Developing the Attributes of Medical Professional Judgement and

Contents

9   Implications for

Executive Summary

Introduction

1. Descriptive data about the processes of British postgraduate medical education is sparse. Outcomes evidence is limited to pass rates for the Royal Colleges examinations and the individual judgements of assessment panels for GP registrars and completion of CCST.

2. Postgraduate trainees are employed as working health professionals, so their current competence is always an issue, as well as the competence they will be expected to demonstrate when their specialist training has been completed. Defining competence in terms of the expectations of the holder of a particular post helps to avoid confusion.

3. The central problem of postgraduate education is how best to combine work within a doctor's current competence, itself a source of learning, with the provision and use of learning opportunities to extend that competence.

4. There is a need for an agreed framework for the development of competence during each training programme, which puts learning outcomes on the priority list alongside service duties.

5. Areas in which competence is seriously underconceptualised include communications, teamwork and management in healthcare settings.

6. The recent report of the US Federated Council for Internal Medicine Task Force, Graduate Education in Internal Medicine: a Resource Guide to Curriculum Development (Sox *et al.*, 1997) is a useful source of ideas.

7. Some perceive judgement as an attribute of personal expertise that goes beyond that competence which any fully trained doctor could be reliably expected to demonstrate. It can also be seen as a dimension of lifelong learning linked mainly to the improvement of decision-making through learning from experience over a long period, rather than the learning of new practices or keeping up to date with research.

Research into Medical Expertise and Decision-Making

- methods of providing feedback;
- qualities of teachers rated as 'good' by trainees and their colleagues.

17. One gets the impression that American residents receive considerably more clinical teaching than their British counterparts, but there is no British data to enable a proper comparison. The variation in the amount of training received by British trainees is reported as considerable, raising issues of quality assurance and trainee entitlement.

Learning in Non-Clinical Settings

18. Research into postgraduate teaching and learning in non-clinical settings mostly comprises evaluations of a wide variety of teaching innovations, rich in ideas but not necessarily generalisable.

19. Strong evidence that the effectiveness of off-the-job teaching is highly dependent

22. Research on innovation strategies points to the danger of focusing only on the development of competence. Competence has to be translated into performance and at this stage many dispositional and organisational factors come into play. Research on the implementation of guidelines, for example, indicates not only that the quality and utility of the guidelines themselves is important but also that both educational interventions (leading to understanding of their purpose and rationale) and administrative interventions (ranging from organisational changes to simple reminders) need to accompany the guidelines.

23. The discussion of recent developments in CPD reaches two conclusions. First, needs analysis is important for quality assurance purposes at three levels - the individual, the working group and the healthcare organisation (the last two are multi-professional). However, it should not be assumed that needs identified by audit, for example, will necessarily require an educational response. Second, following the advice of Fox and Bennett (1998), CME providers should adopt a coordinated approach to all three levels by facilitating self-directed learning, providing

Chapter 1

Introduction

1.1 Aim of the Review

The increasing codification and regulation of medical competence highlights the multi-faceted and complex nature of being a doctor. Not only are extensive skills and knowledge expected within the doctor's area of specialism, but also high levels of communicative ability, ethical understanding and responsibility, teamworbc36.23980Td(under80Tdst)1000.62(y

1.4   The structure of this Report

Following this Introduction are two chapters on professional competence, judgement and expertise in medicine. Chapter 2 provides a definition of **competence** based on the expectations of employers, patients and the medical profession. This approach is implicit in the General Medical Council's publication **Good Medical Practice**; and is particularly well suited to postgraduate training, during which doctors' service contributions need to match their current competence, in addition to providing learning opportunities to extend that competence. This is followed by a brief discussion of the term **judgement** which we have not attempted to define. There are at least three meaning in use: some psychologists treat the term as synonymous with decision-making; our informants used it either with reference to its quasi-legal role in assessment or to refer to particularly complex decisions involving a high level of uncertainty. Instead of attempting to resolve these differences, we have focused on the term **expertise**, which has been the subject of considerable research. Chapter 3 reviews research into medical expertise, which seems to be almost universally defined in terms of the capability of those people deemed by their peers to be experts, or at least highly experienced and well respected. Thus the term "expertise" subsumes both competence and clinical judgement. Our understanding is that Postgraduate Medical Education is mandated to develop the competence expected of consultants of GP principals; and expected to make a significant start to the development of expertise which will continue to develop through lifelong learning long after postgraduate training has been completed.

Chapters 4 and 5 review the research on learning and the support of learning through guidance, coaching and supervision during postgraduate medical education. Chapter 4 covers learning in clinical settings and Chapter 5 learning in non-clinical settings. The majority of this research has been conducted in North America, where postgraduate medical education is based on **residency programmes**: these last for 3 to 6 years after graduation from Medical School, according to the specialism. Give the increasing emphasis on the maintenance of competence and further development of expertise after the completion of training, we have added a further chapter on Continuing Medical Education (CME) and Continuing Professional Development (CPD). Chapter 6 is particularly important because of the large volume of recent research on how doctors learn and the factors affecting changes in their practice; and preparation for this lifelong learning phase is an important goal for postgraduate training programmes.

Chapter 7 is a short specialist chapter on the use of Information Technology in training doctors, an increasingly important source of innovation in medical education. Chapter 8 reviews a second specialist area, Assessment and Revalidation, because these processes set the minimum standards for postgraduate medical education and continuing medical education, respectively. The "backwash effect" of assessment on learning is one of the most firmly established findings of educational research; so this has to be given constant attention as well as the normal expectations of valid and reliable assessment practices.

Finally, Chapter 9 discusses the implications of this research review for policy: the proper use of the construct of competence and the efficient and effective provision of post-registration medical education.

To aid the reader some synopses of key papers are "boxed" in the text. These boxed sections are a continuous part of the main text, though they can be read on their own.

Chapter 2

Competence and Judgement

2.1 Competence

The term competence appears in many

tence, care and conduct expected of you in all aspects of your professional work are described in this booklet. They apply to all doctors involved in healthcare." (page 1)

This confirms the importance of meeting expectations and emphasises that this applies to **all aspects of professional work**, not just those that might be described as purely medical. The GMC does not refer only to competence but also to **care** and **conduct**, because there can be a gap between **competence** — what a doctor can do - and **performance** — what a doctor does do. This gap can be caused by personal factors such as dispositions or attitudes, environmental factors such as workload, workplace climate and working conditions, or situational factors such as multiple emergencies and lack of support. While

of expertise, probably somewhere in the middle, i.e. rather less than excellent. One might be very content with a competent lawyer when buying a house, but look for an expert when seeking advice on a piece of complex litigation. Thus, being referred to as "competent" could in some circumstances be perceived as a rather negative comment.

Pietroni (1993b) explores the practical implications of multiple levels of competence, both confirming the need for a minimum level of performance, below which behaviour is defined as negligent (i.e. the GMC level for keeping on the register) and arguing for targeting postgraduate education and training on a level well above that minimum. He also points out that setting the standard below the current average would be complacent, setting it at the average would be conservative and setting it above the average would be very challenging. Whatever the standard of performance at the end of training, the expectation must be for continuing improvement thereafter; and this depends on the doctor's attitude towards quality improvement and lifelong learning. Many of those we consulted commented on the gap between the standard associated with the Certificate of Completion of Specialist Training (CCST) and that expected of an established consultant, and this must be at least as significant for GPs who receive much less training for a job of similar complexity. Thus the chapter on Continuing Medical Education is an important part of this report.

Specifications of competence are essential for setting standards, and the Certificate of Completion of Specialist Training (CCST) is competence-based. So also are the clinical components of membership examinations of the Royal Colleges. Nevertheless, the transition from implicit judgements of a doctor's competence to explicit descriptions which can guide both training and assessment has not been easy. Many would argue that it still has a long way to go. Difficulties include:

1. finding the most appropriate level of detail for defining a policy, an educational programme, a summative assessment, or a log-book;

2. capturing the essence of an area of expertise and not being content with the most easily observable aspects;

3. both listing important attributes of competence and describing their integration into performance;

4. covering all aspects of a doctor's job, not only the diagnosis and treatment of individual patients.

These problems are not confined to the field of medicine. Nevertheless, the importance for educational policies and programmes, which aim to develop the attributes of competence and judgement, of specifying both the attributes and the nature of competence itself cannot be underestimated. Apart from the publications of the Royal Colleges themselves, there are a number of journal articles discussing various aspects of competence and a range of publications from the Royal College counterparts in North America and Australia.

One document which we found particularly valuable, both in its description of aspects of competence and its discussion of the design of appropriate postgraduate programmes to develop competence is the recent report of the Federated Council for Internal Medicine Task Force on the Internal Medicine Residency Curriculum (Sox *et al.*, 1997)

which is available from the American College of Physicians and also on the Internet **www. asim org/fcim**

In order to overcome some of the difficulties listed above, this Task Force asked experts in the field of Internal Medicine "to identify those difficult-to-measure properties of the expert internist that might be overlooked after biomedical knowledge and skills are presented in organ-specific competency lists." They called this construct "physicianship" and saw it as "the difference between the expert internist and the journeyman practitioner". They grouped the suggestions received into 20 categories, which they call Integrative Disciplines; and these are accompanied by 24 categories of clinical competency.

The term "discipline" may not seem quite appropriate in the British context, but the categories themselves make good sense. These are listed in the Panel below, according to the three FCIM tiers of category. First, are the **core values of internal medicine** which, they anticipate, will be learned largely through discussion, problem-solving exercises, workshops and practical experience. Next, are the **characteristics, or salient expressions**, of these values, which are likely to require at least some formal instruction in addition to opportunities for practice and formal feedback. The final tier comprises **integrative skills, or applications**, of the values and characteristics, for which theory may be less important and the main approach to learning is acquiring experience in realistic settings.

Integrative Disciplines and Categories Comprising Physicianship

1. **Core Values**	2. **Characteristics/Expressions of Core Values**
Humanism	Lifelong Learning
Professionalism	Clinical Method
Medical Ethics	Continuity of Care
	Medical Interview/History
	Physical Diagnosis
	Clinical Epidemiology and
3. Integrative Applications	Quantitative Clinical Reasoning
Home care	Clinical Pharmacology
Nursing Home Care	Scientific Literacy
Occupational/Environmental Medicine	Legal Medicine
Physical Medicine/Rehabilitation	Management of Quality of
Management of Medical Practice	Health Care
Medical Information	Nutrition
	Preventive Medicine

Sox *et al.* (1997)

For each of these headings 6-12 competencies are listed and possible learning venues suggested. The

Examples of General Competencies Associated with Physicianship

Humanistic Practice of Medicine (page 25)

Recognise and appropriately manage so-called "difficult patients," including their personality disorders and problematic behavioural patterns.

Understand the concepts of the health belief model; know how to elicit it and how to work constructively in a patient-centred way with persons from different cultural groups.

Professionalism (page 27)

Show a commitment to standards for lifelong excellence by continuously adding to one's knowledge of medicine and by drawing the distinction between knowledge that is based on high-quality evidence and knowledge from anecdote and personal experience.

Medical Ethics (page 29)

Know what to do when the patient refuses a recommended medical intervention in both emergency and non-emergency situations. Know how to handle the following situations related to end-of-life care:

- Withholding or withdrawing life-sustaining treatment, including

- "Be able to assess a patient's decision-making capacity;

- Know how to select the appropriate surrogate decision maker when the patient lacks decision-making capacity;

- Understand the grounds on which surrogates should make decisions for patients who lack decision-making capacity." (page 29)

The issue of patients whose decision-making capacity may be in doubt is only a small part of a much wider problem of patient understanding. The GMC's duty "to give information to patients in a way they can understand" must be one of the most difficult to fulfil; and "inadequate explanation" is one of the most frequent forms of patient complaint. Moreover, the consequences for the quality of care tend to be underestimated. Sanson-Fisher and Maguire's (1980) research review suggested that the way doctors interact with their patients affects the adequacy of clinical interviews, patient compliance

Health promotion and preventive medicine also require good communication skills with patients, relatives and the wider community, as well as the disposition to seek and take opportunities to talk about the relevant issues. The administration and management of communication is also an important area of competence, and this does not mean doing everything oneself. The GMC publishes guidance on serious communicable diseases and fitness to drive a vehicle; but there is little reference to the detection of risk-bearing psychological problems by doctors outside general practice and psychiatry. Given the increasing emphasis on preventive medicine policies, it would seem reasonable to suppose that some of the competencies required for membership of the Faculty of Public Health Medicine (Kisely & Donnan, 1997) might also be needed by other doctors, e.g. good understanding of local variations in health problems, epidemiological approaches to the assessment of health care needs, evaluation of health care policies.

2.4   Management Competence

Teamwork, management and leadership skills are needed in a wide range of contexts: within the relevant care groups and the medical practice or firm; and in order to perform duties needed for the effective and efficient functioning of the health care organisation in the interests of its patients, employees and other stakeholders. Interprofessional communication, team working skills, record-keeping are frequently cited examples. So are teaching and training; but not appraising, mentoring and giving feedback. Practice eval-

burn-out by limiting their hours of work (Yedidia *et al.*, 1993): doctors too have rights. However, this can be interpreted as unprofessional by "the older generation". Apart from the problem of overall staffing levels, the central issue is often continuity of care. This is turn depends on the ability of the whole health care team to organise itself in a way that ensures such continuity. The notion of team competence and organisational competence are being increasingly used in the private sector. While this goes beyond the brief of this report, it indicates

- being prepared to do nothing.

Chapter 3

Theories of Expertise

Until recently, research into professional education suffered from two major weaknesses: the knowledge-base of professionals was conceived largely in terms of formal, published knowledge; and research into learning was also focused primarily on formal educational contexts.

Practitioners were usually aware of these weaknesses and expressed their concerns by using the currency of experience (months in a job, or number of cases seen) to complement the system of specialist examinations. The outcomes of learning were expressed in terms of competence (a generic term signifying capability to take independent action with only occasional referral to others) or

human judgement and of the use of different kinds of memory (semantic, episodic, procedural). These can all be seen as steps along the path of modelling experts'

3.1 What Experts Know

3.1.1 Decision Making Skills

Much of the psychological literature on medical expertise has concentrated on the important issue of decision-making.

does not mean that analysis, interpretation and organization of the material are completely absent.

as conducted in working medical settings. For example, the decision-making is affected by the context in which it occurs, and a skill learned in one context does not necessarily transfer readily to a different context (see e.g., Gruppen, 1997). However it turns out (see below) that the analysis of expertise in terms of critical cues, small worlds and illness scripts is not that far removed from analyses based in the naturalistic decision-making paradigm. Indeed, Patel *et al.* (1995) provide a detailed account that tries to reconcile studies of medical knowledge and expertise (such as cited in this section) with a more "situated" view that recognizes the important role of context, of artifacts (such as decision-support systems) and of the collaborative nature of much medical decision making.

The following three short sections focus on expertise with respect to three special areas of skill — the perceptual (e.g. radiology), the psychomotor (e.g. surgery), and the communicative (all aspects of medicine).

3.1.2 Perceptual Skills

Most areas of medicine depend crucially on the doctor seeing what needs to be seen. However, while decision-making has been relatively well researched, medical perception has received rather less attention. An exception is radiology.

Norman *et al.* (1992) review 46 studies in the area of visual diagnosis. They examine *inter alia* the effects of prior and concurrent information on radiologic diagnosis, the interplay between perception and analysis, and the question "are good diagnosticians born or made?". For example, on the issue of prior and concurrent information, they describe studies that showed that providing a tentative diagnosis increased true-positive rates of detection with a small increase in false-positive (but see below for studies that post-date this review and which indicate the dangers of prior information). They offer the following conclusion about the educational implications:

> "If one simply accepts that visual diagnosis does have two identifiable, although not entirely separable, components, it is evident that educational strategies directed at perception and cognition are very different. Perceptual skill is unlikely to be enhanced by any elaboration of rules or high-level processing of features lists or causal mechanisms, although this may well enhance cognitive processing. Rather, perception, with its rapid and *gestaltist* aspects, is only likely to improve from exposure to many carefully chosen prototypical examples and variations on the same theme." (Norman *et al.*, 1992, page S82)

In general the literature on radiological decision-making largely concurs with the decision-making literature described earlier but it also takes special account of perceptual processes and the way they interact with problem-solving (Rogers, 1996). One issue is the way that some aspects of perceptual skill may be acquired largely unconsciously and in a way that does not require their verbal articulation (Lewicki *et al.*, 1988).

With respect to radiology novices are slower and less efficient in scanning images (Nodine *et al.*, 1996), are less able to identify the 3D position of abnormalities and less able to identify the physical extent of the abnormality.

Expert radiologists are able to identify much of the abnormality in an image very quickly (an initial gestalt view) and this is followed by a more deliberative perceptual analysis. They are better at identifying the 3D position of the image (i.e. responding to "localisation cues") and also better at identifying the physical extent of the abnormality (Lesgold *et al.*, 1988). Experts have a better appreciation for the range of normality and have a propensity to pay attention and to recall abnormal cases better than normal ones (Myles-Worsley *et al.*, 1988). Raufaste *et al.* (1998) distinguish "super-expert" from "expert" radiologists. In particular they found that super-experts were more alert to less salient factors in the images and more likely to construct an understanding that took all the factors into account. Raufaste *et al.* suggest that this is partly due to their super-experts being exposed to more difficult cases and also because, as researchers, they would be used to devoting "conscious effort making their results explicit and publishing in scientific journals" (page 539).

All groups are sensitive to the effect of other information about the patient on what they see and the way in which they integrate visual and written information (Norman *et al.*, 1996a, 1996b).

Consulting information about the patient prior to viewing the images affects not only what they see but also what they diagnose and therefore recommend (Babcook *et al.*, 1993). A similar effect is also reported for ECG interpretation (Hatala *et al.*, 1996).

Development of Radiological Expertise

Lesgold *et al.* (1988) is a useful paper in this area. The authors describe a series of experiments in which they showed standard posterior-anterior thoracic radiographs to novices, intermediates and experts and invited them to describe what they saw. Their account provides both quantitative and qualitative data, and examines the interplay between cognitive and perceptual processing.
They note:

- the speed and accuracy with which experts build a mental representation of the abnormal anatomy shown in the radiographs.

- the speed with which experts invoke a likely schema to explain what they are seeing, and the way that such a schema subsequently guides both their perception and their reasoning.

- the flexibility that experts exhibit to fine tune a schema to make it fit the findings as well as their ability to make finer discriminations than novices.

- the fact that experts "see things differently" from novices; for example, experts regarded, and traced as abnormal, a larger area from a collapsed lung film than either novices or intermediates.

- experts reasoned "opportunistically" incorporating new pieces of data into their diagnostic decisions.

Lesgold *et al.* (1988)

3.1.3 Psychomotor Skills

As with perceptual skills, effective hand-eye coordination and the ability to carry out procedures is of great importance all across the field. For an extensive theoretical review of the issues of learning and retention of motor skills in general, see Adams (1987). Here we will concentrate on surgical skills. For a much more domain-specific account of the problems of learning and teaching surgical skills (including the use of 'Craft Workshops'), see Kirk (1996).

5. Correction and Reinforcement

6. Skill Mastery

7. Autonomy

Doctor Patient Consultation

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1. The doctor establishes a relationship with the patient.

2. The doctor attempts to discover, or actually discovers, the reasons for the patient's attendance.

3. The doctor conducts a verbal or physical examination, or both.

4. The doctor, or the doctor and the patient, or the patient (in that order of probability) consider the condition.

5. The doctor, and occasionally the patient, details treatment, or further investigation.

6. The consultation is terminated, usually by the doctor.

Byrne and Long's (1976) six phases of a doctor-patient consultation (as described by Pendleton *et al.*, 1984).

Sociologists have drawn attention to the role expectations of doctors and patients which facilitate or constrain communication, including the effects of social class (Bain, 1976, 1977; Pendleton & Bochner, 1980); Kleinman (1980) noted ritualistic parallels between traditional and 'Western' healers. Several anthropologists have distinguished between diseases as labels given by doctors, and illness as a broader concept defined in terms of the patient (Helman, 1981). This includes the response of the patient to a problem, how it affects the patient's behaviour or relationship, the patient's past experiences of illness and the meaning she gives to that experience (Pendleton *et al.*, 1984). Levenstein *et al.* (1986) rightly emphasise integrating a patient-centred approach with the doctor's concern for differential diagnosis, as a purely Rogerian approach does not necessarily elicit more relevant information (Bensing & Sluijs, 1985).

Hence the view that the doctor's understanding of the problem must include an appreciation of the patient's own understanding, whether or not she perceives it to be accurate. Without such understanding patients are unlikely to understand what the doctor tells them or comply with this advice (Becker, 1979). This Health Belief Model, described in detail by Pendleton *et al.* (1984), is also much used in Preventive Medicine.

Empirical evidence in support of these theories is reviewed by Pendleton *et al.* (1984) who concluded that:

> "Patients are more satisfied when the doctor discovers and deals with patients concerns   purely Rogerian

A comprehensive study by Bertakis *et al.* (1991) of 550 consultations by 127 physicians in the US (90% in internal medicine, 35% residents) concluded that patients were most satisfied by interviews that "encourage them to talk about psychosocial issues in an atmosphere that is characterised by the absence of physicians dominance". Becker's (1979) Becker's (1979) review of compliance demonstrated that patients comply better when they believe they can have control over their health and when the advice given is consistent with their own health beliefs; and Korsch and Negrete (1972) showed that mothers leaving a paediatric clinic "highly satisfied" (40%) were three times more likely to follow the doctor's advice fully than those who were "highly dissatisfied" (13%). The main reasons for dissatisfaction were unfriendly behaviour, and the lack of information about the nature or cause of their child's illness. At a more general level, Fletcher and Freeling's (1988) review also concludes that most patients want more information than they are given.

The Toronto consensus statement issued by a meeting of researchers in this field (Simpson *et al.*, 1991) reviewed evidence about the significance of doctor-patient communication, then advised on the teaching of communication skills as follows:

> "To become effective communicators, physicians must master a defined body of knowledge, skills, and attitudes. Clinical communication skills do not reliably improve from mere experience. Examples of relevant areas of knowledge are psychiatry in relation to medicine (for example, diagnostic clues to depression, anxiety, somatisation problems) and the structure and functions of medical interview are those of data gathering, forming and maintaining relationships, dealing with difficult issues (such as sexual history, breaking bad news, HIV), and imparting information; therapeutic skills and strategies are also necessary. These skills can be defined with behavioural criteria and can be reliably taught and assessed. Helpful attitudes include a belief in the importance of a biopsychosocial perspective. A physician's personal growth and self awareness are essential bases of effective communication." (Simpson *et al.*, 1991, pages 1385–6)

Cognitive science concepts similar to those used in theories of diagnostic expertise have also been applied to doctor-patient consultations. Tannen and Wallat (1986, 1987) analyse transcripts in detail, but instead of using the wide repertoire of behaviours identified by Byrne and Long, they use the concepts of 'register', 'frame', 'schema' and 'script'. Their data set is a series of videotaped conversations in five different settings, involving various family members and medical professionals in a single paediatric case of cerebral palsy. The videotapes were also intended for training paediatric residents. In one social encounter involving a paediatrician, mother and child, the following phenomena were noted:

- Three Linguistic Registers were used by the doctor — "motherese" to the child, medical language in a flat intonation for the residents watching the video, and ordinary conversation with the mother.

- Three Competing Frames affected their behaviour — a physical examination of the child, entertaining her with a playful, teasing approach; ignoring the video

decision-making offers a similar account to that of the cognitive scientists who speak in terms of critical cues, illness scripts and small worlds. They offer a similar emphasis on matching the current case to critical former cases as opposed to reasoning from basic (scientific) principles.

- Use of mental imagery: rather than seeing the decision-maker as (mathematically) weighing the costs and benefits of different courses of action, they see him as building a mental model of the situation. Again the notion of an illness script is not dissimilar.

- Context dependence: because decision-making is seen as operating within a context rather than as a disembodied, ethereal activity, factors in that context matter. Familiarity of the context, stress, time dependence among others all influence what factors are taken into account and how they are taken into account.

- Dynamic processes: again this backs up the view from cognitive science that decision-making is a complex process that to some extent can be decomposed e.g. into recognition and then action selection, or into cycles of intuitive mixed with analytic decision-making.

- Description based prescription: while we cannot argue that expert decision makers never make mistakes or are never open to biases, it is important to realise that there may be excellent reasons for the disparity between the

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Dynamic Decision Making

A useful entry point to this literature from a medical point of view is the paper by Gaba (1992) who describes the issue of dynamic decision-making in the field of anesthesiology. He stresses the dynamic issues: (i) "The pace of decision is determined externally ...events may occur frequently ...Some events cannot be avoided"; (ii) "The system is complicated and has many interconnected parts"; (iii) "There is uncertainty". Signals from instruments have to be interpreted and may be either weak or unreliable; and (iv) "There is risk". These factors underline the stressful nature of this work and the need for ways of assessing how decision-making in this area is affected by stress (Byrne & Jones, 1997; Byrne *et al.*, 1998). Gaba, like Lipshitz above, reviews the work of the main investigators in the field. For example, in reviewing the work of Woods (1990), he mentions dynamic decision-making biases such as (i) "cognitive tunnel vision" (where new data are coerced to fit a pre-existing and incorrect view of the situation); (ii) attending to surface issues rather than engaging with the underlying problem; and (iii) 'micawberism' — believing that everything will work out OK in the end, despite all the contra-indications.

Gaba goes on to describe some of his own experiments in the area and outlines a model of dynamic decision making. In simulator experiments (in realistic settings with realistic instrumentation, but using an intubation/thorax mannequin), he found large variations in performance among subjects and large variations across incidents. In agreement with the literature, he found that experts were better at anticipating problems and were more willing to "interact forcefully" with the surgeon.

Finally, Gaba argues that anaesthetists ought to be trained explicitly in crisis management in a way similar to the training given to pilots. That is, the training should explicitly address the way that stress, risk, complexity and lack of time can lead to decision-making biases, such as cognitive tunnel vision, *and* should train anesthetists in strategies to combat these biases.

(Gaba, 1992)

At a much more applied level, Bognor (1997) offers a brief introductory account, from an American perspective, of this approach to understanding the pressures on decision makers in the area of healthcare. She reviews work that has examined time pressure, fatigue and stress as they impact on emergency surgery and anesthesiology: for example, an increase under stress in the reliance on technology by anesthesiologists. Other factors considered are the pressure to reduce costs, the variability in the quality of feedback and the interface with the many (complex) technologies in use, and the problems of shared responsibility (e.g. with surgeons) and communication amongst the team associated with the case.

3.2.1   The Sense of Expertise

Given the pressures under which medical expertise is typically exercised, it is important that experts develop self-confidence and a "sense of equanimity" (Ytterberg *et al.*,

1998). For example, Rhoton *et al.* (1991) found that *non*-cognitive factors (such as conscientiousness and confidence) were strongly correlated with overall performance in anesthesiology departments. They urge that educators "reconsider the lack of emphasis historically placed on the noncognitive aspects of performance" (page 361). Ytterberg *et al.* found that giving students a chance to practice skills (such as history taking) via an assessment using stations in a situation where the students knew that they would not be 'failed' improved their self-confidence in the skills assessed. They also found that the sense of self-confidence was well-founded in that it was correlated with scores in the assessment. The educational lesson from this is that this kind of assessment instrument can be used to provide feedback to students about their progress, and knowing that you are making progress improves self-confidence.

Tracking changes in self-confidence over longer time periods is more problematic. Sim *et al.* (1996) compared responses using a critical incident technique between 18 doctors in their first 6 months of general practice with those same doctors 12 to 18 months later as they completed their advanced or mentor terms in the Royal Australian College of General Practitioners Training Program. In the interviews "doctors were asked to describe incidents and to identify skills either present or lacking, feelings and lessons learned". The researchers found that

> "increasing clinical practice . . . resulted in an increase in the positive feelings associated with making a difficult diagnosis and dealing appropriately with more difficult management problems without immediate referral to a specialist.
> . . .
> Doctors in the first interviews also reported feeling pressured for time,
> 18

assist doctors in their decision-making. Information Technology is involved here much more in its role as a repository and facilitator of access to information, than as a device to weigh information.

3.3.1 Clinical Decision Analysis

> **Decision Analysis**
>
> An excellent introduction to decision analysis is provided by Lilford and Thornton (1992). They distinguish structured patient history taking from diagnostic systems and discuss the value of, and lack of general acceptability, of expert systems. They provide several examples of how to carry out a clinical decision analysis in terms of the treatment with the 'greatest expected utility'. They also are frank about the difficulties of carrying out a fully rigorous decision analysis in dealing with an individual patient. However they argue for its value in determining general treatment policy, in focusing research and in dealing with issues of communities as well as individuals.
>
> Lilford and Thornton (1992)

Dowie (1993), in a book edited by Llewelyn and Hopkins (1993), distinguishes between a number of questions that can be asked about clinical judgement and decision-making:

1. How are clinical judgements and decisions made? (To some extent this question is addressed in earlier parts of this chapter.)

2. How well are clinical judgements and decisions made?

3. How could they be made?

4. How well could they be made?

5. How should they be made?

Dowie concentrates on question 4, and reminds us that many studies have shown that in the area of clinical decision-making 'we could do better'. He goes on to argue that one route towards improvement is the development and use of system-aided judgement and decision-making.

In support of this view de Dombal (1993) reviews a number of studies that have demonstrated improved clinical decision-making performance, including a study that "showed that when findings of detailed studies were made available to *inexperienced staff* performance improved in a number of hospitals" (emphasis ours). For example, initial diagnostic accuracy improved from 45.6% to 65.3% and post-investigative diagnostic accuracy improved from 57.9% to 74.2%. It has to be mentioned that this result is much more positive than that of Elstein *et al.* (1996), described in Chapter 7 on Information Technology.

The book edited by Llewelyn and Hopkins (1993) gives examples of how decision trees can be constructed, including methods to assess (numerically) the probability of every

choice branch and methods to assess (numerically) the utility of each outcome state, as well as how to carry out a sensitivity analysis of the effect of varying the judgements. For instance, Hoellerich and Wigton (1986) provide a detailed example of the development

CHAPTER 3.

3.

source or epistemological status. It is that knowledge which professionals bring to their practice that enables them to think and perform on-the-job. Thus Type B knowledge incorporates not only propositional knowledge (in the form in which it is used) but also procedural and process knowledge, tacit knowledge and experiential knowledge in episodic memory. Skills are treated as part of that knowledge, thus allowing representations of competence, capability or expertise in which the use of skills and propositional knowledge are closely integrated.

3.4.1   Transfer is a learning process

The technical terms most frequently associated with this process are "transfer of knowledge" and "application of theory". The implicit assumption is that one carries scientific knowledge across from an education context to a practice context, then simply applies it. Yet there is a large body of evidence (1) that knowledge may not be carried across by many professionals, because they do not recognise or appreciate its relevance to a particular case or problem, and (2) that they may not apply it because they do not know how to do so. Instead of seeing transfer as an event in which a person suddenly becomes able to apply knowledge acquired in one context to a second, different context, we have to see it as a learning process in which a person not only carries knowledge from one context to another but learns how to apply that knowledge in the new context. Knowledge is acquired in a particular context and remains situated in that context until it can be transformed and resituated in another context; and the extent of this further learning will depend both on the degree of difference between the two contexts and on that person's preparedness and prior experience of successful transfer. Even when transfer involves a sudden flash of insight, considerable learning effort may be needed to convert that insight into usable knowledge. However, programmes for professional formation seldom recognise the learning effort required for the transfer of knowledge. Support for transfer is rarely provided, even though trainee and novice professionals are ill-prepared to tackle it on their own.

Transfer of knowledge is most difficult when the contexts and modes of learning are very different. For example, moving from a university context to a professional practice context involves changing from an environment in which Type A knowledge is dominant to one in which Type B knowledge is dominant. Moreover, resituation of scientific knowledge will require not only transformation of that knowledge but also gaining sufficient

Patel *et al.* also point out that the PBLC students had a tendency to more elaborate explanations, but also to generate errors within those elaborations.

Albanese and Mitchell (1993) cite the above study along with over a hundred others in a detailed meta-analysis of studies (1972–1992) of the effects of problem-based learning. Their overall conclusions are:

> "Compared to conventional instruction, PBL, as suggested by the findings, is more nurturing and enjoyable; PBL graduates perform as well, and sometimes better, on clinical examinations and faculty evaluations; and they are more likely to enter family medicine. Further, faculty tend to enjoy teaching using PBL. However, PBL students in a few instances scored lower on basic sciences examinations and viewed themselves as less well prepared in the basic sciences than were their conventionally trained counterparts. PBL graduates tended to engage in backward reasoning rather than the forward reasoning experts engage in, and there appeared to be gaps in their cognitive knowledge base that could affect practice outcomes." (Albanese & Mitchell, 1993, page 52)

Because only three of the studies examined by Albanese and Mitchell dealt with performance assessment of graduates, they felt unable to draw firm conclusions but urged that further research was needed in this area.

In a larger and more carefully controlled study than that of Patel *et al.* (1991), Schmidt *et al.* (1996) compared 612 Dutch students diagnosing from 30 epidemiologically representative clinical case descriptions. The students were drawn from three Dutch medical schools — one teaching a conventional curriculum, another taking a problem-based approach and a third a *systems* approach that "integrates the biomedical and clinical sciences around major organ systems. Students engage in patient demonstrations and small-group training sessions in which knowledge previously acquired is applied to relevant clinical cases." (page 660). Unlike Patel *et al.* (1991), these students were not exposed to basic science material as part of the study. Schmidt *et al.* found that in all three schools, students

school were rated significantly better than their peers with respect to their interpersonal relations, 'reliability', and 'self-directed learning'. Interns from one of the two traditional New South Wales medical schools had significantly higher ratings on 'teaching', '*diagnostic skills*' and 'understanding of basic mechanisms'." (Rolfe *et al.*, 1995, page 225, our emphasis)

How far the different courses or the different methodologies used in the Dutch and the Australian study contribute to their conflicting result on diagnostic skills is difficult to assess.

3.5 Summary

Theories of expertise developed in different contexts using different research techniques may emphasise different aspects but do not greatly differ in their conclusions. Key features include the importance of case-based experience, the rapid retrieval of information from memory attributable to its superior organisation, the development of standard patterns of reasoning and problem-solving, quick recognition of which approach to use and when, awareness of bias and fallibility; and the ability to track down, evaluate and use evidence from research and case-specific data. Understanding the nature of expertise is important for self-monitoring one's use of heuristics and possible bias, sharing knowledge with others and supporting other people's learning. It is also critical for understanding the respective roles of clinical experience and evidence-based guidelines.

environment. The ethos and values of the workplace and the prominence of good role-models can have a major impact on the professional development of doctors. The role-model aspect is more formalised in the North American residency programmes through the evaluation of clinical

and 2.6 (career), all on the "dissatisfied" side of neutral on a 5 point scale.

Wilson (1993) studied the consultants' perspective on PRHO training, concluding that while they welcomed the concept of an educational supervisor "theoretically", many felt unable to take on this added responsibility. Teaching ward rounds were the standard method of instruction but most consultants estimated their total teaching time to be less than 30 minutes a week. Of the 33 respondents, only 8 had one to one teaching for their house officers; while 24 said they delegated some of that responsibility to other junior medical staff and to ward sisters. 25 said they would welcome feedback on their teaching and 18 would have liked training in educational methods and principles; and they were all concerned about not downgrading the apprenticeship system. Their problem did not appear to be their attitude towards teaching, but the pressure they felt from their lack of time to give to PRHOs when overwhelmed by service demands.

Two in-depth studies in particular localities by Dowling and Barrett (1991) and Eraut *et al.* (1997) focused respectively on the management and learning of PRHOs. Dowling and Barrett highlighted the range of expectations of PRHOs, the disparate and distributed nature of their supervision, their lack of clear goals and systematic training, and the absence of any coherent management of their work and training. Eraut *et al.* found that only a minority of 33 PRHOs in three hospitals received formal feedback from a consultant; and that even informal feedback was totally absent in important areas such as communication with patients. (Roche *et al.*, 1997, found a similar neglect of interactional skills during the intern year in New South Wales). They would have liked a wider range of clinical experience, especially in clinics and surgery (c.f. Toogood *et al.*, 1996), and more bedside teaching. Teaching and learning in clinical areas was always on a case by case basis, not one respondent could recall reviewing a group of patients with a similar condition or engaging in what the Americans call a "chart review". Some received quite a lot of teaching on ward rounds, some virtually none. There was good practice in every hospital but also areas where teaching was neglected. There was no guarantee that official recommendations would be implemented and no quality assurance of training (c.f. Goldacre *et al.*, 1997). Organisational factors such as frequent changes in composition and distributed working locations prevent the formation of the kind of stable working teams with which the ideal form of apprenticeship is frequently

| Learning Method | % included in top 5 | |
| (24 less used methods not listed) | | |
	Consultants	SHOs
Ward round with consultant **	84	55
Ward teaching with registrar/senior registrar	41	47
Formal teaching with consultant	23	19
Supervised practice	17	12
Unsupervised clinical practice **	19	44
Discussion with peers *	34	44
Library work or reference to journals *	25	37
Reading about cases seen *	33	50
Following up outcomes if cases seen	20	28

Bunch *et al.*'s (1998) review of Basic Surgical Training in Yorkshire showed good consultant support for trainees, but deficient clinical experience was found in 32% of general surgical and 70% of orthopaedic posts. This was due mainly to poor organisation of their clinical activity (for example 70% of orthopaedic SHOs never attended outpatient clinics), though it was not helped by the lack of PRHOs in orthopaedics. Only 8% of trainees had undergone an appraisal and "the concept of bleep-free periods for educational purposes was non-existent."

4.2 Learning Procedures

Wigton and his colleagues have published a series of papers on the learning of procedures on residency programmes in Internal Medicine in the U.S. (Wigton, 1981b, 1992; Wigton *et al.*, 1989, 1990). cedusitof

4.3 Learning in the Operating Theatre

A Scottish study by Steele *et al.* (1989) on the technical training of general surgical trainees covered experience, supervision and indirectly competence. 47% of those in teaching hospitals reported that their operative workload was too little (23% in district general hospitals); 35% said they did too little operating alone and 58% too little supervised operating. More worrying was the response from 32% that they were "sometimes out of depth" when doing emergency operations alone in DGH (15% in teaching hospitals, 9% for elective surgery). As in the Gillard study, trainees' concerns relate both to the amount of **experience** (resuscitation or operating) and the degree of **supervision** (in ward or theatre), the two most central features of learning in clinical settings. Steele later participated in an audit of colorectal cancer surgery in three regions for the period 1990-4 (Aitken *et al.*, 1999) which revealed both low levels of supervision of registrars and SHOs and a much lower level of operating experience than that offered by an US fellowship programme for residents. This concern was backed up by a Scottish mortality study of avoidable deaths after colorectal surgery (Macarthur *et al.*, 1998), a finding which prompted Collins (1999) to suggest that surgical training deserved the priority attention given to waiting lists.

Concern about supervision in the operating theatre was raised again by a survey of unsupervised 'first time' procedures by Wilson (1997), who also raised the problem of excessive 'first time' surgery by young consultants and arrangements for the introduction of innovative procedures. In response O'Riordan and Shaper (1997) noted a cultural change towards defining a well trained surgeon in terms of the number of operations performed under supervision rather than the number 80um

medical performance of General Practitioners during a one year programme of vocational training with a similar structure to that used in the UK, i.e. 4 days a week in the practice of a trainer and 1 day a week on a formal course. Both the pre-test and the post-test were based on 20 audio-taped consultations, rated on 26 variables by a panel of 4 assessors. Two groups of trainees were compared, a cohort of 32 from Nijmegen and a cohort of 31 from Gronigen. Significantly greater gains in medical performance resulted from the Nijmegen programme based on systematic skills development than on the Gronigen programme based on problem-based learning. Increases in consulting skills were similar for both groups in four areas but for "psychosocial performance", the Gronigen group maintained a high starting level without further improvement while the Nijmegen group improved from a lower starting level. Performance on knowledge tests also increased and was strongly correlated with both consultation skills and medical performance. Moreover, those with above average knowledge scores at the beginning made the greatest improvement in medical performance. Such improvements resulted from both an increase in obligatory performance and a decrease in superfluous performance, judged against protocols for the most common conditions. Neither programme achieved a desired level of performance across the full range of common conditions; and the vocational training programme in Holland was extended to 2 years.

The British system of vocational training became mandatory in 1982, but had been used in some regions for several years. However, mandation made it necessary to establish criteria for the approval and reapproval of trainers or to tighten up the existing local criteria. The benefit is documented by a before-after study in the West of Scotland (Kelly & Murray, 1992), which showed an increase to 84% of trainees receiving a tutorial weekly (or most weeks), and a decrease to 4% of those rating their training as less than "fairly good". Most British research into the training of General Practitioners has focused on consultations in GP surgeries and the weekly tutorials given by trainers. The main aim of these tutorials is to improve the quality of consultations both from a medical perspective and in terms of communication skill. Since formal summative assessment at the end of the practice-training year and for membership examination of the Royal College of General Practitioners requires the submission of a video of several consultations, this aim has high priority for all concerned. The content of the tutorials typically comprises some combination of cases and issues raised by the trainee, a randomly chosen set of cases seen by the trainee in the previous week, a previously agreed medical topic, and discussion of the consultation process itself, often prompted by notes of a consultation at which both had been present or a video of a trainee consultation (Gray, 1998). Urgent cases are usually discussed at the time but may be reviewed again at a tutorial. Trainers have all received training for their role; and will almost certainly make use of the construct of a patient-centred consultation.

Shapiro (1990) and Shapiro and Talbot (1991) have explored the parallel between trainer or trainee-centred tutorials and doctor or patient-centred consultations. However, both Marvel (1991) and Pitts and Coles (1996) have shown that many experienced doctors are patient-centred in their consultations but trainer-centred in their tutorials. Gray (1998) used both telephone interviews and videos of tutorials, accompanied by separate confidential comments from each participant, to study the nature and effectiveness of tutorials. This raised issues of style, focus, continuity and effective use of tutorial time, all highly pertinent to the training of trainers and meetings of local trainer networks. The system can be described as the regular, flexible and reflective use of two principles

established as important for effective social skills training; regular systematic feedback and facilitation of self-assessment of both verbal and non-verbal communication by video recording. While patient-centredness is usually advocated by the trainer and perceived as a desirable goal by the trainee, no particular approach to consultation is formally modelled and taught. General practice trainees are learning by doing as well as from tutoring, so it would be impossible to isolate the contribution of tutoring; nor would a control group study without training or without video be acceptable.

Not surprisingly, such a short training period cannot cover all conditions, so there have been many articles suggesting areas where GPs need more training. One of the best arguments has been in Palliative Care, where Lloyd-Williams and Lloyd-Williams's (1996) survey found that only 15% of a sample of GPs had received a tutorial, and less than a third felt they had received adequate training in pain and symptom control; while 85% would have liked to have a placement in a hospice as part of their training. Another was in the area of rheumatic disorders where a large survey by Lanyon *et al.* (1995) showed that less than a half of GPs had received any special training, although such disorders account for 10% of an average general practice workload.

Two Australian articles are also relevant. A critical incident study of GPs six month into training and 12 to 18 months later (Sim *et al.*, 1996) demonstrated several major areas of positive change as well as some new or continuing areas of difficulty. The latter include gynaecology, pharmacotherapy and dermatology, the diagnosis of common complaints with uncommon presentations, the skill of managing difficult or angry patients, the organisation for the follow-up of patients with potentially severe disorders, and managing feelings of guilt over missed diagnoses or poor management. The second is Shah *et al.*'s (1997) report on a remediation programme for trainees placed in the borderline zone at their final assessment. This provides additional intensive training and supervision; and having such a "middle pathway" clearly contributes to the maintenance of standards.

Snadden and Thomas (1998) report the use of portfolios by General Practice Registrars (GPRs) for a number of purposes: ongoing planning of a "curriculum" to meet the needs of the individual trainee, as a stimulus to reflection, as a mechanism to capture examples of significant learning in general practice, to reach the more difficult areas of a GPR's experience and to help feedback. They found that a portfolio was useful in establishing confidence during the first half of the year, provided that the relationship between trainer and trainee was reasonably good. However, it ceased to be useful when preparation for the MRCGP examination became the dominant feature of their planned learning.

4.5   Ambulatory Care Settings

This North American term includes both hospital outpatient clinics and private offices (general practice surgeries). These settings are now increasingly used in US residency training, especially in Family Medicine and Internal Medicine, because they "allow learners to:

1. care for patients seen primarily in outpatient settings - especially patients who have chronic illnesses;

2. observe the natural and treated progression of diseases through continuity of care;

3. practise health promotion and disease prevention strategies;

4. develop patient communication and negotiation skills; and

5. deal with social, financial and ethical aspects of medical care".

(Irby, 1995, page 898)

We are especially indebted to Irby's comprehensive 1995 review of research into teaching and learning in **ambulatory care** settings "where 95% of doctor-patient encounters occur".

Several researchers (Krackov, 1982; Napodano *et al.*, 1984; Osborn *et al.*, 1993) report better case mix, more continuity of care, more trainee responsibility for patients and more effective trainer-trainee interaction in private offices than clinics; and Osborn *et al.* found that private office experience led to better performance on an oral examination of clinical competence. In general, however, there is great variation across ambulatory settings which affects both what and how much is learned. Lowdermilk (1986) lists the most critical factors as: the organisation of the clinic, interference from inpatient responsibilities; limited time, space and supervision; access to attending physicians for advice and feedback.

Whereas there is some discretion, at least in theory, over the pacing of visits to inpatients, clinics and office consultations are timetabled in a manner that determines the overall time spent with patients. A major concern, therefore, is the time available for interaction between trainer and trainee and how that time was used. There is a significant amount of evidence from withclinic,

trainees' rating forms provided evidence to the Director of the Clinical Teaching Unit in each hospital. These domains were:

1. Role model of conscientious care

2. Role model of compassionate care

3. Support for house staff

4. Role model of practice of evidence-based medicine

5. Teaching of evidence-based medicine

6. Teaching of clinical skills

7. Teaching of biophysiology

8. Appropriate delegation of responsibility

9. Provision of feedback

10. Openness to feedback

11. Punctuality

12. Role model of respectful, cooperative, productive interaction with health care team

13. Appropriate use of consultants

14. Teaching directed at all house staff, junior and senior.

The inclusion of biophysiology reflects the determination in this particular programme to emphasise basic science as well as evidence-based medicine for which it is renowned. The other categories map well onto Ullian *et al.*'s (1994) four roles of effective clinical teachers in family medicine:

Effective Teachers in Ambulatory Settings

Physician Role Model: Excellent clinical teachers served as positive physician role models. Such physicians were characterised as being knowledgeable and clinically competent, having good rapport with patients, and being perceived by residents as good role models.

Effective Supervisor: In the role of supervisor, effective clinical teachers gave residents responsibilities for patient care, provided opportunities to do procedures, reviewed patients with residents, and

emphasis given to evidence-based medicine and patient preferences and values.

Another adaptation of traditional morning report practice is reported by Wartman (1995) who also incorporated literature reviews commissioned the previous day to encourage the paradigm of evidence-based medicine. His prime innovation, however, is the presentation of a "discharge case" selected by the attending residents to get a good case-mix each month. The case review is expected to cover the reasons for admission, decisions and progress made each day in hospital, discharge and follow-up plans and costing for the hospital visit.

Clinical Teaching Decisions by Six Physicians

Planning: informed by periodic learning needs assessments with their team, they set priorities in advance for the allocation of time. Half of them contacted the resident "on call" the night before for an up-to-date review of their patients. Decisions were made about which cases to highlight (for difficulty or for educational value) and which content to teach (team requested, teacher-determined, filling gaps in the team's knowledge). Five of the six read some literature and four prepared simple learning material (handouts, reprints, exercises, slides, etc.)

Diagnosing the Patient's Condition: the main difference from the diagnostic context described in Section 1 is the greater reliance on second hand information from other members of the team.

Diagnosing the Learner's Understanding: inferred from the presentation and a few key questions. One physicians commented that "the effectiveness of the presentation is directly proportional to how much I can remember of it", another

a little shorter.

4.7 Summary

There have been several evaluations of postgraduate basic training programmes in the UK. Though there have been a few improvements, the overall impression is still negative. Many features of the educational policy seem to be appropriate, but they are not being implemented in many hospitals. There is insufficient supervision and feedback. Educational goals are subordinated to service demands. While many house officers receive good clinical teaching, a minority do not and assurance of educational quality is weak. Learning goals are only specified at a very general level, so there is little clarity about priorities, especially at the PRHO stage. Management of the educational process at local level is given little time and little authority.

Continuing concern has been expressed about the survey evidence on basic surgical training. Sometimes the problem is too little supervision of operations by house officers, sometimes the house officers get insufficient clinical experience. Operating under supervision is seen as the most critical feature of learning to be a surgeon and there is not enough of it.

Chapter 5

Learning in Non-Clinical Settings

The previous chapter spanned a range of learning activities — learning by doing, learning from text and computerised information bases, learning through discussion, and learning from presentations and mini-lectures. The criteria used for describing the learning as being in a clinical setting were (1) its direct relationship with the assessment and management of current patients and (2) its location within the concerns of the health care team responsible for those patients. This chapter covers a similar range of learning activities, but the mix is rather different because the focus is more on the acquisition of knowledge, skills and values needed for serving patients one will meet in the future than those which are one's current responsibility.

5.1 Teaching Conferences

Although the teaching conference (sometimes called a grand round) is similar in many

assigned by the director of the resident training programme with educational needs in mind, not left to the choice of individual presenters or their supervisors.

5.2 Journal Clubs and Self-Study

Another approach to the development of cognitive knowledge used in many programmes of postgraduate education is the Journal Club. Evidence on their effectiveness was recently reviewed by Alguire (1998), who noted that a major goal was to teach critical appraisal skills as well as establishing a lifelong learning habit. Clubs with high attendance and longevity are characterised by mandatory attendance, availability of food, and renewed importance by the programme director. Residents who are taught critical appraisal report paying more attention to the methods and are more sceptical of the conclusions, and have increased knowledge of clinical epidemiology and biostatistics but studies have failed to demonstrate that these residents read more, or read more critically.

A more individualised approach which aims to link self-study with current clinical expe-

3. The original presentation is repeated to an audience of all the residents, who then divide into four groups and go to the wards, where each group is taught the physical examination by one of the senior residents.

and program assignments, a one month administrative rotation and community rotations with administrative elements. This was well received but a survey of graduates also elicited several suggestions for improvement and indications of which aspects of the course could be strengthened. This led to further rotations with professional manager mentors and a series of management seminars, later expanded with a 1-semester course targeting selected management competences.

A different kind of learning environment is provided by day-release courses for General Practice Registrars (Jenkins, 1994). This national system has significant local variation but is highly responsive to local demand. There is a great deal of groupwork and sharing of experience, as GP registrars are more isolated than those in hospitals. It also offers the opportunity to update on clinical areas neglected in their previous hospital-based training, to study consultation and counselling methods, and to address some management topics. The introduction of summative assessment will have affected these courses, but so far there is only anecdotal evidence of this.

5.6   Summary

Research into postgraduate teaching and learning in non-clinical settings mostly comprises evaluations of a wide variety of teaching innovations, rich in ideas but not necessarily generalisable. In particular we would draw attention to improving the learning benefits of departmental conferences, developments in self-directed learning (more prominent for CME), skill-based courses in surgery, the use of GPs to teach primary care to house officers in Accident and Emergency departments, a system for teaching clinical examination comprising both seminar and ward-based components, and confirmation that various types of "lectures plus" teaching are more effective than lectures only. Several departures from the standard lecture format have been positively evaluated, as have variations on case-based departmental seminars.

Chapter 6

Continuing Medical Education and Lifelong Learning

An Ontario Survey of physicians (Davis *et al.*, 1983) distinguished between two types of CME activity: (1) those in which physicians were able to participate locally within the community of practice settings, and (2) those of a more formal nature, often requiring travel. Activities reported by over a third of the respondents are listed below:

Informal, local, community-based CME activity	
Reading journals	98.8%
Informal consultants	83.5%
Reading texts	76.0%
Attending rounds	72.9%
Using drug company materials	42.5%
Using AV materials	37.4%

Attendance at formal or distant CME programmes	
Scientific sessions	71.0%
Formal hospital events	52.1%
Meetings of local medical societies	44.6%
Medical school CME activities	43.4%
Speakers programmes organised by drug companies or other agencies	41.3%

Table 6.1: Types of CME activity: informal (top), formal (bottom).

Davis *et al.* (1994) describe this pattern as still typical ten years later, though a few newer methods were also beginning to feature by this time.

Meanwhile a structured interview study by Owen *et al.* (1989) of General Practitioners in Wales revealed over 90% reading journals and medical papers and extensive purchase of books for personal use (76%) or the practice library (76%). However "reading medical literature" just failed to reach their top five educational activities. The percentages rating educational activities as very valuable (1 on a 1–5 scale) showed a strong preference for informal consultation and discussion:

Sources of Information	
Contact with partners, such as practice meetings and discussions	63%
Contact with patients	43%
Practice meetings with health visitors, social workers, district nurses	31%
Postgraduate meetings, courses and symposia at local hospitals	29%
Informal hospital input	25%

Table 6.2: Sources of information.

54% had carried out performance reviews within their practices and 46% held their own educational meetings (33% at least monthly). Their wish for more contact with other groups was demonstrated by 74% being in favour of non-medical members of the primary health care team being involved in CME for GPs, and by 70% favouring joint educational activities with hospital doctors.

Four years later a telephone survey of 111 GPs (response rate 63%) asked respondents to state the most important influence on the development of their practice of medicine (Drage *et al.*, 1994), leading to a very different kind of response (the total of 156% is due to dual responses being double counted):

Influences on development			
Education events	37%	Several factors	8%
Colleagues	29%	1990 contract	6%
Reading	27%	Consultant letters	5%
In-practice meetings	24%	Other matters	12%
Experience	8%		

Table 6.3: Influences on development.

The increased influence of educational events can be attributed to greater attendance following the introduction of a postgraduate education allowance (PGEA) into GP Contracts (contentious because it was funded by reducing seniority payments, leaving no net gain in income). However, we may be dealing with a bimodal distribution because, when later asked to identify any particular education event(s) that had changed the way they practice medicine, only 54% were able to respond positively.

Specific questions about five different aspects of change in their practice in the last 3–4 years yielded positive response rates as follows:

The first two aspects are linked to new contracts and financial arrangements: 73% attributed changes in health promotion to financial arrangements, though greater awareness (27%) probably affected performance (31% integrating health promotion with consultations and 10% the reverse). Changes in the doctor-patient relationship included an almost equal number of positive and negative responses, the latter usually attributed to deteriorating conditions for work, especially time pressures. The diagnosis and investigation responses largely concerned increases in investigations (ultrasound 18%, gastrocopy

Aspects of change	
Changes in practice organisation	90%
Changes in health promotion	89%
Changes in treatment (including drugs)	86%
Changes in diagnosis and investigation	65%
Changes in doctor-patient relationship	54%

Table 6.4: Aspects of change.

17%, blood investigation 14% were the most common) and referrals (24%), though some decreases were also reported. The main reasons given were improved accessibility (29%) and patient demand (24%). Only the changes in treatment were attributed mainly to CME, as shown below:

Sources of Information Leading to Changes in Treatment (n=95)			
Journals	67%	Cost/audit	26%
Educational meetings	43%	GP colleagues	21%
Pharmaceutical reps	30%	Patient pressure	6%
Local consultants	28%	Other sources	19%

Table 6.5: Sources of information leading to changes in treatment.

Specific treatments changes mentioned by 10 or more doctors included ACE inhibitors (54%), treatment of asthma (24%), anti-depressants (17%), antibiotics (17%) and treatment of GI disease (10%).

A more recent Welsh study by Allery *et al.* (1997) interviewed a random sample of 50 general practitioners and 50 consultants (response rate 77%) about specific changes they had made in the preceding year in four key areas of practice: management of a common clinical condition, prescribing, referral and use of investigations. Reasons for making these changes were then elicited and classified. Each group provided an average of 3.6 examples with GPs giving about 3.2 reasons for each change and consultants 2.8 reasons. The distribution of these reasons between eight most cited categories is given below for type of doctor and category of change.

GPs were twice as likely to mention cost factors; and consultants were twice as likely to mention changes in technology/tests. Patient-centred changes were more likely to be "patient led" for GPs and "patient need" related for consultants. Professional contacts were equally divided for GPs between consultants and other GPs, while 72% of consultants' contacts were with other consultants: a total of 14% of these contacts were with non-medical professionals. The breakdown of reasons within the "education" category was as follows:

Davis *et al.*'s (1995) review of randomised controlled trials in CME found 99 such trials completed by the end of 1994, incorporating both primary and secondary interventions. A third of these trials included residents in the target population; three quarters took place in ambulatory settings — private offices, care centres or clinics. 62% showed an improvement in at least one major outcome related to either physician performance or

Type of Reason	Percentage of citations for each category					
	GPs	Cons	Manage	Prescribe	Refer	Investigate
Organisation	19	17	18	13	12	9
Education	14	21	24	20	5	16
Contact with professionals	14	12	9	13	14	16
Patient-centred	11	8	12	7	12	8
Technology/tests	6	14	4	0	4	28
Economic	11	6	6	22	2	3
Pharmacology/ pharm. companies	8	9	13	18	2	0
Clinical experience	9	6	7	5	12	9

Table 6.6: Citations by category.

Educational category	Number of reasons cited	
	GPs	Consultants
Scientific or medical journals	13	36
Medical newspapers	17	0

6.1   Effectiveness of CME Courses

Davis *et al.* (1995) also concluded that short (1 day or less) CME events usually bring about little change. Although there are a few examples of very short courses focused on simple practical skills leading to positive outcomes — Awh

ferent educational techniques on the cancer control skills of 57 physicians. Methods used included interactive small-group discussion, role playing, videotaped clinical encounters, lecture presentations and trigger tapes. Performance was measured by using unannounced standardised patients (see chapter 8) with hidden microphones to visit one year after the programme. Significantly higher performance was found for breast cancer risk-factor determination and smoking cessation counselling: these were the areas where the CME programme had used techniques that rehearsed or portrayed and discussed clinical activities.

Another 10 hour training programme concerned the assessment and management of depression (Gask *et al.*, 1998). This programme, designed for the Defeat Depression Campaign, included both specially developed video material and course material for follow-on workshops. All five sessions had 1 hour of presentation, viewing and discussion, followed by 1 hour of role-play consultations which were videotaped and discussed. Assessment before and after the course comprised (1) a consultation with an actor role-playing a depressed patient, (2) a semi-structured interview and (3) a Depression Attitude Questionnaire. Although there were changes in interviewing style and the doctors gained in confidence, there were no changes in the two key measures of systematic assessment. The actor-patient ratings indicated improved explanations of depression and better regulation of its management. There was no change in the use of cognitive intervention, which the trainers had observed as causing confusion during the training. Therefore the package was revised to give greater emphasis to assessment and to reduce the time spent on cognitive intervention. This change could be interpreted as an implicit recognition that the course was too ambitious for the time available; but this was not overtly discussed, so it reads more like a "common sense" modification. None of the other evaluations reviewed discussed the feasibility of achieving all the objectives in the allocated time, nor whether certain more important objectives needed to be accorded greater priority. Indeed Davis *et al.54(ts)-11999.7((se9gal.54(ts)-1199967(25-15999.7(doda)-1292TJ*

of physicians showed greater reduction in emotional distress for as long as 6 months after their visits (post-training) although the duration of these visits had not changed. "Trained" physicians recognised more psychological problems, used more strategies to manage emotional problems in their patients, and showed greater clinical proficiency in the management of a simulated patient, than physicians in the control group. Moreover, patients in the PD group showed greater improvement than those in the Rogerian group. It should be noted, however, that for the even more taxing goal of developing the counselling skills of doctors and nurses in cancer care Maguire and Faulkner (1988) have found that a minimum of 3 to 4 days is needed.

6.2 Other Intervention Strategies

Educational materials are another major strategy for CME, but results for interventions comprising materials on their own are not encouraging. Davis *et al.* (1995) review

GPs' use of a series of official guidelines, developed by working parties of experienced practitioners and specialists, focused on the relative importance of various attributes of the guidelines themselves. Ten guidelines and 47 recommendations from them were selected for the study; then a volunteer group of 62 GPs recorded their decisions after each consultation for which one of the 10 guidelines was applicable. Table 6.8 below shows the percentage of compliance with the guidelines when each selected attribute was present and when it was not present; and the "strength of influence" factor was calculated from this data.

Attributes	% compliance when		Strength of Influence
	present	not present	
Controversial, not compatible with other values	35	38	0.26
Vague and not specific	36	67	0.24
Described concretely and precisely	67	39	0.23
Demands changing existing routines	44	67	0.20
Based on scientific evidence	71	57	0.13
Consequences for management	50	65	0.13
Demands new knowledge and skills	54	65	0.10
Will provoke negative reactions in patients	47	63	0.10

Table 6.8: Influence of guideline attributes on compliance

Another variable which affects the use of guidelines is involvement in producing them. Carney and Helliwell (1995) describe an initiative involving 12 general practices in Northumberland to improve the care of patients with diabetes. This involved doctors and nurses learning together, discussion of six practice audits, remediation of identified knowledge deficits and the collaborative development of protocols. Evaluation was based on practice records for 1986 (prior to the initiative) and 1991 (two years after the setting of standards). They reported that:

> "More patients received general practice care only or shared care in 1991 than in 1986. There was a reduction in the use of oral hypoglycaemic agents among non-insulin dependent diabetic patients and more patients were maintained on diet alone. A greater proportion of patients were referred to dieticians, ophthalmologists and chiropodists in 1991 than 1986, and there was increased recording of, examination of, and identification of, diabetic complications. Little change was found in the mean values for clinical parameters between the two years."(page 149)

A study of 92 GP trainers in the North of England (North of England Study of Standards and Performance in General Practice, 1992) found that clinical standards for common childhood conditions improved prescribing and follow-up for those GPs who helped to set up standards for that particular condition, but not for those who were not involved in setting those standards: the experimental design was well chosen for the issue, because each sub-group of GPs was involved in setting standards for a different condition, thus demonstrating that involvement in standard setting only resulted in positive outcomes relating to those specific standards

A London-based study disseminated locally developed guidelines on asthma and diabetes through practice-based education (Feder *et al.*, 1995). Two groups of 12 practices received guidelines and educational visits for either asthma or diabetes, thus acting as a control for the other condition. The intervention involved three lunchtime sessions: (1) introduction to guidelines and discussion of how practice management could be developed into a practice protocol with an emphasis on patient recall for annual review, a stamp for reviewing patients was given as a prompt, and home monitoring was also discussed; (2) review of the practice's organisational decisions, session on clinical content of guidelines, technical demonstration; (3) audit data from patient notes and further review. Practices receiving diabetes guidelines improved recording on all seven variables, those receiving asthma guidelines improved only on review of inhaler technique and prescribing. When the "prompt" was used, there was significant improvement in the recording of both conditions.

This London study involved both an educational intervention (educational visits) and an administrative intervention (the prompt), as recommended by Grimshaw and Russell (1993). Analysis of Grimshaw and Russell's tables reveals a predominance of administrative intervention with preventive care guidelines (63% reminders and 26% changes in patient records) and a slight predominance of educational intervention with clinical care guidelines (33% feedback, 29% conferences or seminars, 21% reminders, 12% changes in records). Based on their analysis of the effect size, the authors suggest that circulation of guidelines should be accompanied by a locally-based educational intervention and patient-specific reminders at the time of consultation. Davis *et al.*'s (1995) review found the outcome evidence to be particularly good for reminders (significant effects in 22 out of 26 RCTs). Given our earlier discussion (Chapter 2) about the relationship between competence and performance, it should be noted that the educational intervention is normally aimed at developing competence by discussion of rationales, evidence and problematic or typical cases, while the administrative intervention is aimed at converting that competence into improved performance.

Davis *et al.* (1994) describe educational interventions involving visits to practices as "academic detailing", and report the use

a control study in Scotland by Bryce *et al.* (1995) demonstrated a significant impact for an audit facilitator on 12 representative general practices' diagnosis and treatment of childhood asthma.

An important aspect of many of these combined interventions is that they are trying to ensure not just competence but consistently good performance by addressing primary health care systems as well as individuals; and also by treating them as multi-professional contexts. Their goal is to expand **individual competence** into **team performance**.

Davis *et al.* (1994) conclude their review of the effectiveness of CME interventions by emphasising the intensity and complexity of interventions with positive outcomes and the multi-faceted nature of the change process. Learning in formal contexts requires (1) problem-based approaches to relevant clinical issues using authentic visual material, (2) formats for facilitating transfer such as small-group case discussions, peer review exercises in clinical settings, and especially role-playing or practice-rehearsal strategies which provide an opportunity to practice new skills and receive feedback, (3) incorporation of practice-useful devices to enable, remind or reinforce clinical physician behaviours; and (4) long term follow-up feedback on practice performance. Even from a purely technical perspective, which regards needs assessment and the design of appropriate CME provision as unproblematic, much CME practice emerges as based on wishful thinking by both providers and participants.

6.3   Needs Assessment and Audit

Davis *et al.* (1995) identified five levels of needs analysis in the 99 trials of CME interventions (160) they reviewed; and these were associated with varying percentages with a positive outcome.

Level of needs analysis reported	Number of interventions	% with positive outcome
No clinical need reported	12	42
Identification of general clinical area requiring change, with clinical care references.	34	53
Based on nationally approved guidelines	41	61
Consensus agreement among local health		

multistage process involving six steps:

1. Selecting a topic;

2. Establishing target standards or criteria against which a level of performance can be measured;

3. Observing practice by collecting, analysing, and presenting data;

4. Comparing performance with targets;

5. Implementing required changes through discussions, written policies or other mechanisms; and

6. Repeating the review to check that changes have been implemented and that quality of care has been enhanced.

In principle the process is iterative, and the cycle can be entered at any point. Derry *et al.*'s (1991) "audit of audits" suggested that one reason for their lack of impact maybe the pressure to demonstrate to the authorities that audit is being done. They found

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decision-oriented, finding the best way to manage a patient; and learning is incidental to that prime purpose. It may take the form of consultation with immediate colleagues or experts with whom they have some contact, or of literature searches and reading. This type of learning is closely tied to individual patients and their progress and therefore cannot be planned. **Formal self-directed learning** corresponds to what Tough (1971) called a "learning project", in which there is a clear intention to learn about a specific problem or issue. There is a fairly clear sense of what needs to be learned, though detailed outcomes may be emergent rather than pre-planned (Gear *et al.*, 1994).

The first large-scale investigation to explore the reasons for physicians making changes in their practice and the learning entailed was Fox *et al.*'s (1989) interview study of 340 physicians in the US and Canada. They found that, although some reasons for change were personal or social, most changes were driven by the desire to be more competent in the delivery of healthcare to patients. Important considerations early on were: (1) developing an image of the outcome of changing, because if this was clear the process of change was more rapid and efficient; and (2) assessing what capability they needed for making the change, which partly depended on the level of excellence they hoped to reach. Planned efforts to learn were commoner when the capability gap was fairly large, and the nature of that gap determined how they

Stage Attribute	Stage 0 "Scanning"	Stage 1	Stage 2	Stage 3
Goal	Identify potential problems to consider during next stage			

A less systematic picture emerges from a British study by Armstrong *et al.* (1996) of general practitioners' reasons for changing their prescribing behaviour. This identifies a preliminary awareness of new possibilities from reading and brief discussions with other doctors, which may lead to action if it matches the doctor's preconceptions, comes from a highly credible source or is triggered by encounters with other doctors' prescribing practices or other critical incidents. But it also reports a rather precarious process of trying out new drugs, which appears to be highly dependent on the responses of a small number of early 'pilots'.

Slotnick's (1999) framework does not give early experience with a change quite such a precarious feel, but it was derived from a different population of doctors in a different context with greater exposure to evidence-based medicine; and was not specifically focused on prescribing. Moreover it offers a realistic and comprehensible approach to lifelong learning which could be discussed in detail with postgraduate trainees. They will need more than exhortation to help turn good intentions into workable patterns of Continuing Professional Development.

6.5   Continuing Professional Development

Most professions have now adopted the term Continuing Professional Development (CPD) as encompassing a wider range of learning experiences than those associated with the term Continuing Education, which still carries associations of more formal, provider-initiated, educational activities. Thus CPD comprises informal learning as well as formal learning, learning on-the-job as well as learning off-the-job, the full range of learning activities described in Table 6.11 above. Eraut *et al.* (1998) suggest that CPD be defined as "all the further learning which contributes to how a qualified professional thinkle   as

outcomes and assurance that priority needs will be addressed, unless they are tightly coupled to audit or performance review. From another perspective, the PDP approach is often criticised for being too individually based. Owen *et al.* (1989), for example, found that 58% of practitioners thought that self-learning activities on their own were an inadequate strategy.

One response to this problem of isolation has been to introduce a mentoring system. For example, the three-part strategy piloted by Challis *et al.* (1997) for GPs in Sheffield comprised: the development of a personal education plan; creating a portfolio to document its progress and gain accreditation for the learning; and mutual support through a co-mentoring group, initially facilitated by a CME tutor. Other initiatives involving GPs' use of personal plans with support from a GP tutor or CME advisor are reported by Bahrami (1998) and Valentine and French (1998). An East Anglian scheme which offered GPs a choice of an experienced GP mentor or co-tutoring in which pairs of GPs support each other's learning has been evaluated by Hibble and Berrington (1998). Both systems were positively received, and 52% of the contracting group used PDPs compared with 27% of the mentored group: an additional finding was a significant reduction in stress levels in both groups.

Another response has been to introduce activities for groups of physicians who work together and for multi-professional health care team, alongside doctors learning on their own (Cunningham, 1995). Recent research on learning in the workplace suggests that learning within workplace groups is very important but also highly dependent on the microclimate of that particular workplace (Eraut et al 1998). Both appropriate management training and contact with other groups can help in the process of improving the learning climate (Burton, 1998).

The American researchers Fox and Bennett (1998) are also now advocating a co-ordinated approach to all three levels, suggesting that the role of CME providers should be to:

- Facilitate self-directed learning by providing for self-assessment, the acquisition of knowledge and skills, and the opportunity to reflect on clinical performance

- Offer high quality individual and group education that provides authoritative information, knowledge, and skills based on expertise and evidence

- Assist healthcare delivery systems to develop and practise organisational learning.

The developments reviewed above are recognised in the Department of Health's 1998 report, **A Review of Continuing Professional Development and General Practice**, whose principal recommendation is

> "to integrate and improve the education process through the **Practice**

and outcomes assessment" (page 14). It notes that further research will be needed to ascertain how best to achieve this goal, and to link CPD with audit and R&D. Significantly it argues that:

> "the main message in delivering effective CPD is that the key to lifelong learning lies not in how to learn, but in how the learning process is managed."
> (page 13)

6.6 Summary

The relevant research into Continuing Medical Education and Lifelong Learning falls into three main categories: research into how doctors learn, evaluation of CME interventions and research into innovation strategies using single or multiple interventions to achieve changes in specifically targeted areas of practice.

Surveys of GPs, and also in a few cases consultants, have shown the importance for learning and changes in practice of a wide range of learning activities and sources of information. Moreover, they differ according to whether the changes involve treatment (including prescription), diagnosis and investigation, doctor-patient relationships, referral policy, health promotion or practice organisation. Models of physician learning distinguish between learning triggered by the problems raised by current individual patients and "learning projects" to acquire or improve proficiency in a targeted area of practice. The initiation of learning is dependent on significant background knowledge of what is out there to be learned to which CME conversations with other physicians, and reading contribute in ways which would not be revealed, for example, by evaluations of CME events.

Evaluations of CME courses have demonstrated the importance of including activities such as the observation and discussion of visual material and/or supervised practical work. Though it has confirmed that short courses of 1 day or less are rarely effective, no controlled studies have been reported which used length of course as a variable. This deficiency needs to be remedied because much time could be wasted trying to improve courses which are too short; and unrealistic expectations of the learning time required for certain goals are easily developed by busy learners and under-resourced providers - a form of collusion from which nobody benefits. Another important conclusion is that educational interventions on their own often fail to achieve changes in practice.

Research on innovation strategies points to the danger of focusing only on the development of competence. Competence has to be translated into performance and at this stage many dispositional and organisational factors come into play. Research on the implementation of guidelines, for example, indicates not only that the quality and utility of the guidelines themselves is important but also that both educational interventions (leading to understanding of their purpose and rationale) and administrative interventions (ranging from organisational changes to simple reminders) need to accompany the guidelines.

Summary — continued

The discussion of

For example, Kushniruk

number of representative training systems.

7.1 Training Systems

The literature on training systems in medicine is large and scattered through a wide variety of sources including journals and books on computers and education in general, via journals on medical education through to journals for particular medical specialities. The following brief section simply provides a general indication of what is on offer.

7.1.1 Psychomotor Skills

Various systems have been developed both for assessing (see for example, Jones *et al.*, 1997; Derossis *et al.*, 1998b) and for developing psychomotor skills. These systems are designed largely for pre-registration rattdhwel990[150d3000.64(ariet)1009uding

the computer simulation did not improve later assessment performance on a pig but did improve later assessment performance on the computer simulation.

7.1.2 Perceptual Skills

A computer-based system that makes no attempt at evaluative interactivity is a CD-ROM addition to a dermatology course (Hartmann & Cruz, 1998). The CD-ROM supplemented an existing course using live-patient sessions and various sources of visual material. The CD-ROM added a 100 pages of text and diagrams. In a comparison with the course prior to the introduction of the CD-ROM, the medical students highly rated the CD-ROM but did no better in the examinations as a result of its introduction.

While there are many computer-based training aids for radiology, most are essentially electronic books or collections of images together with some kind of indexing mechanism, normally based primarily on disease. There have been relatively few systems that attempt to either model the domain or the evolution of knowledge and skill of the student in a detailed way, i.e. provide the evaluative interactivity lacking in more straightforward computer-based training packages. Of these, Azevedo and Lajoie (1998) describe an analysis of the problem solving operators used in mammography as applied by radiologists of various levels of skill. They also analyse the nature of teaching as it occurs in radiology case conferences and particularly the way that experts articulate their diagnostic reasoning. Both these analyses are used as part of the design process for RadTutor (Azevedo *et al.*, 1997). A similar careful analysis in the domain of chest X-rays has been carried out by Rogers (1995) as part of the design process of VIA-RAD tutor. Macura *et al.* (1993) have taken a case-based approach in a tutor for CT and MR brain images. Their system offers a case-retrieval and decision-support mechanism based on descriptors. Their system also employs an atlas and contains tutorial material and images of normal brains as well as those displaying lesions. It can act as a decision support system by offering a range of possible diagnoses and access to the images of related cases, given the textual information that has been entered. Sharples *et al.* (1995, 1997) have developed an image description training system that aims to help radiology trainees learn how to describe MR brain images in a systematic way by means of a structured image description language (IDL). This language allows clinically meaningful features of MR brain images to be recorded, such as the location, shape, margin and interior structure of lesions. The system is deliberately aimed to support and train the radiologist's inferences from what can be observed in the images.

An innovative problem-based approach is adopted by Kevelighan *et al.* (1998). They get their students to develop their own multimedia packages (in areas of obstetrics and gynaecology). This provides the students with useful IT skills, including internet skills, as well as the chance to reflect on the topic chosen by building the package for other students to use. The authors note the problem of preventing over-enthusiastic students from spending too much time as well as the "significant time and effort to establish the programme".

7.1.3 Communication Skills

Hulsman *et al.* (1997) describe a computer-based training system, INTERACT-CANCER, to teach communication skills, particularly those needed in dealing with cancer patients.

Their paper offers a good pointer to the literature on communication skills and to related computer-based training systems. Their system consist of four modules. The first is a general introduction to the topic of communication. The second explains how to break bad news and the third is about providing information about treatment and future expectations. The fourth is about the emotional reactions of the patient. Each module offers video-clip examples of both good and bad communication practice and asks questions of the user to help them reflect on what they are seeing and hearing. What the system cannot do is to observe and comment on the user's own communicative competence (see the discussion of the knot tying tutor above: Rogers *et al.*, 1998). Their evaluation of the system concentrated on the perceived value of the system and how it was used but did not attempt to measure changes in communicative competence as a result of using the system.

7.2 Decision Support Systems

The use of Health Decision Support Systems (see e.g., Tan and Sheps (1998) for a comprehensive overview) raises various issues in relation to competence and judgement. Under their earlier title of expert systems such systems offered much promise but did not have a dramatic effect on medical practice. Now there is a more realistic sense of their strengths and weaknesses, and some are in routine use. A comprehensive meta-analysis of the effects of computer-based clinical decision support systems is provided by Johnston *et al.* (1994). Their paper shows how difficult it is to evaluate the effects of such systems in an unbiassed manner. Having started out examining over 700 papers they eventually analysed the results on patient outcomes and clinician performance of systems described in 28 studies. Within these studies they found only three with positive

Their index for Decision Support Systems is presented below in Table 7.1:

Name	Status	Type	Entry Date
Dxplain	routine use	clinical decision support	Nov 7 1995
Epileptologists' Assistant	decomissioned	nurse progress note assistant	Sept 23 1997
Jeremiah	routine use	orthodontic treatment planner	Nov 19 1997
HELP	routine use	knowledge-based HIS	Jan 2 1995
Iliad	routine use	clinical decision support	Oct 23 1995
MDDB	routine use	diagnosis of dysmorphic syndromes	Mar 29 1996
Orthoplanner	routine use	orthodontic treatment planner	Nov 19 1997
RaPiD	routine use	designs removable partial dentures	Feb 9 1996

Table 7.1: Decision support systems in use.

The issue is no longer one of "can such systems be built and installed in medical care settings?", so much as "how useful are such systems in practice?" and "how does their use affect human decision making processes?"

- "a shift in focus from fragmented data to linked databases

- increased emphasis on the development of more powerful models and improved knowledge engineering methods

- increased emphasis on research to determine and explain decision outcomes" (page 376)

The latter point links back to Kushniruk *et al.* (1996) above with the need to ensure that physicians can understand how the decision support system has framed the problem so that they can judge the quality of the advice that is being proffered.

7.3 Summary

A great many systems have been developed for various aspects of training, but most come up against the the consistently hard problem of having the system monitor, evaluate and react sensibly to the learner's attempts to master a skill or solve a problem. Decision support systems have had a mixed reception over the years, but seem to be growing in acceptance as just another tool in the doctor's armoury. Researchers foresee an increasing delivery of "processed data", e.g. about treatment options, at the point of care delivery, and the increasing dependence of practitioners on validated and trusted databases rather than the primary (journal) literature. They anticipate a coming together of evidence-based medicine and clinical information technology to provide the practitioner with whatever information is needed at the time and place where it is needed.

Chapter 8

Assessment and Revalidation

Assessment is not the prime focus of this report, but it plays an important part in the development of competence and judgement. Three types of purpose can be usefully distinguished:

- Certification or qualification of individual doctors

- Provision of information to guide learners and/or those who supervise and support them

- Quality assurance and improvement of practice.

Certification and Qualification, particularly when examinations are involved, are often described as "high stakes" decisions. For examinations, the risk to candidates will depend on pass rates, the possibility of reassessment and the probabilities of first time and second time success. The cost of failure will depend on whether their career progression is significantly affected, as well as the need to engage in further training or study. However, even for candidates least at risk, the effect of any high stakes assessment is a considerable increase in attention to what is being assessed , with a concomitant decrease in attention to what is not being assessed. Hence the quality of an examination has to be judged not only by whether the right people pass (false positives being of particular concern whenever certification is involved) but also by its effect on candidates' direction of their learning effort. This washback effect of examinations may be positively valued; Wakeford and Southgate (1992), for example, report how the introduction of a Critical Reading Question paper into the Membership Examination of the Royal College of General Practitioners increased time spent by candidates on critically discussing papers and reading two key journals. Where negative views are expressed, it is usually because the examination is thought to overemphasise knowledge at the expense of competence (see Chapter 4), to neglect a holistic approach by focusing mainly on components of competence rather than their integration,

8.1   Assessment Methods

Excellent overviews of assessment methods used in examinations are provided by van der Vleuten and Newble (1994), Shannon *et al.* (1995), and Fowell and Bligh (1998); and advice on the development of specific tests by Newble (1994), Dauphinee *et al.* (1994). Although all the methods reviewed are used at postgraduate level, much of the published research refers only to undergraduates. However, some development are clearly relevant at both levels. For example, Page and Bordage (1995) have taken advantage of recent research on clinical decision-making, supporting the view that problem-solving skills are case or problem specific rather than generic to replace written Patient Management Problems whose validity was increasingly in doubt (Norman *et al.*, 1985b; Bordage & Page, 1987) by sets of problems focused only on those **key features** that are crucial to their successful resolution. Not only does this cover more cases in less time but it achieves high validity by adopting a more holistic construct of competence.

Several different groups have reported developing Objective Structured Clinical Examinations (OSCEs) for use at postgraduate level: Fraser *et al.* (1994) for GP Consultations; Sloan *et al.* (1993), Schwartz *et al.* (1995) for surgical interns; Hodges *et al.* (1998) for psychiatry. Hodges *et al.* (1996) paper on using OSCEs specifically targeted at difficult communication skills suggests that these also have a strong case-specific element, with consequent implications for going beyond generic training in communications. Another development in Canada involved lengthening the time spent at each station on a multi-case examination to 30 minutes in order to make a more comprehensive examination of the more sophisticated knowledge of senior surgical residents (MacRae *et al.*, 1997). The resulting Patient Assessment and Management Examination (PAME) had better psychometric properties than other measures, when using 6 cases. Patient satisfaction ratings were included with global ratings by the examiner for each of the four phases: - initial patient assessment (8 mins), ordering and interpretation of investigations (4), a second interaction with the patient to discuss diagnosis and management (10) and a structured oral examination (6). A parallel development in Ireland led to a objective structured long Examination Record (OSLER) in which the candidates spend 20-30 minutes with the examiner alone, having already been observed examining and taking a history from the patient (Gleeson, 1997). Including a sufficient number of cases is still important for reliability; because case content is the most significant variable (van der Vleuten, 1996) and results should not be left to "the luck of the draw".

Both OSCEs and PAMEs/OSLERs require the use of simulated standardised patients (van der Vleuten & Swanson, 1990), though Barrows's (1993) review points to other, less structured use of standardised patients to assess a doctor's general approach to clinical examination rather than specific skills. Stillman *et al.* (1991) estimated that 2 half-days interacting with 19 Standardised patients was sufficient for evaluating the data gathering and interviewing skills of residents.

Pieters *et al.* (1994) found that GP trainees performed better with actor-patients than in recorded consultations with real patients in daily practice, but this evidence nevertheless provided good predictions of weak performance from trainees. They interpreted this as a distinction between competence and performance rather than lack of validity when using standardised patients: Finlay *et al.* (1995) used actor-patients for testing communication skills at the end of a Diploma course in Palliative Medicine; and showed that, although their ratings of the doctors were a little higher than those by the "official" examiners,

they correlated well. Indeed standardised patients have been trained to give formative feedback to medical students and can play an important role in this aspect of their training (Barrows, 1993; Stillman *et al.*, 1990).

Reznick *et al.* (1997) and Martin *et al.* (1997), extended the use of OSCEs to test technical skills with their objective structured Assessments of Technical Skill (OSATS) for measuring surgical residents' technical skill using bench model simulations outside the operating room. Jansen *et al.* (1996) have developed a test for technical clinical skills of general practitioners in the CME context. A more sophisticated but not highly expensive simulator (£3000) has been used by Byrne and Jones (1997) to assess anaesthetists responses to a range of simulated emergencies; and further work showed that under simulated critical conditions chart recording errors markedly increased (Byrne *et al.*, 1998), thus raising questions about the accuracy of records of such incidents in real situations.

Although associated with formal examinations, these assessment techniques can also be used for formative purposes, to provide feedback to the trainee and/or trainer. Thus Pieters *et al.* (1994) used assessment with simulated patients to identify trainee GPs needing more support. Gleeson (1997) reported how immediate feedback from an OSLER led to a significant improvement in performance. Sloan *et al.* (1996) found that feedback could be given to participants during an OSCE without perturbing test reliability. Garibaldi *et al.* (1994) describe the increasing popularity of a voluntary in-training examination for residents in internal medicine. 47% took this opportunity to compare their performance on a comprehensive written examination with national norms, of whom 45% were second year residents.

8.2 Assessment of Performance

The term **performance assessment** is often applied to any assessment involving real or simulated patients; but, mindful of the important distinction between competence and performance, we shall refer to all the methods discussed above as either competence assessment or assessment of knowledge. The term performance assessment can then be confined to assessment of real on-the-job performance under working conditions. Such assessment is the only form of assessment under a "pure" apprenticeship system and has always played a significant role in the UK. Dauphinee's (1995) review of the increasing use of performance assessment in North America supports the trend towards improved validity but also analyses the reliability problems of new approaches. The least satisfactory of all formal assessments in the UK must surely be that associated with admission to the register. Though subject to ratification, the "satisfactory completion" of a doctor's pre-registration year depends on global judgements by their supervisors, made with varying degrees of rigour and varying amounts of unaggregated evidence.

Registration as a general practitioner now involves a formal supJ/R1288d20Tde99.349(e)-12000.995)thert3a

performance and takes into account dispositions and attitudes as well as clinical competence, a written examination based on Multiple Choice Question (MCQs) and an audit marked against set criteria.

The newly introduced Certificate of Completion of Specialist Training (CCST) represents a major change in policy for hospital doctors. Regional training programmes with built-in rotations are the responsibility of the postgraduate dean, together with the annual progress review and final assessment of specialist registrars (SPRs). The annual review is conducted by members of the regional specialist training committee not directly responsible for the trainee on the basis of inspecting each trainee's logbook and cross-examining them on it contents. For final assessments 1-2 specialists from outside the region are added. The logbooks are designed by the appropriate Royal College and specialism, and typically include a list of competencies, each of which can be assessed at several levels. Two examples are shown below for the Royal College of Obstetricians and Gynaecologists and the Royal College of Physicians. Entries are made jointly by the registrar and supervisor.

The RCOG levels of competence range from observation (1) to independent practice (5). The following list specifies what is meant by each level.

Level 1	Observes	Observes the clinical activity performed by a colleague
Level 2	Assists	Assists a colleague perform the clinical activity
Level 3	Direct Supervision	Performs the entire activity under direct supervision of a senior colleague
Level 4	Indirect Supervision	Performs the entire activity with indirect supervision of a senior colleague
Level 5	Independent	Performs the entire activity without need for supervision

Level 1 (observes) and Level 2 (assists) include the presentation of basic and clinical knowledge, exhibition of clinical reasoning and identification of relevant principles associated with the target activity.

The RCP levels are

Level 0	Insufficient theoretical knowledge
Level 1	Theoretical knowledge but not competent
Level 2	Some competence
Level 3	Fully experienced and competent

Some colleges and specialisms also include written examinations in their requirements for CCST, though most regard their Membership Examinations taken before entering higher specialist training as providing a sufficient foundation of basic knowledge. Further knowledge, especially of recent research, is assumed to be included within the assessment of clinical performance.

Until recently, the traditional practice of using global ratings by supervisors as the main indicators of satisfactory progress has been a major weakness in the UK system of specialist training; because this approach has been repeatedly shown to suffer from halo affects, evaluator leniency and restricted use of the grading range (Norman *et al.*, 1985b). As a result weaknesses in performance which ought to be picked up and dealt with are allowed to continue with adverse effects (Littlefield & Terrell, 1997). The use of other methods, a wider range of raters, improving the rating instrument and

statistical monitoring, a thematic review of a particular category of cases, or a review of individual cases. Local statistical data is available from medical records, but often additional data are collected for thematic reviews. Their utility is improved by the increasing availability of regional or national norms or relevant research findings linking data with patient outcomes. Such evidence is more clearly attributable to individuals in surgery than in most other specialisms.

Lockyer and Harrison's (1994) analysis of chart review noted its value in collaborative efforts

their level of knowledge was highly unreliable. The scope of these examinations is also likely

The first of these goals is a reasonable proposition given the GMC's recent experience of performance assessment and recent developments in Canada. The second is more problematic. Although Irvine (1997) emphasises the need for "sound local arrangements for recognising dysfunctional doctors early and for taking appropriate action" (page 1613), Donaldson's (1994) review of 49 problem cases concluded that "existing procedures for hospital doctors within the NHS are inadequate" (page 1277).

However, this is now being given high priority at local level as the fourth main component of the new policy on **Clinical Governance** (National Health Service Executive, 1999). The Standing Committee in Postgraduate Medical and Dental Education (SCOPME) recommends a combination of clear standards and peer review, recognising that each is in need for further development (SCOPME, 1999). As implied by our earlier definition of competence (Chapter 2), the standards must reflect the expectations of a particular doctor in a particular job. They cite the example of the self-assessment manual and standards of the Faculty of General Dental Practitioners and its use by individuals and voluntary peer review schemes. Given its brief, SCOPME's perspective is primarily educational and they have argued for some time that CPD, review and support should not be linked to regulatory or disciplinary arrangement. Thus they are concerned that: "revalidation could easily be seen as a threat and continuing registration could become the sole focus of clinicians' responses, utilising their energy and available resources at the expense of their professional development" (page 14).

SCOPME rightly argues for more research and development into the causes, assessment and educational remediation of poor performance; but nevertheless conclude with a tinge of euphemism that: "the main challenge for everyone will be to find ways of making the revalidation process both a valued part of professional life and, for the overwhelming majority of doctors, an important stimulus to further development" (page 14).

The factor ignored in this debate is the greater frequency of annual reviews associated with Personal Development Plans and Practice-Based Development Plans. If these incorporate an element of peer review (see Bourdillon (1999) for a description of the Dutch system), then periodic revalidation every 5 to 10 years should not weaken personal commitment to CPD. Indeed, if followed by a universal entitlement to a period of educational leave with a mutually agreed focus, achievement of the third goal of revalidation would be greatly enhanced.

8.4 Summary

Hitherto, most of the research effort has focussed on the assessment of competence linked to certification decisions rather than the assessment of performance on-the-job. This emphasis is gradually changing as public demand for robust quality assurance grows. Revalidation is about to be developed with very close attention to research on performance assessment. A range of assessment methods is reviewed, and the unreliability of the traditional practice of using global ratings by supervisors noted. Persistent conclusions from assessment research are the need to use several methods, to refine all instruments or protocols, to train assessors and to use several assessors.

The Canadian three-tier system for the monitoring and enhancement of physician performance is now well developed and familiar to those exploring revalidation in the UK. The need for good assessment practice linked with effective strategies for the improvement of practice (see Chapter 6) is critical, both for revalidation and for formative and summative assessments during postgraduate education.

Chapter 9

Implications for Policy

9.1 Introduction

This chapter examines the implications for policy of the literature reviewed in this report. Its arguments are more personal because making links between research and policy in educational and social settings often involves extrapolating the conclusions of research beyond the context in which they were obtained; and this entails a change in the status of one's comments from proven conclusions to potentially useful insights. Since there is a substantial amount of North American research in areas relatively unexplored by the small number of British researchers, it is important to investigate the implications for British policy and practice without assuming that the transfer of findings across the Atlantic can be taken for granted. A brief introduction to the US system of residency training after graduation from medical school is provided by Salter (1995).

Although we have organised this discussion on policy implications chapter by chapter for ease of reference back to the relevant research, we have not stuck to this format rigidly but have introduced (with an appropriate cross-reference) material from other chapters when it improved coherence and avoided two separate discussions of essentially the same issue. A recurring conclusion throughout this chapter is the need for further research. Descriptive data about the processes of British postgraduate medical education is sparse and outcomes evidence, other than pass rates for the Royal Colleges' examinations, is very rare indeed. More attention has been given to research into undergraduate education which is generally more accessible to researchers. The overwhelming busyness of the postgraduate experience is not only a constraint on the pursuit of its educational goals but also a deterrent to research.

9.2 Competence and Judgement

Postgraduate trainees are employed as working health professionals, so their current competence is always an issue, as well as the competence they will be expected to demonstrate when their specialist training has been completed. Defining competence in terms of the expectations of the holder of a particular post helps to avoid confusion; and it should be possible to make periodic updates of a doctor's progress beyond the minimum competence for the post to enable responsibilities to be extended to match their devel-

The capability to convert the competence of a range of professional workers into a team performance that meets expectations has to be developed by good supervision and management. This requires sensitivity to organisational factors affecting other professionals' performance as well as one's own; and the disposition to seek changes where these are needed for health care improvement.

and Norman acknowledge that if the data collected and input to the system is subject to bias, then so will be the output. So they go on to say that the aim should be to help "individuals decide when the decision-support system could be beneficial rather than teaching individuals to rely on it extensively". (pages 999–1000)

An alternative to the decision-making aids approach is expressed by Grant (1989) who argues for the employment of a course that helps doctors reflect on their thinking processes via a "large series of exercises which work with the participants' thinking processes *as they are*" (our emphasis).

One possibility is simply to ensure that those being trained are exposed to a sufficient number and variety of cases to allow them to build up the appropriate schemas. Another is to provide cases plus "instructional road maps" to traverse them (Feltovich *et al.*, 1992). Another approach, e.g. as advocated by Mandin *et al.* (1997), is to teach clinical problem solving using schemes. Of course, "using a scheme" is not the same as an expert "having a schema". Their approach (at Calgary) goes beyond simple "problem-based learning" by helping students develop specific schemes for each type of presentation (see also, Palchik *et al.*, 1990) in the area of expertise — as opposed to a more general

for using scientific knowledge are often neglected, because people fail to recognise how much further learning is involved in transferring knowledge from an academic context to a clinical context. The selection and timing of science-based inputs to postgraduate education should be planned from a user perspective; and where appropriate the use of scientific knowledge be taught through case discussions in clinical settings.

9.5 Learning in Clinical Settings

been several evaluations of postgraduate basic training UK. Though there have been a few improvements, the overall impress Many features of the educational policy seem to be appropriate, but

implemented in many hospitals. ;here is insufficient supervision and feedback. Educational goals are subordinated to service demands. While many house officers receive good clinical teaching, a minority do not and assurance of educational quality is weak. Learning goals are only specified at a very general level, so there is little clarity about priorities, especially at the PRHO stage.

Since service responsibilities contribute greatly to the development of competence, working and learning will often be indistinguishable activities. But they still signify different expectations of doctors in postgraduate education, and the tension between their respective priorities is constantly noted in both research studies and policy reviews. The educational dimension cannot easily be sustained by a *laissez faire* approach which allows problems in responding to today's patients to assume precedence over those of tomorrow's patients. This issue has to be tackled at local

training. Sometimes the problem is too little supervision of operations by house officers, sometimes the house officers get insufficient clinical experience. Operating under supervision is seen as the most critical feature of learning to be a surgeon and there is not enough of it. Some authors recommend the greater use of 'skills labs' and simulators. (See also Chapters 3 and 5).

The learning of procedures in medical posts has been criticised for being too haphazard: there is often little continuity of experience and guidance is often provided by doctors who are themselves not very experienced. More planning could enable more systematic teaching by more expert doctors; and a credentialling system like that used in many American hospitals would improve the quality assurance.

The appropriateness for GPs of so much general hospital training has been questioned. Though research on this issue would be difficult, we think 37(ery)arc9.7r40000fie1599

- counselling combined with detailed feedback on patient satisfaction scores improved the performance of residents with below average scores;

- the effectiveness of feedback tended to be reduced by "face-saving" strategies which ameliorated or even disguised the central message.

Qualities of good teachers inferred from rating studies can be grouped under the headings of Physician Role Model, Effective Supervisor, Dynamic Teacher and Supportive Person. There is a great deal of material in Section 4.5 which ought to be introduced into the training of clinical teachers.

Learning in inpatient settings is also researched in greater depth in North America. One gets the impression that American residents receive considerably more clinical teaching than their British counterparts, but there is no British data to enable a proper comparison. The variation in the amount of training received by British trainees is reported as considerable, raising issues of quality assurance and trainee entitlement. The two major constraining factors on learning by US residents were insufficient time and opportunity to learn, and low faculty involvement and commitment. Innovations receiving strong positive evaluations included adaptations of the Morning Report system to incorporate the teaching of Evidence-Based Medicine; and case reviews of patients whose diagnosis had changed while in hospital

tinuing Professional Development (CPD). The recent Chief Medical Officer's Review of Continuing Professional Development and General Practice (Calman, 1998) is an important indication of how government thinking has changed. The research evidence demonstrating that CME is only one of several contributors to physicians' learning and changes in their practice has been strong for some time, the other contributors being:

1. learning from other people through consultation and networking and

2. learning from publications and computerised information systems.

The relevant research falls into three main categories: research into how doctors learn, evaluation of CME interventions and research into innovation strategies using single or multiple interventions to achieve changes in specifically targeted areas of practice. All three of these interrelated areas of research have direct implications for practice.

Surveys of GPs, and also in a few cases consultants, have shown the importance for learning and changes in practice of a wide range of learning activities and sources of information. Moreover, they differ according to whether the changes involve treatment (including prescription), diagnosis and investigation, doctor-patient relationships, referral policy, health promotion or practice organisation. Models of physician learning distinguish between learning triggered by the problems raised by current individual patients and "learning projects" to acquire or improve proficiency in a targeted area of practice. The initiation of learning is dependent on significant background knowledge of what is out there to be learned to which CME conversations with other physicians, and reading contribute in ways which would not be revealed, for example, by evaluations of CME events. The importance of informal consultations with others and a reluctance to "cold call" experts suggest that facilitating social interaction among doctors and strengthening their networks should be a policy goal. These specifically medical models of physicians' learning, go into greater depth than general models of adult learning, though the latter are still confirmed by recent research. They enable more detailed discussions about professional learning, and especially lifelong learning, in which all physicians should now be prepared to participate.

The discussion of recent developments in CPD reaches

were longer. Summative assessment for the award of the Certificate of Completion of Specialist Training will be at least partly performance-based; and will need to be evaluated as it comes on line. Since Membership Examinations of the Royal Colleges are competence-based, the performance-based element at the end of Basic training is given relatively little attention. Thus the most critical certification issue arising from our review is the extent to which assessment regimes cover the full range of competence discussed in Chapter 3 and its translation into performance.

The other two purposes of assessment are (1) formative assessment to provide guidance to learners and/or those who supervise and support them, and (2) quality assurance and the improvement of practice. What research we have seen suggests that these issues deserve considerably more attention. With formative assessment questions have been raised about frequency, coverage, and reliability; and, if it is to properly serve its purpose, the manner in which formative assessment is integrated into training programmes to support the learning process will also need to be researched. Levels of supervision are often affected by factors other than the competence level of the trainee, and feedback may not be based on any systematic (though not necessarily formal) assessment.

The Canadian three-tier system for the monitoring and enhancement of physician performance is now well developed and familiar to those exploring revalidation in the UK. The need for good assessment practice linked with effective strategies for the improvement of practice (see Chapter 6) is critical, both for revalidation and for formative and summative assessments during postgraduate education.

9.10 Implications for Supervisory and Educational Roles

The practice of medicine involves dealing with complexity and uncertainty, often under considerable time pressure. Risk is inevitable, but can sometimes be reduced by the possession of, or ready access to, high levels of experience and expertise. One of the reasons for assigning house officers and registrars to a **firm** of consultants or a primary health care practice is to provide such access. There is also a risk in medical education. At some point a trainee has to conduct a procedure or make a decision for the first time; and taking such responsibility plays an important part in learning. Trainee professionals frequently

reflective judgement: it is mostly received from more senior trainees rather than consultants, and more likely to be negative than positive. Formal feedback appears to vary considerably in quantity, quality and breadth of coverage. Even the best designed logbooks focus on competence rather than performance. Techniques such as chart review which emphasise performance are rarely used in Britain outside General Practice. As reported in Chapter 4, there is sufficient cause for concern to suggest that research into the practice and effectiveness of supervision and feedback during postgraduate medical education is urgently needed. This should include the implicit delegation of certain supervisory and educational responsibilities to senior trainees. Should it be formalised, as in the US role of Chief Resident? Should it be accompanied by training? Which responsibilities could or should be delegated, and which should not?

The other key educational role is that of facilitating learning from clinical experience. For this there is a continuum of possible clinical educators from those who bring clinical and educational expertise to lectures, seminars or workshops for basic, higher specialist, or general practice trainees to more senior trainees who work very closely with their less experiences colleagues in the wards and are best positioned to take up 'live' learning opportunities as they happen. In between are the consultants in their firm who have greater expertise and normally are reasonably accessible for discussing significant cases linked to their specialisms. In practice, specialist registrars will expect to learn most from the consultants, SHOs from registrars and PRHOs from SHOs. But these arrangements are informal. It could be a junior SHO who judges when a PRHO is working within their level of competence, and who might occasionally think about appropriate learning opportunities for which they have no formal responsibility; and junior SHOs have little preparation or experience for this role. Moreover, changes in rotation systems to reduce

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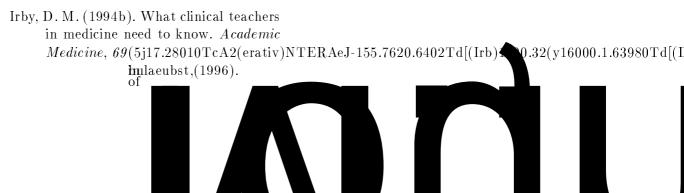Grimshaw, J. M. & Russell, I. T. (1993). Effect of clinical guidelines on medical practice: a systematic review of rigorous evaluations [see comments]. *Lancet*, *342*, 1317–1322. [pages 66,68]

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Additional articles were then found with searches on author names, where an author had published on the psychology of learning in Graduate Medical Education and via backwards citation searches.

Following this, Ian Eiloart and ourselves sorted the remaining articles into education topics and medical specialisms, which were labelled:

Appendix B

Consultations

The following senior doctors were consulted about attributes of competence and judgement, recent changes in postgraduate medical education and current issues of concern.

- Dr Justin Allen, Examiner for MRCGP and Secretary of the Joint Education Committee.

- Professor James Drife, (Leeds University), Junior Vice President Royal College of Obstetricians and Gynaecologists, Member of GMC Education Committee.

- Professor George du Boulay CBE, Emeritus Professor of Neurology at the Institute of Neurology.

- Dr Dennis Eraut, Chair of HST panel for Respiratory Medicine, North East Thames Region.

- Dr Noushin Farhoumand, Clinical Tutor in Psychiatry, South Downs Health NHS Trust.

- Dr Richard Gray, Associate Dean for General Practice, South Thames Region.

- Dr Neville Harrison, Associate Dean (surgery) South Thames Region.

- Dr Roger Neighbour, convenor for MRCGP examination.

- Dr Andrew Polmear, Trafford Centre for Medical Research, University of Sussex (concerned with Evidence-Based Medicine in Primary Care).

- Professor Lesley Southgate (CHIME, University College London), Leader of group who developed and are now implementing GMC Performance Procedures.

- Professor Richard Vincent, Director of Trafford Centre for Medical Research, University of Sussex and Consultant Cardiologist, Brighton Health Care.

- Professor Watson, (UMDS, London), Royal College of Psychiatry.

In addition, leading medical education researchers from Canada, U.S. and the Netherlands were consulted about research into Postgraduate Medical Education at conferences

in April 1998 and April 1999 in the U.S. and Canada (not at DoH expense); and their publications and citations were followed up. Also in April 1998, a 2 day visit was made to North Dakota Medical School to study their residency programmes and gain sufficient background knowledge to properly interpret North American research literature on the education of residents.