## 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 reconstituted (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.

### Table: Vaccines with Diluents

<table>
<thead>
<tr>
<th>Vaccine product name</th>
<th>Manufacturer</th>
<th>Lyophilized vaccine (powder)</th>
<th>Liquid diluent (may contain vaccine)</th>
<th>Time allowed between reconstitution and use, as stated in package insert</th>
<th>Diluent storage environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ActHIB (Hib)</td>
<td>Sanofi Pasteur</td>
<td>Hib</td>
<td>0.4% sodium chloride</td>
<td>24 hrs</td>
<td>Refrigerator</td>
</tr>
<tr>
<td>Hiberix (Hib)</td>
<td>GlaxoSmithKline</td>
<td>Hib</td>
<td>0.9% sodium chloride</td>
<td>24 hrs</td>
<td>Refrigerator or room temp</td>
</tr>
<tr>
<td>Imovax (RABHDCV)</td>
<td>Sanofi Pasteur</td>
<td>Rabies virus</td>
<td>Sterile water</td>
<td>Immediately&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Refrigerator</td>
</tr>
<tr>
<td>M-M-R II (MMR)</td>
<td>Merck</td>
<td>MMR</td>
<td>Sterile water</td>
<td>8 hrs</td>
<td>Refrigerator or room temp</td>
</tr>
<tr>
<td>Menveo (MenACWY)</td>
<td>GlaxoSmithKline</td>
<td>MenA</td>
<td>MenCWY</td>
<td>8 hrs</td>
<td>Refrigerator</td>
</tr>
<tr>
<td>Pentacel (DTaP-IPV/Hib)</td>
<td>Sanofi Pasteur</td>
<td>Hib</td>
<td>DTaP-IPV</td>
<td>Immediately&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Refrigerator</td>
</tr>
<tr>
<td>ProQuad (MMRV)</td>
<td>Merck</td>
<td>MMRV</td>
<td>Sterile water</td>
<td>30 min</td>
<td>Refrigerator or room temp</td>
</tr>
<tr>
<td>RabAvert (RABPCECV)</td>
<td>GlaxoSmithKline</td>
<td>Rabies virus</td>
<td>Sterile water</td>
<td>Immediately&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Refrigerator</td>
</tr>
<tr>
<td>Rotarix (RV1)&lt;sup&gt;2&lt;/sup&gt;</td>
<td>GlaxoSmithKline</td>
<td>RV1</td>
<td>Sterile water, calcium carbonate, and xanthan</td>
<td>24 hrs</td>
<td>Refrigerator or room temp</td>
</tr>
<tr>
<td>Shingrix (RZV)</td>
<td>GlaxoSmithKline</td>
<td>RZV</td>
<td>AS01&lt;sup&gt;1&lt;/sup&gt; adjuvant suspension</td>
<td>6 hrs</td>
<td>Refrigerator</td>
</tr>
<tr>
<td>Varivax (VAR)</td>
<td>Merck</td>
<td>VAR</td>
<td>Sterile water</td>
<td>30 min</td>
<td>Refrigerator or room temp</td>
</tr>
<tr>
<td>YF-VAX (YF)</td>
<td>Sanofi Pasteur</td>
<td>YF</td>
<td>0.9% sodium chloride</td>
<td>60 min</td>
<td>Refrigerator or room temp</td>
</tr>
</tbody>
</table>

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

1. For single-dose vaccine products (exception is Rotarix), select a syringe and needle of proper length to be used for both reconstitution and administration of the vaccine. For Rotarix, see the package insert.<sup>2</sup>
2. 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, and
   - neither the vaccine nor the diluent has expired.
3. Reconstitute (i.e., mix) vaccine just prior to use by:
   - removing the protective caps and wiping each stopper with an alcohol swab,
   - inserting needle of syringe into diluent vial and withdrawing entire contents, and
   - injecting diluent into lyophilized vaccine vial and rotating or inverting to thoroughly dissolve the lyophilized powder.
4. 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 proper storage conditions, and contact your state or local health department immunization program or the vaccine manufacturer.
5. If reconstituted vaccine is not used immediately or comes in a multidose vial, 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.

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<sup>1</sup>If the reconstituted vaccine is not used within this time period, it must be discarded.
<sup>2</sup>For purposes of this guidance, IAC defines “immediately” as within 30 minutes or less.
<sup>3</sup>Rotarix vaccine is administered by mouth using the applicator that contains the diluent. It is not administered as an injection.
<sup>4</sup>AS01<sub>B</sub> is composed of 3-O-desacyl-4'-monophosphoryl lipid A (MPL) from Salmonella minnesota and QS-21, a saponin purified from plant extract Quillaja saponaria Molina, combined in a liposomal formulation. The liposomes are composed of dioleoyl phosphatidylcholine (DOPC) and cholesterol in phosphate-buffered saline solution containing disodium phosphate anhydrous, potassium dihydrogen phosphate, sodium chloride, and water for injection.

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For information on COVID-19 vaccines that are mixed with a diluent, see the COVID-19 Vaccine Addendum in CDC’s Vaccine Storage and Handling Toolkit at [www.cdc.gov/vaccines/hcp/admin/storage/toolkit/storage-handling-toolkit.pdf](http://www.cdc.gov/vaccines/hcp/admin/storage/toolkit/storage-handling-toolkit.pdf).

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