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.

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.

Multiple steps are involved in rational prescribing

Prior to writing a prescription

1. Make a diagnosis
2. (Step 2)
3. (Step 3)
4. (Step 4)
5. (Step 5)
6. (Step 6)
7. (Step 7)
8. (Step 8)
Patients come with symptoms not diagnoses

“Please give me stronger pain relief for a severe headache.”
- Migraine
- Medications
- Sinusitis
- Stroke
- Giant cell arteritis
- Brain tumour
- Meningitis

“I have a cough that won’t go away.”
- Postnasal drip
- Asthma
- Reflux
- Post-infectious cough
- Lung cancer
- Tuberculosis
- Psychogenic

“I am constipated. Can you prescribe something.”
- Medicine induced
- Hypothyroidism
- Hypercalcaemia
- Colon cancer
- Parkinson’s disease
- Diabetes

Prior to writing a prescription

1. Make a diagnosis
2. Consider treatment options
3. [Blank]
4. [Blank]
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

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**Prior to writing a prescription**

1. Make a diagnosis
2. Consider treatment options
3. Choose a medicine
In order to choose a medicine you need to consider...

**Efficacy**

**Safety**

**Appropriateness**

**Adherence**

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**Efficacy of a medicine**

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

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

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

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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

Prior to writing a prescription

1. Make a diagnosis
2. Consider treatment options
3. Choose a medicine
4. Choose a dosing regimen

Choose the dose

- **Population**
  - *The same dose for everyone*

- **Group**
  - *The same dose for similar group (e.g. weight, renal function)*

- **Individual**
  - *The dose is determined by the individual response*

- **The dose response relationship**
- **Therapeutic index**
- **Disease states that influence the response**
- **Potential drug interactions**
## Choose a “route of delivery”

<table>
<thead>
<tr>
<th>Route of Delivery</th>
<th>Advantages/May Be Subject to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IV injection</strong></td>
<td>High concentrations in the blood rapidly &lt;br&gt;Instant and complete absorption &lt;br&gt;Potentially more dangerous</td>
</tr>
<tr>
<td><strong>Depot preparations</strong></td>
<td>Release contents slowly over hours - months &lt;br&gt;May improve adherence &lt;br.Require a deep injection</td>
</tr>
<tr>
<td><strong>Skin patches and gels</strong></td>
<td>Lower peak concentration and extended duration of effect &lt;br&gt;Can bypass first pass metabolism &lt;br&gt;Skin reaction is potential adverse effect</td>
</tr>
<tr>
<td><strong>Local delivery</strong></td>
<td>Site of action can be targeted &lt;br&gt;Reduces systemic effects</td>
</tr>
<tr>
<td><strong>Oral tablets</strong></td>
<td>Slower rise to a later peak concentration &lt;br&gt;May be less complete absorption &lt;br&gt;May be subject to first pass metabolism</td>
</tr>
</tbody>
</table>
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
Each prescription has three parts

<table>
<thead>
<tr>
<th>Enalapril 10mg tablet</th>
<th>Sig: i BD po</th>
<th>M: 30 days supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd</td>
<td></td>
<td></td>
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<td>3rd</td>
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<td>1st</td>
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<td>1st</td>
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<td>2nd</td>
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<td></td>
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<tr>
<td>3rd</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Certified Extended Supply:**

**Substitution not permitted on this prescription unless specified in writing**

**Signature of Prescriber:**

**Date:** 09/07/2021
First Part - Rx, 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:
  \[ Rx \text{ Enalapril 10mg tabs} \]

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:
  \[ \text{Sig: i BD po} \]
• 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.

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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

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ac</td>
<td>before food</td>
</tr>
<tr>
<td>cc</td>
<td>with food</td>
</tr>
<tr>
<td>pc</td>
<td>after food</td>
</tr>
</tbody>
</table>

## Frequency

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BD</td>
<td>twice daily</td>
</tr>
<tr>
<td>mane</td>
<td>morning</td>
</tr>
<tr>
<td>midi</td>
<td>midday</td>
</tr>
<tr>
<td>nacte</td>
<td>night</td>
</tr>
<tr>
<td>pm</td>
<td>when required (as needed)</td>
</tr>
<tr>
<td>q4h</td>
<td>every four hours</td>
</tr>
<tr>
<td>q6h</td>
<td>every six hours</td>
</tr>
<tr>
<td>q8h</td>
<td>every eight hours</td>
</tr>
<tr>
<td>q12h</td>
<td>every twelve hours</td>
</tr>
<tr>
<td>QID</td>
<td>four times a day</td>
</tr>
<tr>
<td>STAT</td>
<td>immediately</td>
</tr>
<tr>
<td>TDS</td>
<td>three times a day</td>
</tr>
</tbody>
</table>

## Route

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>buc</td>
<td>buccal</td>
</tr>
<tr>
<td>IM</td>
<td>intramuscular</td>
</tr>
<tr>
<td>inh</td>
<td>inhalation</td>
</tr>
<tr>
<td>IV</td>
<td>intravenous</td>
</tr>
<tr>
<td>neb</td>
<td>nebuliser</td>
</tr>
<tr>
<td>ng</td>
<td>nasogastric</td>
</tr>
<tr>
<td>po</td>
<td>oral</td>
</tr>
<tr>
<td>pr</td>
<td>per rectum</td>
</tr>
<tr>
<td>pv</td>
<td>per vagina</td>
</tr>
<tr>
<td>nj</td>
<td>nasojejunal</td>
</tr>
<tr>
<td>subcut</td>
<td>subcutaneous</td>
</tr>
<tr>
<td>subling</td>
<td>sublingual</td>
</tr>
<tr>
<td>top</td>
<td>topical</td>
</tr>
<tr>
<td>PEG</td>
<td>percutaneous endoscopic gastrostomy</td>
</tr>
</tbody>
</table>
### Abbreviations to avoid for safety reasons

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

See additional abbreviations to avoid in the link below:

### After writing a prescription

**Communicate with the patient**

After writing a prescription, it is important to communicate with the patient to ensure they understand the dosage and instructions correctly. This can help prevent medication errors and ensure patient safety.
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)**

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/
• 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

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

- Consider the treatment goals and the patient’s goals

Efficacy and safety

- Desired effects
- Adverse effects

Appropriateness

- Changes in the patient (clinical changes, age)
- Changes in medicines

Patient view

- Patient knowledge, understanding and concerns
- Adherence

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

Steps involved in prescribing

Diagnosis
Review
Therapy

diagnosis

Monitor
Medicine
Communication

Prescribe
Dosing regimen

Steps involved in prescribing:

- Diagnosis
- Therapy
- Medicine
- Dosing regimen
- Prescribe
- Communicate
- Monitor
- Review

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