Clinical Pharmacology and Prescribing

Adele Print **2021**

Pharmacist – Auckland DHB

Professional Teaching Fellow - School of Pharmacy

Relevant Clinical Pharmacology Module Learning Outcomes

Domain: Clinical and Communication Skills

- Demonstrate foundation skills for safe and effective prescribing
- Explain the information patients and medical practitioners need before prescribing a medicine
- Write a prescription correctly

Objectives

- Recognise the importance of clinical pharmacology as the scientific discipline that underpins a rational approach to prescribing medicines
- Summarize the knowledge and skills required to:
  - Prescribe drugs safely, effectively and economically
  - Write legal prescriptions that take into account the needs of individual patients
- Describe the factors that influence the choice of medicine and dose
- Explain the importance of monitoring the impact of drug therapy and describe the ways in which therapy can be monitored

Why learn about "Clinical Pharmacology" and "Therapeutics"?

- Pharmacological knowledge is essential to appropriate prescribing, and has been identified by junior doctors as an area to be strengthened in their training.
- Safe prescribing is not just about writing a prescription, but involves many cognitive and decision-making steps.

Elaine Lum et al. The competent prescriber: 12 core competencies for safe prescribing. Australian Prescriber. Volume 36 Number 1, pages 13-16, February 2013.

Prescribing

Is something you will do every day

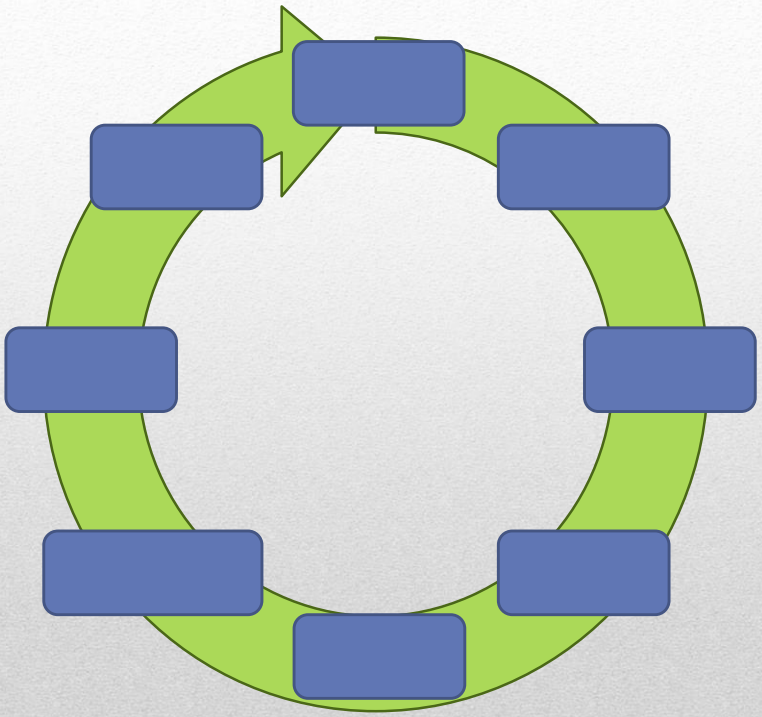
- As newly qualified doctors you will be called upon to prescribe drugs many times every day.
- You need to be able to do it safely and effectively.

Rational Prescribing

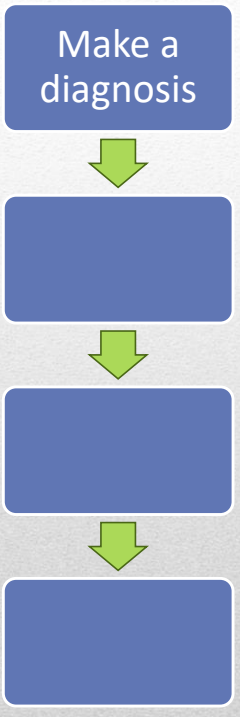
- **Rational prescribers should attempt to:**
- maximise clinical effectiveness
- minimize harms
- avoid wasting scarce healthcare resources
- respect patient choice.

Maxwell S. Rational prescribing: the principles of drug selection. Clin Med 2016.

Multiple steps are involved in rational prescribing



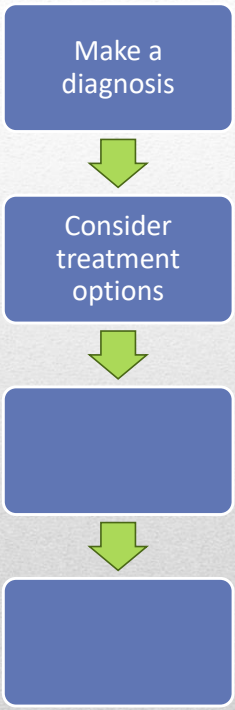
Prior to writing a prescription



Patients come with symptoms not diagnoses

"Please give me stronger pain relief for a severe headache."	"I have a cough that won't go away."	"I am constipated. Can you prescribe something."
Migraine	Postnasal drip	Medicine induced
Medications	Asthma	Hypothyroidism
Sinusitis	Reflux	Hypercalcaemia
Stroke	Post-infectious cough	Colon cancer
Giant cell arteritis	Lung cancer	Parkinson's disease
Brain tumour	Tuberculosis	Diabetes
Meningitis	Psychogenic	

Prior to writing a prescription

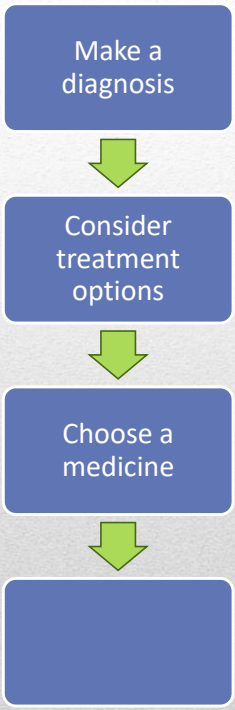


In order to make a treatment decision you need to know…

What your treatment goals are

- Identify key management issues with the patient
  - e.g. patient's ideas/expectations/goals, diagnosis, symptom control, disease modification
- Consider if current symptoms modifiable by symptomatic treatment or disease modifying treatment

Prior to writing a prescription



In order to choose a medicine you need to consider…

Efficacy

Safety

Appropriateness

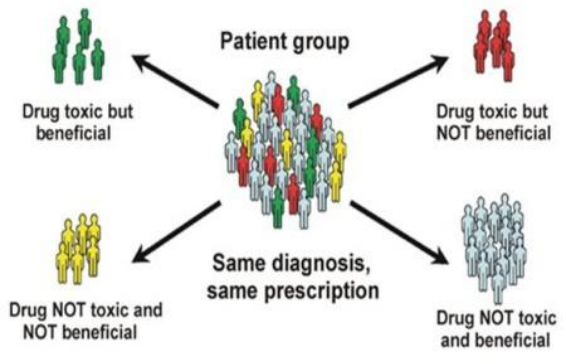
Adherence

Efficacy of a medicine

- How effective are the treatment alternatives?
  - What is the evidence to support these treatment alternatives?

Sources of information include
- Colleagues
- Conferences
- Review articles
- Guidelines

- There may be patient and medicine factors to consider
  - Age, gender
  - Interacting diseases
  - Interacting medicines or foods
  - Patient choice and adherence
  - Pregnancy, lactation
  - Pharmacogenetics



http://sgugenetics.pbworks.com/w/page/47491904/What%20Is%20Pharmacogenomics

Safety of a medicine

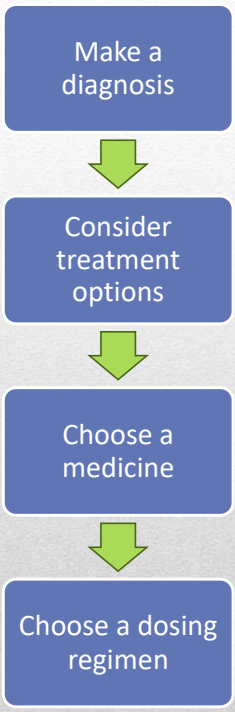
- What are contraindications for using this drug in general and specifically in this patient?
  - Allergies
  - Concomitant disease including major organ failure
- What are common and potentially serious adverse effects that can occur with this drug?
  - Will these side effects affect my choice for this patient?
- What drug interactions need to be considered?
  - Drug-drug, drug-food, drug-disease interactions
- Is the patient pregnant or lactating?

Appropriateness of a medicine

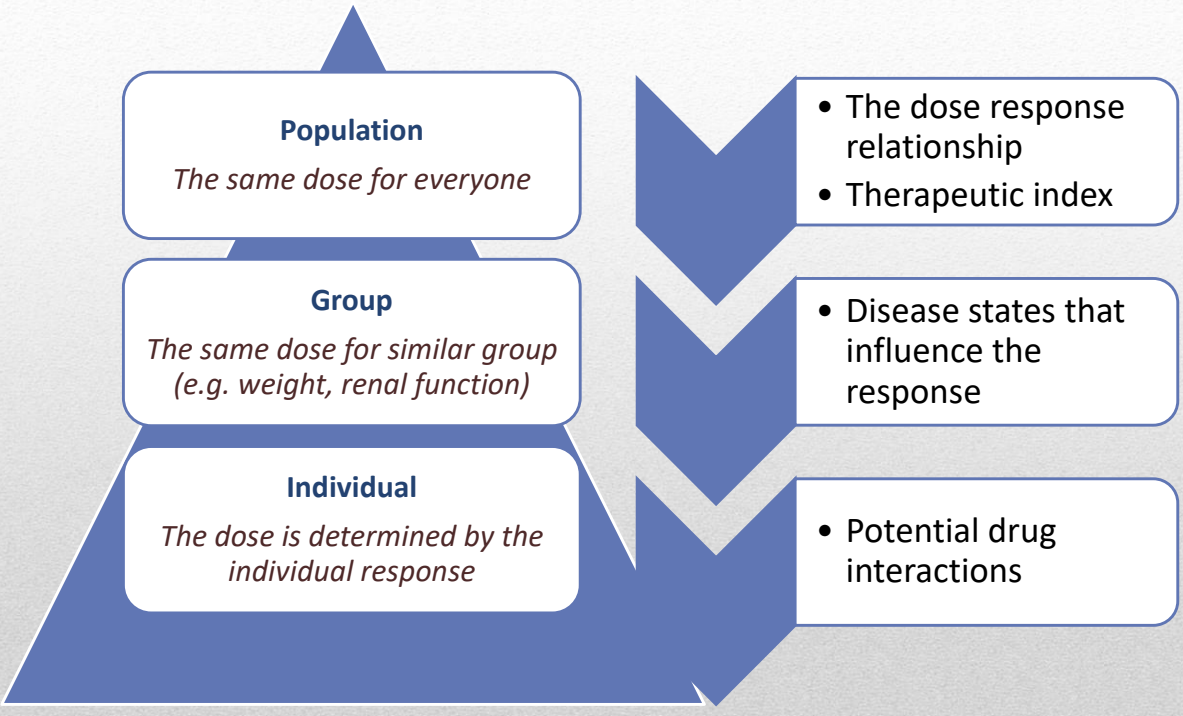
- Can the patient afford it?
- Are there any considerations that need to be made for adherence?
  - Patient's perspective, health beliefs
  - Dosing factors – timing, empty stomach etc
  - Needs blood tests and dose adjustments
- Consider non-pharmacological options

Jatrana, S., Crampton, P., & Norris, P. (2011). Ethnic differences in access to prescription medication because of cost in New Zealand. *Journal of Epidemiology & Community Health*, *65*(5), 454-460.

Prior to writing a prescription



Choose the dose



Choose a “route of delivery”

IV injection

High concentrations in the blood rapidly

Instant and complete absorption

Potentially more dangerous

Depot preparations

Release contents slowly over hours - months

May improve adherence

Require a deep injection

Skin patches and gels

Lower peak concentration and extended duration of effect

Can bypass first pass metabolism

Skin reaction is potential adverse effect

Local delivery

Site of action can be targeted

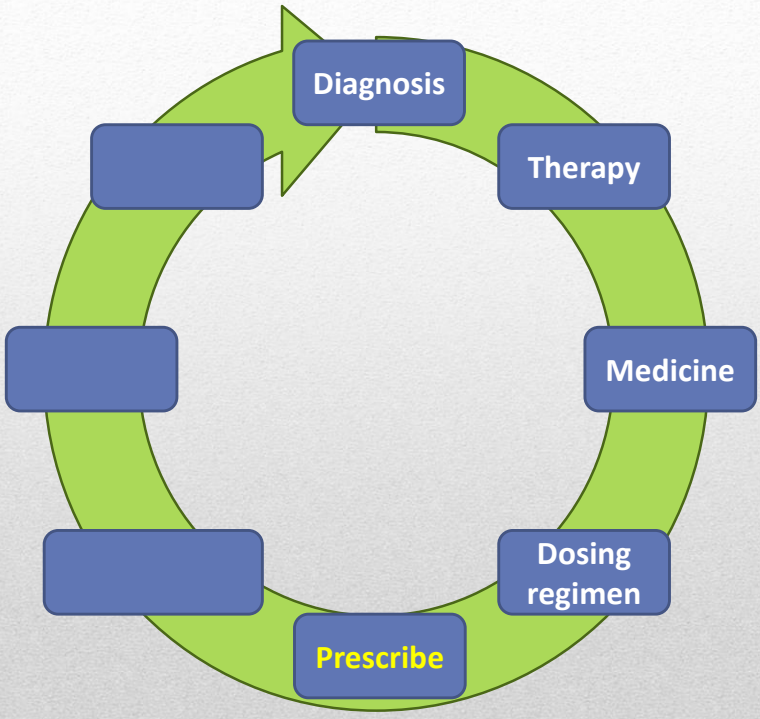
Reduces systemic effects

Oral tablets

Slower rise to a later peak concentration

May be less complete absorption

May be subject to first pass metabolism

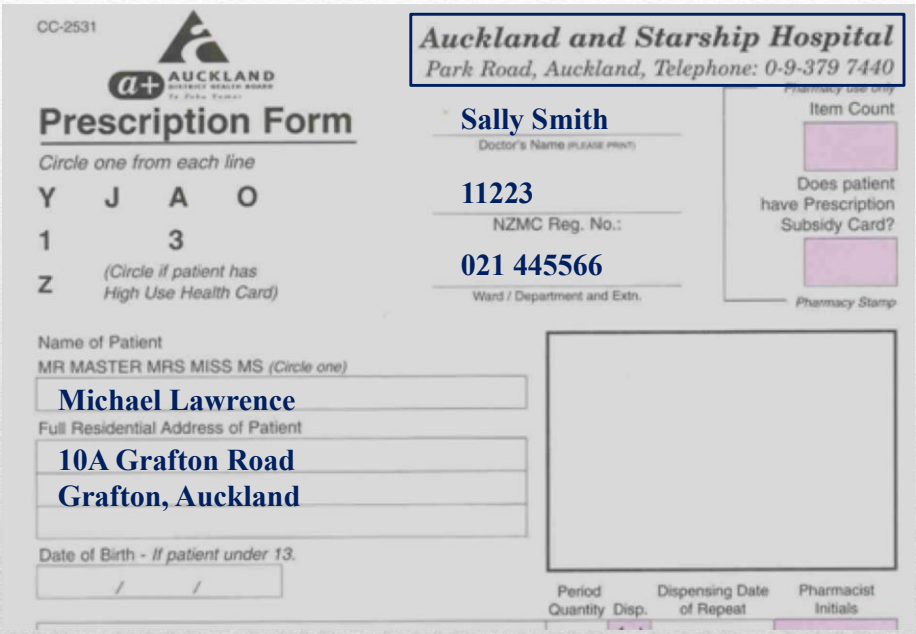


There is certain information that is essential for a legal prescription

- **Prescriber details**
- Full name
- Prescriber's signature
- Workplace Address
- MCNZ registration number
- Contact phone number

- **Patient details**
- Full name
- Residential address
- Date of Birth (if under the age of 13 years)

It is essential that the prescription is legible



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AUCKLAND

Prescription Form

Circle one from each line

Y J A O

1 3

Z *(Circle if patient has High Use Health Card)*

Auckland and Starship Hospital
Park Road, Auckland, Telephone: 0-9-379 7440

Sally Smith
Doctor's Name (PLEASE PRINT)

11223
NZMC Reg. No.:

021 445566
Ward / Department and Extn.

Item Count

Does patient have Prescription Subsidy Card?

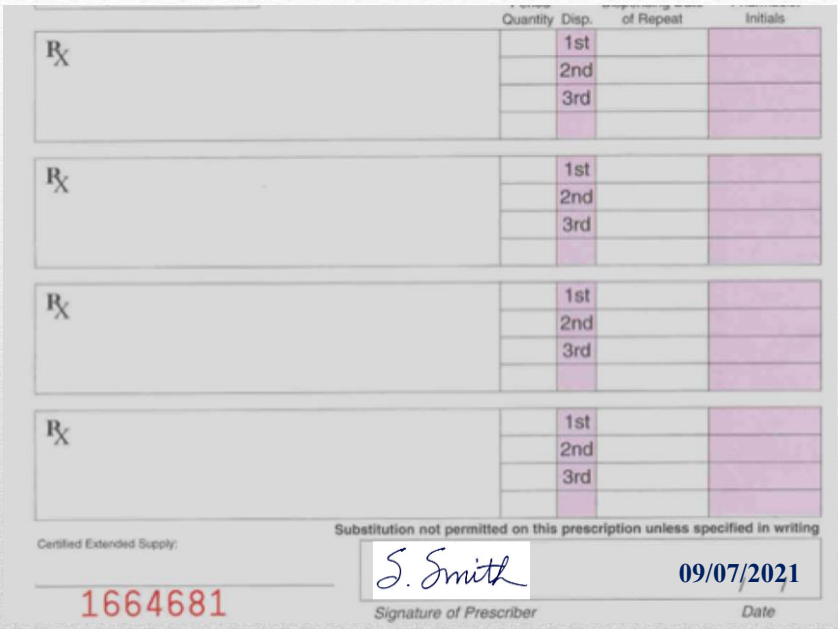
Pharmacy Stamp

Name of Patient
MR MASTER MRS MISS MS *(Circle one)*
Michael Lawrence

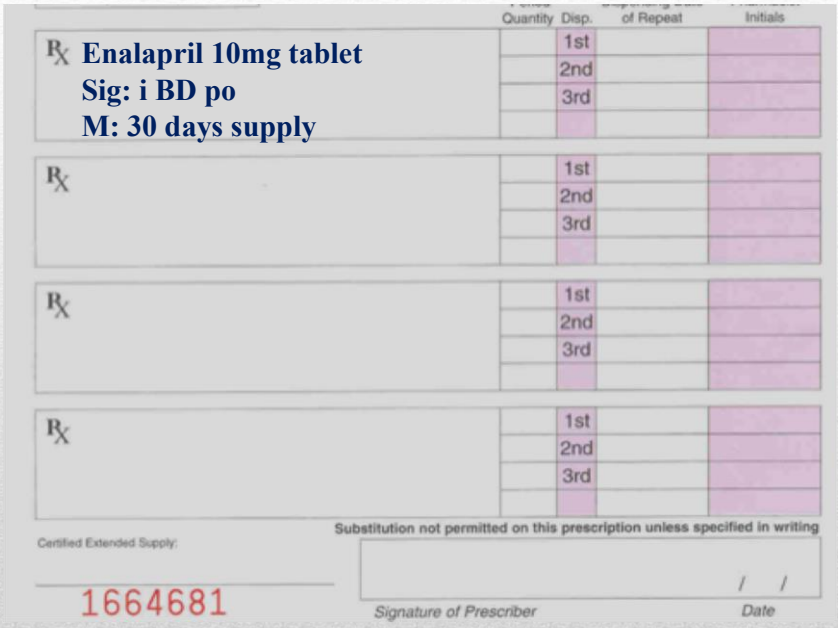
Full Residential Address of Patient
10A Grafton Road
Grafton, Auckland

Date of Birth - *If patient under 13.*
/ /

Period Quantity | Disp. | Dispensing Date of Repeat | Pharmacist Initials



Each prescription has three parts



First Part - R_x or Recipe (translates as *Take thou*)

- Name of medicine
- Formulation e.g. caps, tabs, syrup, injection
- Strength of medicine

- For enalapril this part of the prescription may read as:

R_x Enalapril 10mg tabs

Second Part – Sig or Signa (translates as '*mark*' or *'write')*

- These are the instructions for the patient

- Dose
- Frequency of dose

- For enalapril this may be written as:

Sig: i BD po

- These can be more detailed.

- For warfarin this may be written as:

  Sig: 2mg nocte po

  Take the dose as prescribed, according to the INR blood tests.

Third Part – M or Mitte (translates as *'send to a total of')*

- These are the instructions for the pharmacist.
- Total amount of medicine or Total period of supply

- For enalapril this may specify thirty days supply:

  M: 30 days supply

- The maximum period of supply is 3 months except for oral contraceptive which is 6 months supply.

Commonly used abbreviations

Administration	
ac	before food
cc	with food
pc	after food

Frequency	
BD	twice daily
mane	morning
midi	midday
nocte	night
prn	when required (as needed)
q4h	every four hours
q6h	every six hours
q8h	every eight hours
q12h	every twelve hours
QID	four times a day
STAT	immediately
TDS	three times a day

https://www.hqsc.govt.nz/assets/Medication-Safety/NMC-PR/NMC-UserGuide-Oct2012.pdf

Commonly used abbreviations

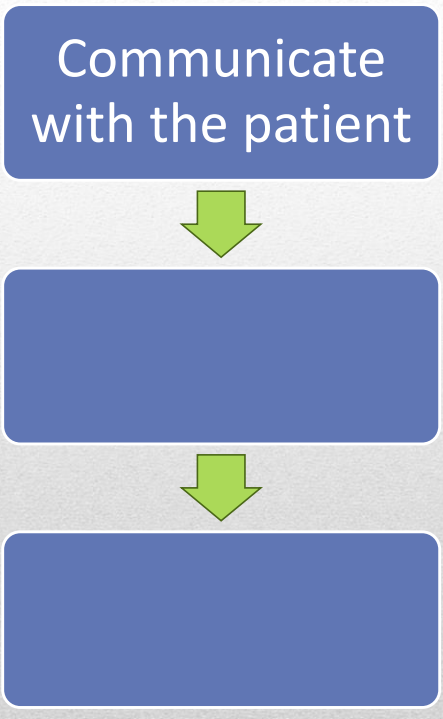
Route	
buc	buccal
IM	intramuscular
inh	inhalation
IV	intravenous
neb	nebuliser
ng	nasogastric
po	oral
pr	per rectum
pv	per vagina
nj	nasojejunal
subcut	subcutaneous
subling	sublingual
top	topical
PEG	percutaneous endoscopic gastrostomy

Abbreviations to **avoid for safety reasons**

µg or mcg	microgram	Mistaken as mg (milligrams).	Write microgram.
U or IU	U = unit	Mistaken U as zero, four, and cc.	Write unit or international unit.
	IU = international unit	Mistaken IU as IV (intravenous), 10 (ten), or as a trailing 1 (one).	
ng	nanogram	Mistaken as milligram.	Write nanogram.
OD, od, or O.D.	once a day, daily or every day	Mistaken as QID (four times a day) or BD (twice daily).	Write daily or the intended time of administration (eg, morning, night).
Q.D, q.d, qd, QD	every day (in USA only)	Mistaken as QID or BD.	Write daily or the intended time of administration (eg, morning, night).
SC	subcutaneous	Mistaken as SL (sublingual).	Write subcut or subcutaneous.
SL or S/L	sublingual	Mistaken as SC (subcutaneous).	Write subling or sublingual.

See additional abbreviations to avoid in the link below:
https://www.hqsc.govt.nz/assets/Medication-Safety/Watch-Updates/Medication-Safety-Watch-2-May12.pdf

After writing a prescription



Patient Education

- Medicine name and dose
- How and when to take it
- Reason(s) for prescribing medicine
- Benefits of treatment and when they should occur
- Possible adverse effects and how to manage them
- Possible interactions with food, drink and medicines
- Timing of follow-up

Don't provide too much information when patient is not able to assimilate it (e.g. when worrying about other issues)

Makoul G, et al. Social Science & Medicine, 41 (1995), pp. 1241–1254.

What else can you do?

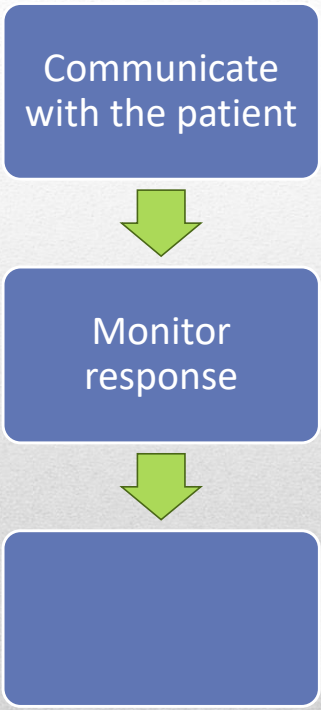
- Provide sources of further information
- Discuss aids to adherence e.g. medicine cards, adherence packs

http://www.douglas.co.nz/compliance-packaging/products/medico-pak/

Health and Disability Code of Rights

- **Right 5**
- The right to effective communication
- **Right 6**
- The right to be fully informed
- **Right 7**
- The right to make an informed choice and give informed consent

https://www.hdc.org.nz/your-rights/the-code-and-your-rights/



Monitor Response

What signs, symptoms and laboratory parameters should I monitor for this patient?

Consider therapy goals, efficacy, safety and adherence

When and how often do I measure them?

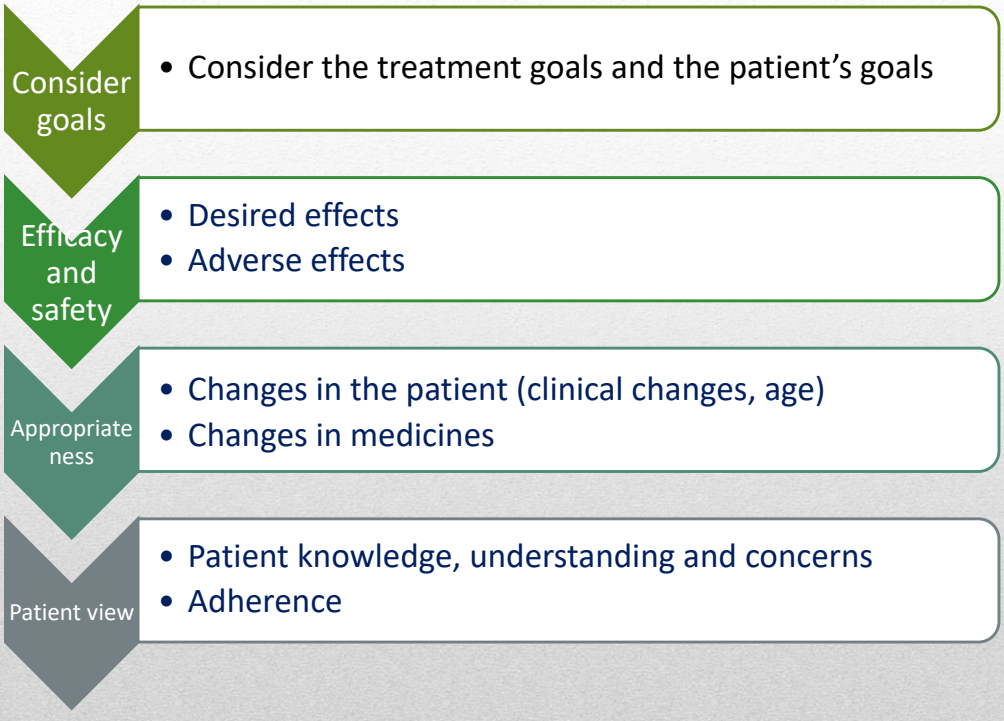
After writing a prescription

Communicate with the patient

Monitor response

Review the medicine

Review a medicine after it has been started – Consider goals

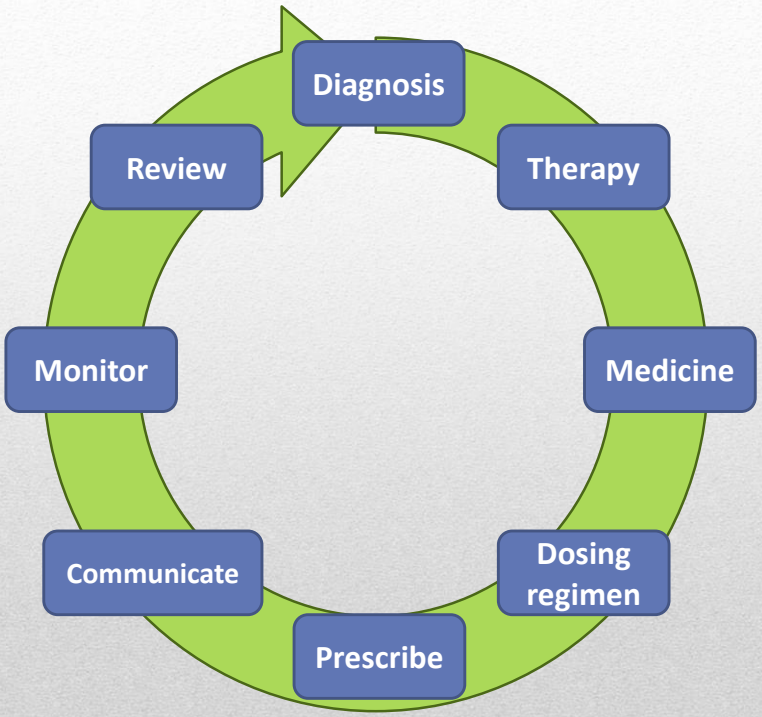


Review medicines at regular intervals

- Offer repeat information and review to patients, especially when treating long-term conditions with multiple medicines
- Any plan should include the goal(s) of therapy and a date for a follow up review

Adapted from http://www.nice.org.uk/guidance/cg76/resources/cg76-medicines-adherence-full-guideline2.

Steps involved in prescribing



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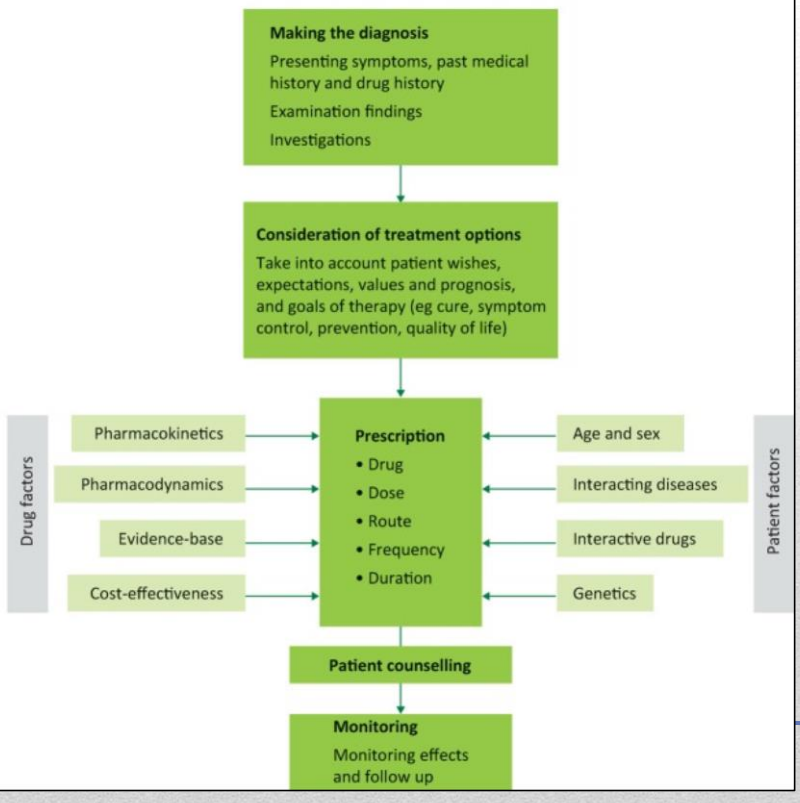

Example Short answer question

Describe FOUR aspects related to the safety of a medicine you would consider before prescribing