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Why are there extra doses of vaccine in the vaccine vial?

In multi-dose vials, there can be a difference between the number of doses stated on the vaccine label and the true number of doses that can be withdrawn. The true number of doses available from a multi-dose vial will depend on several factors such as syringe dead space, vial overfill volume, and technique and accuracy of doses withdrawn and delivered. For more information on how to conduct COVID-19 vaccination, please refer to Module 3 of the COVID-19 vaccination training for health workers (45).

Can extra doses in the vial be used?

- If you can withdraw additional accurate vaccine dose(s) after having withdrawn the number of doses listed on a vaccine vial label, you can administer them. It is important to ensure that the vaccine is appropriately stored while in use and that the multi-dose vial policy is respected. Further, make sure that use of these doses is in accordance with your national policy.
- If an accurate dose cannot be withdrawn from a vial, do not combine residual vaccine from multiple vials. Discard any remaining vaccine.
- Remember that pre-loading of syringes is not recommended. When you are ready to vaccinate, ensure that you always draw up the accurate vaccine dose (e.g. 0.5mL) and administer immediately.

What is vial overfill volume?

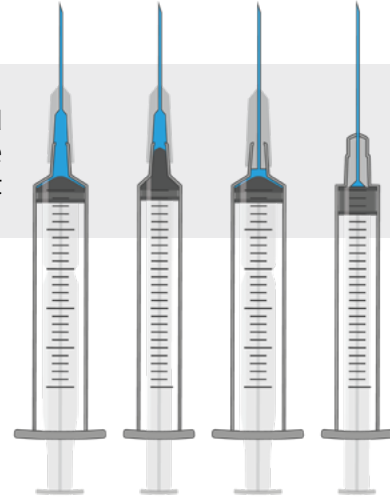
Filling extra vaccine in a vial is a common practice in vaccine production and is called 'overfill'. Manufacturers include extra vaccine to aid health workers in delivering the intended number of accurate doses. Overfill accounts for vial-retained volume (the vaccine left in a vial that cannot be withdrawn), vaccine retained in the dead space of the syringe and needle, and losses of vaccine during the adjustment of the dose if ejected in the air.

Volume of vaccine in a vial that is in excess of volume claimed on a vaccine vial label is allowable. Regulators provide guidance to the manufacturers on this. Overfill for a 10-dose vial can be from about 16% to 24% (or 0.58 to 0.62mL fill-volume for a 0.5mL dose). This is why it is possible to withdraw 11 or 12 doses of 0.5 mL from a 10-dose vial when a low dead space syringe is used.

What is syringe dead space?

Syringe dead space represents a volume of vaccine retained in the syringe after administration. It can vary among devices: in 'high dead space' syringes vaccine remains within the needle and between the syringe hub and the plunger, and 'low dead space' syringes are designed so that the space between syringe hub and the needle is limited.

Syringe design affecting dead space and residual vaccine (in blue), from highest to lowest



Find out more:

<https://www.who.int/bulletin/volumes/81/10/Drain1003.pdf>

<https://www.sciencedirect.com/science/article/pii/S0264410X16310313>

More information available at:

COVID-19 vaccine introduction toolbox

<https://www.who.int/initiatives/act-accelerator/covax/covid-19-vaccine-country-readiness-and-delivery>