

Vaccines with Diluents: How to Use Them

Be sure to reconstitute the following vaccines correctly before administering them! Reconstitution means that the lyophilized (freeze-dried) vaccine powder or water in one vial must be mixed with the diluent (liquid) in another.

- Only use the diluent provided by the manufacturer for that vaccine as indicated on the chart.
- ALWAYS check the expiration date on the diluent and vaccine. NEVER use expired diluent or vaccine.
- NEVER freeze diluents.

Vaccine product name	Manufacturer	Lyophilized vaccine+ (powder)	Liquid diluent (may contain vaccine)	Time allowed between reconstitution and use, as stated in package insert*	Diluent storage environment
Abrysvo	Pfizer	RSV	Sterile water	4 hrs	Refrigerator or room temp
ACAM2000 (SMA)	Sanofi	ACAM2000	50% Glycerin, 0.25% phenol, sterile water	8 hrs/per day (can keep for 30 days if refrigerated)	Room temp
ActHIB (Hib)	Sanofi	Hib	Sodium chloride 0.4%	24 hrs	Refrigerator
Arexvy	GSK	RSV	AS01E adjuvant suspension	4 hrs	Refrigerator
COVID-19, Pfizer-BioNTech, some formulations	Pfizer-BioNTech	see footnote†	Sodium chloride 0.9%, unpreserved	12 hrs	Refrigerator or room temp
Dengvaxia (DEN4CYD)	Sanofi	Dengue	Sodium chloride 0.4%	30 min	Refrigerator
Hiberix (Hib)	GSK	Hib	Sodium chloride 0.9%	24 hrs	Refrigerator or room temp
Imovax (RAB _{HDCV})	Sanofi	Rabies virus	Sterile water	Immediately‡	Refrigerator
M-M-R II (MMR)	Merck	MMR	Sterile water	8 hrs	Refrigerator or room temp
Menveo § (MenACWY)	GSK	MenA	MenCWY	8 hrs	Refrigerator
Pentacel (DTaP-IPV/Hib)	Sanofi	Hib	DTaP-IPV	Immediately‡	Refrigerator
Priorix (MMR)	GSK	MMR	Sterile water	8 hrs	Refrigerator or room temp
Proquad (MMRV)	Merck	MMRV	Sterile water	30 min	Refrigerator or room temp
Rabavert (RAB _{PCECV})	GSK	Rabies virus	Sterile water	Immediately‡	Refrigerator
Rotarix § (RV1)	GSK	RV1	Sterile water, calcium carbonate, and xanthan	24 hrs	Refrigerator or room temp
Shingrix (RZV)	GSK	RZV	AS01B adjuvant suspension	6 hrs	Refrigerator
Varivax (VAR)	Merck	VAR	Sterile water	30 min	Refrigerator or room temp
YF-VAX (YF)	Sanofi	YF	Sodium chloride 0.9%	60 min	Refrigerator or room temp

Always refer to package inserts for detailed instructions on reconstituting vaccines. In general, follow the steps below.

- For single-dose vaccine products (exception: Rotarix), select a syringe and a needle of proper length to be used for both reconstitution and administration of the vaccine. Rotarix, see the package insert.
- Before reconstituting, check labels on both the lyophilized vaccine vial and the diluent to verify that
 - they are the correct two products to mix together,
 - the diluent is the correct volume (esp. for ACAM2000 where diluent volume is 0.6mL but only 0.3mL is used for reconstitution[¶]), and
 - neither the vaccine nor the diluent has expired.
- Reconstitute (i.e., mix) vaccine **just prior to use** by:
 - removing the protective caps and wiping each stopper with an alcohol swab,
 - inserting syringe needle into diluent vial, withdrawing entire contents, and
 - injecting diluent into lyophilized vaccine vial and rotating or agitating to thoroughly dissolve the lyophilized powder.
- Check the appearance of the reconstituted vaccine.
 - Reconstituted vaccine may be used if the color and appearance match the description on the package insert.
 - If there is discoloration, extraneous particulate matter, obvious lack of resuspension, or the vaccine cannot be thoroughly mixed, mark the vial as “DO NOT USE,” return it to the proper storage conditions, and contact your DHA Immunization Healthcare Specialist or the vaccine manufacturer.
- If reconstituted vaccine is not used immediately or comes in a multi-dose vial (i.e., multi-dose ACAM2000), be sure to
 - clearly mark the vial with the date and time the vaccine was reconstituted,
 - maintain the product at 2°-8°C (36°-46°F), do not freeze, and
 - use only within the time indicated on chart above.

* If the reconstituted vaccine is not used within this time-period, it must be discarded.

‡ For purpose of this guidance, “immediately” is defined as within 30 minutes or less.

† The COVID-19 formulations that require dilution are liquid concentrates, not lyophilized powders. The concentrate contains mRNA in lipid nanoparticles.

§ Rotarix and Menveo vaccines are available as either a liquid formulation that does not require dilution or as a lyophilized vaccine that requires reconstitution.

Both formulations of the Rotarix vaccine are administered by mouth; they should not be administered as an injection.

+Vaccine abbreviations in column 3:

Hib = *Haemophilus influenzae* type b
 MenA = Meningococcal serogroup A
 MMR = Measles, mumps, & rubella
 MMRV = MMR + varicella
 RSV = Respiratory syncytial virus
 RV1 = Rotavirus vaccine, monovalent
 RZV = Zoster vaccine, recombinant
 YF = Yellow fever