
Appendix 7: Vaccine presentation, preparation, disposal, and needle-stick recommendations

A7.1 Presentation of vaccines

Most of the vaccines in current use are supplied in prefilled syringes or vials. The exceptions to this are the rotavirus vaccine, which is supplied as a syringe-style oral applicator, and the BCG vaccine, which is supplied as a multi-dose vial.

A vial is a glass container with a rubber³³ seal on the top, protected by a metal or plastic cap until it is ready for use. Vials contain either liquid or powder (freeze-dried or pellet/cake) preparations.

Vaccines should not be mixed in the same syringe, unless the manufacturer's data sheet specifically states it is permitted (eg, the DTaP-IPV-HepB vaccine is mixed with the Hib pellet for the Infanrix-hexa vaccine).

A7.2 Preparation and administration of vaccines

In order to minimise the risk of spread of infection and needle-stick injury, vaccinators should observe standard occupational health and safety guidelines.

- Ensure proper hygiene is maintained (ie, regularly wash hands for at least 20 seconds and dry them for 20 seconds, or regularly use an alcohol-based hand rub if hands are not visibly soiled).
- Prepare the appropriate injection equipment for the vaccines to be administered (see section 2.2).

³³ Assume the rubber seal is latex unless stated 'latex-free'.

- Ensure the refrigerator temperature is within the required range of +2°C to +8°C before removing the vaccines (refer to the *National Standards for Vaccine Storage and Transportation for Immunisation Providers 2017*³⁴).
- Ensure the correct vaccine is taken from the refrigerator and that it is within the expiry date.
- Vaccines should only be drawn up after informed consent has been obtained and the vaccine requirements determined. This should include an NIR status query (if applicable) if there is uncertainty about previous doses. Any vaccines drawn up and not used should be discarded unless otherwise stated.

Vaccines in vials require one needle to draw the vaccine into the syringe, and then a new needle to administer the vaccine. The passage of needles through rubber seals causes blunting, resulting in increased tissue trauma if that needle is used to administer the injection. Also, a new needle prevents tracking the vaccine through the skin and subcutaneous tissue, thereby reducing the risk of local reactions. Do not expel the air contained in the new needle – it is sterile and minute in quantity (see chapter 2, Table 2.7).

A7.2.1 Preparing vaccines supplied as a liquid preparation

- Where applicable, remove the detachable portion of the label from the vial or syringe and place it on (or with) the appropriate documentation. If there is no detachable label, note the batch number and expiry date.
- Inspect the vaccine for any foreign particulate matter and/or variation in the physical appearance described by the manufacturer – if either is observed, do not use.
- Shake the vial: Most inactivated vaccines contain an adjuvant, and to obtain a uniform suspension they must be shaken vigorously prior to being drawn up.
- Flip the plastic cap off the vial, taking care not to touch the rubber seal.

³⁴ Available at www.health.govt.nz/coldchain

- With the vial upright, insert the tip of the needle through the centre of the rubber seal, where it is thinner and easier to penetrate.
- Invert the vial and draw up the entire volume into the syringe.
- Withdraw the needle from the vial.
- Change the needle, choosing the appropriate gauge and length for administration.
- Administer the vaccine.
- Dispose of the empty vials, used syringes and needles into the sharps container.
- Complete the required documentation (eg, in the PMS).

A7.2.2 Preparing vaccines supplied as powder/ pellet vaccines

Some vaccines are presented as a prefilled syringe and freeze-dried (lyophilised) combination vaccines where:

- the pellet or powder preparation is reconstituted with the diluent (vial or prefilled syringe) supplied by the manufacturer (eg, MMR or Hib), or
- the pellet or powder preparation is reconstituted with a prefilled syringe containing vaccine (eg, DTaP-IPV-HepB/Hib).

The method for reconstituting the vaccine varies depending upon whether vials or prefilled syringes are used, as follows.

Reconstituting vaccines where the diluent is in a vial

- Where applicable, remove the detachable portion of the label from the diluent and/or vaccine (powder/pellet) vials and place these on (or with) the appropriate documentation. If there are no detachable labels, note the batch number and expiry date for both vaccine and diluent.
- Inspect the vaccine (powder/pellet) and diluent vials for any foreign particulate matter and/or variation in the physical appearance described by the manufacturer – if either is observed, do not use.
- Flip the plastic cap off the diluent vial, taking care not to touch the rubber seal.

- With the diluent vial upright, insert the needle tip through the centre of the rubber seal, where it is thinner and easier to penetrate.
- Invert the vial and draw up the entire volume of diluent into the syringe.
- Flip the plastic cap off the powder/pellet vial, and slowly, to avoid frothing, empty the contents of the syringe (diluent) into the powder/pellet vial, using the vial entry technique mentioned above.
- Swirl the vial gently to dissolve the powder/pellet. The needle and syringe may be removed or left in place.
- After reconstitution the vaccine should be checked to see that the colour compares with the information supplied by the manufacturer on the data sheet and that there is no particulate matter present. If the colour does not match the manufacturer's information, do not use.
- Withdraw the entire volume of the reconstituted vaccine into the syringe.
- Withdraw the needle from the vial.
- Change the needle, choosing the appropriate gauge and length for administration.
- Once reconstituted, the vaccine must be used within the manufacturer's recommended period. See the respective vaccine data sheets for more information.
- Administer the vaccine.
- Dispose of the empty vials, used syringes and needles into the sharps container.
- Complete the required documentation (eg, in the PMS).

Reconstituting vaccines where the vaccine or diluent is in a prefilled syringe

- Where applicable, remove the detachable portion of the label from the prefilled syringe and/or vaccine (powder/pellet) vial and place these on (or with) the appropriate documentation. If there are no detachable labels, note the batch number and expiry date for both the prefilled syringe and the vaccine (powder/pellet) vial.

- Inspect the prefilled syringe and vaccine (powder/pellet) vial for any foreign particulate matter and/or variation in the physical appearance described by the manufacturer – if either is observed, do not use.
- Flip the plastic cap off the powder/pellet vial, and with the vial upright, insert the prefilled syringe needle tip through the centre of the rubber seal, where it is thinner and easier to penetrate.
- Slowly, to avoid frothing, empty the contents of the prefilled syringe into the vial.
- Swirl the vial gently to dissolve the powder/pellet. The needle and syringe may be removed or left in place.
- After reconstitution the vaccine should be checked to see that the colour compares with the information supplied by the manufacturer on the data sheet and that there is no particulate matter present. If the colour or presentation does not match the manufacturer's information, do not use.
- Withdraw the entire volume of the reconstituted vaccine into the syringe.
- Withdraw the needle from the vial.
- Change the needle, choosing the appropriate gauge and length for administration.
- Once reconstituted, the vaccine must be used within the manufacturer's recommended period. See the respective vaccine data sheets for more information.
- Administer the vaccine.
- Dispose of the empty vials, used syringes and needles into the sharps container.
- Complete the required documentation (eg, in the PMS).

A7.2.3 Preparing vaccines supplied as prefilled syringes

- Where applicable, remove the detachable portion of the label from the prefilled syringe and place it on (or with) the appropriate documentation. If there is no detachable label, note the batch number and expiry date.

- Inspect the vaccine for any foreign particulate matter and/or variation in the physical appearance described by the manufacturer – if either is observed, do not use.
- Shake the syringe: Most inactivated vaccines contain an adjuvant, and to obtain a uniform suspension they must be shaken vigorously prior to being drawn up.
- Do not expel air if the needle is fixed (eg, with an influenza vaccine). This prevents tracking the vaccine through the skin and subcutaneous tissue, thereby reducing the risk of local reactions.
- When the needle is not fixed, expel the air to the hub of the syringe and then attach an appropriate length needle.
- Administer the vaccine.
- Dispose of the used syringe and needle into the sharps container.
- Complete the required documentation (eg, in the PMS).

A7.2.4 Preparing the rotavirus vaccine

The rotavirus vaccine is administered orally. It is available as a syringe-type applicator with a plunger stopper.

- Remove the detachable portion of the label (which includes the batch number but not the expiry date) and place it on (or with) the appropriate documentation. Note the expiry date.
- Inspect the vaccine for any foreign particulate matter and/or variation in the physical appearance described by the manufacturer – if either is observed, do not use.
- Remove the protective tip cap from the oral applicator.
- Administer the entire contents of the oral applicator into the infant's mouth, towards the inner cheek.
- Discard the empty applicator and cap into the sharps container.

For more information, refer to the manufacturer's data sheet (available on the Medsafe website, www.medsafe.govt.nz).

A7.2.5 Preparing vaccines supplied as multi-dose vials³⁵

- The vial should be marked with the date and time of opening and the vaccinator's initials.
- Shake the vial before use and before drawing up subsequent vaccine doses.
- Inspect the vaccine for any foreign particulate matter and/or variation in the physical appearance described by the manufacturer – if either is observed, do not use.
- To ensure optimal vial dosage and minimal vaccine wastage, use a 1 mL syringe.
- Flip the plastic cap off the vial, taking care not to touch the rubber seal.
- Inspect the rubber seal. If there is any doubt about the integrity of the seal (eg, the vial leaks when turned upside down), *do not use*.
- Ideally, draw up all doses of the vaccine at the same time; this allows the drawing-up needle to remain in the vial and avoids the need for alcohol swabbing (of the rubber seal).
- Alcohol swabs should be used with caution. There is an increased risk of alcohol contamination when the swabbed rubber seal is repeatedly pierced. If an alcohol swab is used, allow 30 seconds for the alcohol to completely dry before inserting the needle into the rubber seal.
- Use each vial in one session of vaccinating and discard the vial four hours after first opening (or, follow the manufacturer's instructions), even if the vaccine has not been used.

³⁵ Sources: World Health Organization. 2014. *WHO Policy Statement: Multi-dose Vial Policy (MDVP) – Handling of multi-dose vaccine vials after opening*. URL: http://apps.who.int/iris/bitstream/10665/135972/1/WHO_IVB_14.07_eng.pdf; the Australian Technical Advisory Group on Immunisation and the National Centre for Immunisation Research and Surveillance.

A7.3 Disposal of needles, syringes and vaccine vials

Note: For information about returning vaccines for destruction (such as in the event of a cold chain excursion or failure), see the *National Standards for Vaccine Storage and Transportation for Immunisation Providers 2017*.³⁶

- Do not separate needles from syringes or recap needles, unless a recapping device is used.
- All needles plus empty or partly used vials, syringes, dosing tubes and caps should be discarded into the sharps container for crush incineration.

A7.3.1 Sharps containers

- Sharps containers should be made of rigid, leak- and puncture-proof material. They must be fitted with a carrying handle and have an opening that is wide enough to allow disposable materials to be dropped into the container with one hand while still preventing removal of the contents.
- Sharps containers should be situated out of children's reach and available in every area where vaccinations take place.
- Sharps containers should be filled only to the indicated line, then sealed and given to an approved hazardous waste disposal person for incineration (as per the Resource Management Act 1991).

A7.3.2 Spillages

- In the event of blood or vaccine splashes on the skin, thoroughly wash the area under cold running water, then wash with soap and water or the hand wash that vaccinators have available.
- In the event of spills on work surfaces, put on gloves and treat the spill by wiping the area with a disposable pad soaked in 0.5 percent hypochlorite (household bleach diluted 1 to 9 parts water). Repeat with the hypochlorite solution and a fresh pad, then clean up with

³⁶ Available at www.health.govt.nz/coldchain

water or a commercial detergent. Alternatively, granular hypochlorite can be used for liquid spills, by applying sufficient granules to absorb the spilt fluid and then cleaning up after 10 minutes' contact time. Carefully seal all contaminated material in an approved biohazard bag for incineration by an approved hazardous waste disposal person.

- Contaminated linen is adequately treated by a routine hot wash cycle (60–70°C) using an ordinary bleach concentration.

A7.3.3 Recommendations following a needle-stick injury

In the event of a needle-stick injury, follow the guidelines below.

- The vaccinator should stop what they are doing and attend to the injury.
- Wounds and skin sites should be washed with soap and water. There is no evidence that encouraging bleeding or applying antiseptic reduces the risk of infection, but these actions are not contraindicated.
- The injury should be immediately reported to the medical advisor or employer, who should consider what immediate action is advisable.
- When the needle-stick injury involves exposure to an individual's blood, serological testing of that source individual should be sought and undertaken as soon as possible.
- Blood should be withdrawn from the affected vaccinator within a few days after the injury and counselling arranged. Testing for hepatitis B, hepatitis C and HIV serology should be undertaken.
- Depending on the infection status of the individual and the immune status of the injured vaccinator, it may be appropriate to start anti-HIV medications within the next few hours or to administer HBIG within the next few days.
- The blood-borne viruses of main concern in needle-stick injuries are hepatitis B, hepatitis C and HIV. All vaccinators should be immunised against hepatitis B and their antibody status known. Currently in New Zealand most HIV-infected individuals (or their parents/guardians) are likely to know their status at the time of immunisation, so HIV testing in case of needle-stick injuries is not

routinely advocated. If there is a possibility that the individual could be HIV infected, the informed consent of the individual/parent/guardian is required before blood is drawn for testing.

- Blood-borne virus exposures after vaccination are rarely of high risk: because of the small needle size there is seldom visible blood, and there is a low risk of blood-borne viruses in the community.

For more information, see also section 8.5.7 for serological testing guidelines for hepatitis B, the *Starship Clinical Guidelines for Needle-stick Injuries*³⁷ (for needle-stick injuries from needles discarded in the community) or your local DHB guidelines (if available).

³⁷ Available at <https://www.starship.org.nz/for-health-professionals/starship-clinical-guidelines/n/needlestick-injuries/>