

# 11 Pathology

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# Storing and transporting pathology specimens



## Attention

- **To collect, store and transport pathology correctly you MUST be in contact with your laboratory** — visit them when in town and find out about particular issues for your region or clinic
- Remember:** All pathology specimens must be treated as a **biohazard** during collection, storage and transport. Always wear gloves and goggles.

- **Do not** collect specimens
  - That are not needed (eg test already done in past 3 months)
  - That can't be transported to pathology in a reasonable time
- **Collection of pathology is part of providing a service to patients** — take care to do it right
  - Right person, Right test, Right tube, Right process, Right storage, Right transport, Right recall system
    - Results need to be followed up whether you are there or not — especially abnormal results
- All specimens **must be labelled correctly** or laboratory will throw them away
- Must use packing and specially made container to transport specimen samples by air (IATA packing instructions 650)
  - Commercial airlines and air retrieval services must abide by these regulations
  - Check and follow your local protocols, or courier may refuse to take them
- If samples need to be transported under refrigeration — try to collect 6 hours beforehand to allow time for temperature to drop

## What you do

- Label all specimens
  - Follow instructions on sticky label on tube/swab container/slide holder
  - Minimum information needed
    - Full name including skin/bush names etc as recorded on file notes
    - Date of birth
    - Exactly what specimen is (eg blood, wound swab)
    - Date specimen collected

**Note:** If using pre-printed identification labels — make sure you add **exactly** what the specimen is (eg swab from left eye)

- Make sure all screw/push tops are firmly in place
- All specimens are stored in sealed biohazard plastic bag inside sealed container
  - Store as needed at room temperature *OR* refrigerated (in fridge) *OR* frozen (in freezer)

- Completed pathology forms must be kept with specimens, but not in same compartment in case of leakage. Use plastic sleeve on side of pathology bag

### To transport specimens

- **Fridge or freezer specimens in sealed bags**
  - Put absorbent material (such as blueys) in biohazard bags with specimens in case of leakage — F 11.1
  - Put into recommended transport container/esky with wrapped ice brick in base and another on top
  - Seal lid as instructed or with waterproof tape
- **Room temperature specimens in sealed bags**
  - As above — without ice bricks
- **Label all containers clearly with**
  - Place, date, time of packing, and destination
  - Biohazard sticker (in Australia UN3373) — F 11.2. If no sticker — write it in big letters using black marker
- Make sure courier knows what contents are — so they will not be left in a hot place, will be delivered to laboratory as soon as possible



11.1



11.2

# Collecting blood samples



Taking blood samples using needles, cuvettes, test strips etc.

## Attention

*Vacutainer* barrel and needle safest way to take blood — helps prevent needle stick injuries.

- Warm cloth will improve blood flow to needle site
- **Do not** use cuff or tourniquet for more than 1 minute
  - Instead of using tourniquet on small children, can ask helper to squeeze evenly around limb with hands
- If person had mastectomy or fistula — use other side
- Always let skin dry completely after wiping with alcohol

**Note:** If you don't have *Vacutainer* equipment, or veins thin or difficult to find — use ordinary 21G needle and syringe, or butterfly needle. Both hard to control with wriggling child, you will need help.

## What you need

- Tourniquet, blood pressure cuff, or helper's hand
- Alcohol wipes
- *Vacutainer* barrel and needle
  - *OR* syringe and 21–25G needle
  - *OR* butterfly (scalp vein) needle, 21–25G with screw-top bung
- Blood tubes — type depends on test/s
- Tray for standing tubes upright
- Gauze swab or cotton wool ball
- Small sticking plaster
- Centrifuge for spin (if needed)
- Sharps container

## What you do

- If taking more than one sample — follow Table 11.1

### 4 ways to take blood from vein

#### 1. Using *Vacutainer* needle and barrel

- Connect needle to barrel — F 11.3
- Choose site
  - If elbow crease — put arm straight, rest on pillow/table covered with bluey
- Put on tourniquet *OR* squeeze with helper's hand *OR* use adult/paediatric cuff inflated to 80mmHg



11.3

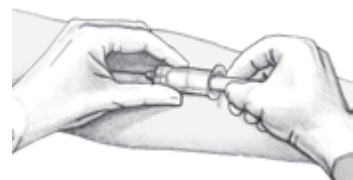
Table 11.1: Order of blood collection

Order	Contents	Test
Take first ↓ Take last	Aerobic Anaerobic	• Blood cultures — paired tubes or bottles
	Sodium citrate	• Clotting studies — INR, APTT, PT
	Heparin	• Clozapine, perhexiline • Cholinesterase, transketolase • Cell surface markers, cytogenetics
	EDTA 10mL	• Blood group and cross match • Renin, ACTH • CMV culture/DNA PCR
	EDTA 4mL	• FBC, ESR, Hb, Hb electrophoresis, red cell folate, haemochromatosis study, viscosity • HbA1c • Ciclosporin, tacrolimus • Viral load/RNA PCR • Mercury, lead
	Fluoride EDTA	• Glucose, alcohol, lactate, homocysteine
	Gel — gives clotted blood for serum	• UEC, creatinine, calcium, phosphate, magnesium • LFT, TFT • CRP • CK, LD • Uric acid (urate), lipids, alcohol • Iron studies, vitamin B12, folate • PSA, other tumor markers • Drugs, hormone levels, viral antibody screens, serum EPG, troponin

- Stretch skin over site, feel for swollen vein. Choose the one that **feels** biggest — may not be easiest to see
- Clean site with alcohol wipe and let dry
- Use main (dominant) hand. With bevel of needle facing up, push needle in along vein — F 11.4
- When needle in vein, use other hand to steady *Vacutainer* barrel against skin before putting first blood tube into barrel — F 11.5
- Push tube into barrel until grey puncture needle has gone through tube's rubber stopper. Blood will flow into vacuum sealed tube on its own
- Wait until blood has stopped flowing into tube
- Steady *Vacutainer* barrel against skin with one hand, take out blood tube with other

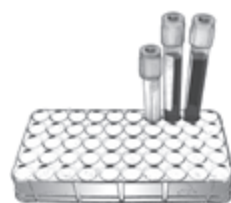


11.4



11.5

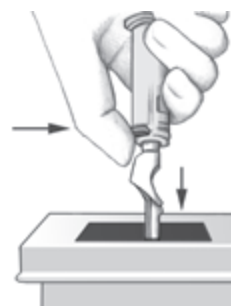
- Some blood tubes need mixing straight away, so invert tube once and stand up in tray — F 11.6 before putting next tube in barrel
- Do this until all tubes have been filled
- Take last tube out of barrel — unless also making a blood slide (p374)
- **Then** undo tourniquet
- Now take needle out of vein
- Put pressure over bleeding site using dry gauze swab or cotton wool ball
- Ask person to press on site. If using arm — keep straight to prevent bruising
- **Do not** take used needle off a syringe or *Vacutainer* barrel with your fingers
  - Use needle release device if *Vacutainer* has one — F 11.7, F 11.8
  - *OR* use groove at top of sharps container to unwind or pull off needle
  - *OR* put both syringe or barrel and needle straight in to sharps container
- When bleeding from needle site stopped, put on small sticky plaster or cotton wool ball and paper tape



11.6



11.7



11.8

## 2. Using butterfly needle

- See *Butterfly needle* (p86)

## 3. Using ordinary needle and syringe

- Connect needle and syringe — size according to vein
  - 25G for small children, 21G for adult
- Put needle into vein. See *Using Vacutainer needle and barrel* (p370)
- Take amount of blood you need to fill blood tubes, then undo tourniquet
- Take out needle, put pressure over bleeding site using gauze swab or cotton wool ball, ask person to press on site
- Carefully push needle through rubber stopper of first tube. Blood will flow into tube by itself
- Wait until flow stops, take needle out, invert tube, stand tube upright in tray. Do this until all tubes filled
- When bleeding from needle site stopped, put on small sticky plaster or cotton wool ball and paper tape

## 4. Using needle — good for small veins in children or the elderly

- Take rubber stoppers off tubes (be careful not to tip them), stand in tray
- Put needle into vein — F 11.9. See also *Using Vacutainer needle and barrel* (p370)



11.9

- Let blood drop into tube — F 11.10 until you have amount needed
- Undo tourniquet, take out needle and press firmly on site with cotton wool ball
- Put stoppers back into tubes, make sure they are tight, invert tubes, stand tubes upright in tray
- When bleeding from needle site stopped, put on small sticky plaster or cotton wool ball and paper tape



11.10

### For all 4 methods

- Make sure all tubes are correctly labelled
- Spin (centrifuge) tubes if needed, put in pathology bag
- Check pathology form/s, put in bag with labelled tubes
- Store and transport as needed. Some samples may need to be refrigerated

## Common blood tests

### Whole blood (eg FBC)

- Use EDTA tubes, usually purple or pink top
- As soon as blood taken, mix well by inverting tube
- Store and transport under refrigeration — try to send same or next day

### Plasma

#### • PTH

- Use special white top PPT tube containing EDTA
- Mix well by inverting tube several times
- If more than 1 day delay getting tube to pathology — spin (centrifuge) tube
  - **Do not** separate or freeze the plasma
- Collect 1 SST tube for calcium testing at the same time — even if not requested

#### • INR

- Use blue sodium citrate tubes
- For test to work properly you **must**
  - Collect right amount of blood — fill to line indicated on tube
  - Make sure tube is in date — old tubes are not accurate
- If using butterfly needle —
  - First draw blood down empty butterfly tubing using any tube (plain one will do) then discard tube. Otherwise some blood remains in butterfly tubing and you won't collect right amount
  - Change to blue top tube
- As soon as blood taken, mix well by inverting tube
- You have 4 hours to get blood to pathology. If any chance of delay — sample must be spun, plasma separated and frozen
  - Spin (centrifuge) as soon as you can for 20 minutes
  - Lift **carefully** out of centrifuge so plasma stays separated

- Take tube top off, gently pipette clear yellowy plasma into 5mL plain screw cap tube. Be careful not to collect any red cells. If you do — put plasma back, re-spin
- To protect label during freezing — put sticky tape over label *OR* cut finger off disposable rubber glove and put 5mL container inside
- Put tube into yellow top urine jar, fill with cold water, freeze
- Transport tube in jar between 2 ice bricks — **must stay frozen in transit**

### Serum separated test (eg UEC)

- Use plain/white top or SST/yellow top (gel-filled) tubes
- **After collection** stand bloods for at least 10 minutes. Bloods need to stand upright first to clot before being spun or may get false results
- **Spin** (centrifuge) at 4200RPM for 10 minutes until serum completely separated from gel. Properly separated serum/cells in tubes will last up to 1 week if stored correctly
- **Store** in fridge and transport with ice bricks
- If you can't spin — stand or hold tube upright, pipette off serum and freeze, see INR ([p373](#)). Transport frozen

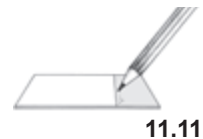
### Blood for testing glucose levels, including OGTT

- Use sodium fluoride–potassium oxalate/grey top tubes
- As soon as blood taken, mix well by inverting tube 6–8 times
- Store and transport under refrigeration as soon as you can

## Making a blood slide

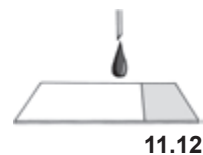
### What you need

- Pencil and pen
- Clean, dust free glass slide with frosted end
- Another slide to use as spreader
- Slide holder



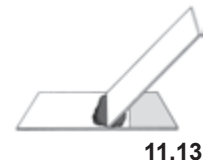
### What you do

- Label slide holder with pen, label frosted end of slide with pencil — F 11.11



### For thin film

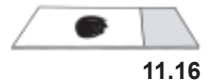
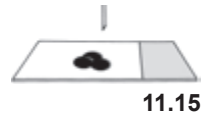
- Need enough blood to make thin 4cm smear
- **If using Vacutainer** — leave tube on needle as you take it out of arm, drop blood from needle tip onto slide — F 11.12
- **If using syringe** — put drop of blood from needle onto slide before filling tubes
- Holding spreader at 45° angle, gather blood into one spot — F 11.13
- Using **just one movement**, push blood steadily back down slide — F 11.14





**For thick film (eg malaria parasites)**

- Using *Vacutainer* or syringe put 3 drops of blood on slide — 1 in middle, 1 on either side in a triangle shape — F 11.15
- In 1 circular movement, use corner of spreader to join drops up and make round shape about 1cm (10mm) across — F 11.16

**For both thin and thick smear**

- **Leave slide to air dry**, put into slide holder
- Make sure it is correctly labelled
- Store and transport under refrigeration

**Blood cultures****Attention**

If collecting blood cultures to send to hospital with person — write in letter/referral, ring hospital to let them know it is coming.

- Blood culture bottles for adults may be larger than those for small children, depending on brand — need to stock both
- Store bottle in cool place, less than 25°C (eg pharmacy or fridge)
- On each bottle, check use-by/expiry date, colour of fluid, rubber stopper intact
- Use new, clean needle for each bottle

**What you need**

- 2 blood culture bottles (10mL or child size), aerobic and anaerobic
- Alcohol swab
- 20mL syringe
- 3 x 21G needles — 1 for taking blood, other 2 for putting blood into 2 bottles
- Artery forceps to take needle off syringe
- Tray for standing bottles upright

**What you do**

- Take off metal or plastic seals/caps
- Wipe rubber stoppers with alcohol wipe, let dry completely
- Choose injection site, take blood using 20mL syringe and 21G needle ([p372](#))
- Take enough blood for both bottles — about 15mL (6–8mL each) for 10mL bottles
- Using forceps or sharps container lid device, carefully take needle off syringe. Don't contaminate end of syringe. Put needle in sharps container
- **Put on new sterile 21G needle**, pierce rubber stopper to fill first blood culture bottle. If bottle not vacuum sealed — push blood into bottle **gently**
- **Change needle again**, fill second bottle the same way

- Mix well by inverting each bottle, stand upright in tray
- Make sure bottles are correctly labelled
- Store and transport at room temperature — remember to send with person in emergency

### Oral glucose tolerance test

75g oral glucose tolerance test (OGTT).

#### Attention

**Remember:** People who are acutely unwell (eg have a fever) may show incorrect reading.

- Record any medicines person is taking, these may affect test
- Do **fasting test** in morning. Tell person
  - Not to eat or drink anything except water for 8–12 hours before test
  - They will have to wait in clinic for 2 hours
  - Not to eat or smoke during test — water is OK, but no tea, coffee, snacks
  - To rest for 30 minutes before test, keep resting during test

#### What you need

- Pathology form
- Blood collection equipment ([p370](#))
- Calibrated glucose meter
- Pre-mixed solution containing 75g glucose *OR* 75g Glucose Challenge solution in 300mL water
- 2–3 grey top/sodium fluoride–potassium oxalate tubes, label with time collected and
  - Fasting or 0 hour
  - At 1 hour, if needed (eg 24–28 weeks pregnant)
  - At 2 hours

#### What you do

##### Collecting blood — each time

- Collect blood specimen in tube, add time taken to label
- Put drop of blood from tip of needle on glucose meter testing strip to check blood glucose levels. If higher than 12 mmol/L — see *Testing for diabetes mellitus* ([p381](#))
- On pathology form — record glucose meter BGL test result, note if fasting

##### Conducting test

- Take first blood specimen in tube labelled ‘Fasting’ or ‘0 hour’
- Give person glucose solution to drink in front of you. Should drink it all within 5 minutes
- At 1 hour if needed (eg 24–28 weeks pregnant), take second blood specimen in ‘At 1 hour’ labelled tube

- Mix well with oxalate by inverting 5–10 times
- At 2 hours, take second/third blood specimen in tube labelled 'At 2 hours'
  - Mix well with oxalate by inverting 5–10 times
- Give person a cup of tea and something to eat

**Then**

- Make sure tubes are correctly labelled
- Store and transport blood tubes under refrigeration

# Collecting blood from babies and children



## Attention

### 3 ways to collect blood from babies and children

- Skin prick — heel or finger
- From arm, hand, foot, ankle site using *Vacutainer*, ordinary needle and syringe, butterfly needle — see *Collecting blood samples* (p370)
- From scalp or jugular vein using butterfly needle

## Skin puncture — heel or finger

### Attention

**Do not** do finger prick tests on children less than 6 months old — use heel instead.

- Make sure finger or heel pink and warm so blood flows easily — keep lower than body
- If cold and blood won't flow — warm finger or heel with warm water
- **Do not** squeeze/milk heel or finger — can change results of some tests. Just let blood drip out
- See F 11.17 for correct place to prick heel or finger

### What you need

- Someone to hold child
- Lancet or lancet pen to prick skin
- Alcohol wipe
- Depending on test — cuvette, collection blotter, test strip or microtainer blood tubes (for small babies)
- Gauze swab or cotton wool ball
- Small sticking plaster



11.17

### What you do

- Choose site — see F 11.17
- Wipe site with swab and let dry completely
- Firmly hold finger/heel, prick with lancet
- Wipe away first drop of blood with gauze swab or cotton wool ball

**Note:** Pressing **firmly against skin** will help get a better puncture and blood flow

### For haematology tests

- Make a blood slide (p374)
- If more than 1 day delay getting blood slide to pathology — also take tube of blood and send in with slide

**For microtainer**

- Hold end of vent (on top of tube) up to blood drop on finger/heel, wait until blood flows in. Stop for a few seconds, then do it again
- Roll microtainer between your palms to mix anticoagulant with the blood, so it doesn't clot

**For test strip/blotter**

- Put single drop of blood on strip/blotter. Make sure test area doesn't touch skin. For blotter, fill circles using as many drops as needed
- Gently press puncture site with dry gauze swab or cotton wool ball for a few seconds, cover with sticking plaster if needed

**Using cuvette**

- See *Testing haemoglobin* (p383)

**Collecting jugular vein blood****Attention**

- Can be done safely on children of any age so long as vein can be seen clearly and child can be held securely
- Wrap child tightly (p82)
- Make sure you explain procedure carefully to carer. Can be frightening to watch, child will cry. Carer may want to wait outside
- Child's crying will make vein easier to see
- Puncture site usually bleeds heavily after procedure, hold dry gauze swab or cotton wool ball firmly against it for about 2 minutes

**What you need**

- Helper to wrap and hold child
- Sterile dressing pack
- Alcohol swab
- 5–10mL syringe
- 23G butterfly needle with screw bung
- Blood tubes — type depends on test/s
- Tray for standing tubes upright
- 2 dry gauze swabs or cotton balls
- Tape (may need)
- Small sticky plaster
- Nerves of steel (a steady hand)

## What you do

- Lay out dressing pack and equipment
- Wipe site with alcohol wipe, let dry completely
- Put on sterile gloves
- Ask helper to lie child on couch/bed with head tipped slightly downward over a pillow. Helper holds child's hands down and head back — F 11.18
- Wait for jugular vein to swell — usually very easy to see
- Make sure bung is screwed up tightly before putting needle into vein
- Fold up wings of butterfly to get a good grip
- Hold needle, bevel upward, parallel to skin, then angle down slightly and put into vein — F 11.18
- Unscrew bung on plastic tubing — blood **only flows back into tubing when bung unscrewed**. Don't forget this or you might think you are in wrong place
- Take screw top off bung, connect syringe. May need to tape butterfly to skin to stop any movement
- Take enough blood for all tests. If blood cultures needed — take separate tube of blood and give to helper to process in culture bottles
- Use dry gauze swab or cotton wool ball to apply firm (but not painful) pressure as needle is taken out
- Sit child up, comfort them while pressing on dry swab for at least 2 minutes
- **Carefully** push needle through rubber stopper of first tube. Blood will flow into tube by itself
- Wait until flow stops, take needle out, invert tube, stand tube upright in tray. Do this until all tubes filled
- Make sure tubes are correctly labelled
- Store and transport blood tubes under refrigeration. Store blood culture at room temperature



11.18

# Testing for diabetes mellitus — blood glucose and HbA1c



## Attention

**Do not** do finger prick tests on children under 6 months — use heel instead.

- Make sure you know how your machines work, how to prepare sample and read result. Read manufacturer's instructions
- Finger/heel must be very clean and dry
- Let blood drop form on its own, or apply gentle pressure if needed. Squeezing will give incorrect results

## Testing BGL with glucose meter

### Attention

- Work through these steps when teaching person to self-monitor BGL with a glucose meter

### What you need

- Warm water and soap to wash finger/heel
- Test strip
- Glucose meter — calibrated if needed
- Lancet and lancet devices *OR* single use lancet
- Gauze swab or cotton wool ball
- Small sticking plaster



11.19

### What you do

- Wash finger/heel with soap and warm water, rinse, dry well. Must be completely dry
- Hold finger/heel pointing downward, prick with lancet — F 11.19
  - Pressing firmly against skin beforehand may help get better puncture and blood flow
- Let a drop of blood form
- Put test strip in glucose meter and wait for machine to register it is ready for blood
- Being careful not to touch skin — touch test strip to drop of blood and let strip fill completely
- Put firm pressure on puncture site to stop bleeding, put on sticking plaster
- If screen shows an error *OR* very high or low reading — do test again

## Testing HbA1c with point of care (POC) test

### Attention

- Only staff who have been trained should do POC testing

### What you need

- Warm water and soap to wash finger
- POC testing machine
- HbA1c testing cartridges
- HbA1c sample holder
- Single use lancet *OR* lancet and lancet device
- Tissue
- Cotton wool

### What you do

- Have person wash hands with soap and water, dry thoroughly
- Prick finger — F 13.19. Let drop of blood form
- Touch tip of sample holder to drop of blood until capillary tube is completely full
- Wipe away any extra blood on outside of tube with edge of a folded tissue
- On flat surface, push sample holder into testing cartridge until it clicks into place — curved edge must face outward
- When machine shows 'ready' — calibrate cartridge. Run bar code down channel
- Open door of machine, put testing cartridge into slot — bar code must face right. Press down on cartridge with 2 fingers until it clicks into place
- Result will display on screen in about 6 minutes (depending on model of machine)



# Testing haemoglobin



Testing Hb with haemoglobinometer and cuvette — adults and children.

## Attention

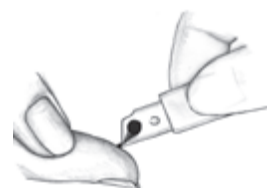
- **Do not** do finger prick tests on children under 6 months — use heel instead. For healthy children first routine Hb test is at 6 months
  - **Do** ask for help from a more experienced practitioner if you are having trouble getting enough blood to do this procedure — you need a full drop of blood for the test to work properly
  - Follow instrument manufacturer's recommendations
- Finger/heel must be very clean and dry — See F 11.20 for correct place to prick
    - Use third or fourth (middle or ring) finger — skin is not as tough as on thumb and index finger
  - Let blood drop form on its own. **Do not** squeeze
  - Haemoglobinometer reads Hb by colour of blood. If you squeeze to get blood you have extra serum, if skin left wet you have extra water — **reading will be wrong**
  - For reliable results use cuvettes from bottle
    - Opened less than 3 months ago. Write use-by date on bottle when you open
    - With lid firmly on. If lid off — throw bottle away



11.20

## What you need

- Lancet
- Swab and/or warm water to clean finger/heel
- Calibrated haemoglobinometer
- Clean cuvette
- Clean gauze swab or cotton wool ball
- Small sticky plaster



11.21

## What you do

- If site dirty — wipe with swab and/or clean water, **let dry completely**
- Loosely hold finger or heel pointing downward — **do not** squeeze
- Prick finger or heel using lancet. Let drop of blood form
  - Pressing firmly against skin can give better puncture and blood flow
- Wipe away first 3 drops of blood
- Let fourth drop form, put cuvette tip into middle of drop, let cuvette fill by itself — F 11.21. Blood will flow easily into collection area
- If drop not big enough the first time — **do not add to it**. Start again with different finger or heel

- Check there are no air bubbles
- Wipe excess blood off outside of cuvette, quickly put into Hb machine, wait for reading
- Put firm pressure on puncture site to stop bleeding, put on sticking plaster
- If screen shows error *OR* unexpected reading — do test again. May be bubble in blood in cuvette chamber or dirty monitor in machine
  - If still unsure about result — recalibrate machine or take venous blood

# Collecting body fluids, viral cultures, skin specimens

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## Collecting sputum specimens

### Attention

- **Remember, fresh is best! Send to town within 3 days (72 hours)**
- **Sputum** is thick and slimy — coughed from deep in throat and lungs
  - If specimen thin and watery or contains bits of food — throw away
- Take **3 samples over 24 hours** (morning, afternoon and morning) for
  - Cytology for cancer testing
  - AFB for tuberculosis (TB) testing

### What you need

- Sterile specimen jars

### What you do

#### For MC&S and/or bacteriology (1 sample)

- Label specimen jar 'MC&S' or 'bacteriology'
- Ask person to take several deep breaths, cough hard and spit into specimen jar. Do first thing in morning, or at time of consultation if urgent
- Store and transport at room temperature — within 3 days (72 hours)

#### For AFB or cytology (3 samples)

- Give person 3 specimen jars labelled (AFB or cytology)
  - Day 1 — Morning
  - Day 1 — Afternoon
  - Day 2 — Morning
- Ask person to take several deep breaths, cough hard and spit into specimen jar
- **AFB**
  - Keep specimens out of sunlight. If room bright — put in brown paper bag then in biohazard bag
  - Store and transport at room temperature within 3 days (72 hours)
- **Cytology**
  - Store and transport **under refrigeration** within 3 days (72 hours)

## Viral culture/smear

### Attention

- Keep viral collection kit in fridge. Check use-by date and colour, should be pink. If yellow — contaminated or out of date

## What you need

- Viral collection kit — cotton swab, glass slide and holder, viral transport medium (VTM), sterile No. 23 scalpel blade
- Pencil and pen

## What you do

- Label glass slide with pencil, label transport medium container with pen
- Lift top off blisters, pustules or scabs with point of scalpel blade
- Rub base of sore (lesion) with cotton swab, then roll swab onto 2 wells (indents) on glass slide
- Let swab air dry, put into VTM
- Check slide is correctly labelled
- Store and transport VTM at room temperature
- Store and transport slide under refrigeration

## Skin scrapings

### Attention

- To find scabies mite you need to find burrows and track marks
- Sores usually called scabies don't contain mite or its eggs — they are part of the allergic reaction

## What you need

- Pencil and pen
- Glass slide and holder
- Blunt blade or wooden spatula
- Paraffin oil
- Magnifying glass

## What you do

- Label glass slide with pencil, label holder with pen
- **Do not** scrape sore/pustule
- Use magnifying glass to find burrow and track mark sites
  - Scrape firmly from edge of site, collect as much skin as possible
  - May have to scrape hard to take off top of lump
  - Keep scraping until tiny flecks of blood are seen
- Repeat in at least 3 different places
- Put scrapings onto slide, leave to air dry, cover with a few drops of paraffin oil
- Check slide is correctly labelled
- On pathology request form — 'Scabies microscopy'
- Store and transport at room temperature

## Fungal lesions

### What you need

- Yellow top (urine) container, labelled
- Pen
- Sterile scalpel blade

### What you do

- With blade at right angles to skin, scrape scaly edge of sore/lesion. Hold open container underneath to catch flakes
- For large or multiple sores/lesions scrape in several places
- Put lid on container, check it is correctly labelled
- Store and transport at room temperature
- On pathology request form — 'Fungal M&C on skin scrapings' can also request 'Scabies microscopy' if suspected

# Collecting swabs



## Making slides

### Attention

- Take slides out of holders, make sure they are 'frosted side up'
- Write on frosted end of glass slide **in pencil** — pen ink will rub off or smear, fixative spray will wash ink off
- Be gentle — pressing too hard or rubbing backward and forward can destroy microscopic cells
- Make sure slides are dry before putting back into holders and snapping them shut — use rubber band or tape if catch won't hold

### What you need

- Clean glass slide with frosted end
- Sharp lead pencil, pen
- Cardboard or plastic slide holder
- Swab

### What you do

- Label frosted end of slide with pencil, label slide holder with pen
- Take specimen, gently **roll swab once only** along glass slide — F 11.22, F 11.23. Don't press down or rub backward and forward
  - **Always leave to air dry**
- When dry, put slide into holder, secure catch. Make sure slide correctly labelled



11.22



11.23

## Wound swabs

### What you need

- Sharp pencil, pen

### MC&S

- Transport medium swab
- 0.5mL sterile **normal saline**
- Glass slide with frosted end, slide holder

### NAAT/PCR

- *Aptima* or sterile dry swab

### What you do

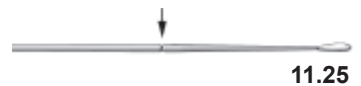
- Label frosted end of slide with pencil, label slide holder and swab container with pen

**MC&S**

- If wound dry (no pus) — wet tip of swab with sterile **normal saline**
- Starting at centre of wound, roll dry swab gently to edges, collecting any discharge on the way
- Gently **roll** swab **once** along glass slide — F 11.22 (*p388*), leave to air dry
- Put swab into transport medium container, close firmly
- When slide dry, put into holder and secure. Make sure slide correctly labelled
- Store and transport at room temperature

**NAAT**

- Start at centre of wound, roll dry swab gently to edges. Collect any discharge
- Put swab back into container
  - If using *Aptima* swab — remove lid, put swab in tube — F 11.24. Break off handle at groove — F 11.25, leaving swab in tube
- Make sure swab container correctly labelled, closed tightly
- Store and transport at room temperature

**Collecting eye, ear, nose, throat swabs****Attention**

- Do throat swabs as quickly as you can so person doesn't gag
- If swabbing both eyes, ears or nostrils — need separate swabs and clearly labelled slide for each side (eg 'left eye', 'right eye')

**What you need****MC&S**

- Wooden spatula/tongue depressor (for throat)
- Transport medium swab
- 0.5mL sterile **normal saline**
- Pencil and pen
- Glass slide with frosted end, slide holder
- Penlight torch

**PCR/NAAT for eye, nose or throat**

- Wooden spatula/tongue depressor (for throat)
- Penlight torch (for throat)
- *Aptima* or dry swab (flocked if available)

**Nasal PCR for influenza and other respiratory viruses**

- Dry swab (flocked if available)

## What you do

- Label frosted end of slide with pencil, label slide holder and swab container with pen

## MC&S

- Wet tip of swab with sterile **normal saline**

### For eye

- Tilt head back
- Hold lower eyelid down, ask person to look upward
- Run swab tip very gently along inside of bottom eyelid, from inner to outer corner of eye — F 11.26



11.26

### For ear

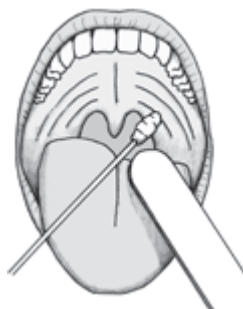
- Tilt head to one side
- Straighten ear canal ([p159](#))
- Put swab about 0.5–1cm into ear canal
- Gently turn it around (rotate), take it out



11.27

### For nose

- Push nose upward as shown — F 11.27
- Put swab up into nostril about 3cm, **parallel to roof of mouth** not to outside of nose
- Gently turn swab around twice, take out



11.28

### For throat

- Tilt head back a little
- Hold down tongue with spatula/tongue depressor
- Look at throat with penlight to pick site/s — pus or red area
- Ask them to say 'aaghhh'
- Quickly rub swab over any pus or red areas on back of throat — F 11.28

### For all

- Gently **roll** swab **once** along glass slide — F 11.22 ([p388](#)), leave to **air dry**
- Put swab into transport medium container, close firmly
- When slide dry put into holder and secure
- Make sure all labelling is correct, store and transport swab and slide at room temperature

## NAAT

- Roll swab for eye, nose or throat on slide as above
- Put swab back into container
  - If using *Aptima* swab — remove lid, put swab in tube — F 11.24 ([p389](#)). Break off handle at groove — F 11.25 ([p389](#)), leaving swab in tube
- Make sure swab containers correctly labelled, closed tightly
- Store and transport at room temperature



## Vaginal and cervical swabs

- Lower vaginal — see *Self-collected lower vaginal swabs* ([WBM p264](#))
- High vaginal and cervical — see *Collecting samples – Swabs for STI tests* ([WBM p274](#)), *Cervical Screening Test* ([WBM p275](#))

## Collecting penile swabs

### What you do

- Swab can be collected by practitioner or patient
- Swab opening of penis as for collecting wound swabs ([p388](#))

## Genital sore (ulcer) swabs

### What you need

- *Aptima* or dry swab
- Sterile needle (for herpes-like sores)

### What you do

- Swab base of sore or scab
- For herpes-like sores (blisters) gently burst with sterile needle, swab fluid
- Put swab back into container
  - If using *Aptima* swab — remove lid, put swab in tube — F 11.24 ([p389](#)). Break off handle at groove — F 11.25 ([p289](#)), leaving swab in tube
- Make sure swab container correctly labelled, closed tightly
- Request 'Genital ulcer – herpes, syphilis, donovanosis NAAT'

## Collecting anal swabs for STIs

### What you need

- **2 swabs**
  - **NAAT** — *Aptima* or dry swab
  - **MC&S** — amies transport medium swab
- Clean paper sheet or bluey

### What you do

#### Both swabs

- Put clean paper sheet or bluey on bed
- Ask person to lie on left side with knees drawn up
- Gently put end of swab 1–2cm inside anus just past anal ring
- Run swab once around inside of anus
- Avoid faecal contamination as much as possible
- Put swab back into container
  - If using *Aptima* swab — remove lid, put swab in tube — F 11.24 ([p389](#)). Break off handle at groove — F 11.25 ([p389](#)), leaving swab in tube
- Make sure swab containers correctly labelled, closed tightly

### Self-collected swabs

- For swab with transport medium (eg *Aptima*, amies)
  - Remove container, leave swab in original packet
  - **Do not** give container to person
- For dry swab — leave swab in original container, break seal
- Give swabs to person and explain
  - Wash hands
  - Squat down, stand with one leg up on toilet seat or chair, or sit on toilet with legs apart and lean forward
  - Take first swab from container or packet — **do not** touch swab tip with hands or any other object
  - Put tip of swab 1–2cm inside anus just past anal ring
  - Run swab once around inside of anus
  - Remove swab, put back into container or packet
  - Take second swab from container
  - Repeat specimen collection with second swab, put swab back into container
  - Wash hands, return swabs
- When person returns swabs
  - If swab in packet — put into transport tube
  - Make sure swab containers correctly labelled, closed tightly

# Collecting urine



## Two types of urine specimens collected

- **First-void urine**
  - First 20mL of urine stream. Can be collected any time of day but best collected first thing in the morning or at least 4 hours after last urination
  - NAAT to test for gonorrhoea, chlamydia, and trichomonas
- **Mid-stream urine (MSU)**
  - Urine collected after allowing first part of urine stream to pass into the toilet. Usually need about 20mL
  - Albumin creatinine ratio (ACR) — protein secreted into urine from kidneys
  - Microscopy, culture and sensitivity (MC&S) — shows bacteria in urine

**Note:** If collecting urine for drug screening — follow same procedure as MC&S (doesn't have to be mid-stream)

## Attention

- Store urine dipsticks at less than 30°C and low humidity. May need to be in air-conditioned room
- **If it takes 12 hours or more for urine sample to reach pathology** — also use dip slide for MC&S
- Do ACR when person well. Best in morning after fasting — less false positive results from protein meals, exercise, infection
- For MC&S you need plain urine, may also need dip slide, stained sample
- Won't need all these tests every time — check which ones you need
- Give person paper bag to carry urine containers through public areas in clinic

## Collecting specimens from older children and adults

### What you need

- Private toilet area for person to pass urine
- Clean gauze swabs/sterile saline wipes
- Sterile water
- Clean paper towel
- 2 x yellow top sterile specimen jars labelled '1' and '2' — F 11.29
- Paper bag for patient to carry collected specimen
- If delay of 12 hours or more before reaching pathology
  - Dip slide
  - 5mL plain sterile container
  - Formalin solution
  - Pipette



11.29

## What you do

- **Ask person to**
  - Wash genital area with gauze swabs or sterile saline wipes, rinse with sterile water, dry with clean paper towel
  - Catch first lot of urine in jar 1 (about 20mL)
  - Catch second lot of urine in jar 2 (about 20mL)
- **For NAAT to test for gonorrhoea, chlamydia, trichomonas (jar 1)**
  - At least 8mL of urine in jar 1
  - Store and transport under refrigeration
- **For MC&S (jar 2)**
  - **Plain sample** — at least 8mL of urine in jar 2
  - **Dip slide** (if needed) — pipette small amount of urine from jar 2 over dip slide, screw top on tightly
  - **Stained sample** (if needed)
    - Pipette 5mL urine from jar 2 into 5mL plain sterile container, add 3 drops of formalin, screw top on tightly
    - *OR* pipette urine into urine stain tube if available
  - Make sure all samples are correctly labelled
  - Store and transport jar 2 and the 5mL container under refrigeration
  - Store and transport dip slide at room temperature

## Bag specimen from babies and young children

**It is possible** to collect reliable urine specimen if procedure followed carefully.

### Attention

- Babies often wee when genital area cleaned — be ready to catch some!
- Best to use double compartment collection bags (eg *Hollister U-Bag*). Not as likely to spill or get contaminated

### What you need

- Soap and water for washing genitals
- Clean gauze swabs or cotton wool balls
- Sterile water for rinsing
- Clean paper towel
- Paediatric urine collection bag
- Alcohol wipes
- 20mL syringe and 21G needle
- Sterile specimen jar
- If delay of 12 hours or more before reaching laboratory —
  - Dip slide
  - 5mL plain sterile container
  - Formalin solution
  - Pipette

## What you do

- Wash genital area well with soap and water using clean swabs or cotton wool balls — F 11.30
  - For boys — gently pull back foreskin (don't force it)
  - For girls — clean gently around labial folds
- Rinse well with sterile water, dry well with clean gauze swab or paper towel
- Wash and rinse from top to bottom, front to back
- Take urine bag out of packet — **do not** touch inside (it's sterile) — F 11.31
- **Peel paper off area, put over genital area**
  - For boys — put opening all the way around penis and ball bag (scrotum) so they are inside bag
  - For girls — start at perineum to make sure it sticks flat and evenly, then fit around genitalia
- Put on loose nappy — or a bluey folded into a triangle
- Give child something to drink and wait ...



11.30



11.31

## When you see urine

- Take urine bag off straight away
- Clean small area on outside of bag with alcohol wipe, let dry completely
- Pierce cleaned area with needle and syringe and suck out urine
- **If delay in transport —**
  - Squirt small amount of urine over dip slide and screw top on tightly
  - Put 5mL of urine into 5mL sterile plain container, add 3 drops of formalin, screw top on tightly
    - *OR* squirt urine into urine stain tube if available
- Put rest of urine into sterile specimen jar, screw lid on tightly
- Make sure containers and dip slide are correctly labelled
- Store and transport jar and 5mL container under refrigeration
- Store and transport dip slide at room temperature

## Finger tap method for newborns and young babies

- Safe and easy method of urine collection using bladder stimulation
- Can use for babies up to 6 months old — depending on how heavy they are

## Attention

- **Baby should have a good feed 15–20 minutes before trying this procedure**
- Babies often wee when genital area cleaned — be ready to catch some!

## What you need

- 2 practitioners
- Soap and water for washing genitals

- Clean gauze swabs or cotton wool balls
- Sterile water for rinsing
- Clean paper towel
- Sterile specimen jar
- If delay of 12 hours or more before reaching pathology —
  - Dip slide
  - 5mL plain sterile container
  - Formalin solution
  - Pipette

### What you do

- Wash genital area well with soap and water using clean swabs or cotton wool balls — F 11.30
  - For boys — gently pull back foreskin (don't force it)
  - For girls — clean gently around labial folds
- Rinse well with sterile water, dry well with clean gauze swab or paper towel
- First practitioner holds baby up by underarms, legs dangling
- Second practitioner uses 1 or 2 fingers to gently tap the suprapubic area at a rate of 100 taps per minute for 30 seconds — F 11.32
- If baby doesn't pass urine — gently rub lower back (lumbar area) in circular motion for 30 seconds — F 11.33
- Repeat until mid-stream sample is caught — F 11.34. Usually within 5 minutes
- If delay in transport — follow same procedure as for bag specimens ([p395](#))
- If finger tap method doesn't work —
  - Give baby another feed and try again
  - Consider doing suprapubic bladder puncture/tap (*below*) if skilled



11.32



11.33



11.34

### Suprapubic bladder puncture/tap

#### Attention

- Done to get sterile urine sample in children less than 2 years of age when bag or finger tap sample can't be collected
- Child's bladder must be full. **Do not** do tap if child has passed urine less than 1 hour before

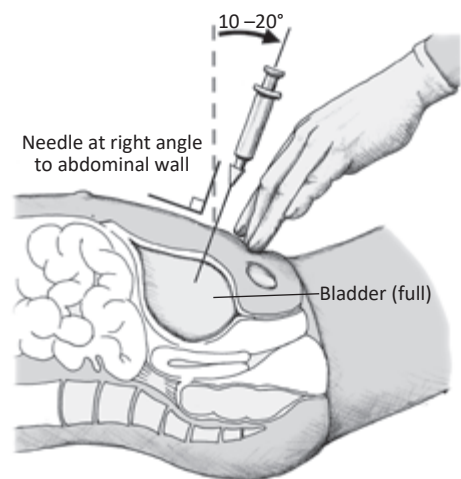
#### What you need

- Helper to wrap and hold baby
- Paediatric urine bag

- Sterile dressing pack
- Povidone-iodine cleaning solution
- 5–10mL syringe — depends on size of child
- 23G needle
- Sterile gloves
- Sterile sticky dressing pad
- Sterile specimen jar
- If delay of 12 hours or more before reaching pathology —
  - Dip slide
  - 5mL plain sterile container
  - Formalin solution
  - Pipette

## What you do

- Label containers and dip slide
- Clean child's genitalia and put on paediatric urine bag ([p394](#)) in case they pass urine during preparation
- Wrap child's upper body, leaving legs and lower abdomen uncovered
- Lie child on back with legs dropped outward in 'frog' position. Ask helper to hold child in this position with hands around thighs
- Feel for (palpate) ([p201](#)) and percuss ([p200](#)) bladder
- Lay out dressing pack and equipment
- Wash hands, put on sterile gloves
- Clean site and drape area with sterile towels
- Connect needle to syringe
- Holding syringe **at right angle (90°) to stomach wall** (usually 10–20° from true vertical) — F 11.35
  - Put needle into skin 1–2cm above pubic bone and in middle (midline)
  - Keeping syringe at this angle, pull back gently on plunger while pushing needle slowly until urine appears in syringe, but no more than 2.5cm
  - Collect amount of urine needed, take out needle
- Press gently on puncture site for a few seconds
- Put on sterile dressing pad
- If delay in transport — follow same procedure as for bag specimens ([p395](#))



11.35

# Collecting faeces and parasites

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## Faeces specimens

### Attention

- **Remember, 'fresh is best' — must send to town within 3 days (72 hours)**
- Usually 3 specimens collected over 3 days, from separate bowel movements. If transport a problem — may only be able to collect 1 or 2
- **Do not** contaminate specimen with urine
- If person menstruating or has bleeding piles (haemorrhoids) — **do not** collect specimens
- If using faecal occult blood test (FOBT) tubes — **do not** empty out liquid already in tubes

**Note:** Not all communities have daily transport services. Try to collect each specimen in the 24 hours before transport leaves. Repeat 3 times, or as needed.

### What you need

- Sterile brown top faeces jar, or tube with scoop (usually built into lid), or use ordinary sterile specimen jar and wooden spatula
- Bed pan (disposable if you have one), nappy, plastic container or cling wrap
- Brown top tube for routine OC&P or MC&S
  - Use OC&P pot containing preservative if available

### What you do

- Label jars/tubes
- For infection (diarrhoea)
  - Scoop some faeces from pan, nappy or container into tube — about the size of a cherry *OR* pour in if runny
  - Screw lid on tightly
  - If you suspect worms — request 'OCP, MC&S, strongyloides'
- For possible cancer — faecal occult blood test (FOBT)
  - Collect 3 specimens for occult bloods
    - From 3 separate bowel movements
    - Put in 3 separate, labelled tubes
- Store and transport as soon as possible at room temperature. Send in esky



## Anal swabs for threadworm

### Attention

- Arrange to collect samples early in morning before person uses toilet or washes

### What you need

- Clean paper sheet or bluey
- See through (transparent) sticky tape
- Wooden tongue depressor
- Immersion oil (transparent oil used in microscopy)
- Microscope
- Microscope slide

### What you do

- Put clean paper sheet or bluey onto bed
- Ask person to lie on left side with knees drawn up
- Fold strip of tape over end of wooden tongue depressor, sticky side out
- Separate person's buttocks. Press end of tongue depressor against skin around anus in several places
- Lift tape up off depressor, put drop of immersion oil under middle, then replace. Will make tape more transparent
- Threadworms can be seen with naked eye
  - 2–13mm long, oval, slightly asymmetrical, cream or pearly-white in colour
- If you have microscope — put tape on slide, sticky side down
  - Look for threadworm eggs using 40x objective

# Collecting semen

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To check male fertility.

## Attention

- If collected semen can't be delivered to pathology within 1 hour — arrange for man to go to town for procedure
- Pathology forms and collection container can be provided by male or female practitioners but a male practitioner (ATSIHP, RAN, doctor) should explain procedure
- Ring pathology to arrange a time to bring semen in — it must reach pathology within **1 hour** of being collected
  - Make sure pathology knows it is for **infertility studies** — some only do post-vasectomy sperm clearance

## What you need

- Yellow capped sterile container

## What you do

- **Tell the man**
  - **Do not** ejaculate for 3 days before collection — no sex or masturbation of any kind
  - **Do not** have too much alcohol, caffeine, or other drugs for 2–5 days before collection
  - **Do not** use condom, saliva, lubricant, lotion, gel of any kind during collection
  - Use masturbation to collect ejaculate
  - Wash your hands with soap and water
  - Ejaculate directly into yellow capped sterile container
    - Try to catch all ejaculated semen including first part
    - **Do not** try to collect any spilled semen
  - Put lid on container as soon as you have finished
- Make sure container is correctly labelled
- Make sure collection time is written on pathology request form
- Transport at room temperature. **Do not** refrigerate

## Estimating kidney function

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'eGFR' is an **estimate** of kidney function. Not accurate in pregnancy, for babies or children, if very undernourished (including advanced liver disease) or if result above 90mL/min/1.73m<sup>2</sup>.

If using point of care (POC) creatinine —

- 'CKD-EPI' formula more accurate than 'MDRD' or 'Cockcroft-Gault' formulas for all Australians, including Indigenous people
- Complicated, best done by computer, see the calculator at [www.kidney.org.au](http://www.kidney.org.au)

