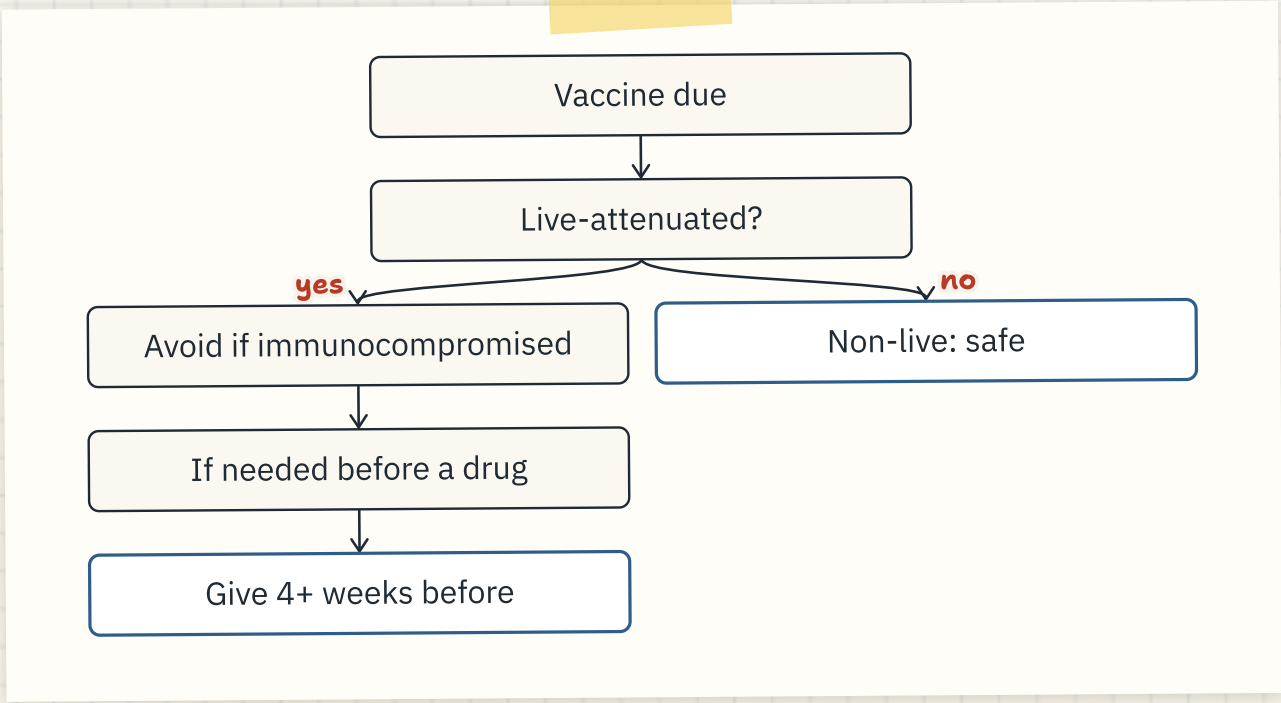
Vaccine types

Live or non-live, and why it matters



Step by step

1. Dendritic cell takes up the antigen
2. Adjuvant danger signal activates it
3. MHC class II peptide to a helper T cell
4. Helper T cell helps B cells
5. Memory B cells and plasma cells

Platform	Key point
Live-attenuated	Replicates; strong, durable; CD8 T cells
Inactivated	Killed; safe; shorter-lived, boosters
Subunit, toxoid	Pieces or toxoid; cannot replicate
Conjugate	Sugar plus carrier protein; T-cell help
mRNA	Lipid nanoparticle; MHC I and II; not live

Platform and response

Rule of thumb

Live vaccines replicate: avoid in immunodeficiency

Non-live vaccines cannot replicate: safe

Sugar alone: no T-cell help. Add a protein: memory

Exam traps

- Live vaccines are avoided in significant immunodeficiency and on immunosuppressants.
- Non-live vaccines are safe but may not protect if B cells or T cells are missing.
- A live vaccine needed before an immunosuppressive drug goes in at least four weeks before it starts.

Vaccine types explained: live, inactivated, conjugate and mRNA

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/immunology/vaccine-types-live-inactivated-subunit-conjugate-mrna

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