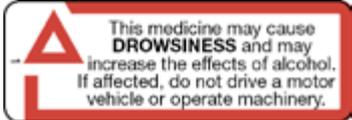
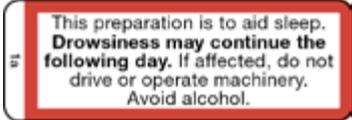
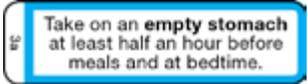
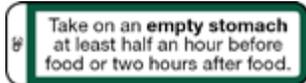
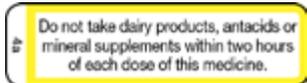
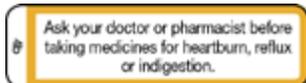
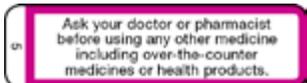
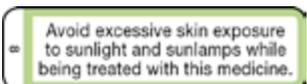
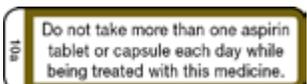
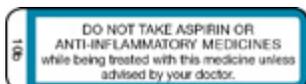
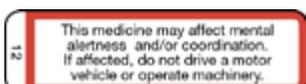
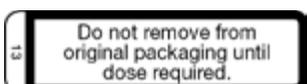


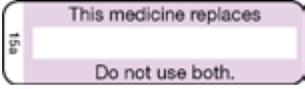
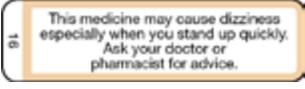
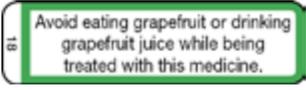
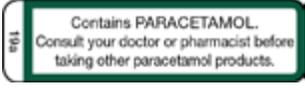
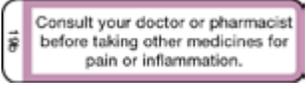
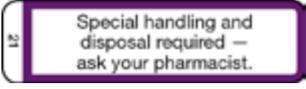
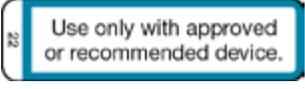
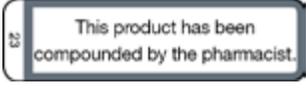
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## Warning stickers

- These warning stickers (Cautionary Advisory Labels — CALs) help with legal requirements to correctly label medicines. Label 1 (or same information) must be applied to medicines causing sedation. Use other stickers if available
- CALs warn users about side effects and provide information about the best way to use and store medicines
- See *Australian Pharmaceutical Formulary and Handbook* for complete list of approved CAL recommendations for medicines

1		1a	
2		3a	
3b		4a	
4b		5	
6		7a	
7b		8	
9		10a	
10b		11	
12		13	

14		15a	
15b		16	
18		19a	
19b		20	
21		22	
23		24	
A		B	
C		E	
F		G	
H		I	
J		K	
L		©Pharmaceutical Society of Australia 2017. Reproduced with permission.	

# Abbreviations

<b>5HT3</b>	5-hydroxytryptamine	<b>IM</b>	intramuscular (in the muscle)
<b>ACE</b>	angiotensin-converting enzyme	<b>IV</b>	intravenous (in the vein)
<b>AMH</b>	<i>Australian Medicines Handbook</i>	<b>kg</b>	kilogram
<b>ARB</b>	angiotensin receptor blocker	<b>L</b>	litre
<b>ATSIHP</b>	Aboriginal and Torres Strait Islander health practitioner	<b>mg</b>	milligram
<b>BP</b>	blood pressure	<b>MIMS</b>	medicine information reference
<b>CAD</b>	coronary artery disease	<b>min</b>	minute
<b>cap</b>	capsule	<b>mL</b>	millilitre
<b>CARPA</b>	Central Australian Rural Practitioners Association	<b>MRSA</b>	Methicillin-resistant <i>Staphylococcus aureus</i>
<b>CARPA STM</b>	<i>CARPA Standard Treatment Manual</i>	<b>NOAC</b>	novel oral anticoagulant
<b>CD</b>	controlled delivery	<b>NRT</b>	nicotine replacement therapy
<b>CDC</b>	Centre for Disease Control	<b>NSAID</b>	non-steroidal anti-inflammatory drug
<b>CKD</b>	chronic kidney disease	<b>O<sub>2</sub></b>	oxygen
<b>CNS</b>	central nervous system	<b>OROS</b>	osmotic-controlled release oral delivery system
<b>COPD</b>	chronic obstructive pulmonary disease	<b>ORS</b>	oral rehydration salts
<b>CPM</b>	<i>Clinical Procedures Manual</i>	<b>PHU</b>	Public Health Unit
<b>CPR</b>	cardiopulmonary resuscitation	<b>PID</b>	pelvic inflammatory disease
<b>CR</b>	controlled release	<b>PMS</b>	pre-menstrual syndrome
<b>CSLD</b>	chronic suppurative lung disease	<b>qid</b>	quarter in die – 4 times a day
<b>CVS</b>	cardiovascular system	<b>SAS</b>	special access scheme
<b>Depo</b>	medroxyprogesterone depot injection	<b>SNRI</b>	serotonin and noradrenaline reuptake inhibitor
<b>DNA</b>	deoxyribonucleic acid	<b>SR</b>	slow-release <i>OR</i> sustained-release
<b>DPP4</b>	dipeptidyl peptidase-4	<b>SSRI</b>	selective serotonin reuptake inhibitor
<b>eg</b>	exempli gratia – for example	<b>STI</b>	sexually transmitted infection
<b>ENT</b>	ear, nose and throat	<b>TB</b>	tuberculosis
<b>EPO</b>	epoetin (medicine group)	<b>UTI</b>	urinary tract infection
<b>ER</b>	extended release	<b>WBM</b>	<i>Women's Business Manual</i>
<b>g</b>	gram	<b>XR</b>	extended release
<b>GLP-1</b>	glucagon-like peptide-1		
<b>HCT</b>	hydrochlorothiazide		
<b>HIV</b>	human immunodeficiency virus		

**Blood tests**

<b>BGL</b>	blood glucose level
<b>CK</b>	creatinine kinase
<b>FBC</b>	full blood count
<b>INR</b>	international normalised ratio (to check blood clotting)
<b>LFT</b>	liver function test
<b>RF</b>	rheumatoid factor
<b>TFT</b>	thyroid function test
<b>UEC</b>	urea, electrolytes and creatinine. Includes a kidney function test

## Glossary

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**Active ingredient** — chemical in a medicine that makes the desired changes in the body (eg aspirin reduces inflammation). Other non-active ingredients in medicines do not cause changes — these include wheat, sugar, colouring.

**Acute** — starts suddenly, usually lasts for a short time, can get worse quickly, may need urgent care.

**Adrenaline (epinephrine)** — hormone and neurotransmitter produced by the body, usually in response to stress. Increases heart rate, constricts blood vessels, and opens air passages. Also a medicine used to treat anaphylaxis, shock, cardiac arrest.

**Allergic reaction** — overly sensitive immune response to substances that are usually harmless (eg pollen).

**Anaphylaxis (anaphylactic shock)** — severe allergic reaction that needs urgent medical attention. Symptoms include difficult or noisy breathing, swelling of tongue or throat, loss of consciousness.

**Angina** — chest pain felt when the heart can't get enough blood and oxygen. Usually caused by coronary artery disease.

**Antibiotic** — medicine that kills or stops growth of certain bacteria. Antibiotics can attack a bacteria's cell wall, or stop it from reproducing.

**Antibody** — molecule made by body's immune system that can recognise and attack a specific invading germ. Created when person is infected with a germ or immunised against it. Can also pass from mother to child during breastfeeding, another good reason to breastfeed.

**Antivirals** — medicines that can slow growth of, but not kill, certain viruses. Used for treating viral diseases including HIV and herpes.

**Arrhythmia** — when the heart skips a beat, beats irregularly, beats too quickly or too slowly.

**Autoimmune disorder** — person's immune system mistakenly attacks its own body tissues and makes person unwell (eg rheumatoid arthritis).

**Bacteria** — single cell micro-organisms that exist everywhere. May be essential, helpful, harmless, or cause infections or disease.

**Beta receptor** — special molecule that responds to messages carried by central nervous system and hormones. Most found in the heart and blood vessels, where they can increase BP. Some medicines block beta receptors to reduce BP and the work load on the heart.

**Bloating** — swelling of the abdomen.

**Cardiac arrest** — heart is unable to contract properly so the blood stops circulating. Can be caused by a heart attack. Treatment is cardiopulmonary resuscitation (CPR) and defibrillation.

**Cholesterol** — fat-like substance made by the body and found in foods made from animals (eg meat, dairy products). Important for cell structure and function. Too much cholesterol will gradually clog blood vessels supplying the heart.

**Chronic** — lasts for a long time or doesn't change.

**Congenital** — condition that a person is born with (eg a heart problem). It can be inherited (genetic) or caused by environmental factors.

**Coronary artery disease (CAD)** — blood vessels going to the heart are clogged and narrowed so the heart doesn't get enough oxygen and nutrients to function properly. People with CAD have chest pain, can be short of breath, are at risk of having a heart attack.

**Diabetes** — chronic condition where levels of glucose (sugar) in blood are too high. Pancreas can't make enough insulin to control blood glucose levels. Can lead to heart disease, kidney, eye or nerve damage

- **Type 1 diabetes** — autoimmune disease. Usually starts in childhood or adolescence, often in people who are otherwise healthy
- **Type 2 diabetes** — metabolic disease where some organs (eg pancreas, liver) become diseased or do not function normally. Usually starts in adulthood, contributed to by an unhealthy lifestyle (eg overweight, lack of physical activity).

**Diuretic** — medicine that increases urination and passing of water from body. Used to remove fluids that build up when the heart is not pumping properly.

**Drug** — substance that, when absorbed by body of a living organism, changes how the body normally functions. Called medicines when used to treat, cure, prevent, or diagnose disease, or to improve physical or mental wellbeing.

**Electrolytes** — electrically charged salts found in body fluids. Include sodium, potassium, magnesium, calcium. Help carry nerve impulses, help muscles contract. Kidney failure, severe vomiting, diarrhoea or dehydration can cause electrolytes to become unbalanced.

**Full blood count (FBC)** — laboratory blood test. Also called FBE – full blood examination, CBC – complete blood count, CBE – complete blood evaluation.

**Fungus** — an organism that's not a plant, animal or bacteria. Yeasts, moulds and mushrooms are all types of fungi. Some fungi grow on human skin and nails and cause infection — more common in moist conditions. Penicillin is made by a fungus.

**Heart attack (myocardial infarction)** — blockage of blood to the heart causing heart cells to die. Cardiac arrest occurs when the heart is unable to contract.

**Histamine** — produced as part of the body's immune response to a threat (eg from bacteria or viruses). It triggers inflammation that helps damaged body parts to heal, and acts as a neurotransmitter. Antihistamines or histamine antagonists inhibit the action of histamine and are used to treat allergic reactions (eg runny nose).

**Hormone** — chemical released in one part of the body that takes messages through the blood stream to cause changes in another part of the body.

**Hyperglycaemia** — blood glucose levels too high. Can indicate diabetes or impaired glucose tolerance. Happens when body doesn't make enough insulin or can't use it properly, or person with diabetes isn't taking enough blood glucose control medicine.

**'Hypo' (hypoglycaemia)** — blood glucose level too low. Causes person to tremble, sweat, and become confused. Can happen if person gets too much insulin or has not been eating properly. Hypos range from minor to very serious.

**Immunisation** — receiving a vaccine and then becoming immune to a disease. Vaccines create immunity by enabling the body to build antibodies to fight the particular disease (eg polio, whooping cough).

**Infection** — invasion of micro-organisms (eg virus, bacteria, fungus) in a body part or tissue. Can cause damage or disease.

**Inflammation** — body's response to infection, damage or irritants. Caused by increased movement of plasma and white blood cells into damaged tissues, makes tissue look red and swollen.

**International normalised ratio (INR)** — test of how well blood clots. Mainly used to check warfarin therapy, which is used to thin the blood.

**Liver enzyme-inducing medicines** — medicines that cause liver to make more of some enzymes it normally produces. Extra enzymes change the way other medicines work (eg increasing or decreasing their effect). Medicines causing the liver to make more enzymes include:

- Strong effect — carbamazepine, enzalutamide, phenytoin, rifampicin, St John's wort
- Moderate effect — bosentan, efavirenz, etravirine, modafinil
- Other — aprepitant, corticosteroids, dabrafenib, nevirapine, phenobarbitone, rifabutin, ritonavir, tipranavir, vemurafenib

**Medicine** — drug used to treat, cure, prevent, diagnose disease, or to improve physical or mental wellbeing.

**Metabolism** — the chemical and physical processes in the body that use energy for growth and to maintain life. Hormone thyroxine helps determine how fast or slow the chemical reactions of metabolism happen in a person's body.

**Micro-organism** — organism that is too small to see without a microscope. Usually single cell organism such as bacteria.

**Mood** — emotional state, may last for longer than usual if person is unwell.

**MRSA (methicillin-resistant *Staphylococcus aureus*)** — type of *Staphylococcus aureus* bacteria resistant to methicillin and some other antibiotics. Usual antibiotics don't work so infection harder to treat, more dangerous to patient.

**Neurotransmitter** — chemical used by the brain and nerves to pass messages.

**Opioid** — medicine that binds to receptors in the brain, decreases pain and increases pain tolerance. Opioids include heroin, morphine, codeine.

**Organism** — living thing such as an animal, plant, fungus, bacteria.

**Osteoporosis** — condition where bones become thinner and weaker over time.

**Pathogenic** — something able to cause disease or infection (eg a germ).

**Platelets** — similar to cells, circulate in the blood. Not enough can lead to excessive bleeding, too many can cause unwanted blood clots.

**Prophylaxis** — use of a medicine or other treatment to prevent disease.

**Receptor in the brain** — sensory nerve ending that changes specific stimuli into nerve impulses.

**Resistance (to antibiotic)** — when antibiotic once used to kill a certain bacteria no longer does so (ie antibiotic stops working). For example mupirocin is no longer used on school sores as resistance quickly develops.

**Serum sickness** — body's immune system reacts to antibodies that come from animals (eg in antivenoms). Can take up to 2 weeks to develop. Usually includes rashes, itching, muscle or joint pain — but can be more serious.

**Shock** — when there is not enough blood being pumped around the body. Life threatening condition usually brought on by serious injury or illness.

**Steroids** — hormones that are important for metabolism, immune reactions, water and salt balance. Human body produces a range of steroids for different purposes. Steroids are also strong, effective medicines (cream, ointment, tablet, injection) for a variety of medical conditions (eg allergic reactions, asthma, skin conditions).

**Stroke** — supply of blood to the brain is disrupted because an artery is blocked or has burst. Lack of oxygen causes brain cells to be damaged or die.

**Therapeutic** — helps treat or improve illness.

**Triple whammy** — dangerous combination of 3 medicines: ACE inhibitor/ARB + diuretic + NSAID. Can cause kidney failure. Patients taking ACE inhibitors or ARBs **and** diuretics **should not** take NSAIDs.

- ACE inhibitor/ARB — decrease blood pressure and increase blood flow by widening the blood vessels, increases blood flow out of the kidneys
- Diuretic — acts on the kidneys, increases urination and passing of water from body
- NSAIDs — anti-inflammatory analgesics (eg aspirin, ibuprofen) restrict blood flow to the kidneys

Interaction is more dangerous if the kidneys are already starting to fail.

**Urinary tract infection** — infection of kidney, bladder or urinary tract.

**Vaccination** — having a vaccine, ie actually having the injection.

**Virus** — infectious agent that grows inside other organisms. Causes an immune response. Antibiotics can't fight viruses, but antiviral medicine can slow their growth, and vaccines help immunise the body against them.

# Anatomy dictionary

## Using this dictionary

This dictionary gives a brief overview of some body organs and systems.

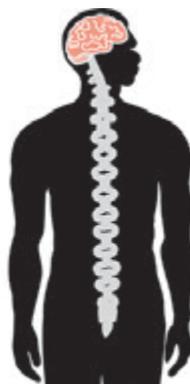
- **First point** tells you what it does and how it works
- **Second point** tells you about things that can make it stronger or weaker
- **Third point** tells you how it is affected by medicines or other drugs

### Brain



- The brain is the centre of the nervous system and controls all other organ systems in the body through electrical impulses or chemicals
- Affected by diseases such as epilepsy and mental illnesses (eg depression, schizophrenia). Damaged by impact (injury), lack of blood supply, chemicals in the blood (eg alcohol). Exercise helps keep a good blood supply to the brain and can improve depression
- Some medicines alter messages being sent within, and to and from the brain (eg pain messages). Medicines can help to control seizures, relieve anxiety and depression, make you sleep

### Central nervous system (CNS)



- CNS is made up of the brain and spinal cord. Operates using electrical impulses or chemicals so all parts of the body can communicate
- Damaged by injury and infection. Damage can result in paralysis if messages from the brain can't pass along spinal cord
- Drugs such as alcohol and opioids can depress (slow) CNS so that the heart, breathing, or movements may slow or stop altogether. Some medicines act by stimulating or depressing the CNS or reducing pain messages

## Heart



- The heart is a muscle that contracts regularly to pump blood around the body
- Regular exercise makes the heart strong. Damaged or weakened by smoking, lack of physical activity, fatty and/or salty foods. Blockages that stop blood reaching it can cause a heart attack. Affected by cardiovascular diseases such as high BP, problems with rhythm (arrhythmia), diabetes
- Medicines can help the heart by
  - Evening out the heart beat (antiarrhythmics)
  - Thinning the blood (antiplatelets, warfarin)
  - Opening up or relaxing blood vessels and lowering BP (antihypertensives)
  - Removing excess fluid (diuretics)
  - Lowering fat (lipids) in the blood
  - Dissolving blood clots or stopping blood clots forming (thrombolytics)

## Blood — circulatory/cardiovascular system (CVS)



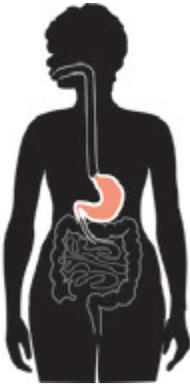
- CVS is made up of the heart and blood vessels (arteries, veins and capillaries)
- Good blood supply to all parts of the body needed for good health — blood provides nutrients and oxygen, removes waste. Damaged by smoking (kills small capillaries and blocks arteries), diabetes (damages walls of blood vessels), too much fatty food (blocks arteries)
- See *Heart* for how medicines affect the blood system

## Lungs — respiratory system



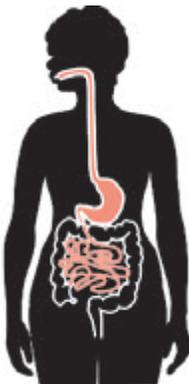
- Lungs put oxygen into the blood so it is circulated around the body
- Badly damaged by smoke, dust, infections (eg pneumonia), especially during childhood. Affected by conditions such as asthma and COPD. Lungs are kept healthy with exercise, good hygiene, not smoking, keeping out of dust and fire smoke
- Medicines help treat lung infections (eg antibiotics), control asthma, help breathing

## Stomach



- The stomach is the main organ in the digestive system. It begins breakdown (digestion) of food by churning it with enzymes and acid
- Damaged by infections that cause ulcers, too much acid, too much alcohol, some medicines
- Medicines treat infections and help stop the stomach producing too much acid (eg proton pump inhibitors). Some medicines (eg NSAIDs) must be taken with food so they don't damage stomach lining

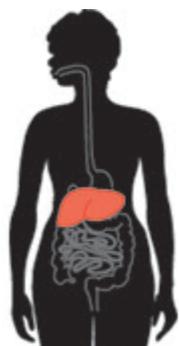
## Digestive system



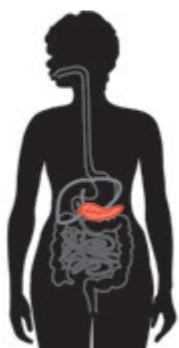
- Digestive system breaks down food, provides nutrition for the body, removes waste. Includes mouth, oesophagus, stomach, intestines, rectum
- Doesn't work well if not enough fibre (eg fruit, vegetables, grains) in food eaten or if person eats too much. Bowel cancer is associated with obesity
- Medicines can help reduce acid in the stomach, and relieve nausea (antiemetics), constipation (laxatives), diarrhoea

**Kidneys — urinary system**

- Kidneys help remove waste from the blood and regulate the body
- Affected by repeated urinary tract infections, skin infections, high BP, diabetes, too much alcohol (grog), old age
- Can be badly damaged by taking too much of some medicines. Other medicines help damaged kidneys function better and remove waste from the body

**Liver**

- The liver cleans the blood and helps with digestion
- Badly damaged by too much alcohol (grog), infections (eg hepatitis), too much of some medicines (eg paracetamol)
- Medicines can help treat infections and improve functioning

**Pancreas**

- Pancreas makes hormones (eg insulin) and enzymes that help to break down food in the small intestine
- Damaged by too much alcohol, gallstones, infections (eg mumps). If pancreas can't make enough insulin to break down sugar — person will develop diabetes
- Medicines can help increase the amount of insulin made by the pancreas to help control diabetes, and replace enzymes that break down food

**Thyroid**

- The thyroid is one of the largest glands in the body. Produces hormones that regulate metabolism and affect the growth and functioning of many other systems in the body
- Wrong amounts of thyroid hormones can make people very unwell
- Medicine (eg thyroxine) can help to control amount of thyroid hormone in the body

**Reproductive system**

- In women — vagina, uterus, ovaries.  
In men — testes, penis
- Damaged by infections, especially STIs. Problems for women include having trouble getting pregnant, bleeding, cancer
- Medicines can prevent pregnancy (eg the Pill), help to control bleeding and ovulation, and treat infection. Some medicines can harm production of sperm, others can harm an unborn baby

**Musculoskeletal system**

- Musculoskeletal system gives us shape, lets us move by contracting the muscles to pull the bones
- Affected by injuries that break bones or tear muscles, bone infections, arthritis, osteoporosis. Physical activity and good nutrition when young build strong bones and muscles
- Some medicines can help build bones, others can damage them. Medicines can help to relieve pain associated with arthritis and inflammation, and treat infections

**Skin**



- The skin is the largest body organ. It helps regulate temperature, protects the body from germs and fluid loss, and stores water, fat and vitamin D. It allows us to feel sensations
- Damaged by injuries (especially burns), too much sun, smoking. Affected by dermatitis, eczema, allergies, infections
- Medicines can treat infections, reduce inflammation and allergies (eg cortisone creams)

**Ears**



- The inner and outer ear let us hear by sensing movements in the air and converting them to signals that are sent to the brain. The inner ear also helps us to balance
- Structure of ear can be badly damaged by meningitis, chest and ear infections (especially when young) resulting in poor hearing, learning, language development
- Medicines can help treat meningitis, ear and respiratory infections

**Eyes**



- Eyes allow us to see by detecting light and converting it into a picture (image) in our brain
- Affected by allergies, infections, glaucoma. Badly damaged by too much sun (especially midday sun), diabetes, smoking, infections such as trachoma. Important to protect eyes by keeping them clean, out of bright light, eating good food, having regular eye checks
- Medicines can help treat eye infections, glaucoma, allergies

**Nose**



- The nose lets us smell and taste, cleans and warms the air we breathe in
- Allergies and infections can irritate lining of the nose causing swelling and blockages, make the nose run
- Medicines can treat allergies, or open a blocked nose (eg nasal sprays)

## Calculating medicine doses and drip rates

### Dose calculations

- Dosages often written as amount/kg/dose (eg 25mg/kg/dose)
  - This means a dose is made up of 25mg for each kg of body weight
- **Dose needed = amount of mg/kg x weight of person in kg**
  - *Example:*
    - Amount in mg/kg is 25mg/kg, weight of person is 12kg
    - Dose needed = 25mg/kg x 12kg = 300mg

**Table 2.1: Calculating doses**

TABLETS	
Number of tablets needed = dose needed [a] ÷ strength of tablet [b]	<i>Example:</i> Dose needed is 15mg [a] Strength of tablet is 10mg [b] <b>Number of tablets =</b> 15mg ÷ 10mg = 1.5 (1½) tablets
MIXTURES OR INJECTIONS — small volume IM or IV push	
Volume needed (mL) = (dose needed [a] ÷ strength of mixture or injection [b]) x volume this strength is in mL [c]	<i>Example 1:</i> Dose needed is 300mg [a] Strength is 250mg/5mL [b/c] <b>Volume needed =</b> (300mg ÷ 250mg) x 5mL = 1.2mg x 5mL = 6mL
	<i>Example 2:</i> Dose needed is 20mg [a] Strength is 30mg/mL [b/c] <b>Volume needed =</b> (20mg ÷ 30mg) x 1mL = 0.67mg x 1mL = 0.67mL

**Note:** Dosage examples given in mg, but same formulas can be used for other strengths (eg microgram). Must use same unit for strength and for dose needed (eg mg and mg, microgram and microgram).

### Quick calculations

- **Dose needed** = amount of medicine per kg x body weight (kg)
- **Number of tablets needed** = dose needed ÷ strength of tablet
- **Volume of mixture or injection needed (mL) =**  

$$\frac{\text{dose needed}}{\text{strength of mixture or injection}} \times \text{volume this strength is in (mL)}$$

Table 2.2: Calculating drip rates and infusion rates for IV fluids

GRAVITY ADMINISTRATION SET	
<b>Remember:</b> Check drop rate on infusion set packet (eg 20 drop/mL, 60 drop/mL)	
Rate (drops/min) = (total volume of solution (mL) [a] x number of drops/mL [b]) ÷ time in minutes [c]	<i>Example:</i> Volume of fluid to give is 1000mL (1L) [a] Set delivers 20 drop/mL [b] Time to give is 5 hours = 5 x 60 = 300 minutes [c] <b>Rate</b> (drops/min) = (1000mL x 20 drops/mL) ÷ 300 min = 20,000 drops ÷ 300 minutes = 67 drops/min
INFUSION PUMP — setting dials	
<b>Remember:</b> Always check instructions for your machine	
Rate (mL/hr) = volume of solution (mL) [a] ÷ time (hr) [b]	<i>Example:</i> Volume of medicine is 5mL, volume of fluid is 1000mL (1L). Total volume of solution to give is 1005mL [a] Time to give is 5 hours [b] <b>Rate</b> (mL/hr) = 1005mL ÷ 5 hours = 201mL/hr

## Units and concentrations

- 1 litre (L) = 1000 millilitres (mL)
- 1 milligram (mg) = 1000 micrograms
- 1 gram (g) = 1000 milligrams (mg)
- 1% solution = 1g of solute dissolved in 100mL of solution
- 1:1000 = 1g solute dissolved in 1000mL of solution = 1mg solute dissolved in 1mL of solution

## Converting units

- Grams (g) to milligrams (mg) = g x 1000
  - OR move decimal point 3 numbers to right
- Milligrams (mg) to grams (g) = mg ÷ 1000
  - OR move decimal point 3 numbers to left
- Milligrams (mg) to micrograms = mg x 1000
  - OR move decimal point 3 numbers to right
- Micrograms to milligrams (mg) = microgram ÷ 1000
  - OR move decimal point 3 numbers to left
- Litres (L) to millilitres (mL) = L x 1000
  - OR move decimal point 3 numbers to right

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