

## 10 Medicines

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# Managing a remote clinic dispensary

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Standards for running a dispensary in a remote area.

## Room design

- Big enough to store
  - Medicines for chronic disease and acute imprest separately
  - Individual patient labelled medicines and/or dose aids
- Need space for 2 fridges
- Lockable door, security screens on all windows, no public access
- Well lit
- Constant room temperature (less than 25°C) with good air circulation. Air conditioners should be connected to back-up power supply
- Shelving — clearly labelled, enough room to store and display medicines
  - If shelving above shoulder height — non-slip step or two-rung ladder
- Workbench with waterproof top, large enough for at least 2 practitioners to prepare medicines for dispensing
  - If workbench low — adjustable swivel chair on wheels
- Computer with access to internet and electronic file notes
  - Label printer
- Stainless steel sink, elbow control taps, soap dispenser, paper towel holder
- Equipment for dispensing medicines — purified water, measuring devices, medicine cups, paper cups, syringes, tablet cutters, mortar and pestle (for crushing tablets), tablet counter (eg triangle)
- Equipment for packaging medicines — dose aids, labels, cartons, bottles, time of day (sun and moon) stickers, warning labels
- Containers for return of unwanted medicines (RUM)

## Lockable safe

- Safe attached to wall, large enough to store all controlled drugs and prescription medicines that can be misused (eg benzodiazepines, codeine)
- Drug register for recording supply and use of all restricted S4 and S8 medicines
  - In some states/territories you need 2 separate books

## Cold storage areas

- 2 refrigerators — should be large enough to allow free air circulation around medicines
  - 1 for vaccine storage ([p335](#)) — purpose built vaccine refrigerator
    - Display current Vaccine Cold Chain Graph
  - 1 for all other medicines needing refrigeration
  - Both monitored twice a day for temperature — should be 2–8°C
  - Plugged into back-up power supply

## References

- Medicine specific books — print or electronic versions
- Examples include
  - *Australian Medicines Handbook* (essential)
  - *Medicines Book for Aboriginal and Torres Strait Islander Health Practitioners*
  - *Australian Therapeutic Guidelines*
  - *Australian Immunisation Handbook*
  - *Australian Injectable Drugs Handbook*
  - *Don't Rush to Crush*
- Best-practice guidelines (eg *CARPA STM*, *WBM*)

## Ordering medicines

- Most chronic diseases medicines can be ordered through PBS or S100
  - If not available, contact supply pharmacy
- Restock all imprest and prescription medicines every month
  - If medicines going out of date — consider reducing imprest size
  - Consider if you still need to keep medicine in stock before re-ordering
- Make orders for wet season or events (eg ceremonies, sports carnivals) in advance
- Talk with pharmacy about special projects (eg mass treatment programs, clinical trials) in advance to give them time to organise stock

## Stock management

**Remember:** Check medicine stocks in your emergency kit (p28) and ambulance (p30) as well.

- Store and transport medicines at recommended temperatures
  - Under 25°C for shelf medicines, 2–8°C for fridge medicines
- Unpack and store medicines as soon as possible after delivery
- Store in categories by active ingredient in alphabetical order. Label shelves with generic names of medicines
  - ATSIHP medicines can be stored separately for convenience
- Document how your medicine stock is organised to make it easier for all staff, including visiting doctors, nurses
- Work with supplying pharmacist to develop and regularly review imprest list
  - Use local guidelines and protocols to help decide what medicines to keep
  - Keep order quantities at level that reflects twice your order period usage
    - If you order monthly — keep 2 months worth of stock. This covers you for any delays in delivery or unexpected high use
- If using imprest list — keep list in same order as medicines on shelves. Makes it easy to fill your order. Fill imprest list as you check along shelf
- Keep medicine containers neat and clean so easy to find, labels easy to read

- Circle use-by/expiry date on new stock or write clearly on container
  - Put new stock behind current stock — try to make sure older stock (first to expire) is used first
  - If use-by/expiry date only printed on outer package
    - Keep stock inside package until it is going to be used
    - *OR* if items must be taken out of original packaging — write use-by/expiry date on each separate item
- Check use-by/expiry date on current stock regularly, at least once a month. Make this part of your routine clinic checklist
  - Try to use, or redistribute in region, any stock that will expire soon
  - Dispose of expired stock according to health centre policy

# Storing and transporting vaccines and medicines

## Attention

Always have **anaphylaxis kit** (*CARPA STM p32*) ready when giving vaccines.

- If you are carrying vaccines or medicines in vehicles — need to maintain cold chain

## Maintaining cold chain process — vaccines

If not stored at correct temperature — vaccines will not work and people will not be immunised.

- Cold chain process monitors vaccine storage temperatures and lets you know if there are any problems
- Many states/territories require practitioners to have formal training in how to give and store vaccines — for more information see *The National Vaccine Storage Guidelines* (Strive for 5). Keep copies available on or near fridge

## Attention

- **Never separate vaccines from cold chain monitors**
  - Monitors are put in bag with vaccines by pharmacy so you can check they are kept at right temperature (2–8°C) during travel to clinic
  - If vaccines too warm or too cold when they arrive — store where they will not be used, talk with pharmacy or state vaccine centre to find out
    - If vaccines need to be thrown away or given a shorter expiry date
    - What caused problem with temperature
- **Do not store food or other goods in vaccine fridge**
  - No medicines except blood products or antivenoms
- **Do not open fridge door**
  - During power cuts or fluctuations
  - Unless you know what you need — find it quickly, close door
- **If you know power is going off for more than a few hours** — get ready
  - Take vaccines out, close door quickly
  - Surround or wrap vaccines loosely in insulating material (eg polystyrene chips, shredded paper, bubble wrap, newspaper) put in esky
  - Put esky back in fridge with ice bricks, keep door closed, keep heat and freeze sensitive monitors with vaccines
  - Never let bare ice bricks touch vaccines — may freeze

**Note:** Extreme temperature changes (eg very hot days followed by very cold nights) affect fridge temperatures and can cause vaccines to freeze. Monitor very carefully, adjust fridge settings slightly if you need to, but don't make sudden, drastic changes. Fridge temperature controls can be tricky.

## What you need

- **Purpose built vaccine refrigerator** plugged into back-up power supply, if available
  - Label power supply 'DO NOT turn off power or disconnect this refrigerator'
- Refrigerator should have
  - Clear (glass) door, clearly labelled shelves so you can see what's inside without opening door
  - Temperature probe on inside, temperature monitor on outside
  - Cold chain protocol clearly visible
  - Minimum of one heat and one freeze monitor on each shelf
  - Vaccines stored away from sides, top and bottom to allow for circulation
  - Stock rotated (new stock behind current stock)
  - Sign on door to remind people to keep it closed
- Temperature monitor chart for recording daily temperatures
- Two types of cold chain monitor
  - **Freeze-sensitive** — turns purple if vaccine stored below freezing
  - **Heat-sensitive** — gradually turns blue if vaccine stored above 8°C
- Ice bricks and esky (in case of power or fridge failure)

## What you do

- Check and mark on cold chain monitor cards — date vaccines arrive in clinic, colour of monitors
- Monitor card will indicate freezing or heat exposure
  - Follow instructions about what to do for each vaccine
  - If vaccine not listed on card — contact supplying pharmacy
- Check cold chain cards each time you take out vaccine for use
- Check and mark cold chain cards once a week, note changes to monitors
- Check highest and lowest fridge temperatures twice a day, before opening fridge for first time and at end of the day
  - Use special thermometer, record on temperature graph chart
  - Temperature should be kept at 2–8°C. If big variations — find out why. May be the weather, power supply, fridge, thermometer/monitor
  - **Fix problems as soon as you can to stop loss of vaccines and possibility of giving vaccines that won't work**

## Storing, transporting, checking controlled drugs

### Attention

- **You must know the legal requirements** for all aspects of controlled drug management in your state/territory and your health service's policies and procedures
- **Take a lot of care with routine checking of controlled drugs.** If working alone — ask visiting medical staff to check with you as often as possible
- **Before you give controlled drug to patient** you must know your state/territory legislation and best-practice procedures. If you are alone — good idea to at least have patient check label amounts with you, if possible
- **Never leave controlled drugs in vehicles** when carrying from town. Check local requirements about transport and receipt of these drugs
- **Disposal of controlled drugs** must be done in line with state/territory legislation

### What you do

- Keep controlled drugs (and some prescription medicines) in strong metal safe attached to wall — see *Managing a remote clinic dispensary* (p332)
- When drugs arrive, ask colleague to check them into drug register with you
  - Sign and return pharmacy receipt as soon as you can
- Always do a drug check with arriving and departing relief staff
- Check drugs and record in register at least once a week or in line with your health service policy. Add this to your clinic routine checklist
- Ask your visiting pharmacist to check balances and entries each time they visit. Record this in drug register

# Giving medicines

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**Remember:** Right patient, right medicine, right dose, right route, right time, right documentation, right to refuse.

- Make sure you are *legally* allowed to give the medicine

## What you do

### Follow the RIGHTS for giving medicines

- **RIGHT patient**
  - Make sure you have right patient and right set of records
    - Ask patient's name, date of birth, bush name, next of kin
    - Check patient's name and date on prescription
- **RIGHT medicine**
  - Check name and spelling of medicine against prescription
  - Check use-by/expiry date on package
  - Is it safe for this person
    - **Always ask about** allergies, pregnancy, breastfeeding, other medicines, medical problems (eg kidney problems)
  - Could it interact with other medicines the person is taking
  - Is medicine in your protocol manual (eg *CARPA STM*, *WBM*)
  - Look up in reference manual (eg *AMH*, *Medicines Book*). What is it, how does it work, what is it used for
  - Are you allowed to give medicine or do you need to contact doctor or pharmacist
- **RIGHT dose**
  - Check dose on prescription and in reference manual (eg *AMH*, *CARPA STM*, *WBM*)
  - Check strength — medicine can be packaged in a range of different strengths and forms
  - Measure dose carefully using proper equipment
  - If dose is by weight — check person's weight. **Always weigh children**
  - Watch and help parent/carer give first dose to children
- **RIGHT route**
  - Check how to give (administer) medicine
    - Oral — tablets, syrups, sublingual, buccal
    - Injection — IM, IV, subcut
    - On the skin — transdermal, topical
- **RIGHT time**
  - Check how and when medicine should be taken — night, morning, with food, on empty stomach
  - Use times that are meaningful to the person

- **RIGHT documentation**

- Record medicine administered/supplied in file notes. Include active ingredient, dose, frequency, quantity supplied (eg dicloxacillin 500mg 4 times a day [qid], 24 caps)

- **RIGHT to refuse**

- Person may not want to take medicine you give them
- Make sure person knows reason for the medicine so they can make an informed decision
- If person doesn't want to take medicine — try to find out why, a different medicine may be appropriate
- If person still doesn't want to take medicine — always document this

### Label medicine

See example of completed medicine label — F 10.1

- Written in red on white background — **KEEP OUT OF REACH OF CHILDREN**
- Name (active ingredient) of medicine
- Strength (eg microgram, mg, g) and form (eg liquid, tablet, capsule)
- Total number of tablets or amount of liquid in package
- How to take. Dose and number of times a day — 'Take 2 tablets 3 times a day'
- Name of patient
- Name, address, phone number of clinic
- Your name or initials
- Date you gave out medicine
- Medicine use-by/expiry date — take from original packet
- Prescription reference number (if your clinic uses these)
- Special directions — 'Take with food', 'Keep in fridge'
  - Use warning stickers (*MED p298*) if your dispensary has them

|  |                       |
|--|-----------------------|
| <b>KEEP OUT OF REACH OF CHILDREN</b>   |                       |
| DRUG <i>Metformin</i>  | STRENGTH <i>500mg</i> |
| Take <i>one (1)</i> tablets/capsules/mL <i>three (3)</i> times a day <del>or</del> |                       |
| <i>with food</i>   |                       |
| .....as directed.  |                       |
| Patient <i>Peter Jones</i>   |                       |
| Issued by <i>Ross Colins ATSIHP</i>  | Date <i>20/4/18</i>   |
| CLINIC <i>Mt Eagle Clinic NT ph8912 3456</i>                                       | Qty <i>100 tabs</i>   |
| <i>Use by Aug 2020</i>   |                       |

10.1

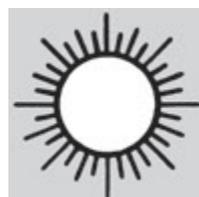
- Use medicine time stickers for people with poor English or eyesight
  - Morning/evening — F 10.2
  - Middle of the day — F 10.3
  - Night time, before bed — F 10.4



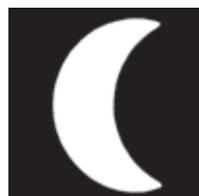
10.2

### Check what you have done and record

- Record in file notes, hand-held record for travellers, in register (eg Schedule 8), if needed
- Make sure file notes include
  - Name of medicine, date and time of supply
  - Reasons for giving
  - Name of person ordering medicine, or protocol used
  - Strength and amount (quantity) given (eg 2mg in 4mL, 20 x 500mg tabs)
  - Way it is given (route)
    - *Examples:* By mouth (oral), by injection into muscle (IM)
  - Dosing instructions — ‘Take 2 tablets 3 times a day’
  - Counselling given, including any possible side effects
  - Name and designation of person supplying medicine



10.3



10.4

### Before giving medicine make sure person knows

- Why they are taking the medicine
  - Possible side effects and what to do about them
  - When and how to take it
  - How to store it (eg in fridge, away from children)
- Ask them to repeat what you told them to make sure they understand.

### Check

- Are tests needed (eg blood tests)
- Does person need to come back to clinic, and when

## Dose administration aids

Includes dosette boxes, blister packs, sachets.

### Filling dose administration aids (dose aids)

#### Attention

- **Do not** get distracted when filling dose aid. Focus on the job
- **Do not** use dose aid label to refill aid — it may have an old prescription
- Dose aid must be labelled KEEP OUT OF REACH OF CHILDREN
- For medicine safety — best to have dose aids filled by pharmacy if possible (eg sachets, blister packs)
- If person visiting from another community — ask if they have a copy of their prescription/s. If not — ask their clinic to send current copy (eg fax, scan)

## What you need

- Up-to-date prescription or file notes
- Dose aid
- Pen
- Medicine/s — from medicine basket in pharmacy, or stored under person's name. Take **extra care** to collect right medicine

## What you do

- **Check**
  - Right person and right prescription or file notes
  - Reusable dose aid must be clean. Most slide out at side for easier cleaning, refilling
  - Preparation area clean and tidy, hands clean
  - **Dose aid label** — you must check every time dose aid is filled
    - Full name of person
    - Name and strength of medicine
    - Amount to give, how to give, how often
    - Name of clinic where usually filled
    - Label and any changes to medicines are clear. If not — use new label
- **Fill dose aid.** Put in medicines one at a time. Follow current prescription in same order
- Put medicine packet back into basket or move to one side
  - **Do not** put packets back onto shelves or throw away empty containers until dose aid has been checked
- Record in file notes — date, your name and designation, name of person checking, whether dose aid was given to person or stored for later collection
- Check again you have right person, they understand how to use dose aid
- **Check** filled dose aid by following procedure below
- Before sealing, ask another staff member to check medicine/s in dose aid. If not possible — make a second check yourself
- Write on sticker across end of dose aid — date, your name, clinic name

## Checking filled dose aid

### What you do

- **Check**
  - Medicine used has not expired
  - Both original medicine packet and label on dose aid match prescription
  - One full day's medicine by emptying out cell/s and refilling from prescription, checking colours from original packets if needed
  - Each of the other cells for **same number and colour** (eg 2 small white + 2 large white + 1 yellow + 1 blue/white capsule = 6)
- **Sign and date** record of dose aid check in file notes, or on prescription. Make sure person filling dose aid has also signed file notes or prescription

- Document number of doses given and expected completion date (when refill needed)
- **Close dose aid**, seal if possible. Some reusable dose aids can be sealed by putting a sticker across opening end. Initial and date sticker

## Medicine by delivery type

### Attention

- If medicine bitter — have person suck on an ice cube before taking
- Give children sultanas, fruit, orange juice to help cover unpleasant taste

### Giving tablets

#### Attention

- **Do not crush enteric-coated tablets or slow-release tablets.** If not sure — check prescription or refer to a reference manual

#### What you do

- **To halve tablets**
  - Only halve tablets that have a line — F 10.5
  - Use a tablet cutter or sharp knife on clean piece of paper towel
- **To crush tablets**
  - Check manufacturer's instructions to see if this is OK
  - Crush between 2 spoons or use pestle and mortar. Mix with honey and/or give with a drink of water



10.5

### Giving syrups

#### What you do

- If syrup not premixed — add exact amount of sterile water prescribed on bottle. If sterile water not available — use clean tap water
  - Use graduated measure or syringe for exact measurements
- Shake syrup bottle to mix well. Watch for powdery lumps
- Put medicine cup on bench and bend down so cup at eye level to check you are pouring out exact amount. If amount small — use syringe

### Giving medicines under tongue (sublingual) or inside cheek (buccal)

#### Attention

- Sublingual medicines may only be effective for a certain period of time after opening (eg 3 months)
  - **Do not** use if packet open and has no date, or has been open too long
- When opening new packet, write today's date on it
- Get person to wet tablet with saliva and put under tongue. Wait for it to dissolve. If any tingling — tell them to put in cheek instead

## Putting medicine patches onto skin (transdermal)

### Attention

- Follow instructions for individual patches — see *AMH*
- Make sure **old** transdermal patch removed
  - Some are replaced straight away, others need to stay off for 10–12 hours (eg glyceryl trinitrate)
- Rotate site used for patches
- Check how long new patch should stay on — may be hours or days
- Wear gloves *OR* if too difficult to put on patch wearing gloves — wash hands straight afterwards so you don't absorb any medicine yourself
- Dispose of patch safely — follow policy for medicine type in the patch

### What you do

- Clean, carefully dry new site. If person hairy — shave area so patch sticks
- Write time and date applied on edge of patch
- Take foil off patch, smooth patch onto site sticky-side down
- If person very sweaty or weather hot or humid — put plastic see-through dressing or paper tape over patch to keep in place

## Giving medicine through nasogastric tube

See *Putting in nasogastric tube* ([p81](#)).

### Attention

Tube **must** be in right place before you start giving medicine.

### What you need

- pH test strip to test tube's position
- 10–20mL syringe barrel — you don't need plunger
- Medicine in a medicine cup
- 20mL of tap water in a cup

### What you do

- Test that tube is in stomach ([p83](#))
- Fold small piece of nasogastric tube over to clamp it off
- Take out tube stopper/plug, connect syringe barrel to tube
- Pour dose of medicine into syringe barrel
- Unfold tube, hold tube and syringe up high to let medicine flow down tube.  
**Do not** force with syringe plunger
- When empty, add 10–20mL of water to syringe barrel, hold it up to flush.  
When empty, fold tube over again to clamp it off
- Take off syringe, unfold tube, put back stopper/plug

## Giving rectal suppositories

### Attention

- **Do not** let suppository get too warm, will soften and be hard to put in

### What you do

- Lie person on left side, ensure privacy
- Take suppository out of packet, lubricate pointy end
- Separate buttocks, ask person to breathe deeply and try to relax
- Gently push suppository into anus (pointed end first), to length of your finger — F 10.6
  - Adults and older children — use forefinger
  - Younger children and infants — use little finger
- Do again if second suppository needed
- Take out finger, gently hold buttocks together until urge to pass faeces stops
- Wipe area with tissues



10.6

# Giving injections

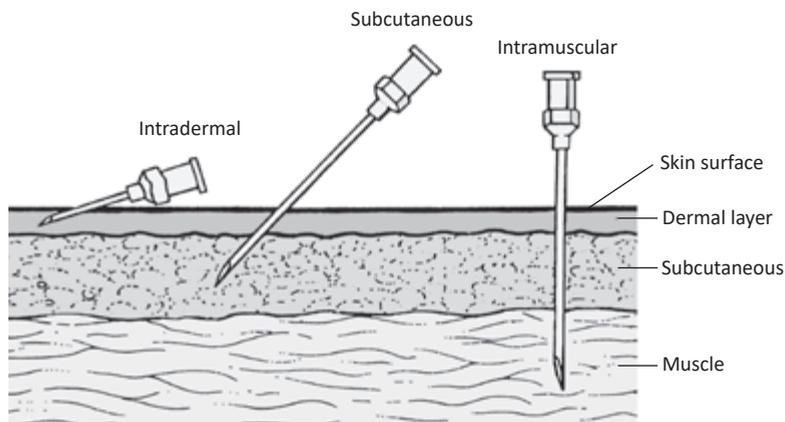


## Attention

To prevent needle stick injuries, always carry injections in plastic tray or kidney dish, and have a sharps container close by.

- **Before giving injection**
  - Always check file notes, ask person about allergies or adverse reactions
  - Remember the RIGHTS before giving any medicine ([p338](#))
  - Always check manufacturer's instructions
  - If injection site dirty or bloody — wash with soap and water
- **Preparing injection**
  - Draw up solution, put draw up needle in sharps container
    - Except insulin syringes — needles can't be removed
  - Put on fresh, sterile needle to give injection
- **To stop injection stinging**
  - Before giving — clean site with alcohol wipe, let dry completely
  - After giving — use gauze or cotton wool to press down firmly on site
  - Check manufacturer's guidelines

## Angle and depth of injections — F 10.7

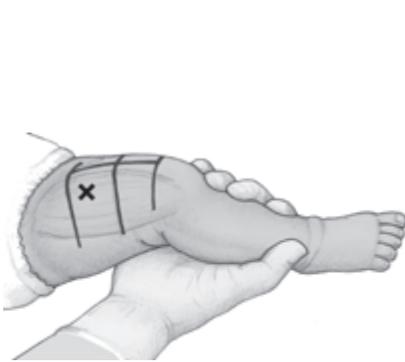


10.7

## Injection sites

### Subcut or IM injection sites

- Outside (anterolateral) thigh (vastus lateralis), baby or toddler — F 10.8
- Outside (anterolateral) thigh (vastus lateralis), child or adult — F 10.9
- Upper arm (deltoid) — F 10.10
  - **Do not** use for children under 12 months
  - Best site for small injections in adults



10.8



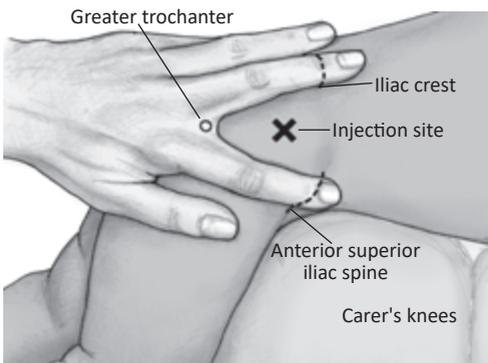
10.9



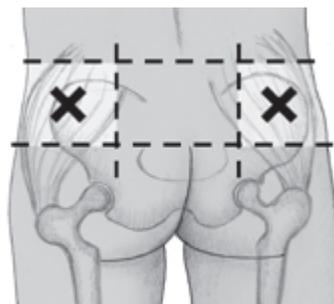
10.10

### IM injection sites

- Ventrogluteal — F 10.11
  - Better than buttocks (gluteal) as less risk of damage to nerves or blood vessels
  - Best site for large injections in adults
  - Child — lie over carer's knee, upper leg flexed
  - Adult — lie on side, upper leg flexed and forward
- Buttock (gluteal) — F 10.12
  - **Do not** use for babies, toddlers, small preschool children



10.11



10.12

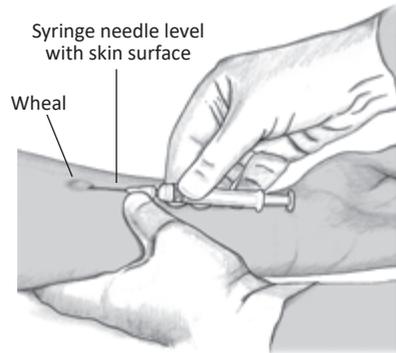
## Intradermal injections

### Attention

- Used for Mantoux test or Mycobacterium bovis (Bacillus Calmette and Guerin [BCG] strain) vaccine

### What you need

- Injection tray
- Insulin syringe
- Gauze swab
- Injection solution



10.13

### What you do

- Choose injection site, clean if needed, let dry completely
- Draw up solution
- Hold syringe with needle lying flat to skin and bevel edge facing up
- Slide needle under skin until it disappears, then a **little** further so it goes into intradermal tissue. **Keep level with skin** — F 10.13
- Slowly inject solution until you see raised area (wheal)
- **If wheal is not appearing** — adjust needle position and continue injection
  - **Do not** repeat dose
- **Do not** put pressure on site after taking out needle. Ask person to blow on area until it dries
- **Do not** rub site or put on sticking plaster. Leave open to air

### Mantoux test or Mycobacterium bovis (Bacillus Calmette and Guerin [BCG] strain) immunisation

- First check person's Mantoux status
- Only give Mantoux test or BCG immunisation if authorised to do so
- Mantoux test — usually given in inner forearm — F 10.13
- BCG immunisation
  - Give in upper arm (deltoid area)
  - Check regional guidelines to see if right or left arm used
- **Never** cover Mantoux test or BCG immunisation injection site with dressing

## Subcut injections

### Attention

- If person has daily injections (eg insulin for diabetes) — change injection site often

### What you do

- For angle and depth of injection — see F 10.7
- For injection sites — see F 10.8 – F 10.10
  - Fatty pad below umbilicus can also be used in diabetes

## Subcut cannula

### Attention

- Used for people in palliative care or who can't swallow medicines
  - More comfortable than repeated IM or IV injections
  - Less likely to become infected
- **Do not** use metal butterfly needles. Less comfortable and site needs to be changed more often
- Subcut catheter system (eg *Intima*) — F 10.14 allows regular administration of medicine by
  - Injecting into side portal
  - *OR* continuous infusion through syringe driver
- If catheter system not available — use 22–24G cannula



10.14

### What you do

#### Choose site

- Rotate sites. Make a plan using sites that allow person the most movement. Consider these sites
  - Intercostal spaces on anterior chest wall
  - Above pectoralis muscle
  - Anterior abdominal wall — **do not** use if ascites, abdominal disease, oedema
  - Upper arm — **do not** use if bed-bound and needs frequent turning
  - Outer thigh
  - Above shoulder blades — good if person restless or disorientated
- **Do not use**
  - Breast tissue or skin folds
  - Portacath or CVC sites
  - Stoma sites
  - Tumour masses, tumour nodules, oedematous areas
  - Scar tissue, mastectomy sites
  - Bony areas

#### Insert subcut catheter system or cannula

- Trim hairs if needed. Clean site with alcohol swab, allow to dry
- Lift fold of skin between forefinger and thumb, insert full length of cannula at 30° angle
- Tape down butterfly flaps with transparent film dressing
- Remove metal insert, put in sharps container
- Attach injectable bungs to outlets (if not already there)
- Prime line with sterile water or normal saline before injecting medicine

**Follow-up**

- Label site with date of insertion, record site in file notes
- Check site before giving injection
- Check site regularly for swelling, redness, leakage when injection given
  - If present — change site straight away
  - If not present — change site in 7–10 days

**IM injections****Attention**

- Using small bore needle **causes more pain**, as more pressure needed
- Usually use 25mm long needle. Use 16mm for small babies
  - For ventrogluteal or buttocks — use 38mm if obese
  - For gluteal — use 50.8mm if very obese

**What you do**

- Choose site — F 10.8 – F 10.12
  - If repeat injection — use different site to last time
- Position limb so muscle being injected into is relaxed
  - Ventrogluteal
    - Child — lie over carer's knee, upper leg flexed
    - Adult — lie on side, upper leg flexed and forward
  - Buttock — stand bent forward with hands on bed *OR* lie on stomach (prone) with foot on same side turned inward
    - If person large or tall — suggest lying down, won't hurt themselves or you if they faint
  - Outside thigh — lie on back (supine) with toes pointing straight up
  - Upper arm — sit with elbow bent and forearm supported
- Clean site if needed, let air dry
- Pull skin tight, or use Z-track method ([p350](#)) — insert needle quickly at 90° to skin
- Only if giving in buttock — pull back plunger a little to make sure you are not in blood vessel. If blood seen — change site
- Slow steady injection
- Remove needle quickly, apply pressure to injection site

**To lessen pain of thick injections — benzathine penicillin (penicillin G), procaine benzylpenicillin (procaine penicillin)**

- Mix well by shaking
- *OR* warm and mix by rolling syringe in your hands for 1 minute
- Use needle provided with pre-loaded syringe
  - **Do not** change to smaller bore needle, more likely to get blocked
  - **Do not** pre-load needle — leave hollow of needle empty

- Before injecting
  - Put ice pack on site
  - Press **hard** on site with thumb and count to thirty (30–60 seconds)
- These injections are very painful. Best to have helper, patient may try to grab syringe

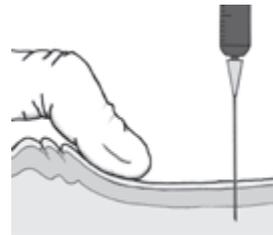
## Z-track injections

### Attention

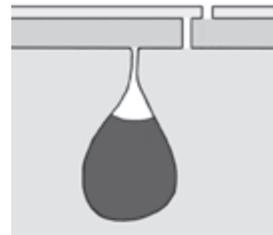
- Use for
  - Thick injection fluids (eg benzathine penicillin [penicillin G]) — can leak out through large bore needle track
  - Iron injections — can permanently stain skin if solution leaks out

### What you do

- Choose site
  - Larger/older children and adults — IM into
    - Ventrogluteal — F 10.11
    - *OR* buttocks — F 10.12
  - Small children — IM into
    - Outside (anterolateral) thigh — F 10.8, F 10.9
    - *OR* ventrogluteal — F 10.11
- Pull skin down from chosen site, hold in this spot — F 10.15
- Put needle into muscle and give injection slowly
- When finished, leave needle in place for about 10 seconds. This stops medicine solution leaking out onto skin surface
- Take needle out, let go of skin — this will make Z-track — F 10.16



10.15



10.16

# Giving medicines and injections to babies and young children



## Attention

- One option may be to have parent give medicine with adequate training

## What you do

### For infants

- Use dropper or syringe to put one drop at a time onto tongue and wait for them to swallow — F 10.17
- *OR* use syringe nozzle between gums and cheek to give small amounts at a time — wait for swallow reflex
- *OR* if breast fed — use syringe nozzle between breast and side of baby's mouth to give small amounts at a time — F 10.18



10.17



10.18

### For young children

- Hold in positions shown — F 10.19, F 10.20, F 10.21
  - If kicking — put legs between carer's thighs and ask carer to hold tight
- For medicine — keep medicine cup to lips, so if child spits out syrup you can catch it and give it to them again



10.19



10.20



10.21

# Giving IV medicines by injection

---



Many different plastic connections are used to give IV medicines through cannula bung. These instructions are general principles only.

## Attention

- **Do not** give medicine if cannula site painful, red, swollen — resite cannula
- Some IV medicines should be given very slowly — check before use

## What you need

- Injection tray with 2 syringes
  - One with medicine to be given (drawn up ready)
  - One with IV flush (usually **normal saline**)
- Needles *OR* connections that go into IV bung, if needed
- Chlorhexidine 2% in isopropyl alcohol 70% wipes
- Medicine label — to be put on paediatric chamber or in-line burette

## What you do

- Find IV bung — under bandage or on IV line
- Clean bung with chlorhexidine 2% in isopropyl alcohol 70% wipe for 30 seconds, let dry
- If using IV cannula — flush to make sure cannula is clear
- If IV running — stop flow using plastic clamp
- Pierce IV bung with needle/connection on medicine syringe
- Give medicine at right speed
  - If using paediatric chamber — set drip rate you need, put medicine label onto chamber
- **Watch person closely** for signs of reaction to medicine or pain around cannula. If either happen — **stop immediately**
- When finished — take needle/connection out of bung
- If using IV cannula — use IV flush to clear cannula of medicine
- If using IV line — restart IV slowly to flush, then return to drip rate needed
- Stay with person for a few minutes to make sure they feel alright
  - Check temp, pulse, RR, BP

## Giving iron by IV infusion



### Attention

- **Procedure only applies to giving ferric carboxymaltose (eg *Ferinject*)**
  - Available in 2mL (100mg iron) and 10mL (500mg iron) vials
- Doctor, nurse, midwife or ATSIHP trained in life support must stay with person during infusion
- Have anaphylaxis kit and emergency equipment ready in case of reaction (rare)
  - If any signs of adverse reactions — **stop** infusion straight away
- Infusion pump must be used
- **Do not** use in first 3 months of pregnancy

### What you need

- Ferric carboxymaltose (eg *Ferinject*)
- Normal saline infusion bag
- 10mL normal saline ampoule
- Drawing up equipment — 10mL syringe, 18G needles x 2
- IV giving set
- IV infusion pump
- Additive labels/IV bag sticker
- Chlorhexidine 2% in isopropyl alcohol 70% wipes
- Tape
- Bluey
- Tourniquet
- IV cannula — 18G–20G for adult, 22G–24G infants and children
- See-through dressing

### What you do

- Check temp, pulse, BP, RR, cannula site
    - Before starting infusion
    - 5 minutes after starting infusion
    - Every 15 minutes during infusion
    - When infusion complete
  - If pregnant — also check fetal heart rate before starting and after procedure
- 
- Work out dose of ferric carboxymaltose, amount of normal saline needed, infusion rate
    - Adult— see relevant anaemia protocol
      - Adult ([CARPA STM p304](#))
      - Pregnant woman ([WBM p134](#))
    - Child — **medical consult**

- Ask another practitioner to check
  - Dose, infusion rate
  - That you have correct form of iron solution — **do not** use iron polymaltose
- Check vials have no sediment
- Wash hands and put on gloves
- Draw up dose of **ferric carboxymaltose**, remove needle
- Add dose of **ferric carboxymaltose** to correct sized **normal saline** infusion bag
  - Clean bung with chlorhexidine 2% in isopropyl alcohol 70% wipe for 30 seconds, let dry
  - Use new needle
- Tip bag up and down (invert) several times to make sure the contents are well mixed
- Fill out additive label and stick onto infusion bag
- Put together IV giving set, prime line with fluid, let out any air bubbles
- Attach giving set to IV infusion pump
- Put in IV cannula ([p84](#)), check and secure with tape
  - Flush with 5–10mL normal saline to make sure you are in vein. Should be no swelling above cannula site
- Connect and run iron infusion
- Put see-through dressing over cannula
  - Signs of irritation around cannula may mean dose or infusion rate needs to be changed — **medical consult** if not sure
- Person should stay at clinic for at least 30 minutes after end of infusion
  - Check temp, pulse, BP, RR before they leave clinic
  - If pregnant — also check fetal heart rate

# Giving oxygen

Table 10.1: Oxygen flow rates

| Oxygen delivery system                  | Oxygen flow rate<br>Infant under 1 year   | Oxygen flow rate<br>Child 1–9 years | Oxygen flow rate<br>10 years and over | Examples of medical conditions   |
|---|---|-------------------------------------|---------------------------------------|--|
| Nasal prongs / cannula (not humidified) | 1–2L/min  | 1–2L/min                            | 2–4L/min                              | <ul style="list-style-type: none"> <li>• Bronchiolitis</li> <li>• Mild pneumonia</li> <li>• COPD</li> </ul>  |
|   | Target O <sub>2</sub> sats — 94–98%   |                                     |                                       |  |
| Simple mask (eg Hudson mask)            | 5–10L/min   |                                     |                                       | <ul style="list-style-type: none"> <li>• Bronchiolitis</li> <li>• Pneumonia</li> <li>• Chest pain with hypoxia or breathlessness</li> <li>• Moderate asthma</li> </ul> |
|   | Target O <sub>2</sub> sats — 94–98%   |                                     |                                       |  |
| Non-rebreather mask                     | 10L/min   | 10–15L/min                          | 15L/min or more                       | <ul style="list-style-type: none"> <li>• Critically ill but adequate breathing — shock, major trauma, sepsis</li> </ul>  |
|   | Target O <sub>2</sub> sats — 94–98%   |                                     |                                       |  |
|   | Make sure flow from wall/cylinder to mask is enough to keep reservoir bag fully inflated during whole respiratory cycle (inspiration and expiration). |                                     |                                       |  |
| Air-entrainment (venturi) mask          | Variable L/min  | Variable L/min                      | Variable L/min                        | <ul style="list-style-type: none"> <li>• COPD</li> <li>• Bronchiectasis</li> <li>• Morbid obesity</li> </ul>   |
|   | Target O <sub>2</sub> sats — 88–92%   |                                     |                                       |  |
| Bag-valve-mask (BVM)                    | 8L/min  | 8L/min                              | 15L/min                               | <ul style="list-style-type: none"> <li>• Respiratory arrest</li> <li>• Cardiac arrest</li> <li>• Inadequate spontaneous ventilation</li> </ul>                         |
|   | Target O <sub>2</sub> sats — 100%   |                                     |                                       |  |

## How much oxygen to give (adult and child)

- Important to check person's response to oxygen treatment often, and increase or decrease if needed. **Medical consult** if not sure
- If not breathing, or very poor respiratory effort — use bag-valve-mask at 8–15L/min
- If critically unwell — use non-breather mask at 10–15L/min
  - Aim for O<sub>2</sub> sats of 94–98%
- If condition such as chest pain or respiratory condition (eg pneumonia, asthma) — first use simple oxygen mask (eg Hudson mask) at 5–10L/min
  - Aim for O<sub>2</sub> sats of 94–98%
  - If improving — use less oxygen via nasal prongs

- If moderate/severe COPD — use nasal prongs or air-entrainment (venturi) mask and less oxygen
  - Aim for O<sub>2</sub> sats of 88–92%

### Oxygen delivery devices

#### Nasal prongs/cannula — F 10.22

- Uses
  - Oxygen needed for long periods. Lets patient eat, drink, talk
  - Babies/young children with pneumonia who won't tolerate face mask
- Flow rate
  - 2L/min = 28% inspired oxygen concentration
  - 4L/min = 36% inspired oxygen concentration



10.22

#### Simple mask — F 10.23

- Uses
  - Adults/older children with pneumonia or other moderate respiratory illness
- Flow rate
  - 5–6L/min = 40% inspired oxygen concentration
  - 7–8L/min = 60% inspired oxygen concentration
  - Give over 4L/min (child) or 6L/min (adult) to remove expired air from mask and prevent rebreathing of CO<sub>2</sub>
  - Giving over 10L/min will not increase percentage of oxygen given



10.23

#### Non-rebreather mask — F 10.24

- Uses (for high flow oxygen)
  - Critically ill but adequate breathing — shock, major trauma, sepsis
- Flow rate
  - 15L/min = 85–90% inspired oxygen concentration
- Before using — make sure
  - Reservoir bag full
  - Mask seals properly around mouth and nose (strap tight)



10.24

#### Air-entrainment (venturi) mask — F 10.25

- Uses
  - Acute exacerbation of COPD
- Flow rate
  - Gives 24%, 28%, 31%, 35%, 40%, or 60% inspired oxygen concentration
  - Oxygen must be set at recommended flow rate for required concentration
    - Flow rate listed on valve



10.25

**Bag-valve-mask — F10.26**

- Uses (for positive pressure ventilation)
  - Not breathing (apnoea), cardiac arrest, inadequate respiratory effort
- Flow rate
  - 15L/min = 90–100% inspired oxygen concentration
- Before using — make sure
  - Valve opens properly
  - Reservoir bag full
  - Mask seals properly around mouth and nose (essential)
  - Airway open (essential)

**10.26**

# 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 10.2: Calculating doses**

| TABLETS  |  |
|--|--|
| Number of tablets needed =<br>dose needed [a] ÷ strength of tablet [b]   | <i>Example:</i><br>Dose needed is 15mg [a]<br>Strength of tablet is 10mg [b]<br><b>Number of tablets =</b><br>15mg ÷ 10mg = 1.5 (1½) tablets           |
| MIXTURES<br>OR INJECTIONS — small volume IM or IV push   |  |
| Volume needed (mL) =<br>(dose needed [a] ÷ strength of mixture<br>or injection [b])<br>x volume this strength is in mL [c] | <i>Example 1:</i><br>Dose needed is 300mg [a]<br>Strength is 250mg/5mL [b/c]<br><b>Volume needed =</b><br>(300mg ÷ 250mg) x 5mL = 1.2mg x 5mL<br>= 6mL |
|  | <i>Example 2:</i><br>Dose needed is 20mg [a]<br>Strength is 30mg/mL [b/c]<br><b>Volume needed =</b><br>(20mg ÷ 30mg) x 1mL = 0.67mg x 1mL<br>= 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 10.3: Calculating drip rates and infusion rates for IV fluids**

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

# Inhalation devices for respiratory medicines



- See *National Asthma Council* website ([www.nationalasthma.org.au](http://www.nationalasthma.org.au)) for
  - Videos and guides demonstrating use of commonly used delivery devices
  - Asthma and COPD medicines chart

## Attention

- Help person become familiar with their own medicine
- Always check package insert for specific instructions about person's device
- Make sure your clinic always has emergency supply of extra inhalation devices for people living and travelling in remote and rural communities
- If person's condition doesn't improve with normal medicine — follow **asthma or COPD action plan**
  - If they don't have plan — talk with health team about developing one

## Puffer (metered dose inhaler/MDI)

Aerosol inhaler that gives medicine straight to airways as fine mist — F 10.27. Many different medicines in aerosol form.



10.27

## Attention

- Best if used with a spacer ([p364](#))
- Tell person — when device empty
  - Throw away in sealed bag or container
  - **Do not** throw on fire. Pressurised — could explode
- To clean — take metal canister out. Wash plastic holder/mouthpiece in warm soapy water, rinse, air dry. Put canister back
  - Some inhalers (eg *Intal*, *Tilade*) need daily washing to stop them clogging

## What you do

### Using without a spacer

- Take cap off mouthpiece, shake inhaler for 10 seconds
- Breathe out completely, tilt head back slightly
- Put mouthpiece between teeth without biting, close lips to form good seal
- Put finger on top of canister, press once firmly and **at same time** take a slow deep breath all the way in
- Hold breath for 10 seconds, while taking mouthpiece out of mouth
- Breathe out slowly away from mouthpiece
- If another dose (puff) needed — wait 1 minute then repeat
- Put mouthpiece cap back on, store inhaler in cool place

### Using with a spacer

- See *Spacer devices for respiratory medicines* ([p364](#))

## Turbuhaler

Dry powder inhaler — F 10.28.

### Attention

- **Do not** get *Turbuhaler* wet
- **Do not** blow into *Turbuhaler*. Breathe out away from mouthpiece
- To clean — use dry clean cloth to wipe device and mouthpiece. **Do not** get wet



10.28

### What you do

- Remove cover, check dose counter
- Hold *Turbuhaler* upright while priming — twist grip right around and then back until click heard
- Breathe out away from mouthpiece
- Put mouthpiece between teeth without biting, close lips to feel good seal
- Breathe in strongly and deeply, remove inhaler from mouth
- Breathe out gently away from mouthpiece, replace cover

## Nebuliser

Used in clinic with oxygen for severe and life threatening asthma — F 10.29.

### Attention

- Relievers (bronchodilators) work as well with puffer and spacer as with nebuliser. Only use nebuliser for severe cases
  - 12 puffs salbutamol = 5mg salbutamol



10.29

### What you do

- Check strength of medicine in nebule to be used with nebuliser — most come in more than one strength
- Different nebuliser solutions can be mixed in bowl (eg salbutamol with ipratropium)
- Dilute with **normal saline** if needed

## HandiHaler

Used to deliver tiotropium powder from capsule — F 10.30.

### Attention

- **Do not** swallow capsules. Breathe in contents using *HandiHaler* — F 10.30
- **Do not** breathe into device
- To clean — wipe daily with clean dry cloth. Wash complete device as needed, allow to air dry



10.30

## What you do

- Open cap, open mouthpiece, put fresh capsule in chamber
- Close mouthpiece until it clicks, to pierce capsule
- Breathe out gently away from mouthpiece
- Put mouthpiece between teeth without biting and close lips to form good seal
- Breathe in slowly and deeply, so capsule vibrates
- Hold your breath while taking mouthpiece out of your mouth
- Breathe out gently away from mouthpiece
- Put mouthpiece back into mouth and repeat
- Open mouthpiece, remove used capsule, close mouthpiece and cap

## Accuhaler

Dry powder inhaler — F 10.31.

### Attention

- Hold accuhaler horizontally when loading and taking dose, or medicine may be dislodged
- **Do not** breathe into device or leave cover open — moisture will get in
- To clean — use dry clean cloth to wipe device and mouthpiece. **Do not** get wet



10.31

## What you do

- Check dose counter
- Open using thumb grip
- Holding horizontally, load dose by sliding lever until it clicks
- Breathe out gently away from mouthpiece
- Put mouthpiece in mouth and seal lips, breathe in steadily and deeply
- Hold breath for about 10 seconds or as long as comfortable
- While holding breath, remove inhaler from mouth
- Breathe out gently away from mouthpiece
- Close cover to click shut

## Ellipta

Dry powder inhaler — F 10.32.

### Attention

- Every time you slide cover down a dose is loaded
  - Dose is lost if you open and close cover without inhaling the medicine
- **Do not** breathe out into device
- Dispose of device 6 weeks after opening
- To clean — use dry clean cloth to wipe device and mouthpiece. **Do not** get wet



10.32

## What you do

- Check dose counter
- Slide cover down to see the mouthpiece. Should hear a click
- Breathe out fully away from mouthpiece
- Close your lips firmly around mouthpiece so lips fit over curved shape of mouthpiece
  - Don't block air vents with your fingers
- Take 1 long, steady, deep breath in through mouth
- Remove inhaler from your mouth and hold your breath for 3–4 seconds
- Breathe out slowly and gently away from mouthpiece
- Slide cover up over the mouthpiece
- If another dose (puff) needed — wait 30 seconds then repeat
- After use — rinse mouth thoroughly with water then spit out

# Spacer devices for respiratory medicines



Helps person using puffer (metered dose inhaler/MDI) (p360) to get correct dose of medicine. Encourage for all users, especially children and the elderly. Reduces side effects (eg oral thrush, hoarse voice).

- Puffer and spacer as effective as nebulisers for reliever medicines

## Attention

Everyone using a spacer needs to know how to make bush spacer (p365) — may save a life.

- If inhaler won't fit spacer — use a different spacer or ask your pharmacist about a mouthpiece adapter
- Keep spacers of each size in clinic for people to practise with

**Remember:** Only spray 1 puff at a time into spacer.

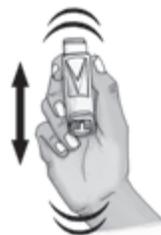
- Each puff is sprayed into spacer and inhaled for a few breaths before next puff

All spacers (including bush spacers) should be

- **Primed before first use** — reduces static charge on inside so medicine won't stick, works more effectively
  - Wash spacer in warm water with a little dishwashing detergent
  - **Do not** rinse
  - Leave to air dry
- **Maintained**
  - Wipe mouthpiece/mask with damp cloth — daily or after each use
  - Wash in warm soapy water, don't rinse, leave to air dry — once a month
    - Don't wash more often or more medicine will stick to walls of spacer

## What you need

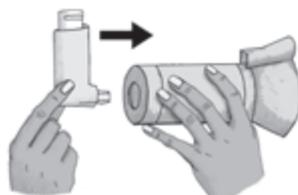
- Spacer — check best size for person, one they will use/carry with them
- Person's puffer/aerosol inhaler with prescribed medicine
- Mouthpiece adaptor if needed



10.33

## What you do

- Take mouthpiece cap off puffer, shake puffer for 10 seconds — F 10.33
- Put puffer mouthpiece into hole in spacer opposite spacer mask or mouthpiece — F 10.34
- Hold spacer long ways (horizontally) with one hand and puffer with other hand — F 10.35
- Seal lips around spacer mouthpiece, or fit mask



10.34

- Press puffer canister once only — F 10.36
- Take a few breaths — F 10.37
- Do this for as many puffs as prescription says
- Take puffer off spacer, put cap back on puffer mouthpiece



10.35



10.36



10.37

## To make emergency bush spacer

### What you need

- 1 x 500–600mL plastic water or soft drink bottle — F 10.38
- Scissors or soldering iron

### What you do

- Soften bottom plastic soft drink/water bottle in hot water
- Cut or melt hole the same size and shape as inhaler mouthpiece into bottom of bottle
- Fit inhaler into hole — F 10.39. Use as above



10.38



10.39

