

*Undergraduate and
Postgraduate
Education in Basic
and Clinical
Pharmacology*

A one-day workshop of the
8th International Congress on Clinical Pharmacology and Therapeutics

Brisbane, Australia
August 1, 2004

Programme

Session 1: What to teach?

Michael Orme, *Chairman of the European Association for Clinical Pharmacology and Therapeutics*

Developing a core curriculum for CPT in Europe.

Kathie Knights, *Dept of Clinical Pharmacology, Flinders University, Australia*
Pharmacology for nurses who prescribe.

Patangi Rangachari, *Director of Inquiry, O'Brien Centre for the B.HSc Program, University of Calgary, Canada*

Beyond competencies – room for flair?

Morning tea

Session 2: Pharmacology in problem-based medical curricula

Anne Tonkin, *Co-Director, Medical Education Unit, University of Adelaide, Australia*

Fitting pharmacology into a PBL-based medical curricula.

Owen Woodman, *Dept. Pharmacology, University of Melbourne, Australia*
Keeping a place for pharmacology in the curriculum.

Lunch

Session 3: New approaches to supporting understanding of clinical pharmacology.

John Mucklow, *University of Keele, UK*

Interactive support material for medical students and continuing professional development.

Emilio Sanz, *Departamento de Farmacología, Universidad de La Laguna, Spain*
Teaching the WHO Guide to Good Prescribing.

Afternoon tea

Session 4: On-line and computer-based material in teaching pharmacology

Tina Tasioulas, *National Prescribing Service, Australia*
NPS Prescribing Curriculum for Medical Students

Paul White, *Victorian College of Pharmacy, Monash University, Australia*
E-learning for traditional face-to-face pharmacology programmes; what's the point?

Michael Lew, *Dept. Pharmacology, University of Melbourne, Australia*
Extending and supporting “wet” practicals with computer-based exercises.

Developing A Core Curriculum for CPT in Europe

Michael Orme, on behalf of the Education Sub-Committee of the European Association for Clinical Pharmacology and Therapeutics (EACPT)

The Undergraduate medical curriculum has been extensively modified in the United Kingdom over the last ten years or so, primarily following publications by the General Medical Council such as "Tomorrow's Doctors (1993). This document encouraged medical schools to reduce the emphasis on factual knowledge and didactic teaching and instead to concentrate on skills, competencies and attitudes with topics such as communications skills and problem solving. While this has arguably helped the overall training of medical students it has not been beneficial to the teaching of CPT and there are still concerns that the newly qualified doctors from these curricula are less able to prescribe medicines properly than their forbears.

To try to improve the teaching of CPT in Europe and to address the above concerns the education sub-committee of EACPT has undertaken a number of initiatives. One of these has been to try to develop a core curriculum for CPT which would be relevant in a number of European countries. The first approach is a drug based one in which drugs have been examined to see if they are essential for students to know about. This has resulted in a list of 120 core drugs which, in the three European Countries examined (The UK, Germany and Croatia) were felt to be essential by at least one medical school. A shorter list of drugs that the students should be expected to know about was also prepared as well as a list of drugs for emergency use.

The second approach was a disease-orientated approach in which three categories of disease were created. Firstly disease states that the student must know how to manage (category M , 67 disease states) and secondly diseases that the student must be able to diagnose (category D of which 158 diseases were nominated). Finally a list of diseases) category A (n = 36) that the student should be aware about.

This approach to the topic has proved useful in the teaching and learning process and is probably best coupled to other systems (eg that places emphasis on the relevance of eg pharmacokinetics, or of drug use in liver disease).

Beyond competencies – room for flair?

Patangi Rangachari
University of Calgary, Canada

Student-centred learning seeks to shift the locus of control to the students and thus provide an opportunity for greater flexibility. This flexibility comes with a price. Evaluation is far from easy since one cannot comfortably use standardised testing and quietly ignore the needs of the learner. The student certified to be competent by highly reliable examinations may well deal with the problems of today but may be unable to deal with or even imagine the ones to come. Opportunities to explore subjects of particular interest MAY provide some inkling into a student's capacity to do so. Assessing flair rather than mere competence is far from easy. Several examples will be provided. Though the psychometrically inclined may sniff at such approaches, these procedures may actually make learning more enjoyable and perhaps more meaningful. The consequential validity of such procedures cannot be ignored.

Fitting pharmacology into a PBL-based medical curriculum

Anne Tonkin

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Background

Over the past decade, many medical schools, including the University of Adelaide Medical School, have implemented major change in their medical curricula, leading to major impacts on the teaching of clinical pharmacology and therapeutics. At Adelaide, the first three years of the 6 year, undergraduate course have been changed from a structure based on individual discipline-based, departmentally-organized courses to an integrated curriculum based on a PBL approach. The PBL approach is based on self-directed active learning in a clinically relevant context, and results in integration of material from a wide variety of disciplines during the study of a particular problem (usually a clinical case). While the benefits of this approach have been debated and some have been demonstrated, it raises important issues for disciplines whose individual courses have been lost. At Adelaide, for example, the pharmacology course which occupied one quarter of the students' time throughout 3rd year has been replaced by student-directed acquisition of knowledge during the PBL process, supported by opportunistic scheduling of pharmacological teaching sessions in association with relevant cases.

Fitting pharmacology into the curriculum

A number of issues arise in the context of such a change.

1. Loss of departmental control over content

The loss of the specific course in pharmacology, which was organized to provide the basic concepts first, followed by systematic teaching of major therapeutic drug groups by means of 48 didactic lectures and several workshops and tutorials, has resulted in control of the content of the curriculum being transferred from the department to a curriculum development team working as a subcommittee of the Curriculum Committee. From the departmental perspective, the question is whether or not the key concepts have all been included, and if not, where the gaps may be. The integrated, PBL-based structure has certainly made it harder to pull together all the core principles of CPT that underpin prescribing in all areas, including basic concepts of pharmacokinetics and pharmacodynamics. Attempts to deal with this problem at Adelaide include the preparation of a detailed Concept map in pharmacology and therapeutics, and the inclusion of occasional "key concept" lectures that are

not directly related to cases. The inclusion of pharmacology has been facilitated by a major involvement by one of the clinical pharmacologists within the school in the Curriculum Committee and the curriculum planning group.

2. Potential for omission of key topics, or lack of assurance that all are covered

The reduction in time available for specific pharmacological teaching raises this concern, particularly in relation to the basic underpinnings of clinical pharmacology – including pharmacokinetics, pharmacodynamics, drug metabolism, pharmacogenetics. The knowledge explosion has been very marked in pharmacology over the past 20 years – and therefore the development of skills for lifelong learning have become ever more important. The abilities to identify what information is needed, and then utilize information sources to find it are fundamental to the PBL approach. The background knowledge remains critical.

3. Loss of expert input from pharmacologists and clinical pharmacologists

Therapeutics is now often taught by clinicians from other specialty areas or by student-directed knowledge acquisition, often with non-expert tutor assistance. Pharmacological input to the objectives of the course, generation of cases, determination of supporting teaching sessions and assessment is critical.

These and other issues related to fitting pharmacology into integrated medical curricula will be discussed, and potential solutions explored with workshop participants.

Keeping a Place for Pharmacology in the Curriculum

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The world wide move away from the didactic teaching of single disciplines to integrated Problem-based Learning (PBL) curricula in medical education has posed challenges for the basic sciences including pharmacology. The University of Melbourne has introduced a curriculum framework for active learning and for the integration of basic and clinical sciences. This requires that pharmacology be taught within a vertically and horizontally integrated PBL-based program of study. The first two and a half years of the degree at the University of Melbourne are pre-clinical and students take two subjects during each of five 14 week semesters. The main science subjects are systems based, for example Nutrition, Digestion and Metabolism, is taught in the second semester of the first year. Each of these systems subjects has two PBL tutorials at the beginning and end of each week. Five lectures and at least one practical class are delivered between the two tutorials, giving students resources for their independent study. Inclusion of pharmacology in relation to therapeutics is relatively easy, although any drug treatment tends to appear at the end of the problem and therefore not appear in the students' learning issues. A further challenge for pharmacology, within this systems based teaching, is in the inclusion of basic principles such as pharmacokinetics and pharmacodynamics that span across all systems. This presentation will discuss the development of a problem that explores pharmacokinetic principles to encourage self-directed learning. This case, and others, was the subject of a student survey¹ and the reaction of students to this case and whether it achieved our aims will be discussed.

1. Woodman OL, Dodds, AE, Frauman AG, Mosepele, M. (2004) Teaching pharmacology to medical students in an integrated curriculum: an Australian perspective. *Acta Pharmacologica Sinica*, (*in press*).

Interactive support material for medical students and continuing professional development.

John Mucklow

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Web-based Therapeutics for Medical Students

Modern medical curricula in the UK afford no great emphasis on Clinical Pharmacology and Therapeutics. To establish a presence, clinical pharmacologists must therefore infiltrate the teaching programme and provide learning material of high quality. The opening at Keele University of a new medical school using a problem-based curriculum developed at Manchester Medical School provided a challenge for the local clinical pharmacologist. With no initial University support to release time for face-to-face teaching, and no other local pharmacological expertise, an interactive web site offered an attractive way of bridging the gap between teacher and textbook. All problem-based cases were scrutinised to identify every learning objective concerning drugs and their use. These formed the basis for a list of questions on each topic to which student would be seeking answers. Using questions as headers for each paragraph, material was written to cover the clinical management of each condition discussed, with additional information on the action, uses, effectiveness and hazards of every drug mentioned. Extensive hyperlinkage allowed easy navigation and for every topic five self-assessment True/False questions were produced with links back to the relevant paragraph to explain each answer. The website (The Medicine Chest) has proved very popular with the students, most of whom access it at least once a week and have nothing but praise for its content and quality. It is the most highly-rated of all the local electronic resources to which the students have access. Weekly tutorials, which are well-attended, allow students to seek clarification on points of detail and an opportunity to test their knowledge and understanding. The web site has been compiled over three years to support the first four years of the course. It now includes around 200 thousand words of text and all material is updated annually.

The BPS Web Site for Continuing Professional Development in Clinical Pharmacology and Therapeutics

What should a clinical pharmacologist know and be able to do, that other physicians cannot? The answer to this question determines the competencies that shape our training and that, as specialists, we must endeavour to develop and maintain. The British Pharmacological Society (BPS) attempted to remedy this shortcoming in 2000 by means of a Delphi exercise which defined 58 competencies considered essential for the

specialist CPT working for the National Health Service. Recognising that keeping up to date with this variety of knowledge and skills presented a challenge, the BPS tried to identify the key sources of information to which specialists might refer for guidance. A web site was compiled, with submissions from 26 authors, comprising 42 competencies amalgamated from the Delphi exercise in six domains: pharmacological principles; optimal choice and use of drugs; hazards of drug use; investigating drug effects; investigating drug use; and managing drug use. For each competency a list of key reference sources is identified and a summary of the essential knowledge given, along with opportunities for self-assessment. The web site was uploaded in June 2003 and the hit rate to date suggests that it is useful to specialists and trainees. It is accessible to BPS members and to other national societies on payment of an annual fee. The content will be updated annually.

Brit J Clin Pharmacol 2003, 56:349-350.

P-DRUGS: A computer program for teaching the WHO's "Guide to good prescribing" approach

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In 1995 WHO published the "Guide to Good Prescribing. A practical manual" intended to be use as a guideline for teaching a structured way of prescribing to medical students. After the completion of the course and the practical exercise, each student is supposed to have a "personal-formulary" ("P-Drugs formulary") produced according to the bases of efficacy, safety, suitability and cost, together with the basic Pharmacodynamic and Pharmacokinetic concepts.

Last year medical students at the University of La Laguna in Tenerife, Spain, have been using the mentioned approach for the last 5 years. A computer program has been developed in order to facilitate the evaluation of the different pharmacological groups and the particular active principles and pharmaceutical specialities for the treatment of the most common diseases. The version 2.0 has now an English translation available.

During the academic year 2003-2004, 60 medical students completed their P-formulary for the 25 most common disease in Primary Health Care. A mean number of 51 (Range: 49 - 83) different specialities were selected by each of the student for the treatment of all those diseases. All of them passed their Clinical Pharmacology Exam, partially based in clinical cases in which a final prescription must be made, and enough knowledge of their p-treatments was requested. The evaluation of the exercise by the students was outstanding.

The European Association of Clinical Pharmacology Education Group Committee is supporting the teaching of Clinical Pharmacology and Therapeutics based on the P-Drugs Concept, and the program is well integrated on this line of work

NPS NATIONAL PRESCRIBING CURRICULUM

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The objective of this program was to design, field-test, implement and evaluate the impact of a web-enabled, interactive prescribing curriculum based on the WHO 'Guide to Good Prescribing'. The target population for the curriculum were the senior medical students in the 11 Australian medical schools. Pharmacotherapy teachers (all members of the partner organisation, the Australasian Society for Clinical and Experimental Pharmacologists and Toxicologists) from each medical school developed the content for the modules of the curriculum. The modules were problem-based, web-based and interactive. The total program was made available to medical schools in January 2002 for their elective use. The measures of the program included: uptake of the program, the numbers of 'hits' by students from individual medical schools and feedback from student and staff interviews. Logons and passwords were provided to 1450 students in 2002 and 700 students in 2003. In 2002, 9 /11 medical schools used the program and in 9/11 are still using the program in 2003. Feedback from staff and students has been positive about the curriculum's usefulness and relevance as a teaching tool. On the basis of evidence and need, the selection of modules was considered appropriate. Uptake was voluntary and NPS had no power to enforce the use of the curriculum. Uptake of the curriculum was critically dependent on local 'champions' who could influence curriculum committees and year coordinators to include the program.

Curriculum Website: <http://nps.unisa.edu.au>NPS Website: <http://www.nps.org.au>

E-learning for traditional face-to-face pharmacology programmes; what's the point?

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There are currently a number of factors motivating the increased use of “non face-to-face teaching and learning methods” in higher education. Universities like to be seen to be progressive, students now arrive at university conditioned to use the web in many facets of their daily life, and educational e-software has developed to the level at which a modestly skilled user is able to create web-based teaching and learning environments. However, these motivating factors do not necessarily drive changes that actually improve the achievement of learning outcomes.

Distance education courses clearly show that these approaches can successfully achieve certain educational objectives when used to replace traditional teaching methods. The challenge to academics who are teaching courses where students are predominantly on campus is to incorporate the use of web-based and computer-based teaching methods which result in increased student performance and attainment of desired skills and attributes.

We have used a number of web-based teaching and learning methods in teaching pharmacology and physiology to Pharmacy students. Our experiences over the last 5 years have provided some insights into the benefits and pitfalls associated with the use of novel teaching methods. We have used WebCT as an online learning management system, and have used focussed discussion groups to replace face-to-face tutorials. We have replaced some didactic lectures with modules which consist of online content delivery, active learning tasks and associated assessment. The outcomes of these experiences will be discussed.