Educational resources and assessments for prescribers

Interprofessional education conference, Cardiff, 17th May 2013

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Plan

• Prescribing: a challenge for all of us
• How good is prescribing education?
• Does prescribing education improve prescribing?
• How can we provide better prescriber training?
• How can we assess prescribing competence?
• Future questions
Prescribing: a challenge of all of us
An in depth investigation into causes of prescribing errors by foundation trainees in relation to their medical education. EQUIP study. Dornan et al, 2009

<table>
<thead>
<tr>
<th>Prescriber</th>
<th>Description</th>
<th>On admission</th>
<th>During stay</th>
<th>When drug chart re-written</th>
<th>TTA¹/Discharge Rx</th>
<th>Not known</th>
<th>Not given</th>
<th>NA</th>
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<td>FY1</td>
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<td>8.6</td>
<td>3.2</td>
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<td>8.5</td>
<td>6.5</td>
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<td>4.8</td>
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<td>3.9</td>
<td>6.4</td>
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<td>7.7</td>
<td>8.9</td>
<td>8.9</td>
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</table>

Available at http://www.gmc-uk.org/about/research/research_commissioned_4.asp
# PROTECT Study - Scotland

Ryan et al.

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<th></th>
<th>Total</th>
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<th>F2</th>
<th>Other</th>
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<td>Number of errors</td>
<td>993</td>
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<td>98</td>
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<tr>
<td>Error Rate (%)</td>
<td><strong>4.9</strong></td>
<td>4.5</td>
<td>6.4</td>
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## Causes of prescribing errors

<table>
<thead>
<tr>
<th>Systems factors</th>
<th>Prescriber factors</th>
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<tbody>
<tr>
<td>• Working hours</td>
<td>• Knowledge</td>
</tr>
<tr>
<td>• Patient throughput</td>
<td>– Clinical pharmacology</td>
</tr>
<tr>
<td>• Professional support from colleagues</td>
<td>• Skills</td>
</tr>
<tr>
<td>• Senior supervision</td>
<td>– Obtaining information</td>
</tr>
<tr>
<td>• Poor knowledge of workplace systems</td>
<td>– Communicating</td>
</tr>
<tr>
<td>• Availability of information</td>
<td>• Attitudes</td>
</tr>
<tr>
<td>• Decision support</td>
<td>– Coping with risk/uncertainty</td>
</tr>
<tr>
<td></td>
<td>– Monitoring of prescribing</td>
</tr>
<tr>
<td></td>
<td>– Checking routines</td>
</tr>
</tbody>
</table>
“shocking”
“almost one in ten hospital prescriptions were wrong”
“recommendations ..[majority involved better training].. deserve recognition and warrant urgent implementation”
Kent Woods, Chief Executive for the UK’s Medicines and Healthcare products Regulatory Agency, told *The Lancet* that “teaching of clinical pharmacology and therapeutics is patchy across medical schools and in some has declined to an unacceptable level”. Clinical pharmacologists are well placed to teach medical students and postgraduate doctors, but pharmacists too have a key educational role to play.

Therapeutics—the practical application of pharmacology to the prevention, treatment, and alleviation of disease—needs to become part of every doctor’s undergraduate training and continuing professional development. Sustained on-the-job interprofessional training would help to remind doctors of best prescribing practices.
How good is prescribing education?
Teaching of clinical pharmacology and therapeutics in UK medical schools: current status in 2009

Lelia O'Shaughnessy,¹,² Inam Haq,² Simon Maxwell³ & Martin Llewelyn¹,²

¹Division of Medicine, ²Medical Education Unit, Brighton and Sussex Medical School, Brighton, East Sussex and ³Clinical Pharmacology Unit, University of Edinburgh Clinical Research Centre, Western General Hospital, Edinburgh, UK
How good is prescribing education?

• Anecdote
  – Students
  – Those teaching students (clinical pharmacologists)
  – Those supervising junior hospital prescribers (physicians)

• Surveys of student opinion

• Regulatory visits

• Hospital prescribing audits/assessments

• Reliable and valid assessment of knowledge, skills and attitudes relevant to prescribing
Undergraduate preparation for prescribing: the views of 2413 UK medical students and recent graduates

Amy Heaton, David J. Webb & Simon R. J. Maxwell

Clinical Research Centre, University of Edinburgh, Western General Hospital, Edinburgh, UK

WHAT IS ALREADY KNOWN ON THIS SUBJECT

- Adverse drug events are common in National Health Service (NHS) hospitals where junior doctors take responsibility for most of the prescribing.
- Safe and effective prescribing of drugs is a core competency expected of all medical graduates.
- There is a perception from some of those who supervise the prescribing of drugs in the NHS that undergraduate teaching in this area may be deficient, although this view is contested.

WHAT THIS STUDY ADDS

- Our study suggests that a large proportion of medical students and recent graduates from UK medical schools who responded also believe that their teaching and assessment in this area was inadequate.
- This result implies that those responsible for overseeing undergraduate education should urgently review teaching and assessment of competency in relation to prescribing in all UK medical schools.

AIMS

To gather opinions from UK medical students and recent graduates about their undergraduate training to prescribe and their confidence about meeting the relevant competencies identified by the General Medical Council (GMC).

METHODS

We designed a web-based survey that was distributed to UK medical students and first year Foundation doctors (graduation years 2006–2009) via medical schools and postgraduate networks.

RESULTS

Analysed responses from 2413 students graduating in 2006–2009 from the 23 UK medical schools (mean 65.3 per school) with a complete and accurate database of students in clinical pharmacology & therapeutics (or equivalents) were identified by 19% and 11%, respectively, with mode of learning missions most commonly via opportunities for learning during clinical attachments (44%). Only 38% felt confident about prescription writing and only a minority (29%) had had a hospital prescription chart more than twice during training. The majority (71%) felt that the amount of teaching in this area was too little or far too little, and most tended to disagree or disagreed that their assessment through feedback and skills (56%). When asked if they were confident that they would be able to achieve the competencies identified by the GMC, 40% disagreed or tended to disagree, whereas only 20% agreed or tended to agree.

CONCLUSIONS

Many respondents clearly perceived a lack of learning opportunities and assessment related to the safe and effective use of drugs and had little confidence that they would meet the competencies identified by the GMC. There is an urgent need to review undergraduate training in this area.
‘I feel that the amount of teaching in Pharmacology, Therapeutics & Prescribing during my course is (was)’

How prepared are medical graduates to begin practice?
A comparison of three diverse UK medical schools.


• 250 interviews, 479 doctor questionnaires, 78 senior questionnaires, 420 F1 prescribing assessments and learning portfolio data

• There was a consistent thread, from primary sample data throughout the year, and from triangulation data, of under-preparedness for prescribing. Weaknesses were identified both in the pharmacological knowledge underpinning prescribing, and the practical elements of calculating dosage, writing up scripts, drug sheets, etc.

• Prescribing was also the main area of practice in which errors were reported by respondents, indicating a significant potential risk.

• Data from the safe prescribing assessment ......[showed that].... 19% of Newcastle and 16% of Warwick graduates passed. Assuming that this is a fair and appropriate test of prescribing at the level of an F1, it highlights a weakness in prescribing.

Does prescribing education improve prescribing?
Training improves prescribing

- Lots of evidence
- Most clin.pharm./pharmacy-led interventions
- Most assessments under ‘controlled’ conditions
- Most short term
  - Langford et al. *BMJ* 2001;322:1424
  - De Vries *et al. Lancet* 1995;346:1454
Do educational interventions improve prescribing by medical students and junior doctors? A systematic review

Sarah Ross & Yoon K Loke

University of Aberdeen, Aberdeen and 1University of East Anglia, Norwich, UK

Screened 3,189 studies but only 22 met criteria (15 controlled trials)

- Real world prescribing (1/15)
- OSCE Stations (5/15) – number 1 to 9
- Written short answer (6/15)
- Calculations (1/15)
- MCQs/SAQs (2/15)
Does education actually improve prescribing?

- Large numbers of students/trainees required
- Long and detailed follow-up
- Detecting events adverse events related to poor prescribing represents a major challenge
- Difficulty in measuring good prescribing practice
- Achieving random allocation of learning style
- Constant change in curricula (other confounders)
- Multi-factorial nature of prescribing events
- Lack of will to do this
How can we provide better prescriber training?
<table>
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<th>PATIENT</th>
<th>Prescribing sub-competencies</th>
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<tr>
<td>1</td>
<td>Make a diagnosis</td>
<td>Knowledge</td>
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<tr>
<td>2</td>
<td>Establish therapeutic goal</td>
<td>Knowledge</td>
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<td>3</td>
<td>Choose the therapeutic approach</td>
<td>Knowledge</td>
</tr>
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<td>4</td>
<td>Choose the drug</td>
<td>Knowledge</td>
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<tr>
<td>5</td>
<td>Choose the dose, route and frequency</td>
<td>Knowledge</td>
</tr>
<tr>
<td>6</td>
<td>Choose the duration of therapy</td>
<td>Knowledge</td>
</tr>
<tr>
<td>7</td>
<td>Write the prescription</td>
<td>Knowledge</td>
</tr>
<tr>
<td>8</td>
<td>Inform the patient</td>
<td>Knowledge</td>
</tr>
<tr>
<td>9</td>
<td>Monitor drug effects</td>
<td>Knowledge</td>
</tr>
<tr>
<td>10</td>
<td>Review/alter prescription</td>
<td>Knowledge</td>
</tr>
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</table>
The educational challenges

- ‘Knowledge rich’ area
  - Large numbers of medicines

- Rapid change
  - new drugs, new ways of using them

- Difficulty in gaining prescribing practice
  - Patient safety concerns

- Cross-cutting through the curriculum

- Integrates knowledge, skills, judgement
Clear learning outcomes

- **Core learning outcomes** should be clearly identified for the students, including knowledge and understanding about drugs, skills related to the prescribing of drugs, and attitudes towards drug therapy.
- ‘Outcomes-based curriculum’ now widely introduced
- **Recent developments**
  - Safe Prescribing Working Group 2007
  - Tomorrow’s Doctors 2009
  - BPS Curriculum – Ross & Maxwell BJCP
Learning Environment

- Leadership and visibility
- Knowledge and understanding
  - CPT principles, drugs, therapeutics
- Student formularies
- Problem solving
- Skills practice
- eLearning initiatives
- Assessment
The factual burden imposed by the large numbers of medicines that are encountered should be eased by prioritising learning around a core list of around 100 commonly used drugs (a student formulary).
Managing the graduation transition

Undergraduate | Postgraduate career

Medical student | Junior Doctor | Senior Doctor

Knowledge
Attitudes
Skills

- Therapeutics tutorials
- Prescribing simulation
- Near-peer tutorials
- Pre-prescribing
e-Learning resources
eLearning resources

- Virtual Learning Environments
- Cost-effective
- Convenient
- Influence extends beyond manpower
- Learning can be monitored
- User (rather than teacher) driven
- Flexible/interactive

*But should be part of a ‘blended’ learning solution*
Clinical Pharmacology & Prescribing

Prescribe is the e-learning platform to help medical students and others develop a firm grounding in the principles of basic and clinical pharmacology. We will have a pilot site in the near future. To express an interest, and to join our mailing list please register.

Prescribing Skills Assessment

PSA is a collaborative project by the British Pharmacological Society and the Medical Schools Council, with the aim of enabling students to demonstrate competencies in relation to the safe and effective use of medicines.

www.prescribe.ac.uk
Welcome to Prescribe, the online resource for prescribers in training.

Prescribe is being developed by the British Pharmacological Society as an e-Learning resource to support the training of medical students and students of other healthcare professions. It aims to support the acquisition of the knowledge and skills required for safe and effective use of medicines in the National Health Service.

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**Prescribing news**

06.04.12 A BMJ commentary discusses reform of the policy towards illicit drug use. [read more](#)

06.04.12 Research shows that prescribing for women patients is less likely to follow guidelines than prescribing for their male counterparts. [read more](#)

06.04.12 A brief review of gene-drug associations (pharmacogenetic) and discussion of why few have been incorporated into clinical practice or guidelines. [read more](#)

31.03.12 A Lancet paper offers further evidence that aspirin has protective effects against cancer. [read more](#)

31.03.12 A paper in Ann Int Med suggests that anti-platelet drugs offer little if any benefit to patients with chronic kidney disease. [read more](#)

23.03.12 A brief BMJ review of the use of emergency contraception. [read more](#)

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**What's new in Prescribe**

08.02.12 A link to a fantastic lecture given by Professor David Nutt, the former Chair of the Advisory Committee on Drugs Misuse, who was sacked by the last Government, after expressing views on the illogical position taken on misuse of drugs can be found in the Prescribe library. [read more](#)

01.01.12 HAPPY NEW YEAR from all at Prescribe. We hope the site will develop significantly over coming months. [read more](#)

03.11.11 Why is it that the response to drugs can diminish over time? New session on Pharmacodynamics - Desensitisation and tolerance just added. [read more](#)

07.05.11 The Prescribe glossary has now been updated to contain one hundred further entries. Suggestions for more information for all users are welcomed and should be sent to editors@prescribe.ac.uk [read more](#)

13.04.11 Two new sessions on pharmacodynamics were launched covering topics such as potency, efficacy, dose-response curves, agonists and antagonists [read more](#)
Prescribe Curriculum

The Prescribe curriculum is based on the British Pharmacological Society's core curriculum for medical students and covers all the relevant knowledge and skills outcomes identified by the General Medical Council in its recommendations on undergraduate medical education (Tomorrow's Doctors 2009). These reflect earlier proposals made by the Safe Prescribing Working Group, convened by the Medical Schools Council in 2007.

The curriculum is divided into four sections:

- Section 1 – Principles of Clinical Pharmacology
- Section 2 – Drugs
- Section 3 – Therapeutics
- Section 4 – Prescribing Skills

To access the modules and learning sessions in each of these sections click the links on the right.

To download a pdf version of the Prescribe curriculum and learning objectives click here.
Section 1 - Principles of Clinical Pharmacology

This section will cover the basic principles of pharmacology, clinical pharmacology and toxicology that underpin rational prescribing. These sessions will introduce students to some of the important generic principles of clinical pharmacology that apply to all areas of therapeutics.
Pharmacokinetics I – Introduction to pharmacokinetics

Authors: John Mucklow, Simon Maxwell
Section: Principles of Clinical Pharmacology
Module: Pharmacokinetics

Description

This session forms a basic introduction to important concepts in pharmacokinetics such as absorption, distribution, metabolism and elimination of drugs and explains why these concepts are relevant to prescribers.
Learning objectives

By the end of this session you will be able to:

- Define the term pharmacokinetics
- Describe the four phases of pharmacokinetics
- Explain why an understanding of pharmacokinetics is relevant to prescribers

Prerequisites

Before commencing this session you should have:

- An understanding of basic physiological concepts, including cells and membranes, body compartments, lipid and water solubility, and the functions of the liver, kidney and the cardiovascular system
- Completed the related Prescribe sessions in the module Principles of Clinical Pharmacology/Pharmacodynamics
As already seen, an agonist is a ligand that binds to a receptor and produces a conformational change that initiates an intracellular signal (Fig 12).

An antagonist is a ligand that binds to a receptor but does not produce the conformational change that initiates an intracellular signal. Occupation of the receptor by an antagonist prevents the binding of any other ligand and so 'antagonises' the biological response to the agonist.

Competitive antagonists (Fig 13) bind to the same site on the receptor as the agonist with which they are competing (Fig 14). The inhibition (reduction in response to the agonist) they produce can be overcome by increasing the dose of the agonist.

Non-competitive antagonists (Fig 15) inhibit the receptor activity by binding to a different part of the receptor or associated pathway from the agonist (Fig 16). Simply increasing the dose of the agonist cannot overcome their effects and so the maximum response to the agonist (its 'efficacy') is reduced.

Fig 14: The competitive antagonist competes with the agonist for receptor occupancy and prevents it from producing a full biological response (unless the agonist concentration is greatly increased to overcome the competition).
Welcome to SCRIPT

This innovative e-Learning programme is designed to help you in your learning and knowledge of safe prescribing. It is easy to use: just register, login and use the resources.

There are 40 modules in the seven groups displayed on the left-hand side containing interactive videos & graphics & clinical case exercises for you to test your learning & measure your progress.

Those modules marked with an asterisk (*) are mandatory for West Midlands F1 trainees.

We hope you find this toolkit useful! Safe prescribing!

Why use this site?

- Specifically designed to support you via a range of interactive methods
- Draws on a wealth of experience from clinicians
- Underpins good prescribing practice
- Allows a flexible approach to learning
- Readily available at your convenience

Login

Username: [input]
Password: [input]
Sign In

I have forgotten my password
About SCRIPT

SCRIPT is a web based tool that allows students to gain practical experience of handling mock prescriptions, and identifying legal, ethical and clinical errors. The system allows for localisation (patient and prescriber addresses) and randomly generates names and other details to generate a set of permutations on a set of over 4,000 prescriptions, covering NHS, GP, dental, veterinary and private scripts, registers, labels and dispensing. The system supports both Scottish and English prescriptions.

Students gain immediate feedback on their performance when using the on-line prescription tutor, as it highlights any errors they make in real time, and keeps a personal record of all the students attempts on the tutor. The tutor assesses the students using a customizable marking guide, allowing staff to determine the marking scheme used, or even remove marking to allow for a feedback only operating mode.

Users have identified the tutorial as user-friendly and that the feedback is very useful in highlighting problem areas, the tutor providing both an excellent learning tool and revision aid.

Throughout the UK, many students have used it as part of their course.

Marking and Feedback

Registers

English Rx

Feedback with no marking scores
Welcome to the NPS National Prescribing Curriculum web site. The site provides an interactive learning environment to encourage the development and practise of rational prescribing skills.

Medical, nursing and pharmacy students should obtain a username and password from their University. Junior medical officers and other new practitioners should obtain a username and password from the medical education office at their allocated hospital. Visitors should enter "visitor" for both the username and password.

Visitor access is restricted to the COPD (Chronic Obstructive Pulmonary Disease) module in the Student prescribing modules and to the Diabetes and Insomnia modules in the Junior practitioner modules. Visitor modules are fully functional except for the prescribing screens where the functionality is limited for demonstration purposes.

If you have any questions or problems we would like to hear about them. Please email the project team.

Take the student survey – feedback to NPS

Student Prescribing Modules

Junior Practitioner Modules

Dental Student Program

Visitors should enter "visitor" for both the user name and password.

NPC Newsletter 2007
Prescribing assessment
Why assess prescribing?

• Clinical governance/patient safety reasons
  – Assessment might be a marker of competence to enter into (or continue in) clinical practice
  – Protection of patients – patient safety

• Educational reasons
  – Measure the success of training
  – Identify the need for improvements in training
Prescribing Skills Assessment

- No validated, reliable and widely accepted measure of prescribing performance currently exists
- Developed jointly by Medical Schools Council and British Pharmacological Society
- Pass/fail assessment of ability to prescribe medicines
- A national prescribing assessment would
  - pool academic resources
  - serve to raise and unify standards (drive learning)
  - provide equity in assessment
PSA: Basic principles

• Should be passed **before qualification** and subsequent assumption of NHS prescribing responsibilities

• It will be available to be taken during the final year and **can be repeated** if necessary

• Delivered **online**

• ‘Open book’ with access to the **British National Formulary**

• Assesses prescribing competencies **relevant to Foundation doctors** that map onto those in *Tomorrow’s Doctors 2009*

• Will test **skills and deductive powers** (as well as knowledge) relevant to early postgraduate practice
Prescribing Skills Assessment

Section 1: Prescribing

Section 2: Prescription Review

Section 3: Planning Management

Section 4: Communicating Information

Section 5: Calculation Skills

Section 6: Adverse Drug Reactions

Section 7: Drug Monitoring

Section 8: Data Interpretation

8 sections
TOTAL = 120 mins
(200 marks)
# Prescribing Skills Assessment Blueprint

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Surgery</th>
<th>Elderly Care</th>
<th>Paediatrics</th>
<th>Psychiatry</th>
<th>Obstetrics &amp; Gynaecology</th>
<th>General Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prescribing</strong></td>
<td>Unstable angina</td>
<td>Thromboprophylaxis</td>
<td>Intravenous Fluids</td>
<td>Allergies</td>
<td>Depression</td>
<td>Oral contraception</td>
</tr>
<tr>
<td></td>
<td>Acute asthma</td>
<td>Antibiotics</td>
<td>Laxatives</td>
<td>Infection (e.g. otitis media, epiglottitis, croup)</td>
<td>Anxiety</td>
<td>HRT</td>
</tr>
<tr>
<td></td>
<td>Dyspepsia</td>
<td>Analgesia</td>
<td>Analgesia</td>
<td>Reflux</td>
<td>Acute behavioural disturbance</td>
<td>Bladder Instability</td>
</tr>
<tr>
<td><strong>Prescription review</strong></td>
<td>Interactions</td>
<td>Medication errors</td>
<td>Pre-operative assessments</td>
<td>Diuretics</td>
<td>Antihypertensives</td>
<td>Cases will be more difficult to find</td>
</tr>
<tr>
<td></td>
<td>Causes of symptoms and signs</td>
<td></td>
<td></td>
<td>Benzodiazepines</td>
<td>Opioids</td>
<td></td>
</tr>
<tr>
<td><strong>Planning management</strong></td>
<td>Acute (e.g. asthma, pulmonary oedema, MI), Chronic (e.g. COPD, diabetes, angina)</td>
<td>Acute (e.g. bleeding, low BP, acute abdo)</td>
<td>Chronic (e.g. IBD, oncology)</td>
<td>Asthma</td>
<td>Acute anaphylaxis</td>
<td>Cases will be more difficult to find</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Diabetic Ketoacidosis</td>
<td>Dehydration</td>
<td></td>
</tr>
<tr>
<td><strong>Communicating information</strong></td>
<td>Oral hypoglycaemics</td>
<td>Tamoxifen</td>
<td>Anticoagulants</td>
<td>Vaccinations</td>
<td>Antidepressants</td>
<td>Advising about drugs in breast feeding</td>
</tr>
<tr>
<td></td>
<td>Corticosteroids</td>
<td>Antibiotics</td>
<td>Bisphosphonates</td>
<td>Insulin</td>
<td>Benzodiazepines</td>
<td>Advising about drugs preconception</td>
</tr>
<tr>
<td></td>
<td>Nitrates etc.</td>
<td>Heparin</td>
<td>Diuretics</td>
<td>Cystic fibrosis</td>
<td>Antipsychotics</td>
<td>OCP, HRT</td>
</tr>
<tr>
<td><strong>Calculation Skills</strong></td>
<td>Aminophylline</td>
<td>Infusion rates (e.g. dopamine)</td>
<td>Digoxin elixir</td>
<td>Fluid replacement</td>
<td>Intravenous lorazepam</td>
<td>Lidoendocardial injections</td>
</tr>
<tr>
<td></td>
<td>Infusion</td>
<td>Intravenous fluid volumes</td>
<td></td>
<td>Dosing by weight</td>
<td>Haloperidol</td>
<td></td>
</tr>
<tr>
<td><strong>Adverse drug reactions</strong></td>
<td>Renal impairment</td>
<td>Opioid toxicity</td>
<td>Dehydration</td>
<td>Hypoglycaemia</td>
<td>Benzodiazepines</td>
<td>Oestrogenic effects</td>
</tr>
<tr>
<td></td>
<td>Liver function</td>
<td>Vomiting</td>
<td>Collapse</td>
<td>Vomiting</td>
<td>Antimuscarinic effects</td>
<td>Interactions with the OCP</td>
</tr>
<tr>
<td></td>
<td>Hyponatraemia</td>
<td></td>
<td>Constipation</td>
<td>Substance abuse</td>
<td>Antipsychotics</td>
<td></td>
</tr>
<tr>
<td><strong>Drug monitoring</strong></td>
<td>Digoxin, Insulin, Methotrexate, Amiodarone, Oxygen</td>
<td>Fluid replacement</td>
<td>Carbazole</td>
<td>Asthma therapy</td>
<td>Lithium</td>
<td>Monitoring safety of OCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Antibiotics</td>
<td>Theophylline</td>
<td>Diabetes</td>
<td>Antipsychotic drugs</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anticoagulants</td>
<td>Anti-epileptics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Data interpretation</strong></td>
<td>TFTs, glucose, INR, renal function etc</td>
<td>Antibiotic levels</td>
<td>Hb level, UEs, CR, anti-epileptic concentrations</td>
<td>PEF, paracetamol poisoning</td>
<td>Lithium level</td>
<td>BP and OCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fluid replacement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unformatted content (scenarios and MCQs) provided by medical schools

Steering Group members and volunteers apply content to PSA templates (ppt files)

Volunteer item writers write assessment items using the 8 station type PSA templates

Project team conducts initial review of items, checking for completeness, face validity, relevance to station type etc. Entered into item log with appropriate metadata. Sent for peer review.

Peer review workshops to (i) conduct face validity and cover up test of scenario and correct answer, (ii) review and edit the item to remove any ambiguity and eliminate detractors in the answer options, and (iii) decide whether to refer the item for standard setting.

Project team collects item performance data based on performance amongst randomly selected students.

Assessment Board standard sets V3 items with reference to performance data and the definition of a borderline student.

Project team enters V4 items into live bank

Assessment Board monitors and maintains the bank in relation to current prescribing policy and practice, current relevance to the FY1 role, and balance of items across station type, domain, patient group and drug type.
Case presentation
A 62-year-old woman is admitted to hospital with a 3-day history of increasing breathlessness, wheeze and dry cough. PMH: COPD with several admissions for exacerbations. DH: Salbutamol inhaler 200 micrograms as required, tiotropium inhaler 18 micrograms daily, fluticasone propionate 250 micrograms with salmeterol 50 micrograms inhaler (Seretide 250 Accuhaler®) 12-hry. Treatment with prednisolone 30 mg orally daily has already been started by the GP.

On examination
She appears distressed, and is centrally cyanosed and coughing. Temperature 37.1°C, HR 112/min, BP 116/72 mmHg, RR 30/min, O₂ sat 90% (94–99) breathing air. PEFR 120 L/min. She is using her accessory muscles to breathe. Auscultation of the chest reveals widespread wheezes bilaterally.

Investigations
Hb 145 g/l (115–165), WCC 9.8 x 10⁹/L (4.0–11.0).
Na⁺ 140 mmol/L (137–144), K⁺ 4.2 mmol/L (3.5–4.9), U 7.2 mmol/L (2.5–7.0), Cr 85 μmol/L (60–110). CXR shows hyperinflated lungs.

Prescribing request
Please write a prescription for ONE drug that will provide rapid relief of her bronchospasm. (Use the hospital 'once-only medicines' prescription chart provided)
Case presentation
A 70-year-old man is admitted from home following a collapse. Clinical examination reveals that he is dehydrated and hypotensive. His current regular medicines, as recorded by his daughter, are listed (right).

Question A
Identify the TWO prescriptions that are most likely to have contributed to his dehydration. (mark them with a tick in column A)

Question B
Identify ONE prescription that would constitute a potentially fatal prescribing error if it were transcribed onto the in-patient prescription chart. (mark it with a tick in column B)

CURRENT PRESCRIPTIONS

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Route</th>
<th>Freq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>amiodarone</td>
<td>200 mg</td>
<td>ORAL</td>
<td>daily</td>
</tr>
<tr>
<td>amitriptyline</td>
<td>75 mg</td>
<td>ORAL</td>
<td>daily</td>
</tr>
<tr>
<td>atenolol</td>
<td>500 mg</td>
<td>ORAL</td>
<td>daily</td>
</tr>
<tr>
<td>bendrofluamide</td>
<td>5 mg</td>
<td>ORAL</td>
<td>daily</td>
</tr>
<tr>
<td>prazosin</td>
<td>1 mg</td>
<td>ORAL</td>
<td>12-hrly</td>
</tr>
<tr>
<td>simvastatin</td>
<td>20 mg</td>
<td>ORAL</td>
<td>nightly</td>
</tr>
<tr>
<td>spironolactone</td>
<td>25 mg</td>
<td>ORAL</td>
<td>daily</td>
</tr>
</tbody>
</table>
Case presentation
A 55-year-old man is to be given a dose of 40 mg of furosemide by IV injection to treat acute left ventricular failure. Furosemide injection is available in ampoules containing 50 mg in 5 mL.

Calculation
What volume of furosemide injection should he be given?
(Write your answer in the box below)
Case presentation
A 55-year-old woman presents to her GP with aching of her arms and legs. PMH. Type 2 diabetes mellitus, hypertension, hypercholesterolaemia, recent bronchitis. DH. Her current regular medicines are listed (right).

Question
Identify the TWO prescriptions that are most likely to interact to cause the aching of her arms and legs.
(mark them with a tick)

Prescription options
- aspirin 75 mg orally daily
- clarithromycin 500 mg orally 12-hrly
- lisinopril 5 mg orally daily
- metformin 500 mg orally 12-hrly
- simvastatin 40 mg orally nightly
PSA Progress

- 2010-04  Paper-based pilots (8 schools/1,000 students)
- 2011-05  Online pilot (2 schools/200 students)
- 2011-09  Question item author training (60 authors)
- 2012-02  Major peer-review event (bank – 600 items)
- 2012-04  Online pilot (8 schools/1,300 students)
- 2013-02  Major peer-review event (bank – 1,200 items)
- 2013-05  Online pilot (29 schools/6000 students)
- 2014  Planned implementation?
Positive outcomes for learners

• Summative assessment of prescribing that is fair and equally applied across medical schools (and hospitals)
• Formative education tool
• Stimulate better training experiences
• Enhanced confidence