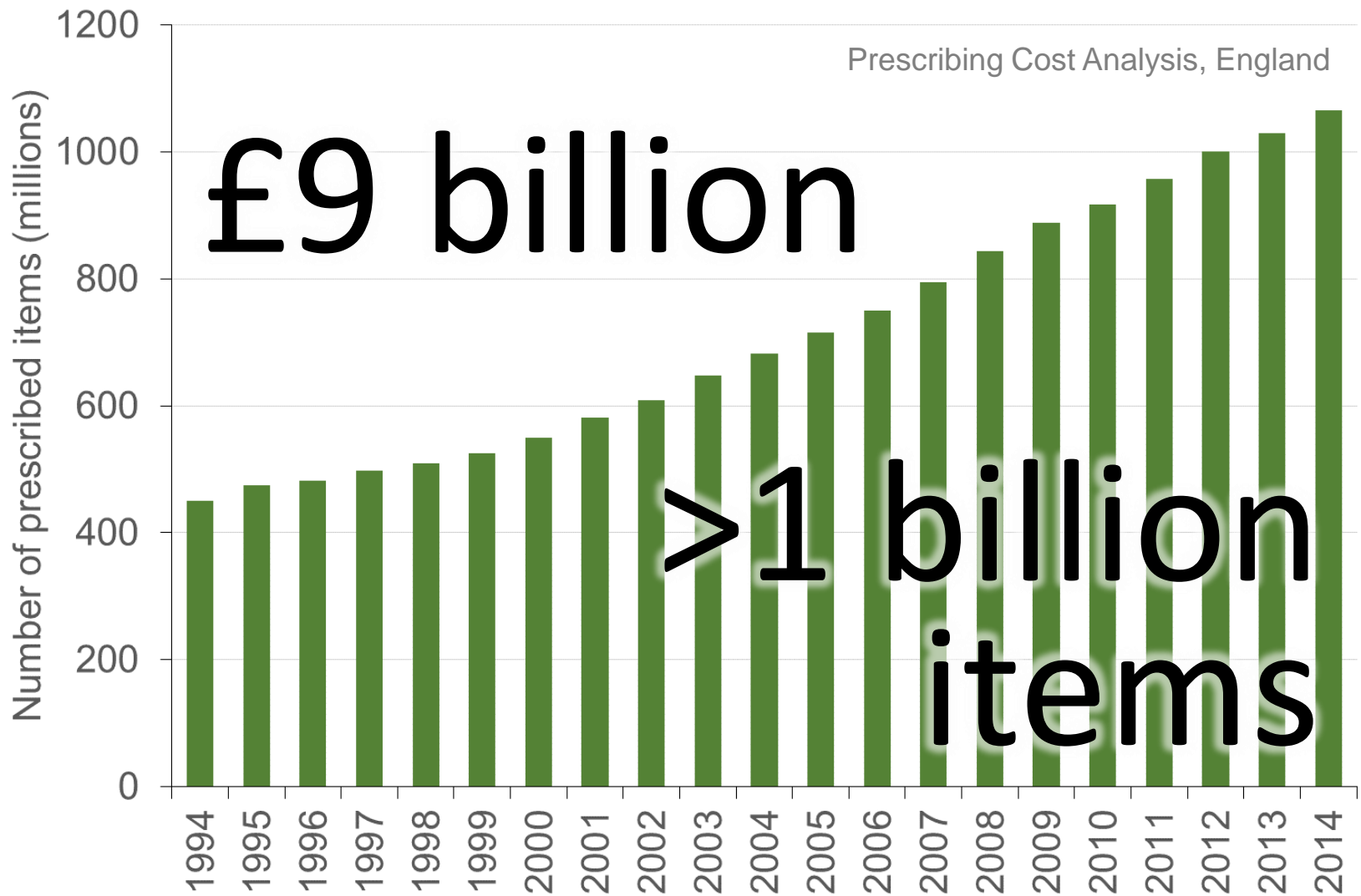


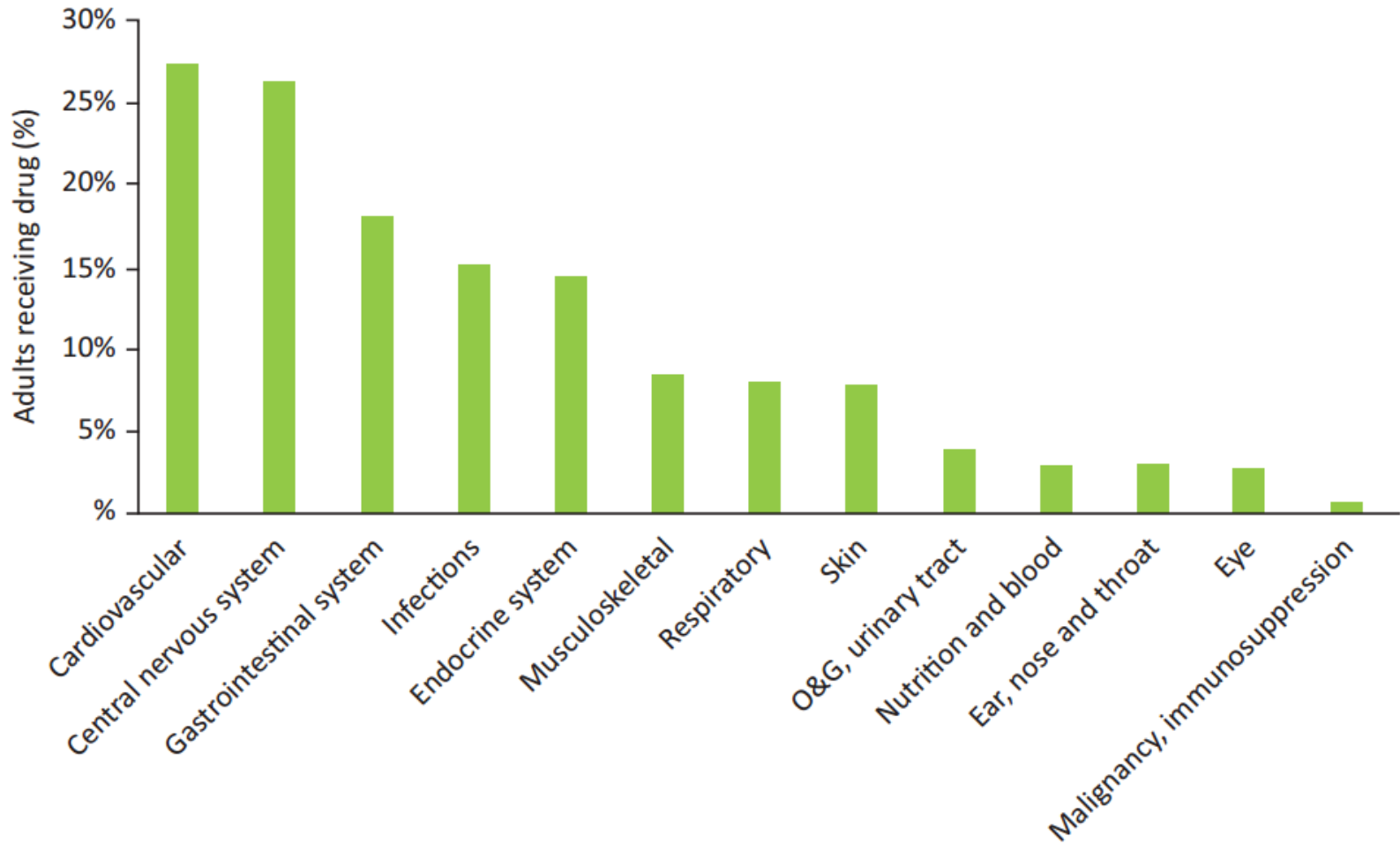
# How should we teach prescribing to medical students?

Year 3 MB21

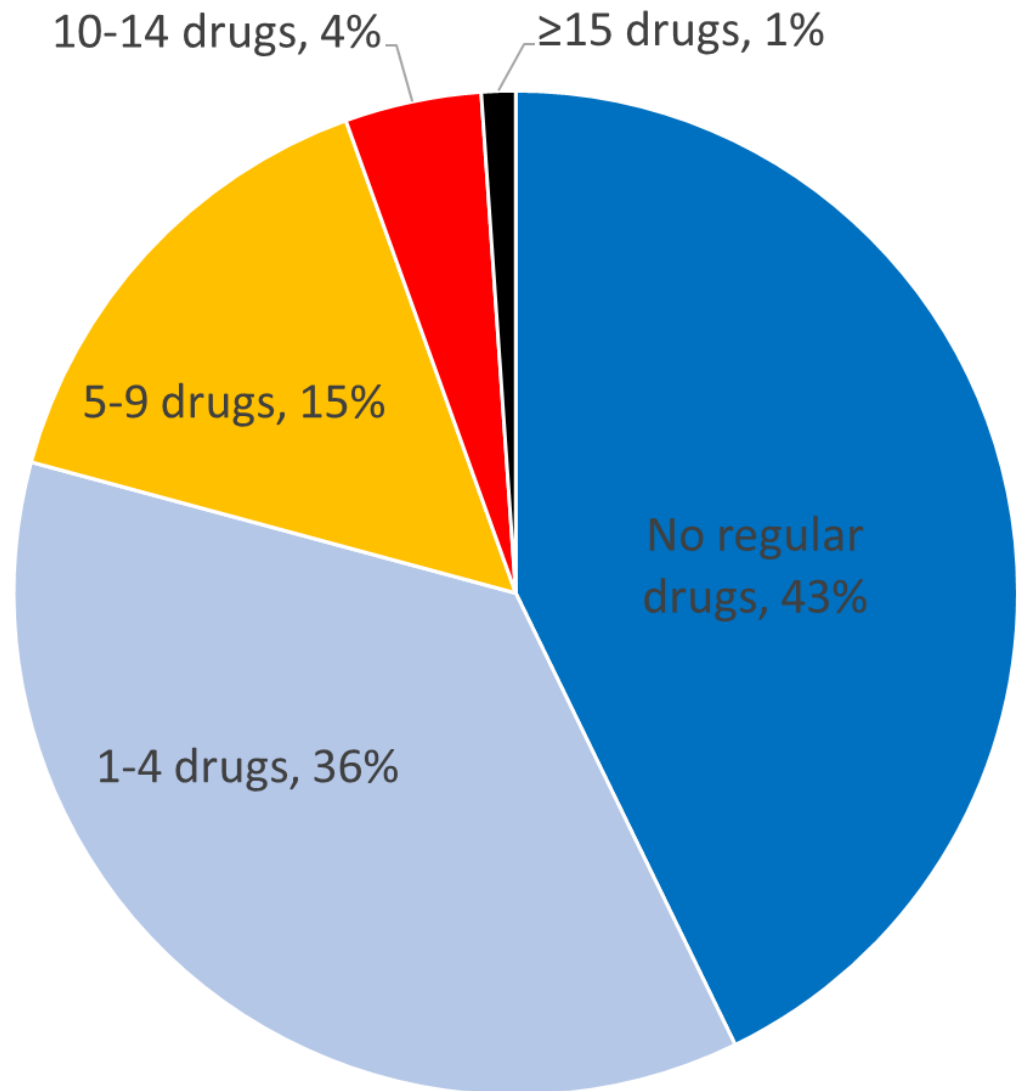
Rupert Payne



# Types of drugs used in primary care



# Polypharmacy is common



Guthrie B, 2015

Black dot interactions

**>50%**

10+ drugs

Medication errors

**16%**

increase per drug

# Risks of polypharmacy

Medication adherence

**half**

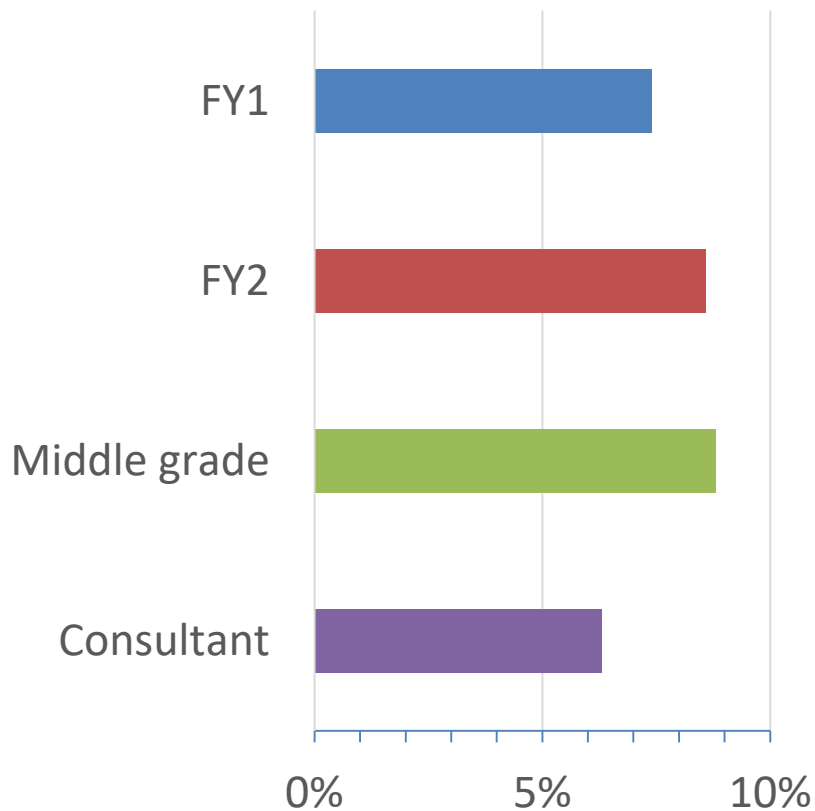
5+ drugs

Quality of Life

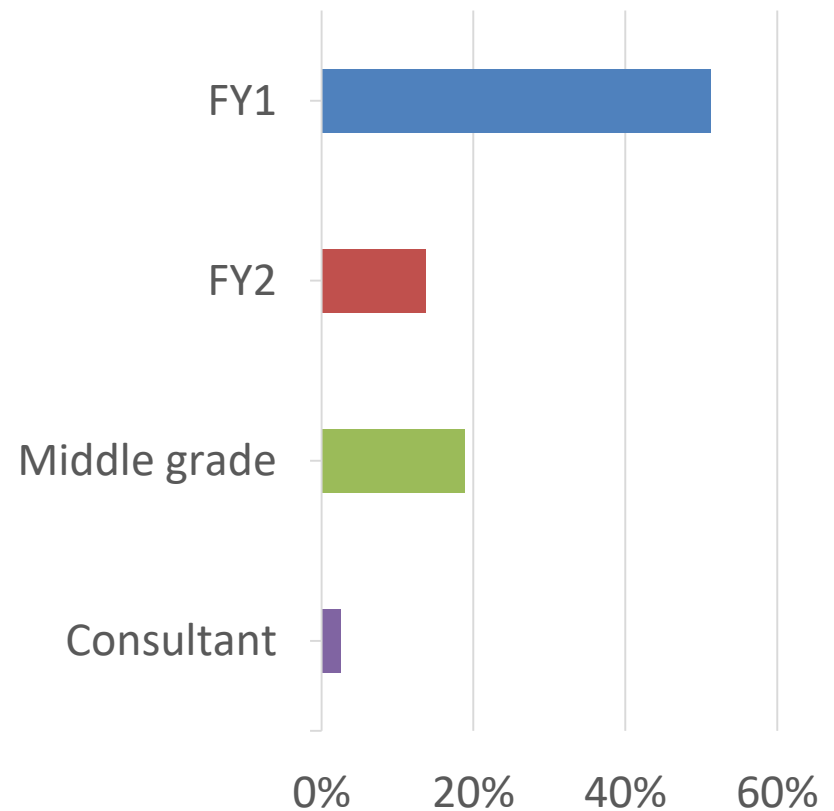
**↓**

# Junior doctor prescribing errors

Prescribing error rate



Percentage of all errors



Ryan, PLOS One 2014

FY1s write **52%** of all prescriptions



**7.4%** of FY1 prescriptions have an error

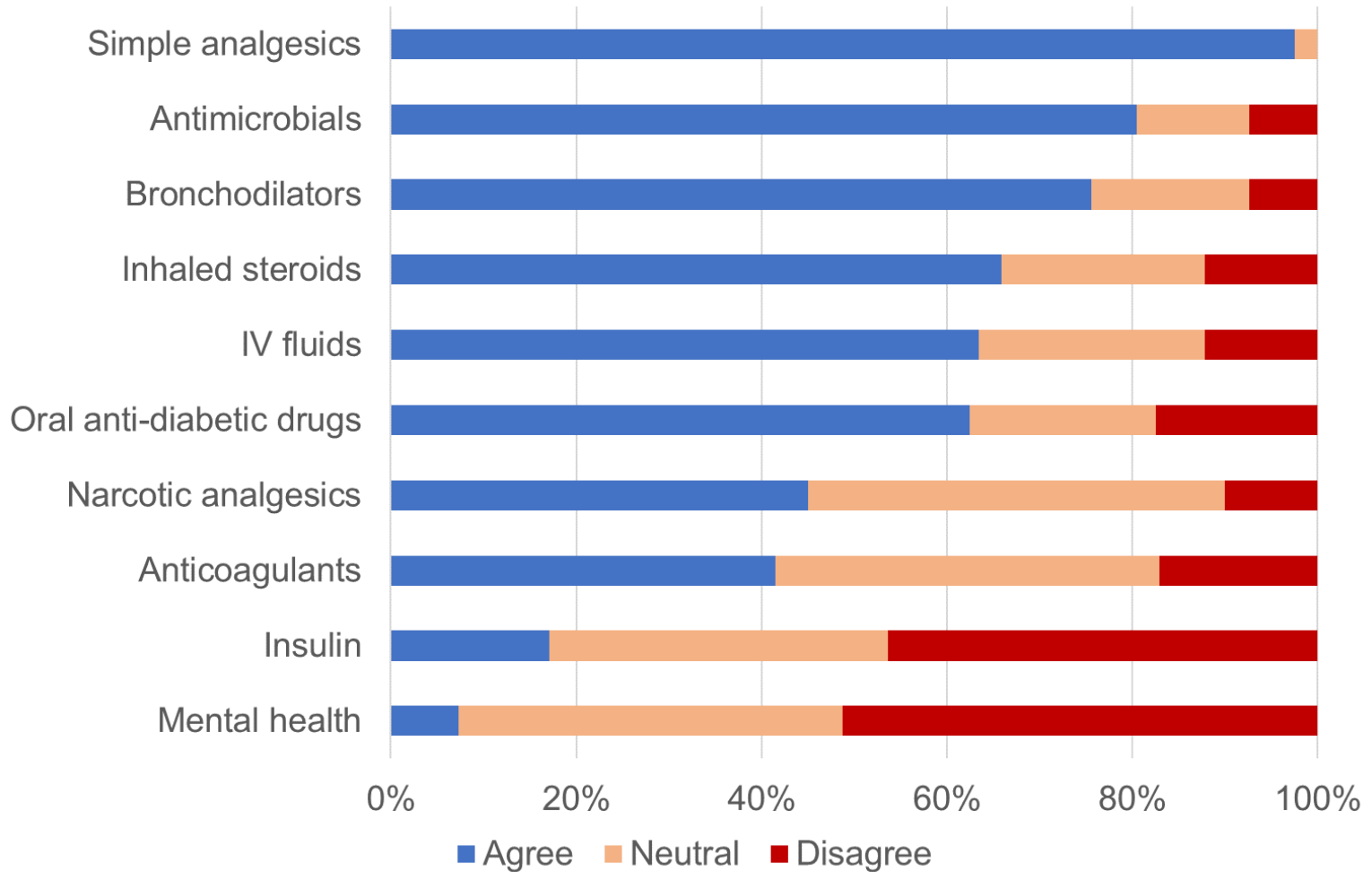
# Survey of medical graduates

*“I feel confident that my training will enable me to achieve the prescribing competencies set out by the GMC”*

**29%**  
*agreement*



# I feel confident prescribing...

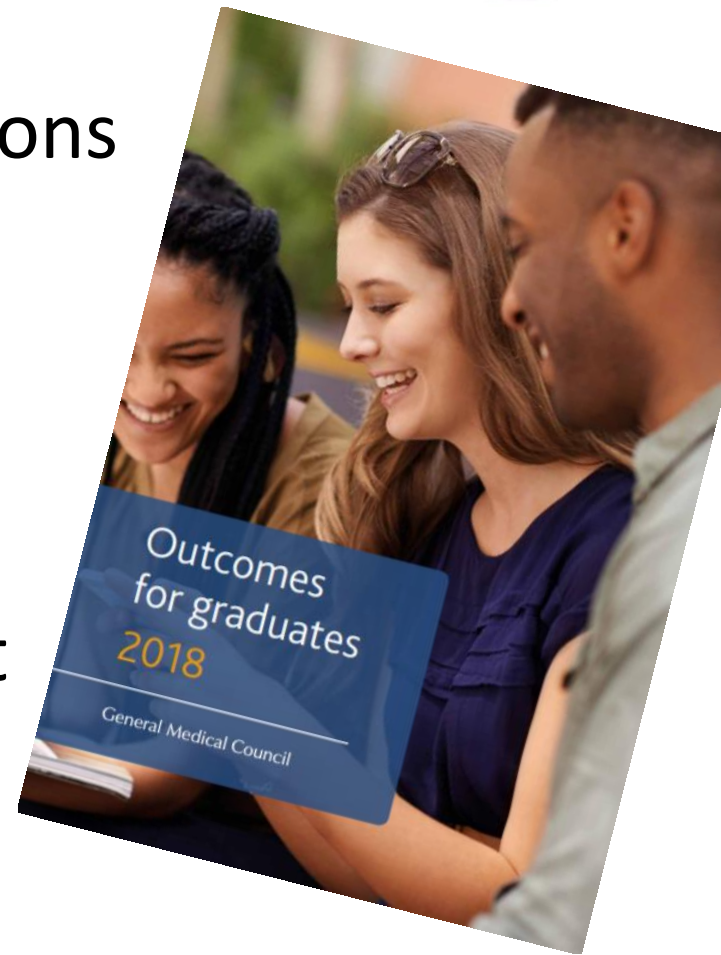


UKFPO Survey, 2017

# Prescribing Safety Assessment



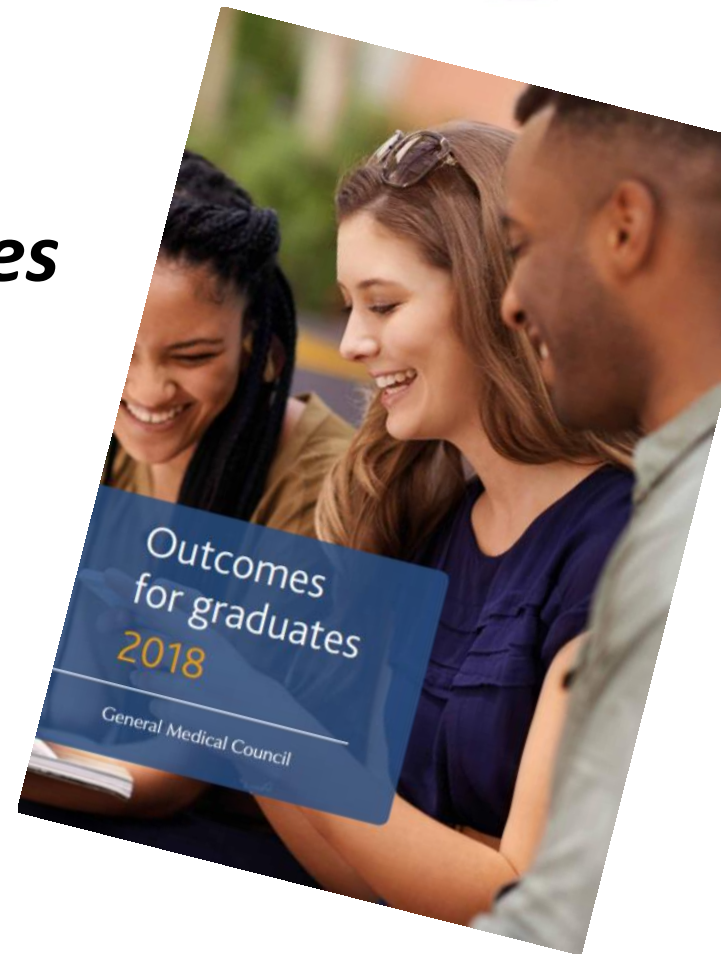
- Writing new prescriptions
- Reviewing existing prescriptions
- Calculating drug doses
- Identifying and avoiding adverse drug reactions and medication errors
- Amending prescribing to suit individual patient circumstances



# Prescribing Safety Assessment



***“...allows candidates to demonstrate their competencies in relation to the safe and effective use of medicines”***



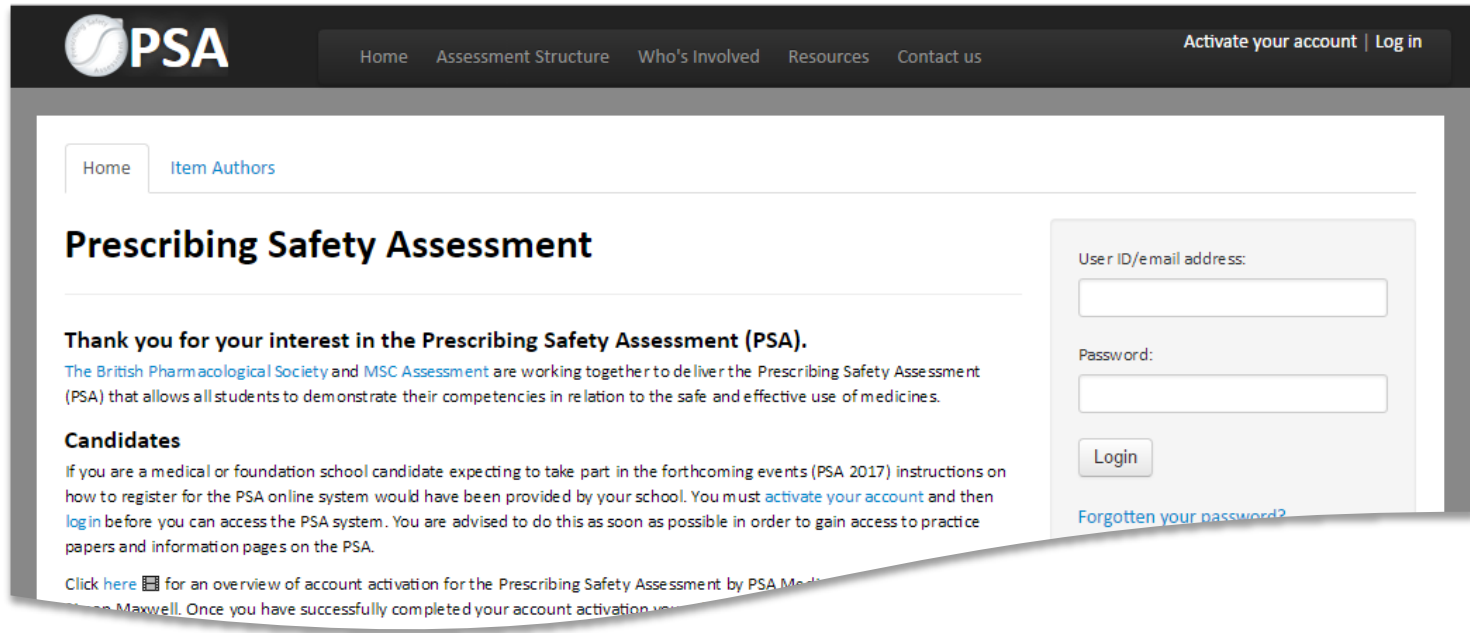
# Components of Finals

- Applied Knowledge Test
- Prescribing Safety Assessment (PSA)
- Clerking portfolio
- Entrustable Professional Activities
- Elective plan
- Consultation and Procedural Skills (CaPS) logbook
- Team Assessment of Behaviour



# Exam format

- Online: [prescribingsafetyassessment.ac.uk](http://prescribingsafetyassessment.ac.uk)
- 2 hours, Open book (BNF)

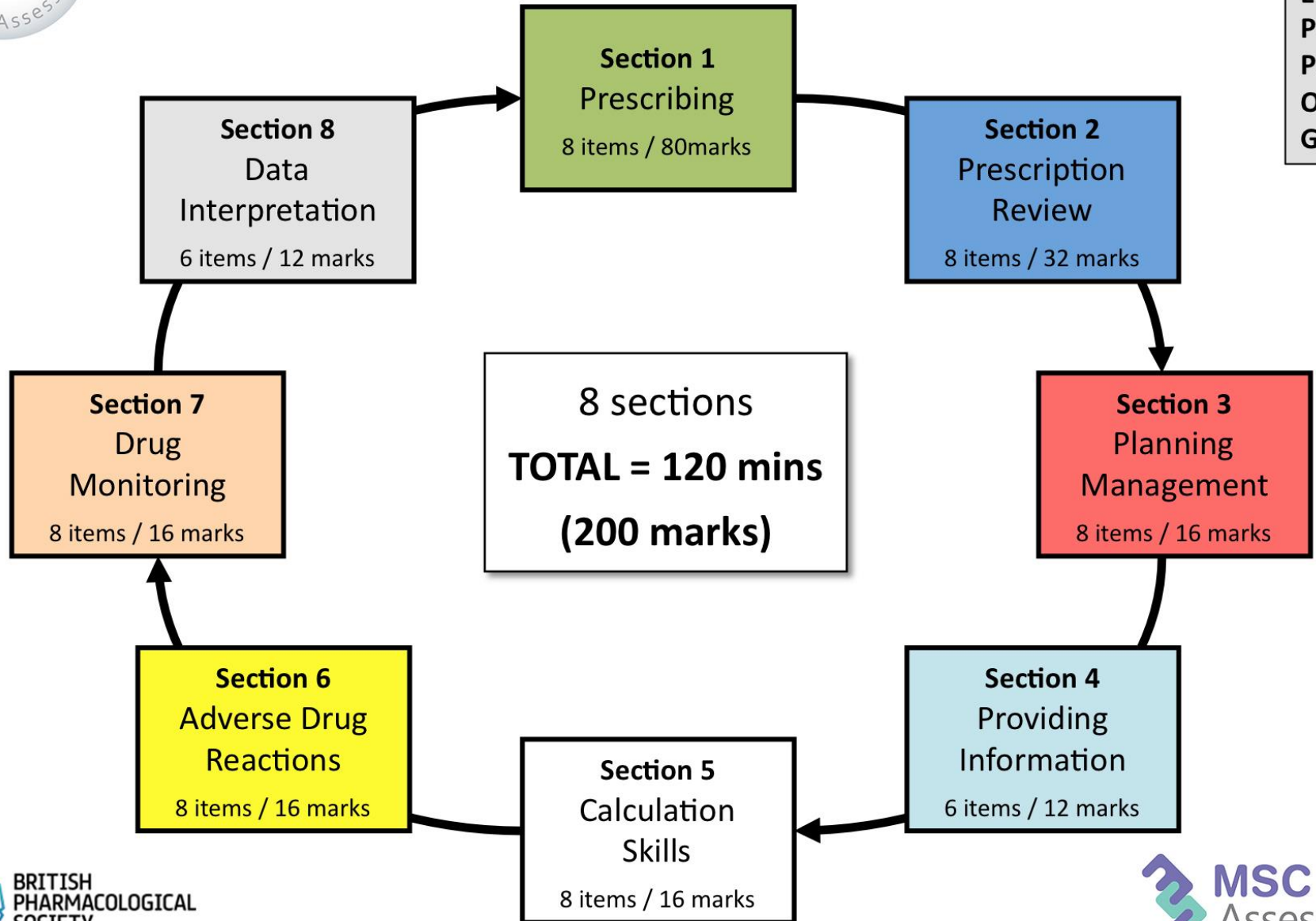


The screenshot shows the PSA website interface. At the top, there is a navigation bar with the PSA logo and links for Home, Assessment Structure, Who's Involved, Resources, and Contact us. On the right side of the navigation bar, there are links for 'Activate your account' and 'Log in'. Below the navigation bar, there are two tabs: 'Home' and 'Item Authors'. The main heading is 'Prescribing Safety Assessment'. Below this, there is a message: 'Thank you for your interest in the Prescribing Safety Assessment (PSA). The British Pharmacological Society and MSC Assessment are working together to deliver the Prescribing Safety Assessment (PSA) that allows all students to demonstrate their competencies in relation to the safe and effective use of medicines.' There is a section for 'Candidates' with instructions on how to register and activate an account. On the right side, there is a login form with fields for 'User ID/email address' and 'Password', a 'Login' button, and a link for 'Forgotten your password?'.



# Prescribing Safety Assessment

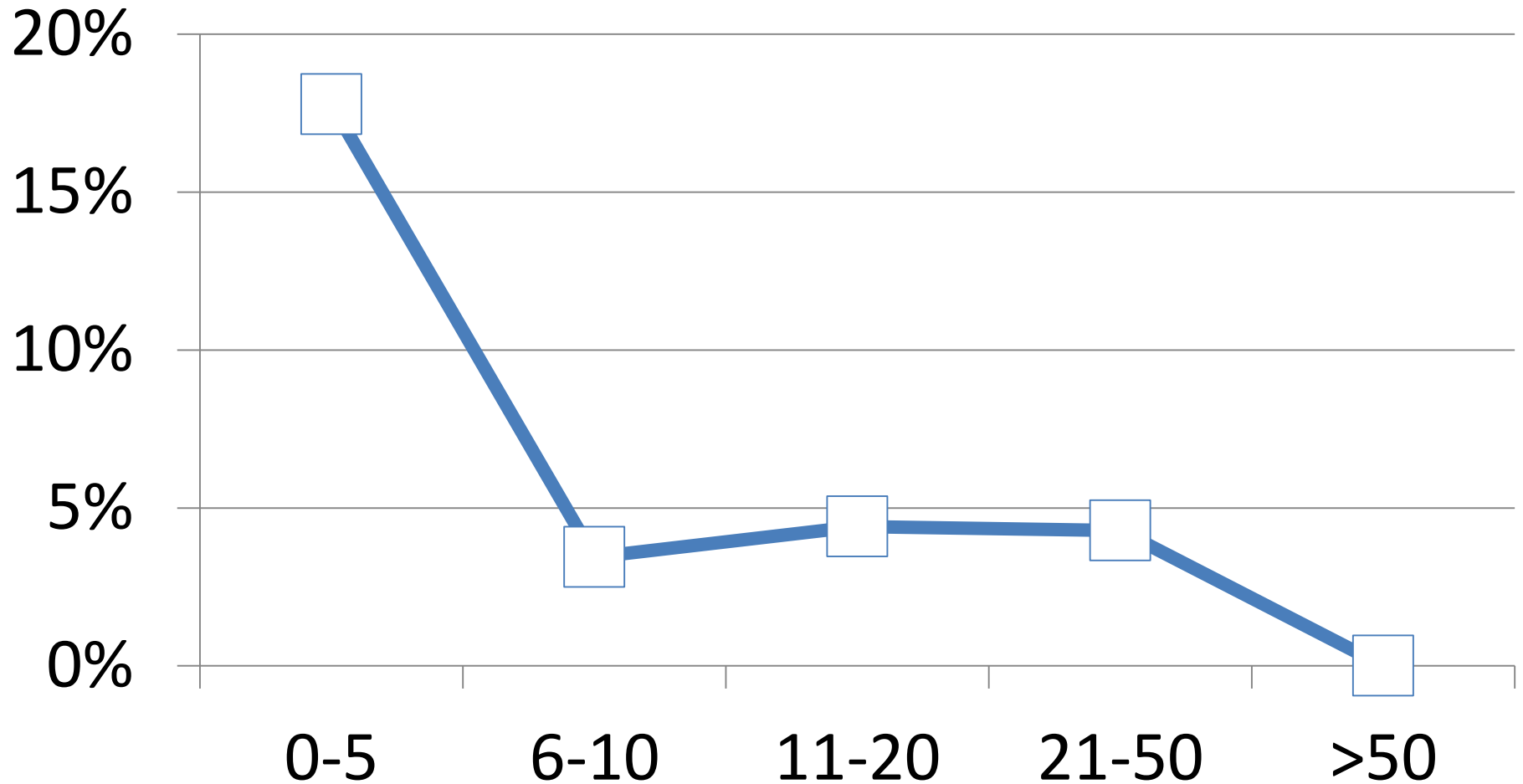
MED  
SURG  
ELD  
PED  
PSYCH  
O&G  
GP



# The Blueprint

	Medicine <sup>A</sup>	Surgery <sup>B</sup>	Elderly Care <sup>C</sup>	Paediatrics <sup>D</sup>	Psychiatry <sup>E</sup>	Obstetrics & Gynaecology <sup>F</sup>	General Practice <sup>G</sup>
<b>Prescribing</b>	Unstable angina Acute asthma Dyspepsia	Thromboprophylaxis Antibiotics Analgesia	Intravenous Fluids Laxatives Analgesia	Allergies Infection (e.g. otitis media, epiglottitis, croup), Reflux	Depression Anxiety Acute behavioural disturbance	Oral contraception HRT Bladder instability	Hypercholesterolaemia Hypertension Urinary tract infection
<b>Prescription review</b>	Interactions Medication errors Causes of symptoms and signs	Pre-operative assessments	Diuretics Antihypertensives Benzodiazepines Opioids	<i>Cases will be more difficult to find</i>		Reviewing prescribing in pregnancy Interactions with OCP	Patients presenting with common symptoms
<b>Planning management</b>	Acute (e.g. asthma, pulmonary oedema, MI), Chronic (e.g. COPD, diabetes, angina)	Acute (e.g. bleeding, low BP, acute abdo) Chronic (e.g. IBD, oncology)	Acute (e.g. back pain) Chronic (e.g. Parkinson's disease, dementia)	Asthma Acute anaphylaxis Diabetic Ketoacidosis Dehydration	<i>Cases will be more difficult to find</i>	<i>Cases will be more difficult to find</i>	<i>Cases will be more difficult to find</i>
<b>Communicating information</b>	Oral hypoglycaemics Corticosteroids Nitrates etc.	Tamoxifen Antibiotics Heparin Finasteride	Anticoagulants Bisphosphonates Diuretics Anti-epileptics Hypnotics	Vaccinations Insulin Cystic fibrosis Acne	Antidepressants Benzodiazepines Antipsychotics	Advising about drugs in breast feeding Advising about drugs preconception OCP, HRT	Antihypertensives Nicotine replacement NSAIDs,latanoprost Sildenafil Vaccinations
<b>Calculation Skills</b>	Aminophylline infusion	Infusion rates (e.g. dopamine), intravenous fluid volumes	Digoxin elixir	Fluid replacement Dosing by weight Buccal midazolam	Intravenous lorazepam Haloperidol injection	Lidocaine injections	
<b>Adverse drug reactions</b>	Renal impairment Liver function Hyponatraemia etc.	Bleeding Opioid toxicity Vomiting	Dehydration Collapse Constipation	Hypoglycaemia Vomiting Substance abuse	Benzodiazepines Antimuscarinic effects Antipsychotics	Oestrogenic effects Interactions with the OCP	Headache Ankle swelling Dizziness Lethargy etc.
<b>Drug monitoring</b>	Digoxin, Insulin, Methotrexate, Amiodarone, Oxygen	Fluid replacement Blood transfusion Antibiotics Anticoagulants	Carbimazole Theophylline Anti-epileptics	Asthma therapy Diabetes	Lithium Antipsychotic drugs	Monitoring safety of OCP	Statins ACE inhibitors Antibiotics
<b>Data interpretation</b>	TFTs, glucose, INR, renal function etc	Antibiotic levels Fluid replacement	Hb level, UEs, CXR, anti-epileptic concentrations	PEFR, paracetamol poisoning	Lithium level	BP and OCP HRT and LFTs	Cholesterol, BP, diuretics and K

# 2015 PSA: % fail vs number of charts completed

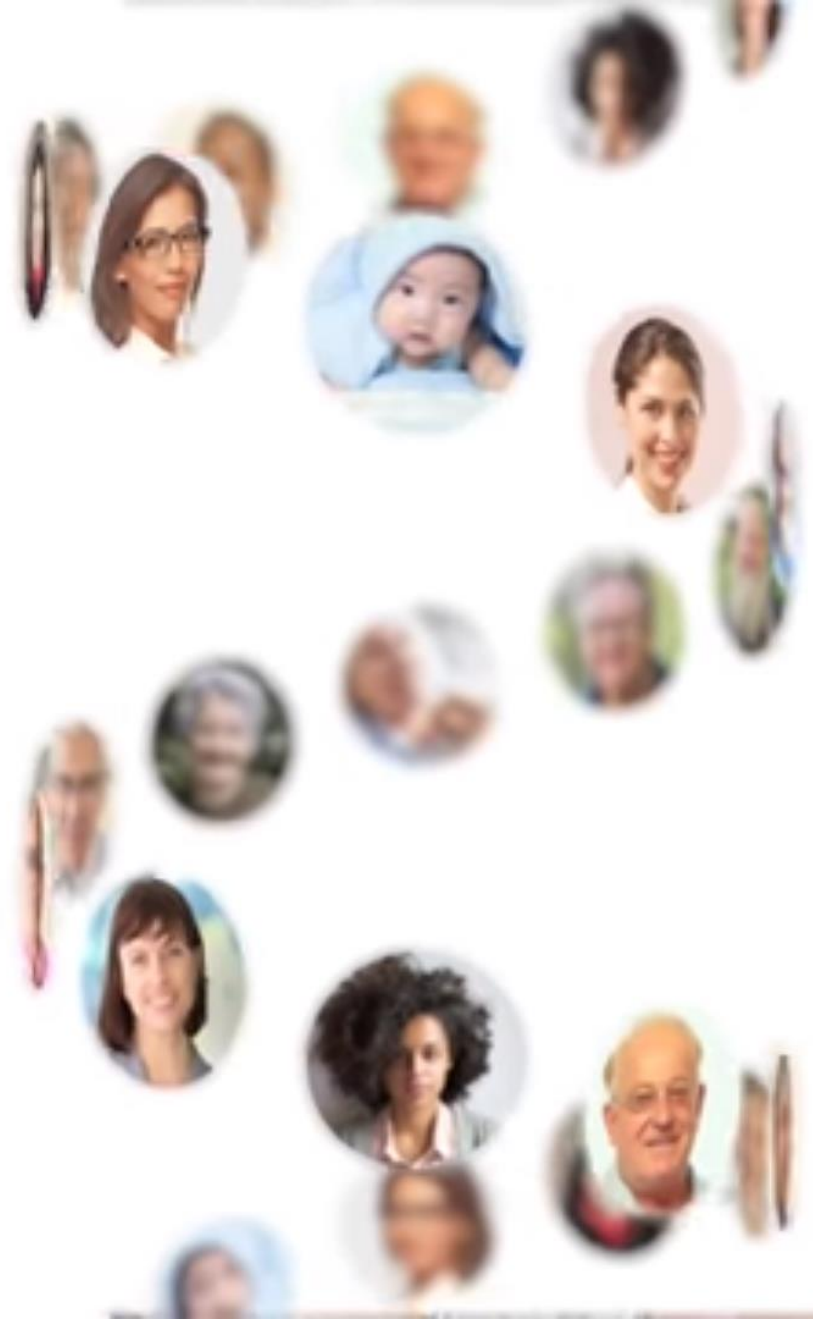




# How do we teach prescribing to medical students?

# Pharmacology & Therapeutics Helical Theme

- To enable our graduates to prescribe or otherwise use medicines in a safe, effective and appropriate manner.





# Pharmacology & Therapeutics in MB21

- Year 2
  - Disease processes and differential diagnosis, basic principles of pharmacology
- Year 3
  - Introduction to prescribing and therapeutics, management of common conditions
- Years 4 and 5
  - Increased experiential learning, therapeutic complexity, PSA exam

# Year 3

- Understanding the key stages of prescribing
- Familiarisation with using the BNF
- Drug history taking and medication reviews
- Drug management of specific diseases
- Common drugs and the Bristol Student Formulary



# How do our students learn?

- Weekly case-based learning
- Lectures
- Tutorials
- Books
- eLearning resources
  
- Practice, practice, practice



# Stages of prescribing

- Make diagnosis
- Establish therapeutic goal
- Choose therapeutic approach
- Choose drug
- Write prescription
- Communication
- Monitor
- Review

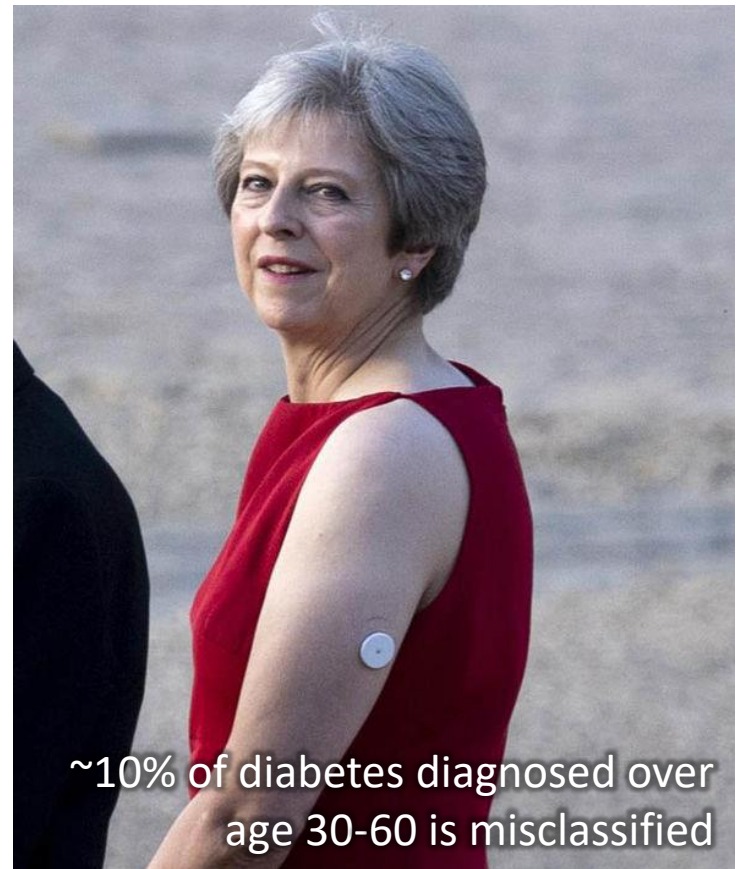
# Stages of prescribing

- Make diagnosis
- Establish therapeutic goal
- Choose therapeutic approach
- Choose drug
- Write prescription
- Communication
- Monitor
- Review



# Step 1: Make a diagnosis

- 56 year old woman
- Polyuria, polydipsia
- Hyperglycaemic
  
- What do you do?
  - Diet
  - Metformin
  - Insulin



# Stages of prescribing

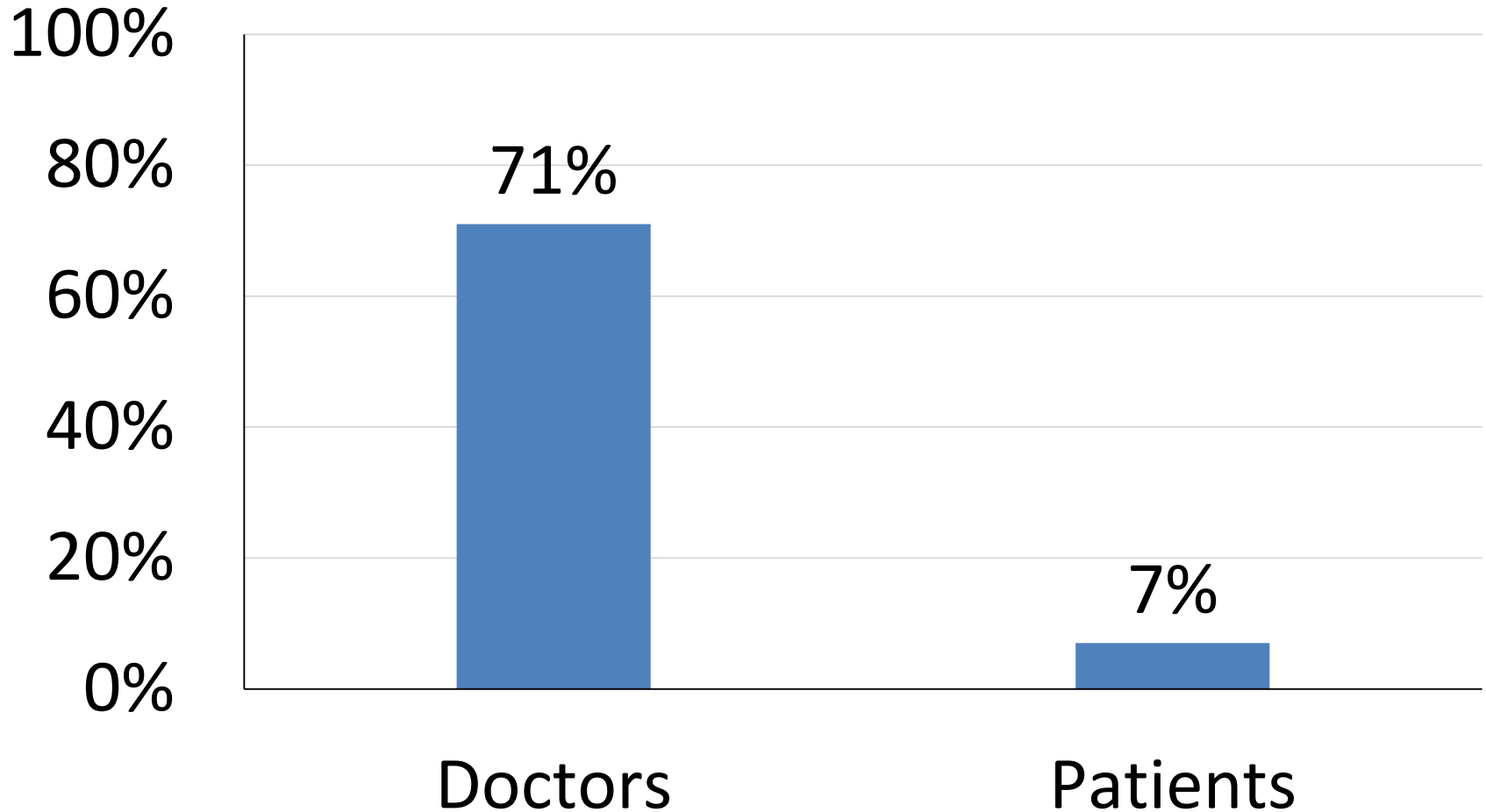
- Make diagnosis
- Establish therapeutic goal
- Choose therapeutic approach
- Choose drug
- Write prescription
- Communication
- Monitor
- Review

# Patient preference?

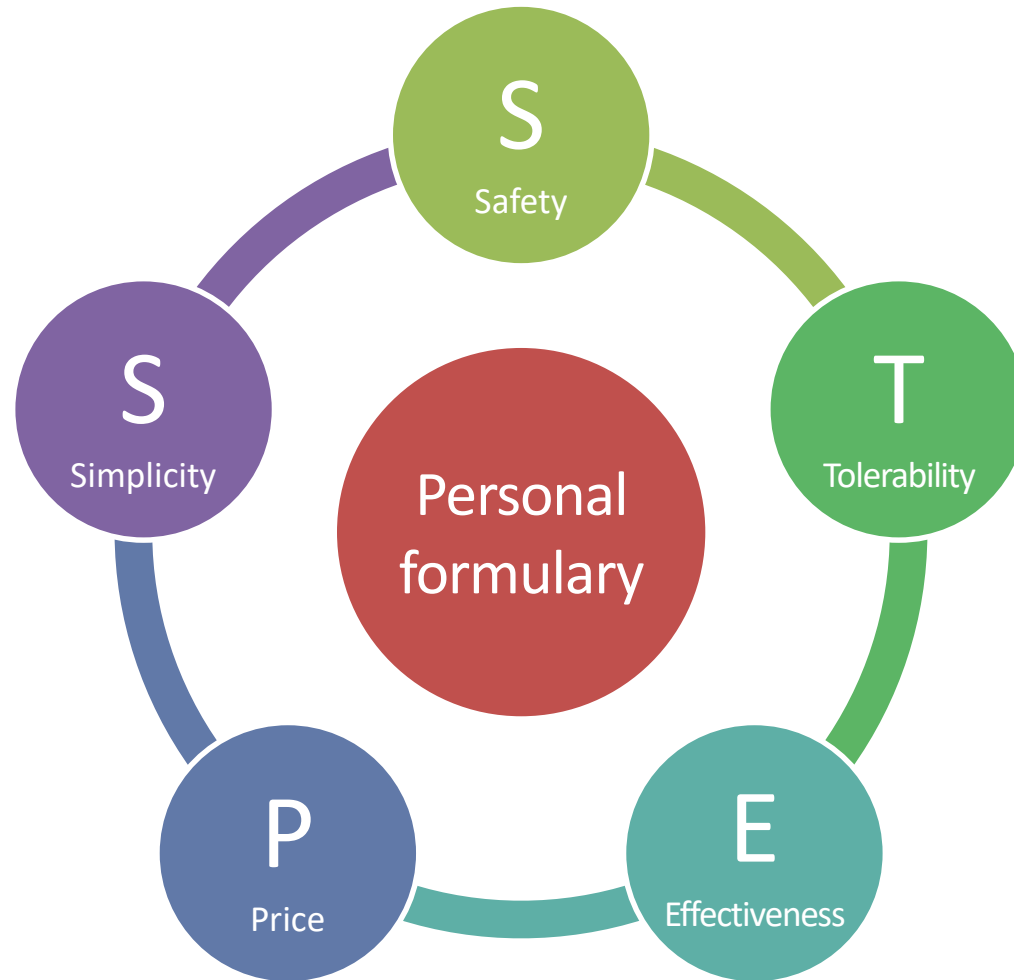
- Patients make different choices when well informed
- Doctors do not understand the outcomes that patients prefer



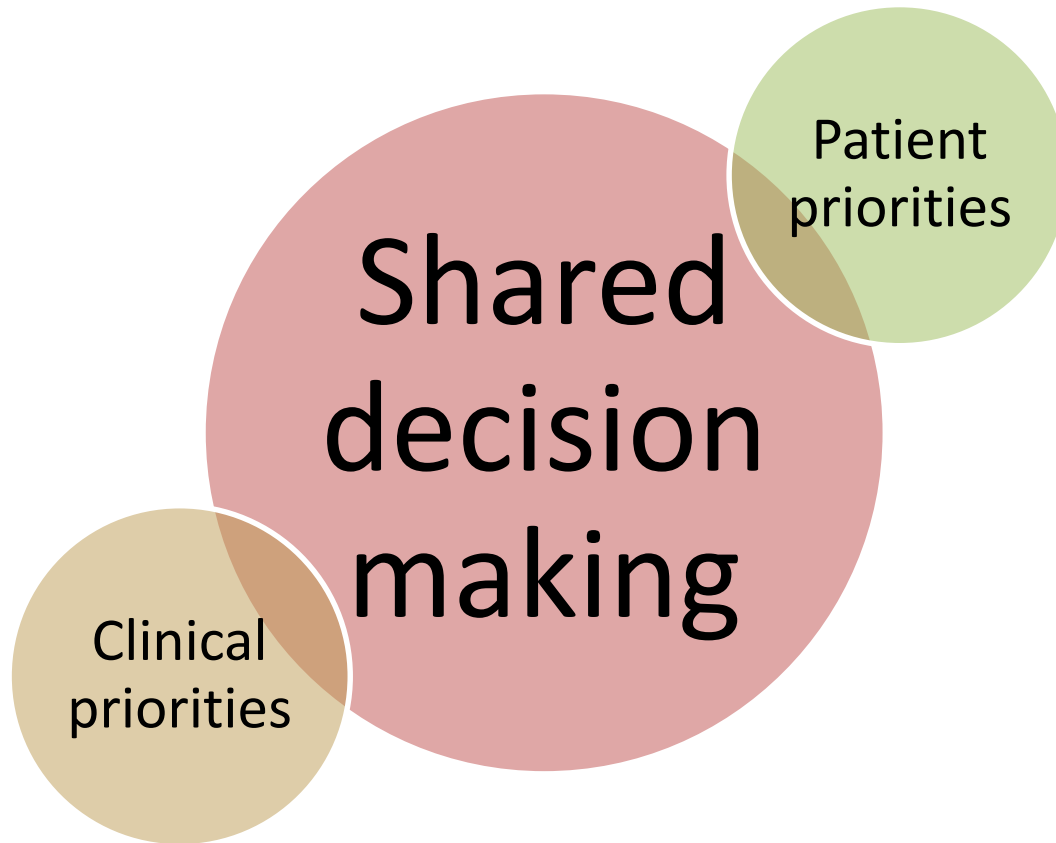
# Do breast cancer patients rate keeping their breast as a top priority?



# Clinician approach



# Competing priorities



# Stages of prescribing

- Make diagnosis
- Establish therapeutic goal
- Choose therapeutic approach
- Choose drug
- Write prescription
- Communication
- Monitor
- Review

# British National Formulary



- Drug monographs
- Treatment summaries
  - Body systems – e.g. skin conditions
  - Comparison of drugs – e.g. beta-blockers
  - Common conditions – e.g. asthma
- Writing prescriptions
  - controlled drugs
- Special circumstances
  - children, renal impairment, elderly, palliative
- Emergencies





## BRISTOL STUDENT FORMULARY – 100 key drugs

Classification		Key examples
<b>Gastro-intestinal system</b>		
Antidiarrhoeal drugs	Anti-motility drugs	loperamide
Antispasmodic	Anti-muscarinics	hyoscine butylbromide
Inflammatory bowel disease	Aminosalicylates	mesalazine
Laxatives	Osmotic laxatives	macrogol, lactulose
	Stimulant laxatives	senna, docusate sodium
Peptic ulcer disease	Alginates and antacids	
	Histamine (H <sub>2</sub> )-receptor antagonists	ranitidine
	Proton pump inhibitors	omeprazole, lansoprazole
<b>Cardiovascular system</b>		
Anti-arrhythmic drugs	Amiodarone	
	Other anti-arrhythmic drugs	atropine, adenosine
	Cardiac glycosides	digoxin
Anticoagulants	Direct oral anticoagulants	rivaroxaban, apixaban, dabigatran
	Heparins	enoxaparin, heparin
	Vitamin K antagonists	warfarin
Antiplatelet drugs	Aspirin	
	Thienopyridines	clopidogrel
Beta-blockers	Beta-blockers	bisoprolol, atenolol, propranolol
Calcium-channel blockers	Calcium-channel blockers	amlodipine, felodipine, diltiazem, nifedipine, lercanidipine
Diuretics	Aldosterone antagonists	spironolactone
	Loop diuretics	furosemide, bumetanide
	Thiazide and thiazide-like diuretics	bendroflumethiazide, indapamide
Drugs affecting the renin-angiotensin system	Angiotensin-converting enzyme inhibitors	ramipril, lisinopril, perindopril
	Angiotensin-II receptor antagonists	losartan
Lipid-lowering	Statins	
Nitrates and potassium channel activators	Nitrates	
Sympathomimetics	Adrenaline (epinephrine)	
Thrombolytics	Fibrinolytics	

# Stages of prescribing

- Make diagnosis
- Establish therapeutic goal
- Choose therapeutic approach
- Choose drug
- **Write prescription**
- Communication
- Monitor
- Review

Pre-operative, ONCE ONLY and P.G.D. drugs

	Date	Time	Approved name	Dose	Route	Prescribers name and signature	Given by	Time given	Pharmacy
1	12/9	10:30	DIAMORPHINE	5mg	IV	<i>PTH</i>			
2	12/9	10:30	ASPIRIN	300mg	PO	<i>PTH</i>			
3	12/9	10:30	CLOPIDOGREL	300mg	PO	<i>PTH</i>			
4	12/9	10:30	METACLOPRAMIDE	10mg	IV	<i>PTH</i>			
5	12/9	10:30	GTN	TT	S/C / buccal	<i>PTH</i>			
6	12/9	10:30	ENOXAPARIN	86mg	S/C	<i>PTH</i>			
7									
8									

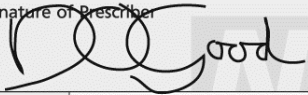

Regular medication

On other evidence base if trust guidelines N/A

	Date	Approved name	Dose	Route	Time of administration				Other directions (including stop date)	Prescribers name and signature	Pharmacy/ POD
					8	12	18	22			
1		<b>CANNULA</b>	Site	Size					Inserted by	Removed by	Date removed
2		<b>ANTIEMBOIC STOCKINGS</b> ABOVE KNEE / BELOW KNEE (Delete as appropriate)							Check for contraindications before application		
3	12/9	ENOXAPARIN	86mg	SC	✓			20		<i>PTH</i>	
4	12/9	OMEPRAZOLE	40mg	PO	✓					<i>PTH</i>	
5	12/9	FLUOXETINE	20mg	PO	✓					<i>PTH</i>	
6	12/9	ASPIRIN	75mg	PO	✓					<i>PTH</i>	
7	12/9	BISOPROLOL	1.25mg	PO	✓					<i>PTH</i>	
8	12/9	RAMIPRIL	2.5mg	PO	✓		✓			<i>PTH</i>	
9	12/9	SIMVASTATIN	40mg	PO				✓		<i>PTH</i>	
10											
11											

# Prescribing in general practice

- The FP10 form
- Pros and cons of electronic prescribing
  - Guidance and recommendations
  - Over-reliance
  - Warnings and alert fatigue
- Repeat prescribing and dispensing

Pharmacy Stamp	Age 1yr 3mths D.o.B 2/4/2010	Title, Forename, Surname & Address Master Peter Patient Flat 1 50 Stanhope Street Newtown TE22 1ST
Please don't stamp over age box		
Number of days' treatment N.B. Ensure dose is stated	5	
Endorsements	Amoxicillin oral suspension 125mg/5ml sugar-free 125mg three times daily Supply 100ml [No more items on this prescription]	
Signature of Prescriber		Date 02/07/11
For dispenser No. of Prescns. on form	Anyborough Health Authority Dr D O Good 345543 7 High Street Anytown KB1 CD2 Tel: 0111 222 333	
	FP10NC0105	

# Calculations

$\frac{1}{4}$  students  
score less than  
half marks



# Stages of prescribing

- Make diagnosis
- Establish therapeutic goal
- Choose therapeutic approach
- Choose drug
- Write prescription
- **Communication**
- Monitor
- Review

- Communicate clearly
  - Patients/carers
  - Colleagues
  - Cross-sector
- Document decisions and reasoning
- Make shared decisions
- Explain important information
  - Benefits
  - Risks, side effects
  - How to take the drug
  - Any monitoring required



# Stages of prescribing

- Make diagnosis
- Establish therapeutic goal
- Choose therapeutic approach
- Choose drug
- Write prescription
- Communication
- **Monitor**
- Review



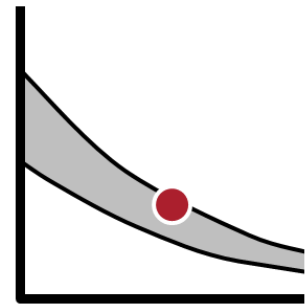
# Long-term disease increasingly managed by general practice



Symptom response



Therapeutic effect



Drug levels

# Stages of prescribing

- Make diagnosis
- Establish therapeutic goal
- Choose therapeutic approach
- Choose drug
- Write prescription
- Communication
- Monitor
- Review

# An “ideal” drug history

- Elicit and record an accurate medication history to support effective medicines reconciliation
  - Current *and* recent medicines
  - Ask about indications, dates, effects of the drug, monitoring
- Remember
  - Complementary medicines, OTC drugs, contraception, less common administration routes, recent changes (and why)
- Record problems
  - Distinguish allergies and adverse effects
  - Determine adherence
  - Identify potential interactions
  - Are there special circumstances?
- Sources of information
  - “brown bag”, relative, GP record, pharmacist

# The patient perspective

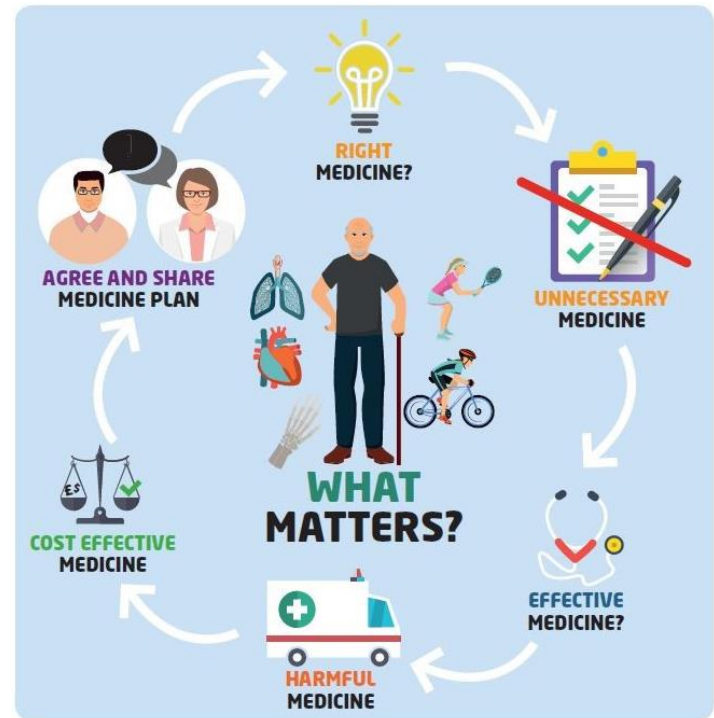
- Gain insight into effectiveness and problems through open questions
  - What benefit do you feel your medicine gives you? How important are these benefits to you?
  - How well have you felt since taking this medicine?
  - What would you like your medicine to allow you to do?
  - What do you know/would you like to know about your condition/medicine(s)?
  - What, if anything, are your worries about your medicine?
  - What problems do your medicines cause you?
- Non-adherence is common
- Create blame-free, non-judgemental environment to encourage patients to share true medication-taking behaviour
  - What sort of problems do you have remembering to take your medicines?
  - Many people have trouble taking their medications on a regular basis. Do you find this is the case for any of your medications?

# NO TEARS review model

- Need and indication
- Open questions
- Tests and monitoring
- Evidence and guidelines
- Adverse effects
- Risk reduction or prevention
- Simplification and switches

# The “seven steps” process

- What matters to the patient?
- Identify essential drug therapy
- Does patient take unnecessary drug therapy?
- Are therapeutic objectives being achieved?
- Is the patient suffering or at risk of ADRs?
- Is there a significantly cheaper alternative?
- Is the patient willing and able to take drug therapy as intended?



[www.polypharmacy.scot.nhs.uk/polypharmacy-guidance-medicines-review/for-healthcare-professionals/7-steps/](http://www.polypharmacy.scot.nhs.uk/polypharmacy-guidance-medicines-review/for-healthcare-professionals/7-steps/)

# How can I help teach prescribing and therapeutics as a GP?

# Teaching prescribing and therapeutics in general practice

- Talk about the different stages of prescribing
- Practice, practice, practice
  - Writing prescriptions
    - acute illness (e.g. antibiotics)
    - long-term (e.g. statins)
  - Drug histories
  - Medication reviews
- Discuss management of common diseases



# Teaching prescribing and therapeutics in general practice

- Discuss things that are particularly important in general practice and seen less in hospitals
  - Complexity and multimorbidity
  - Clinical uncertainty
  - Patient-centredness
  - Antimicrobial stewardship (esp. “minor” infections)
  - Long-term illnesses management (e.g. depression, hypertension)
  - Electronic prescribing