

R&D



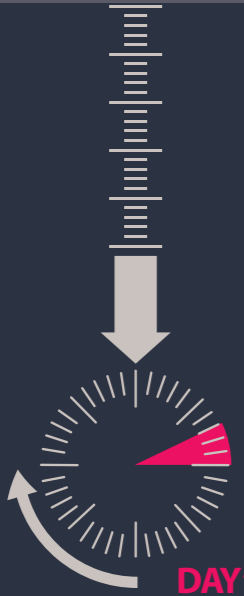
APPROVED SAFE & EFFECTIVE BY A REGULATORY AUTHORITY



THE COMPLEX JOURNEY OF A VACCINE



MANUFACTURING CHAIN



DAY "0"

Vaccine manufacturing involves **6 basic steps**. Each step can be performed in different sites situated in different countries.

- Testing done by the **manufacturer**
- Testing done by the **exporting country**
- Testing done by the **importing country**

1 RAW MATERIAL RECEPTION

All incoming raw materials are checked for conformance with the quality specifications.



2 BULK ANTIGEN MANUFACTURING

The active ingredient of the vaccine is manufactured. This is the most critical step in the production of high quality, safe and efficacious vaccines.



3 FORMULATION

The active ingredient is mixed with other ingredients to enhance the immune response and ensure product stability.



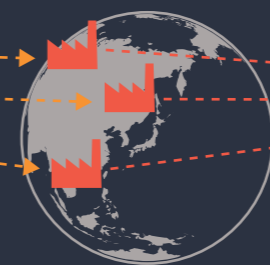
4 FILLING

The vaccine is filled into the final container. This could be a vial or a pre-filled syringe.



5 PACKAGING

The vaccine in the final container is labeled in accordance with regulatory requirements and packed, ready for shipping to the customer.



6 LOT RELEASE

Quality assurance confirms that the product has been manufactured and tested in accordance with the correct procedures. The national regulatory authority gives the final authorization to release the product for distribution.



+/- 24 MONTHS



VACCINE OF CONSISTENT QUALITY

SHIPMENT



DISTRIBUTION



Quality Control represents up to **70%** of manufacturing time.

A vaccine typically travels through **several different sites** before being ready for shipment.

A vaccine undergoes up to **several hundred Quality Control tests** during its manufacturing journey.