The Scottish doctor--learning outcomes for the medical undergraduate in Scotland: a foundation for competent and reflective practitioners


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Online Publication Date: 01 March 2002


To link to this Article: DOI: 10.1080/01421590220120713

URL: http://dx.doi.org/10.1080/01421590220120713

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The Scottish doctor—learning outcomes for the medical undergraduate in Scotland: a foundation for competent and reflective practitioners


The Scottish Deans’ Medical Curriculum Group*

SUMMARY This paper describes a set of learning outcomes that clearly define the abilities of medical graduates from any of the five Scottish medical schools. The outcomes are divided into 12 domains that fit into one of three essential elements for the competent and reflective medical practitioner.

Introduction

Outcome-based education is neither a new concept nor a passing phase in educational technology and is equally applicable throughout the educational continuum from primary school to postgraduate training (Association for Medical Education in Europe, 1999).

Outcomes focus on the end-product and define what the learner is accountable for. They do not tell teachers how to teach, nor students how to learn—both these elements of education remain flexible—but they do help determine what is taught and assessed and can help to identify what is or is not essential. Using learning outcomes leads to common-sense curriculum design both by specifying what students are to learn and by providing a clear and unequivocal statement of what the end-product will be like. This is particularly relevant in medical education where the end-product is newly qualified doctors—in the UK, pre-registration house officers (PRHOs)—who must demonstrate from the outset general competence and a range of capabilities that will allow them to function satisfactorily. This implies that the competences are present at the end of undergraduate education, even if only in embryonic form and in need of further development. Hence the need for clearly defined learning outcomes that reflect the requirements of the immediate postgraduate period and, indeed, beyond.

The Learning Outcomes project

These agreed common outcomes were the result of a collaborative project, conceived and undertaken by the Scottish Deans’ Medical Curriculum Group (SDMCG), which included an extensive and iterative consultation with staff and students in all five Scottish medical schools in order that the ideas expressed are as representative as possible. The project has demonstrated that it is possible for consensus to be reached on learning outcomes even between schools with very different styles of curricula.

The outcomes are meant not simply to define our ‘product’, but also to assist curriculum planners, teachers, students and those responsible for postgraduate training. They could also be used as a measurable benchmark for each school’s own curriculum, whether internally or in any wider quality assurance process. Although predominantly a description of the graduates we believe we produce now, the outcomes also contain an aspirational or visionary element in keeping with the expectations and standards set by the General Medical Council and other bodies, including the general public, concerned with the quality of the medical workforce. They are not, however, intended as a blueprint for a ‘national’ curriculum for undergraduate medicine.

These outcomes are not fixed: they will evolve and develop further as they are used by the schools and as undergraduate medical education changes. They also serve to highlight areas of common interest and concern between undergraduate and postgraduate medicine.

The development, structure and presentation of the Learning Outcomes

The starting point for the development of the outcomes was the definition of the three essential elements of the competent and reflective medical practitioner (Harden et al., 1999). These are:

- what the doctor is able to do (‘doing the right thing’ = technical intelligences);
- how the doctor approaches his/her practice (‘doing the thing right’ = intellectual, emotional, analytical and creative intelligences);
- the doctor as a professional (‘the right person doing it’ = personal intelligences).

*The Scottish Deans’ Medical Curriculum Group was first established during the period of major curriculum change resulting from the Tomorrow’s Doctors recommendations on undergraduate medical education (General Medical Council, 1993). The remit of the group is to foster closer links between the Scottish medical schools, namely the universities of Aberdeen, Dundee, Edinburgh, Glasgow and St Andrews. In particular the group aims to promote the exchange of ideas on all aspects of medical education and to encourage collaboration in areas of curriculum development and implementation.

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Twelve key domains were then identified, each related to one of the three elements listed above. These are:

- **What the doctor is able to do**
  - clinical skills;
  - practical procedures;
  - patient investigation;
  - patient management;
  - health promotion and disease prevention;
  - communication;
  - medical informatics.

- **How the doctor approaches his/her practice**
  - basic, social and clinical sciences and underlying principles;
  - attitudes, ethical understanding and legal responsibilities;
  - decision-making skills and clinical reasoning and judgement.

- **The doctor as a professional**
  - the role of the doctor within the health service;
  - personal development.

It is important to note that the order in which the domains are presented is not intended to imply any hierarchy of importance. Each is an essential component of the competent and reflective practitioner (Figure 1).

Each domain was then further subdivided into the appropriate Learning Outcomes. The task of identifying the Learning Outcomes was undertaken by the members of the SDMCG in consultation with colleagues at each school.

Each domain has an introductory, explanatory paragraph indicating the nature of the domain. The bullet points list the essential outcomes for that domain and the section in italics that follows indicates what could be included in each of these when they are broken down into more detail. The outcomes are intentionally quite broad and lack precise detail. The latter can be determined by each school according to its own interpretation of the outcome and how it should be achieved. The examples of what the outcomes could include show: (a) how they might be defined at a level of detail allowing them to be understood by students and teachers; and (b) how they might be translated into specific teaching and learning activities.

The degree of emphasis placed on each outcome and the level of detail to which it is taken will vary between schools, as will the learning and teaching methods depending on the type of curriculum and available resources. The examples provided in this document are thus not intended to be either prescriptive or comprehensive.

Inevitably there is overlap between the different domains with some outcomes being common to more than one domain, but such duplication serves to illustrate the inextricable links and interdependence between the different elements comprising a competent and reflective practitioner.

**The Scottish doctor learning outcomes**

**What the doctor is able to do**

**Domain 1—Outcomes for clinical skills.** The new medical graduate should be able to demonstrate competence in a range of clinical skills unsupervised and to a predetermined standard.

- **Take a history from patients, relatives and others**
  - This could include: all age groups, local multicultural/multiethnic factors, a wide range of different contexts and a patient-centred, sensitive, structured and thorough

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**Figure 1.** A three-circle model for classifying learning outcomes.
approach with demonstration of principles of good communication.

- **Undertake physical examination of patients**
  This could include: general and systems-based approach; appropriate for patient's age, gender and state of mental and physical health, in a thorough, sensitive and systematic manner.

- **Interpret results of history taking, physical examination and investigations**
  This could include: recognition of abnormality and correct interpretation of common investigative tests.

- **Make a diagnosis**
  This could include: gathering and analysis of all available information, recognition of important, life threatening conditions requiring immediate treatment.

- **Formulate a management plan**
  This could include: focus on patients' needs, prioritize, involve patients and other members of the healthcare team and recognize own limitations.

- **Record findings**
  This could include: records concerning all relevant communications with patients/relatives and colleagues and that, at a minimum, records are legible, dated, signed, concise and contemporaneous.

Domain 2—Outcomes for practical procedures

Mastery of appropriate practical procedures at the time of graduation is an essential part of the smooth transition from undergraduate to PRHO. The following are suggested procedures that the new graduate should be able to carry out unsupervised. Some of these procedures also feature in the domain of Patient Investigation and many others are not specifically mentioned here as they should be covered by normal physical examination, e.g. fundoscopy, visual field testing, otoscopy, rectal examination etc.

- **Measuring and recording**
  This could include: radial pulse rate, blood pressure, body temperature, peak expiratory flow rate, blood glucose using reagent sticks with and without a glucometer, urinalysis using Multistix, faecal occult blood testing, pregnancy testing, performing and interpreting a 12-lead ECG, managing an ECG monitor.

- **Administering and doing**
  This could include: First Aid, basic resuscitation and basic life support for adults and children/infants, administration of oxygen therapy, venepuncture, taking a blood culture, establishing intravenous access and setting up a giving set, male and female urinary catheterization, collection of MSU, arterial puncture, scrubbing up and gowning for surgical and sterile procedures, skin suturing, wound care and basic wound dressing, making up drugs for parenteral administration, administration of intravenous, intramuscular and subcutaneous injection, dosage and administration of insulin and use/prescribing of sliding scales, using i.v. infusion and volumetric pumps, taking nose, throat and skin swabs.

Domain 3—Outcomes for patient investigation

As with practical procedures there are different categories of patient investigation depending on whether or not we would expect a new graduate to be able to undertake the task him/herself or simply to know how the investigation is carried out and when it is appropriate to use it. Competence in the general principles of patient investigation is essential.

- **General principles of patient investigation**
  This could include: appropriate choice and use of investigation, requesting/ordering of investigations according to local protocols/guidelines, obtaining informed consent for investigations, preparing patients for investigations practically and with adequate information.

- **Laboratory-based investigations**
  This could include: demonstrable knowledge of the circumstances in which the commoner laboratory-based investigations are indicated and the procedures required to obtain the necessary material for investigation. To include: biochemistry, haematology, microbiology, pathology, cytology, genetics, immunology, virology.

- **Radiological investigations**
  This could include: demonstrable knowledge of the range of radiological investigations available and their appropriate use in different circumstances.

- **Clinical investigations**
  This could include: a number of system-specific investigations which the graduate should know about and may have observed, but would not routinely be expected to perform, e.g. practical procedures, such as exercise tolerance test; pleural tap/biopsy; upper and lower GI endoscopy; EEG; lumbar puncture; cystoscopy; cervical smear; colposcopy; skin biopsy; joint aspiration.

Domain 4—Outcomes for patient management

New medical graduates cannot be expected to have had unsupervised experience of all aspects of patient management as many are restricted by law, e.g. drug prescribing. However, it is reasonable to expect that they will have a demonstrable knowledge of the important aspects of management in the areas outlined below and that they will have had supervised involvement in such activities.

- **General principles of patient management**
  This could include: use of patient-centred, holistic approach with careful consideration of all information available from history, physical examination and investigations and in full consultation with patient, relatives etc.; recognition of the importance of teamwork.

- **Drugs.**
  This could include: knowledge of prescribing, selecting method of delivery, calculating dosages, consideration of interactions and adverse effects.

- **Surgery**
  This could include: recognition of indications for intervention and the available surgical interventions, appropriate use of informed consent and the understanding of principles of pre-, peri and postoperative care.

- **Psychological**
  This could include: recognition of interventions available and their use.

- **Social**
  This could include: consideration of patient's social circumstances, work, family etc., when determining treatment
options, available interventions, the role of other organizations.

- **Radiotherapy**
  This could include: knowledge of options available and their appropriate use, understanding the effect on the patient.

- **Therapy services**
  This could include: appropriate use, an understanding of what can be achieved and what is involved for patient and physiotherapist/occupational therapist/speech therapist etc.

- **Nutrition**
  This could include: understanding the role of nutrition as a major non-drug therapy in some medical conditions, selecting appropriate method of ensuring adequate nutrition to meet individual patients’ needs.

- **Emergency medicine**
  This could include: management of life-threatening conditions whether due to trauma or disease, e.g. acute MI, diabetic ketoacidosis, acute asthma, haemorrhage, anaphylaxis, etc. demonstrating systematic approach with appreciation of local protocols/guidelines and working effectively as part of emergency care team.

- **Acute care**
  This could include: management of a variety of medical and surgical conditions that are not immediately life-threatening but which require early treatment, or management of more serious, life-threatening conditions in the period following emergency management e.g. uncomplicated cerebrovascular accident, exacerbation of chronic obstructive airways disease, etc.

- **Chronic care**
  This could include: consideration of: patient’s age, nature of chronic disease, effect on patient, e.g. loss of mobility, psychological impact, appropriate use of drugs, appliances/aids, etc.

- **Intensive care**
  This could include: the circumstances under which an individual patient might require intensive care, recognition of interventions/monitoring capabilities offered by intensive care and the implications for patient and family including psychological.

- **Palliative care**
  This could include: recognition of what palliative care can offer, where it can be delivered and by whom, knowledge of how to involve patient, family and friends as well as healthcare professionals and other relevant bodies.

- **Pain control**
  This could include: specific knowledge of pharmacological, physical and psychological interventions, selecting the most appropriate method and knowledge of when to initiate pain relief, understanding the role of the pain management specialist.

- **Rehabilitation**
  This could include: understanding of the integral role of rehabilitation in recovery especially after major illness, significant trauma or surgery, e.g. myocardial infarction, spinal injury or transplantation, appreciation of the need for a specific programme of rehabilitation and the role of other healthcare professionals in providing this.

- **Complementary therapies**
  This could include: appreciation of what is available, outline of what is involved in most commonly practised therapies, how alternative and conventional therapies might be combined, keeping an open mind and remaining impartial regarding the use of complementary therapies.

- **Patient referral**
  This could include: making appropriate referrals to the right professionals, assessing at what stage of management referral may be indicated, giving and receiving the appropriate information, keeping the patient informed.

- **Blood Transfusion Services**
  This could include: nature and extent of service, how blood products are obtained through donors and by manufacture including issues of safety, diversity of blood products available and how they are used in different circumstances, making the most efficient and appropriate use of the Blood Transfusion Service in the care of patients.

### Domain 5—Outcomes for health promotion and disease prevention

Every contact between a doctor and a patient can be seen as an opportunity for health promotion and disease prevention. It is therefore essential that the new graduate knows how to make the most of these opportunities through demonstrable knowledge of the principles involved both for individual patients and populations.

- **Recognition of the causes of disease and the threats to the health of individuals and populations at risk**
  This could include: assessment of distribution of risk factors in the population.

- **Ability to implement, where appropriate, risk-reduction strategies for individual patients**
  This could include: knowing how to change risk factors, the use of evidence-based medicine and effective interventions.

- **Appreciation that health promotion and disease prevention depend on collaboration with many other professionals and agencies**
  This could include: identifying who the other professionals and agencies are and what their role is.

- **Planning health promotion taking into account barriers to preventing disease and promoting health in both the individual and the population**
  This could include: consideration of political, economic, behavioural and organisational barriers.

### Domain 6—Outcomes for communication

Good communication underpins all aspects of the practice of medicine. All new graduates must be able to demonstrate effective communication skills in all areas and in all media, e.g. orally, in writing, electronically, by telephone etc.

- **General principles of good communication**
  This could include: being able to listen and use other appropriate communication techniques including an appreciation of non-verbal communication/body language.
(one’s own and the interviewee’s), gathering and giving information with good record keeping and correspondence skills, mediating, negotiating and dealing with complaints, making oral presentations and writing reports/papers, telephone usage.

- **Communicating with patients/relatives**
  This could include: answering questions and giving explanations and/or instructions, strategies for dealing with the ‘difficult’ consultation including defusing aggression, breaking bad news and admitting lack of knowledge or mistakes, making requests, e.g. post-mortem, organ donation, obtaining informed consent, confidentiality.

- **Communicating with colleagues**
  This could include: transfer of information orally, in writing and electronically, the ‘art’ of the good discharge summary and patient referrals.

- **Communicating with Police and Procurator Fiscal/Coroner**
  This could include: proper procedure when such communication is necessary and how to relay appropriate information without breaking rules of confidentiality.

- **Communicating with media and press**
  This could include: a clear understanding of who should give information to the media and press and what form it should take including the need to maintain confidentiality where individual patients are concerned.

- **Communicating as a teacher**
  This could include: recognizing the importance of sticking to what you know, knowing your own limitations and admitting when you don’t know, some basic teaching techniques, e.g. demonstrating practical procedures, using various teaching aids, etc.

- **Communicating as a patient advocate**
  This could include: how to recognize when this is appropriate and how it may be accomplished effectively.

### Domain 7—Outcomes for medical informatics

Collecting, storing and using information has always been an integral part of the practice of medicine. It has, however, become more complex and technology based, thereby creating an increasing need for medical graduates to be competent in basic information-handling skills ranging from simple record keeping to accessing and using computer-based data. As well as having the technical skills to undertake such tasks it is important that graduates appreciate the role of informatics in the day-to-day care of patients and the advancement of medical science in general.

- **Keeping patient records**
  This could include: maintaining high quality of recording (whether in writing or on computer), accuracy and data quality, legibility, knowledge of the different types of records and how records are stored and retrieved (manually and electronically), coding and classification, confidentiality—including legislation governing access to medical records and data.

- **Accessing data sources**
  This could include: using library and other systems to access data and information from sources such as computerized databases and the Internet, how routinely collected health information is used in service planning and delivery of care, using information in evidence-based practice, identifying and using professional guidelines.

- **IT skills/computing skills**
  This could include: use of email, word-processing, databases, statistical packages, spreadsheets, Medline/BIDS and online journals, etc.

- **Personal record keeping for professional development**
  This could include: the role and use of logbooks and portfolios.

### How the doctor approaches his/her practice

**Domain 8—Outcomes for basic, social and clinical sciences and underlying principles**

The competent graduate recognizes, explains and manages health problems using the principles of current scientific knowledge and understanding that underpin medicine.

- **Normal structure and function of the individual as an intact organism and of each of its major organ systems**
  This could include: anatomy, physiology, biochemistry, genetics, molecular, biochemical and cellular mechanisms that are important in maintaining homeostasis.

- **The life cycle**
  This could include: the different stages and how these affect normal structure and function, e.g. the foetus, the neonate/infant, childhood, adolescence, adulthood, old age, death.

- **Behaviour and relationships between an individual and his/her family/peers, immediate social groups, society at large and the general population, physical environment**
  This could include: behavioural sciences, psychology and sociology.

- **The causes of diseases and the ways in which these diseases affect the body (pathogenesis)**
  This could include: knowledge and understanding of the following causes of disease: genetic, developmental, metabolic, toxic, microbiological, autoimmune, neoplastic, degenerative, traumatic, environmental, social, occupational.

- **The alteration in structure and function of the body and its major organ systems resulting from various diseases and conditions**
  This could include: appropriate pathology and pathophysiology;

- **Pharmacological principles of treatment using drugs**
  This could include: pharmacokinetics and pharmacodynamics, mechanisms of action/interaction, side-effects/adverse reactions.

- **Principles of therapeutic measures in the management and symptomatic relief of diseases**
  This could include: drugs, surgery, complementary therapies, evidence base for use of therapeutic measures.

- **Public health**
  This could include: knowledge and understanding of scientific reasoning in the practice of public health in the
NHS, principles of healthcare planning, prioritization of service and communicable disease control.

- **Health economics**
  *This could include:* knowledge and understanding of basic concepts including the cost of patient management to NHS and society and rationing.

- **Disease prevention**
  *This could include:* knowledge and understanding of causes of disease and evidence of causes, disease aetiology and relationships between risk factors and disease—high-risk approach and population approach.

- **Epidemiology**
  *This could include:* knowledge and understanding of principles of demography, biological variability and clinical trials.

- **Education**
  *This could include:* knowing about and applying basic theories of learning and teaching, basic organization of medical teaching and training in the UK.

**Domain 9—Outcomes for attitudes, ethical understanding and legal responsibilities**

The demonstration of appropriate attitudes by new medical graduates, as shown by their professional behaviour, is a key area of concern for educators and employers alike and is obviously also of great importance to patients and the public in general. It is therefore important to have attitudes as an outcome for undergraduate medical education even if it is more difficult to define what we mean by this in comparison with some of the other outcomes. The legal responsibilities of even new graduates are numerous and relate to all aspects of practice. A firm grasp of ethical principles and their appropriate application must be gained before graduation.

- **Appropriate professional attitudes**
  *This could include:* establishing trust between doctor and patient and respect for patients and colleagues, adopting an empathic, holistic approach to patients and their problems, valuing and preserving patient autonomy and involving patients in decisions affecting them; respect for professional institutions and health service bodies.

- **Basic ethical principles and standards**
  *This could include:* knowledge and understanding of contemporary medical ethics and the main ethical principles of autonomy, beneficence, non-maleficence and justice, the duties of a doctor, practical application of theories, e.g. consequentialism, deontology (duty) and double effect, the importance of confidentiality, truthfulness and integrity, dealing effectively with complaints about own performance.

- **Legal responsibilities**
  *This could include:* legal responsibilities particularly with respect to: death, drug prescribing, physical and sexual abuse of children and adults, reporting of adverse medical care/standards involving other practitioners, codes of conduct, human rights issues.

- **Practice of medicine in a multicultural society**
  *This could include:* knowledge of and respect for differing cultures, views, beliefs and practices relating to the human body and healthcare.

- **Psychosocial issues**
  *This could include:* those arising from patients and colleagues and relating to the multitude of differing characteristics making up the human personality.

- **Economic issues**
  *This could include:* knowledge and appreciation of financial constraints affecting the NHS and their impact on delivery of care.

- **Contributing to the advancement of medicine**
  *This could include:* progress in medical science and how it is achieved, particularly the potential for every doctor to contribute to such progress, and the doctor’s role in ethical regulated clinical trials.

**Domain 10—Outcomes for decision-making skills, and clinical reasoning and judgement**

Decision making, and clinical reasoning and judgement are activities in which medical undergraduates should be proficient. The new medical graduate must continue to display such skills with the additional burden of increasing responsibility for his/her decisions and actions. This is undoubtedly one of the most stressful aspects of the transition between undergraduate and PRHO and therefore the achievement of these outcomes to a high standard is essential.

- **Clinical reasoning**
  *This could include:* how to recognize and define the problem, analyse and interpret information and cope with limitations of information and personal limitations.

- **Evidence-based medicine**
  *This could include:* how to seek the best available evidence and keep up to date, how to analyse and interpret evidence and work with guidelines and protocols, recognizing the link between evidence-based medicine and audit and the reasons for variation in clinical practice.

- **Critical thinking**
  *This could include:* the importance of adopting an inquisitive and questioning attitude and applying rational processes, recognizing irrationality in oneself and others, the importance of one’s own value judgements and those of patients.

- **Research and scientific methodologies**
  *This could include:* knowledge and appreciation of quantitative and qualitative methodology including the differences between them and their appropriate usage, using research and scientific methodologies to interpret investigations.

- **Statistical understanding and application**
  *This could include:* how to think and communicate quantitatively, choosing and applying appropriate statistical tests with some understanding of the underlying principles and their strengths and weaknesses.

- **Creativity/resourcefulness**
  *This could include:* creative use of techniques, technologies and methodologies, demonstration of self-reliance, initiative and pragmatism, the importance of sometimes looking beyond conventional boundaries.

- **Coping with uncertainty and error in decision making**
  *This could include:* appreciating that uncertainty exists and that sources of uncertainty might include: oneself,
the environment, the patient, limits of knowledge; how to use cognitive and intellectual strategies when dealing with uncertainty and the need to be adaptable to change, how to harness one's own emotional resilience and courage, the importance of making decisions in partnership with colleagues and patients, an outline of levels of responsibility in the healthcare system.

- **Prioritising**
  This could include: knowledge and understanding of the factors influencing priorities, how to prioritize one's own time as well as prioritizing the care of patients, both of which include management of tasks, events, time and stress, how to use protocols to aid prioritization.

**The doctor as a professional**

**Domain 11—Outcomes for the role of the doctor within a health service**

This is a rapidly changing area of medical education and practice, which is subject to many external influences including political, legal and economic. However, there are a number of key outcomes applicable to the new graduate, awareness of which should provide a firm basis for dealing with future developments and changes within the health service.

- **Healthcare systems**
  This could include: an outline of the structure of the medical profession in the UK, the professions allied to medicine, roles and relationships of primary, secondary and tertiary care, NHS organization, the origin and history of medical practice, systems that impact on the NHS, e.g. private medicine, EU, complementary therapies, etc.

- **The clinical responsibilities and role of a doctor**
  This could include: the ‘Duties of a Doctor’ as defined by the General Medical Council, appreciation of the medical profession as a voice in society and an agent of change, the importance of valuing and participating in professional audit.

- **Code of conduct and required personal attributes**
  This could include: Duties of a Doctor (GMC), local codes where applicable.

- **The doctor as researcher**
  This could include: appreciation of the value of medical research and how this is organized and funded in UK and Europe, outlining the potential role of research in career progression and the opportunities for research even as an undergraduate.

- **The doctor as mentor and teacher**
  This could include: the importance of reflecting on and analysing one’s own experience of mentors and teachers, identifying the ‘positive’ and the ‘negative’ and how to use this in one’s own practice as a teacher of others; the importance of adopting a culture of lifelong learning and fostering this in the health service.

- **The doctor as manager**
  This could include: managing people and resources, e.g. financial.

- **The doctor as a member of a multi-professional team and the roles of other healthcare professionals**
  This could include: the opportunity to learn with and be taught by other healthcare professionals during undergraduate education with an understanding of the benefits to be gained by all concerned including patients; working with other healthcare professionals in the context of patient care as an undergraduate in order to better develop team-working, leadership and facilitative skills.

**Domain 12—Outcomes for personal development**

Personal development within the context of undergraduate medical education is a complex issue. The underlying personality of the individual graduate and his/her life experiences outside the university have a major influence on personal development, as do experiences relating specifically to his/her training. Personal development is, of course, an ongoing, lifelong process but it is possible to identify a number of important outcomes for the undergraduate period.

- **Self-awareness**
  This could include: the ability to conduct oneself as a reflective and accountable practitioner including seeking out sources of informed criticism and valuing, reflecting and responding to them appropriately, enquiring into one’s own competence and evaluating one’s own capabilities and personal effectiveness.

- **Self-learner**
  This could include: the ability to manage one’s own learning as demonstrated by: searching out and selecting appropriate learning resources of all types, making use of all available technical aids, employing appropriate and effective study skills, recognizing limitations of current personal understanding and capabilities and identifying areas needing refreshed or extended, setting realistic and appropriate personal learning goals, selecting learning strategies that take account of personal learning preferences and that are likely to succeed, setting challenging personal learning goals as a basis for personal growth.

- **Self-care**
  This could include: recognition of the pressures of a demanding professional life on health, well-being and relationships with others and the need to maintain a balance between personal, professional and social goals and activities; evidence of attention to lifestyle, diet, exercise and relaxation; making use of available help and advice in stressful circumstances; recognition of the hazards of self-medication or substance abuse in dealing with stress.

- **Career choice**
  This could include: identifying short and long-term career and personal plans and aspirations and work towards these by establishing realistic development plans involving relevant activities; participating fully in the life of the professional community and making use of professional and other networks of all types.

- **Motivation**
  This could include: recognizing key personal motivating factors and their importance in sustaining a high level of motivation.
Commitment

This could include: demonstrating dedication to one’s chosen career pathway through adherence to the codes of conduct and behaviour expected of undergraduate medical students and doctors and an acceptance of any limitations that might be associated with them.

Conclusions

The authors believe that an outcome-based approach to undergraduate medical education will allow curriculum development and reform to keep pace more effectively with changes occurring in medical practice and the delivery of healthcare.

Clear educational outcomes can also be of assistance in other areas. The SDMCG is already exploring whether and how they might assist in medical student selection, bridging the undergraduate–postgraduate interface, the production and sharing of learning resources and issues of staff development. One of the most interesting developments under way is the delineation of methods of assessment for each of the outcomes. Over the past year or so a number of working groups, drawn from the five medical schools and under the direction of the SDMCG, have been examining precisely how each of the outcomes can best be assessed. The results of that exercise will be the subject of further publication.

The activities of the Scottish Deans’ Medical Curriculum Group are supported by the Scottish Executive.

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