during their working lives. There is public concern for the quality of health care, and society demands accountability on the part of physicians. What up till now had solely been in the hands of health professionals is increasingly being judged by others. Authorities are getting more involved in the quality of health care delivery and are setting up standards which physicians have to meet. For instance, the introduction of managed care, such as programmes for reviewing the medical necessity of specific services and controls on inpatient admissions and lengths of stay, leads to physicians having to justify their decisions and validate their advice. Moreover, patients are behaving more like articulate consumers. Since the mass availability of the Internet, access to health- and health care information has become much easier and physicians are expected to know, discuss, and explain the medical information found by patients. However, science is moving fast, resulting in an enormous amount of new evidence which is expanding every day, making it difficult for physicians to keep up-to-date.

For occupational physicians (OPs), it is probably even harder to keep up-to-date than it is for most medical specialists. Most medical specialists have to keep up-to-date only in their own (organ-specific) medical field, whereas OPs, like general practitioners and e.g. specialists in internal medicine, have to keep up in a broader range of medical fields, since they see patients with a wide variety of health questions and diseases. OPs focus their tasks primarily on three key objectives:
1. They support the maintenance and promotion of workers’ health and working capacity; 2. They improve the working environment and the work itself, to make it conducive to safety and health; and 3. They develop the organization of work, and working cultures so that health and safety at work is supported, and in doing so, they also promote a positive social climate and smooth-running operation, and may
enhance the productivity of the enterprise. This implies that OPs have to take into account not only the values, expectations, and interests of the patient or employee, but also those of other stakeholders, e.g. employers, company management, works councils, and government (legislation). Correspondingly, it is known that OPs require valid information on, in particular, medical, legal and rehabilitation topics on a daily basis.

However, it seems that although OPs need to be up-to-date, by using the latest evidence in their practice, it is not common for them to do so in all cases. Like other physicians, OPs are busy people, are not used to looking for the most recent evidence, and do not know how to sort easily through the overwhelming volume of evidence they face. They rather look for pragmatic solutions or consult colleagues or experts to meet their information needs in their daily practice. Unfortunately, the advice that OPs routinely get from colleagues or experts can differ substantially from the best available scientific evidence.

**Evidence-Based Medicine**

In response to the lack of evidence used in the daily decision-making process of physicians, and as a means of searching in an efficient way for evidence, Evidence-Based Medicine (EBM) made its entrance during the latter decades of the previous century and has proven its effectiveness in the clinical medical fields during the beginning of this century. It involves the integration of the best evidence from scientific literature with the physician’s expertise and the patient’s unique values and circumstances. It focuses not so much on physicians being completely up-to-date, but rather on their awareness of what they do not know and their ability to identify where and how to find it. Practising EBM involves 5 steps (see table 1).
Table 1. The five steps of practising EBM (Straus et al., 2005).

<table>
<thead>
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<th>5 Steps of EBM</th>
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<td>1. The physician should convert the need for information into an answerable question.</td>
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<td>2. The physician should track down the best evidence with which to answer that question.</td>
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<td>3. The physician should critically appraise that evidence for its validity (closeness to the truth), impact (size of the effect), and applicability (usefulness in health practice).</td>
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<tr>
<td>4. The physician should integrate the critically appraised evidence with health expertise and with the patient’s unique biology, values, and circumstances.</td>
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<td>5. The physician should evaluate the effectiveness and efficiency in executing steps 1 through 4 and seek ways to improve them both for the next time.</td>
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These steps can be feasible and useful for OPs and, following primary health care, EBM is now making its entry within the occupational health field. Differing from the more regular EBM practice, in evidence-based occupational health the problem can involve a branch of industry, a company, an occupational group or an individual. In addition, the ‘patient’s unique values and circumstances’ could be extended to the values and circumstances of other stakeholders like the employer, company management, and labour inspectorate. In addition, not only is the area of health and diseases the subject of expertise, but also the area of work and social security.

Obstacles in evidence use in Occupational Health (OH) field
EBM has not yet been implemented in the OH field to the extent that it has been implemented in some advanced sectors in the clinical field and in general practice. From studies in the clinical field, we know that obstacles still exist in the implementation of EBM that also play a role in the OH field. There is a lack of skills in formulating answerable questions, and in searching and appraising literature; the capacity of integrating evidence with the decision making process is limited; there is insufficient time available and a limited overview of available sources of evidence. Additionally, for OPs there is the extra obstacle that main medical and social sciences databases often lack solid evidence on work-related outcomes. In other cases, evidence is not easy to find as the available search tools are not well suited for work-related topics, which is why new tools had to be developed and tested. Searching for relevant evidence is therefore not easy for OPs, but it is feasible.
Consequently, if we want to implement EBM in the OH field and evaluate its effectiveness on the quality of healthcare, we have to take into account these obstacles and try to overcome them at least partially. For a successful implementation of EBM in the OH field, we can learn from knowledge management strategies.

**Knowledge Management**

Knowledge management can be instrumental in an effort to overcome the information overload OPs face, and compensate for their lack of knowledge and skills on EBM. From a knowledge management perspective, there are two kinds of knowledge that physicians need to possess: explicit and tacit knowledge. Explicit knowledge is ‘codified’ and recorded in a structured way in, for example, a journal or textbook. The knowledge that is focused on in EBM is explicit knowledge (evidence). Tacit knowledge is mostly stored in physicians’ heads and involves the know-how and the skills they use, including the perspectives and schemes that are not always easy to define, which physicians use during their practice and consultations. These days, a lot of knowledge is being consolidated in ‘knowledge products’ (or digital forms thereof) like protocols and guidelines. Scientific knowledge from various disciplines (medical, psychological, biomechanical, toxicological, etc.) and sometimes even legislative, economic, and ethical knowledge is incorporated in these products.

Knowledge management involves an organization’s or community’s activities like generating, searching, sharing, applying, and evaluating both explicit and tacit knowledge to add value to the performance of physicians. This added value can be expressed in direct output like clinical productivity, quality of care, patient satisfaction and efficiency, but also in the contribution to physicians’ job satisfaction and their perception of self-efficacy. Knowledge management aims at designing these activities in the most effective, efficient, and creative way in order to stimulate physicians to carry them out and to control the quality of care. The process of managing knowledge needs support in several ways. In this thesis we focus on two ways. One way is ‘information-oriented’ and concentrates on the access of knowledge which is
an essential prerequisite for progress. There is a need to manage easy access for OPs who practice EBM as they have to integrate evidence in their decision-making process. This is a task for OPs themselves, but also for e.g. managers of OH providers. However, access to knowledge does not automatically lead to a search for knowledge and to the use of knowledge. A second way of supporting knowledge management is more ‘learner-oriented’ and concentrates on the use of knowledge, emphasising the education which is needed to be able to use knowledge. As mentioned before, many OPs need to improve their EBM skills and need education in EBM to optimize their EBM practice.12

Knowledge infrastructure
The availability of a knowledge infrastructure on a national or local level is an essential aspect for the access of knowledge. Good facilities are needed for searching and finding knowledge, for developing knowledge products, for knowledge dissemination, and for implementing knowledge and knowledge products in the daily practice of physicians. Therefore, a well-functioning knowledge infrastructure within the direct workspace of physicians as well as outside it is needed to support the EBM practice. A good knowledge infrastructure encompasses three types of facilities or instruments: Information and communication technology (ICT) instruments; organisational instruments; and human resource development instruments. ICT instruments, often presupposing other material facilities, can create the practical preconditions, like Internet access, availability of search strategies, digital libraries, full-text articles facilities and guidelines or protocols. Additionally, the organisational structure and culture of the work environment of physicians should support them to keep up-to-date and to carry out any necessary knowledge management activities. Negative feedback such as demanding only a high production in quantitative terms, e.g. number of medical examinations, can be a serious obstacle for EBM implementation. Consciously using the right human resource management techniques like providing opportunities to share knowledge, e.g. during a morning report or a journal club, also promotes the practice of keeping up-to-date by using the latest evidence.
There are some obstacles in the knowledge infrastructure for the OH field. For instance, we know that not every OP has access to the Internet, or to essential databases or full-text scientific articles. We also know that not all OPs are being stimulated by their manager or other key persons in their working environment to practice EBM. In addition, we do not know what knowledge infrastructure facilities are available for OPs and how important these facilities are for OPs to practice EBM.

Continuing Medical Education

Continuing Medical Education (CME) is an important instrument for knowledge management as well. CME concentrates on the use of knowledge and the learning which is needed in practice and has been defined as: “Any and all the ways by which doctors learn after formal completion of their training.” The main aim of CME is to improve the professional performance of physicians and for that reason recertification and (re-)accreditation are related to it. CME is a form of adult or postgraduate education which strongly appeals to the physicians’ own motivation and the relevance for the (clinical) practice and relates new learning to past experiences. Therefore, it is essential that the latest evidence is being integrated into CME programmes. The most effective ways of CME include active learning opportunities, learning delivered in a longitudinal or sequenced manner, and the provision of enabling methods to facilitate implementation in the practice setting. Additionally, CME opportunities for physicians can influence their job satisfaction in a positive way. Learning new knowledge and refreshing the knowledge gained in the past can reduce the feelings of boredom and lack of self-confidence that sometimes occur after many years in practice.

Since EBM is relatively new in the OH field, many OPs still lack sufficient knowledge and skills in EBM. A recent study revealed that in most cases, OPs’ attitude towards EBM is fairly positive. Unfortunately, there are not many postgraduate EBM courses tailored to the OH field available, let alone ones being evaluated on improvements in EBM knowledge and skills. Insights from CME can help us to develop effective EBM courses for OPs. Next, these courses can be evaluated on the effectiveness related to EBM knowledge, skills, and behaviour and effects on job satisfaction and self-efficacy can be evaluated as well.
E-learning
With the availability of the Internet, e-learning has gained popularity and is being implemented in the CME of physicians. E-learning uses Internet technologies to enhance the knowledge and performance of learners and offers them control over content, learning sequence, pace of learning, time, and often media. This allows learners to tailor their own education agenda to meet their personal learning objectives. In the medical education context, e-learning seems to be at least as effective as traditional instructor-led methods such as lectures. However, developing e-learning is expensive and the application depends for a large part on a well-developed knowledge infrastructure including high-level educational institutes and digital libraries, to organise access to e-learning materials. E-learning, more concretely as an introductory EBM course for OPs, can support the CME of OPs in different countries since it is available via the world-wide web

Objectives of this thesis
In this thesis we first explore the role of the knowledge infrastructure on EBM practice of OPs. Next, we analyse the effectiveness of various forms of CME for the OH field. The objectives are: (1) to explore which knowledge infrastructure facilities are needed as support for the EBM practice of occupational physicians; and (2) to determine the effect of continuing medical education (CME) interventions on the implementation of EBM with the ultimate aim of enhancing the professional performance of OPs. These objectives are illustrated in figure 1.
With respect to the first objective, it is hypothesized that the existence of a clear and complete knowledge infrastructure on various levels is a precondition for OPs to practice EBM. It is assumed that EBM knowledge, skills, and a positive attitude towards EBM are not enough to be able to practice EBM. To assist OPs in practising EBM, there also must be sufficient support from the working environment, education and training facilities, and an efficiently-run ICT environment.

Regarding the second objective, the extent to which OPs practice EBM in their own daily work is considered as an important aspect of the professional performance. EBM practice presupposes well-developed knowledge, skills, and attitude towards EBM. EBM practice can be regarded as the extent, frequency, and quality of the use of evidence when solving problems. Ultimately this should lead to improved professional performance and more sound advice in sickness absent management. Finally, it is hypothesized that CME interventions affecting the professional performance of OPs may enhance their job satisfaction and occupational self-efficacy.
Outline of this thesis

Chapter 2 first explores elements of a knowledge infrastructure that are important for evidence-based occupational health care. In view of experiences in the Netherlands, an example is given on how a well-functioning knowledge infrastructure could be developed and could operate. Chapter 3 elaborates on chapter 2 and presents a description of available knowledge infrastructure facilities and the relevance and significance to practising EBM as perceived by occupational health professionals in various countries.

In the next four chapters (4 till 7) a multifaceted EBM intervention is tested in a randomized controlled trial within the context of CME. The EBM intervention combines an EBM course with recurrent case method learning sessions in order to train OPs in using EBM by solving their patient cases and to share the evidence they searched for as well as the tacit knowledge they possess. In Chapter 4, the effect of the EBM intervention on the knowledge, skills, and behaviour of OPs towards EBM are studied. Chapter 5 describes the quality of the evidence-based advice of occupational health physicians as a result of this EBM intervention. The professional performance, job satisfaction, and self-efficacy of OPs are studied in Chapter 6. The OPs’ perceived value of this EBM intervention related to their professional performance, assessed in a qualitative study, is described in Chapter 7. In chapters 8 and 9, the effect of e-learning in the context of CME for occupational health care is the central theme.

Subsequently, in Chapter 8 the effect of e-learning within a CME context is tested among Dutch OPs in a randomized controlled trial. Based on these findings, an EBM e-learning module was developed and tested in a wide variety of countries. The findings of this international study on the EBM knowledge, skills, attitude, and the use of evidence by occupational professionals are described in Chapter 9.

The main research findings of the thesis will be discussed in the general discussion in Chapter 10. Conclusions, implications for practice, and recommendations for further research will also be stated in this final chapter.
Reference List


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