# Care of vaccines: ensuring safe storage


## ABSTRACT

Vaccines cost the NHS around £200 million a year and the loss of only one dose of Pediacel vaccine a month in each general practice would cost an estimated £4 million a year. There is a collective responsibility for the safe ordering, storage and administration of vaccines which will be covered in this article.


**Key words** | Vaccines | Vaccination | Documentation

The correct storage of vaccines is key to avoiding waste and ensuring that they remain effective. Storage of vaccines outside of the recommended temperature range can result in the biodegradation of vaccines speeding up, leading to the failure of the vaccine to create the desired immune response and providing poor protection to the recipient (UK Health Security Agency (UKHSA, 2013a). Practice nurses have a collective responsibility for the safe ordering, storage and administration of vaccines. This article will provide an overview of the key parts of the process:

- Ordering and delivery
- Vaccine fridges and cool boxes
- Storage and stock rotation
- Recording and documentation.

## Ordering and delivery

There should be a named member of staff and a deputy for ordering vaccines using a personalised ImmForm account. There needs to be a protocol in place. Generally, orders are placed every 2-4 weeks according to need – it is important not to over stock. The vaccine should be promptly stored in a fridge after delivery, maintaining the cold chain at all stages wherever possible. On delivery it is important to check that there are no leakages, damage or discrepancies in the delivered vaccine (practices may be audited if they appear to be using too many vaccines), so this must be explained to anybody who may take receipt of the vaccines. Stock needs to be properly rotated, with those with the shortest expiry date used first. A stock information system can be used to keep track of orders, expiry dates and running total of vaccines, but this is hard to maintain if these are several vaccinators in the clinical area. Essentially, orders must be made in sufficient time to ensure that there is an adequate supply for clinics. You may need to change your clinic dates or times if you find that supply is an issue (Public Health England, 2014).

Vaccines are available for ordering through the ImmForm website only. This makes ordering easier and more effective and efficient. You need to have a personalised account and register on ImmForm (https://www.immform.dh.gov.uk/registration/).

When registering you will need to supply your NHS code (eg practice code), delivery address, name, email and telephone details (of the key contact responsible for placing orders) (Public Health England, 2014).

## The vaccine fridge and cool boxes

The 'cold chain' describes the specific temperature conditions in which vaccines should be kept during storage and distribution to protect against loss of potency (Public Health England, 2021). Specialised vaccine fridges cost around £600-£1200. It is important to ensure you are using a fridge validated for vaccines. For home/domestic visits a validated carrier must be used, which costs around £300 and gives a manufacturer's guarantee for the maintenance of temperature for a certain amount of time (generally 4 hours). If giving vaccines off site, it is essential to remember to take anaphylaxis kits with you, ensure you are indemnified for home visits and be aware of personal safety issues if working alone. Additionally, with cool boxes, the max/min temperature must be monitored while the box is in use, vaccines should be kept in their original packaging, vaccinators should take only enough vaccine for a particular session, and minimise exposure of the vaccines to room temperatures. Vaccines removed for an external session can be marked before returning to the fridge and then used at the earliest opportunity (an agreed protocol may be needed for this). An appropriately sized cool box for the amount of vaccine needed should be used and cool packs should not be frozen (Public Health England, 2014).

For guidance, a validated vaccine fridge must be between +2 and +8°C – looking for a mid-range of +5°C

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is good practice. It should be locked (but this can prevent opportunistic vaccination) or kept in a locked room. It should be used to store only vaccines and medicines – no food or specimens should be stored alongside vaccines – and it should be large enough to hold the stock and allow sufficient space around the vaccine packages for air to circulate. Do not pack the vaccines in. If you have insufficient space you need another fridge!

Additionally, the fridge wiring should be into switch-less sockets to avoid them being turned off accidentally. Vaccines stored in validated vaccine fridges must be kept in their original packaging as they need to be protected from light and the box serves as an extra resource for the batch number and expiry date (Public Health England, 2014).

Maintaining the correct temperature is essential as freezing vaccines causes deterioration and can give rise to increased adverse reactions because it irreversibly denatures the proteins in the vaccine, reduces the efficacy of the vaccine and causes the emulsions in the vaccines to become unstable. Additionally this may cause the production of hairline cracks in the ampoule/vial/prefilled syringe, potentially contaminating the contents. The glass spicules (small sharp pointed fragments) produced may also cause serious local adverse reactions, as they will be injected into the patient (Public Health England, 2014). The chances of this can be reduced by using the correct needle size for administering vaccines – usually a 25 mm 1 inch needle with a bore size of 23 g (for most vaccines)and a green bore needle with a gauge of 21 g for drawing up from a glass vial (UKHSA, 2013b).

Data loggers are recommended and are very useful. They allow the fridge temperature to be checked and monitored when a fridge failure is suspected for whatever reason. But you need to be instructed on how to use these effectively and cross check them against your visual monitors (Chojnacky et al, 2015).

## Storage and stock rotation

It is important to ensure all vaccines are kept in their original packaging during storage as mentioned previously. Checks should be made at least once a week and audits should be performed monthly. Stock should be rotated so that those with the shortest expiry date are moved to the front of the refrigerator and used first. Expired vaccines (there should be none) should be removed and discarded in the appropriate waste stream (you may need to check if the manufacturer will take them back). Clearly mark any vaccine returned to the fridge with the date and time of its return and place it at the front of the fridge so it is used first at the next session – this should only be done with vaccines that have remained in the cold chain. Do not stockpile (no more than 4 weeks' stock) in case there any incidents (Public Health England, 2014).


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## Incident reporting

If you have a fridge failure, inform everyone in your clinical area and quarantine the fridge (maintaining the cold chain) until you have assessed the incident. Inform the local NHS England screening and immunisation team, record all details of the incident and implement any follow-up of the incident after discussion with your team. Implement and share lessons learned from the incident and consider an agreed protocol. The incident should be reported on the ImmForm website (www.immform.dh.gov.uk). Never throw away any vaccines until you have information on the severity of the incident. Many vaccines can be used, albeit in a non-licensed manner, eg using a Patient Specific Direction (PSD) (Public Health England, 2014).

Advice from Public Health England (2021) suggests: '"One off" fluctuations in fridge temperatures rising above +8°C but lasting less than 20 minutes, such as may occur when stock taking or restocking, are not likely to have breached the vaccine cold chain and as such do not require further action.'

## Recording and documentation

Ideally, the fridge temperature should be recorded twice daily and annotated, but use of a data logger means that the temperature can be assessed first thing every morning to make sure there has been no interruption to the cold

## CPD reflective practice

- Why is it important to ensure vaccines are stored correctly?
- Does your practice have appropriate protocols in place for the storage of vaccines?
- If you are doing home visits for vaccinations, what things do you need to consider with regards to maintaining the cold chain?

## KEY POINTS

- The correct storage of vaccines is key to avoiding waste and ensuring that they remain effective
- Stock needs to be properly rotated, with those with the shortest expiry date used first
- It is important to ensure you are using a fridge validated for vaccines
- Vaccines must be kept in their original packaging as they need to be protected from light and the box serves as an extra resource for the batch number and expiry date

### Useful resources

- This is a good resource to use if you are unsure about an incident involving a vaccine or storage: Vaccine Incident Guidance. Responding to errors in vaccine storage, handling and administration. 2021. https://www.gov.uk/government/publications/vaccine-incident-guidance-responding-to-vaccine-errors

chain overnight. Those who monitor the temperature should be aware of the correct temperature and what to do if this falls outside the recommend range. The suggestion of 'Read, Record, Reset, React' is useful to consider (Public Health England, 2014).

## Conclusion

Good care of vaccines is essential to maintain our excellent and well resourced national vaccination programme. It is important to take the time to understand the extensive guidance that is readily available and easily accessible.


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