### Station 1—Vaccine-Preventable Diseases

**Directions:** Write Low, Medium, or High in each column.

What was the **risk of getting the disease** before the vaccine was available? What is the **magnitude of harm** caused by the disease, if contracted? What is the **risk of suffering harm** from the disease, if contracted?

<table>
<thead>
<tr>
<th>Disease</th>
<th>Risk of getting the disease (before vaccine was available or if most people are not vaccinated)*</th>
<th>Magnitude of harm caused by the disease, if contracted</th>
<th>Risk of suffering that harm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chickenpox</td>
<td>High (4 million cases per year)</td>
<td>Low (Usually mild.)</td>
<td>Low (4 million cases resulted in 11,000 hospitalizations (0.3%) and 100 to 150 deaths)</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Medium (70,000 acute cases per year estimated)</td>
<td>Medium (Chronic infection can lead to increased risk of liver-related complications.)</td>
<td>Medium (5,000 deaths per year from complications)</td>
</tr>
<tr>
<td>Measles</td>
<td>High (500,000 cases per year)</td>
<td>Medium (Most commonly characterized by body rash. Pneumonia is a serious complication.)</td>
<td>Medium (20% need hospitalization, 0.3% die)</td>
</tr>
<tr>
<td>Mumps</td>
<td>Medium to High (150,000 cases per year)</td>
<td>Low (Relatively mild viral disease causing swelling in the jaw and cheeks.)</td>
<td>Low (0.005% become deaf, 1 out of 150,000 die)</td>
</tr>
<tr>
<td>Polio</td>
<td>Low (13,000–20,000 cases per year)</td>
<td>Medium (Most infected people don’t have symptoms, however some become permanently paralyzed or die.)</td>
<td>Low (1% become paralyzed; of those, 15–30% of adults die)</td>
</tr>
<tr>
<td>Smallpox</td>
<td>Medium (50,000 cases per year)</td>
<td>High (Smallpox is often fatal.)</td>
<td>High (30% of people who contract the most common form die)</td>
</tr>
</tbody>
</table>

* “Risk of getting the disease” is defined here as the approximate number of cases per year in the United States before the vaccine was available.

**Notes:** Students’ notes will vary, but they should reflect the facts listed on Master 2.3.
Station 2—Vaccine Risks

**Directions:** Add Low, Medium, or High to each column.

What is the **magnitude of harm** caused by the vaccine? What is the **risk of suffering that harm**?

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Harm caused by the vaccine</th>
<th>Risk of suffering that harm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chickenpox</td>
<td>Low (Soreness and swelling are most common.)</td>
<td>Low (Seizure caused by fever is found in fewer than 1 in 1,000; pneumonia is also rare.)</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Low (Soreness and swelling are most common.)</td>
<td>Low (Mild to moderate fever in 1 out of 14 children, including adolescents, and 1 out of 100 adults; serious allergic reaction is also rare.)</td>
</tr>
<tr>
<td>Measles, Mumps, and Rubella (MMR)</td>
<td>Low (Fever and mild rash are most common, as are temporary pain and stiffness in the joints.)</td>
<td>Low (Seizure due to fever in 1 out of 3,000 doses, risk of bleeding disorder in 1 out of 30,000 doses, and serious allergic reaction in fewer than 1 out of 1 million doses.)</td>
</tr>
<tr>
<td>Polio</td>
<td>Low (for Inactivated form of vaccine) (Soreness is most common.)</td>
<td>Low (The Inactivated form has never been known to cause serious harm.)</td>
</tr>
<tr>
<td>Smallpox</td>
<td>High (For every 1 million vaccinated, 1 to 2 will die from the vaccine and between 14 and 52 will have a serious, life-threatening reaction.)</td>
<td>Medium (Even though risks are greater than from other vaccines, they are still low compared with those of the disease itself.)</td>
</tr>
</tbody>
</table>

**Notes:** Students’ notes will vary, but they should reflect the facts on Master 2.4.
Station 3 — The Measles Graph

1. What are two things that the Measles Graph shows? Refer to specific years and number of measles cases in your answer.

   Answers may include
   • During the period 1950–2004, the number of measles cases was highest in 1958, at almost 800,000.
   • The vaccine was licensed in 1964, when the number of measles cases was approximately 450,000.
   • Within 5 years after licensure (by 1969), the number of measles cases had dropped by 400,000, to approximately 50,000.
   • The graph also shows that smaller fluctuations in the number of cases per year have occurred since licensure. For example, the number of cases increased from under 5,000 in 1987 to almost 30,000 three years later, in 1990.

2. Why might outbreaks of vaccine-preventable diseases still occur? List below as many reasons as you can for why people might not be vaccinated.

   Answers can vary and may include
   • No access to vaccines (lack of health insurance, no health clinic nearby).
   • Religious or cultural objections.
   • Concern about vaccine safety and side effects.
   • Thinking that the disease no longer exists.
   • Too young to be vaccinated.
   • Medical reasons (for example, allergic reactions to vaccine components).
   • Sometimes, even vaccinated individuals are not fully protected because they haven’t developed an appropriate immune response ("vaccine failures").

3. Which members of the community might be most susceptible (vulnerable) to infectious disease?

   Answers can vary and may include very young, very old, poor, or individuals with immune deficiencies or getting cancer treatments.
Station 4—Exemptions

1. List the different types of exemptions and provide an example of each.
   - **Medical**: This can be used when a child is allergic to some vaccine components or has a weakened immune system, such as occurs during cancer treatment.
   - **Religious**: This is used by individuals belonging to a particular religion with written views against vaccination.
   - **Philosophical (personal belief)**: This is a very broad category. Parents who are concerned about risks of vaccines can sometimes use this category to opt out of vaccination programs.

2. How many states allow medical exemptions?
   All 50 states allow medical exemptions.

3. How many states allow only medical exemptions? Which states are these? (These are the states with the most restrictive policies.)
   Two states allow only medical exemptions: Mississippi and West Virginia.

4. How many states allow medical, religious, and philosophical exemptions? (These are the states with the least restrictive policies.)
   Twenty states allow these exemptions. See Master 2.6, page 2, for a list of the types of exemption allowed by each state as of fall 2008.

5. What types of exemption are allowed in your state?
   See Master 2.6, page 2, for a list of the types of exemption allowed by each state as of fall 2008.