VACCINES & IMMUNIZATION

How to realize the full benefits of immunization
IMMUNIZATION SAVES LIVES AND KEEPS PEOPLE HEALTHY

• Immunization saves up to 3 million lives annually
• Vaccines are available to protect against the following 26 infectious diseases, with many more in development

Cholera • Dengue • Diphtheria • Hepatitis A • Hepatitis B • Hepatitis E • Haemophilus influenzae type b (Hib) • Human papillomavirus • Influenza • Japanese encephalitis • Malaria • Measles • Meningococcal meningitis • Mumps • Pertussis (whooping cough) • Pneumococcal disease • Poliomyelitis • Rabies • Rotavirus • Rubella • Tetanus • Tick-borne encephalitis • Tuberculosis • Typhoid • Varicella (chickenpox) • Yellow Fever
Vaccines can eradicate diseases, but declining coverage puts progress at risk

Immunization has reduced wild poliovirus by more than 99%.

Global vaccine coverage has stagnated at 86%.

Large measles outbreaks affected 1 in 4 European countries in 2017.
HOW VACCINES WORK

The body is exposed to a weakened or dead pathogen

The body’s immune cells make antibodies to attack the pathogen

If the body is exposed to the pathogen again, the body will be prepared with antibodies
VACCINES PROTECT THE COMMUNITY

COMMUNITY IMMUNITY
When a sufficient proportion of a population is immune to an infectious disease to make its spread from person to person unlikely.

COVERAGE THRESHOLD
The minimum percentage of individuals immune to a disease needed to prevent an outbreak.

Only 6 countries in the EU/EEA achieved the 95% coverage threshold needed to prevent measles outbreaks in 2017.
VACCINES PROTECT THE COMMUNITY

WHEN NO ONE IS IMMUNIZED
Disease spreads through the population

WHEN SOME OF THE POPULATION IS IMMUNIZED
Disease spreads through some of the population

WHEN MOST OF THE POPULATION IS IMMUNIZED
Spread of the disease is constrained

Not immunized but still healthy
Immunized & healthy
Not immunized, sick & contagious
TYPES OF VACCINES

- **Live attenuated**: contain weakened pathogen; require 1-2 doses. Ex. MMR, rotavirus, varicella

- **Inactivated**: contain killed pathogen; require several doses (booster shots). Ex. Hepatitis A, rabies, inactivated poliovirus vaccine

- **Subunit**: contain killed, antigenic component of pathogen; require several doses (booster shots). Ex. Hib, HPV, pneumococcal

- **Toxoid**: contain toxin made by pathogen; may require booster shots. Ex. Diphtheria, pertussis
VACCINE DOSING THROUGH THE LIFESPAN

Some vaccines provide life-long immunity from a single dose

Others provide greater protection after multiple doses

New vaccines are needed frequently for pathogens that mutate often (such as influenza)

VACCINES AREN’T JUST FOR CHILDREN – OLDER POPULATIONS NEED TARGETED PROTECTION FROM CERTAIN DISEASES
VACCINE COMPONENTS: SAFE AND EFFECTIVE

• Provide immunity
  • Antigens
  • Adjuvants
• Keep vaccines safe and long lasting
  • Preservatives
  • Stabilizers
• Used during the production of vaccines
  • Cell culture materials
  • Inactivating ingredients
  • Antibiotics
IMMUNIZATION SCHEDULES: BASED ON SCIENTIFIC EVIDENCE

• Designed to best protect public health
• Formulated using robust scientific evidence
**ENSURING VACCINES ARE SAFE AND EFFECTIVE**

**PHASE 1**
- **20-100 HEALTHY VOLUNTEERS**
  - Is this vaccine safe?
  - Does this vaccine seem to work?
  - Are there serious side effects?
  - How is dose related to side effects?

**PHASE 2**
- **SEVERAL HUNDRED VOLUNTEERS**
  - What are the most common short-term side effects?
  - How are the volunteers’ immune systems responding to the vaccine?

**PHASE 3**
- **HUNDREDS OF THOUSANDS OF VOLUNTEERS**
  - How do people who get the vaccine and people who do not compare?
  - Is the vaccine safe?
  - Is the vaccine effective?
CONTINUOUS SAFETY MONITORING

A VACCINE’S SAFETY CONTINUES TO BE MONITORED

- Collect & review data
- Monitor side effects
- Identify & understand risks
- Communicate & manage risks appropriately
CONTRAINDICATIONS & PRECAUTIONS

Contraindications and precautions are conditions under which vaccines should not be administered. The majority of these conditions are temporary, so immunizations often can be administered later when the conditions no longer exist.

CONTRAINDICATION

- A rare condition in a recipient that increases the risk for a serious adverse reaction
- The only contraindication applicable to all vaccines is a history of a severe allergic reaction after a prior dose of vaccine or to a vaccine constituent

PRECAUTION

- A condition in the recipient that may increase the risk of a serious adverse reaction, might cause diagnostic confusion, or might compromise the ability of the vaccine to produce immunity
- Vaccine may be administered if the benefit from the vaccine is judged to outweigh the risk
# DANGEROUS EFFECTS OF LOW VACCINE COVERAGE

Even small pockets of low coverage can trigger deadly outbreaks.

<table>
<thead>
<tr>
<th>Source</th>
<th>Information</th>
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<tbody>
<tr>
<td>Le Monde</td>
<td>The number of measles cases reaches a record in Europe (23 August 2018)</td>
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<tr>
<td>The Washington Post</td>
<td>U.S. officials say measles cases hit 25-year record high (29 April 2019)</td>
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<tr>
<td>24 ORE</td>
<td>2,295 cases of measles reported in Italy in 2018. (25 November 2018)</td>
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COMMON MYTHS

MYTH: VACCINES CAUSE AUTISM

- Myth incited by flawed and fraudulent study
- Study retracted and lead author had his medical license revoked
- Subsequent studies have found no connection between vaccines and their ingredients and autism

FACT: NO LINK EXISTS BETWEEN VACCINES AND AUTISM
COMMON MYTHS

**MYTH:** IT IS BETTER TO SPACE OUT CHILDHOOD VACCINES USING AN ALTERNATIVE SCHEDULE

- From birth, a baby’s immune system is well equipped to respond to vaccines
- There is no evidence that spreading out the schedule improves health outcomes
- Delaying vaccines increases the time children will be susceptible to diseases

**FACT:** SPREADING OUT VACCINES LEAVES CHILDREN UNPROTECTED
COMMON MYTHS

**MYTH:** Vaccines cause the diseases they are designed to prevent

- Inactivated vaccines cannot cause disease
- It is nearly unheard of for live attenuated vaccines to cause disease
- Mild symptoms are rare, but can indicate immune response (not infection)

**FACT:** Vaccines undergo extensive monitoring and testing before approval
COMMON MYTHS

**MYTH: MY CHILD IS AT GREATER RISK OF HARM FROM A VACCINE THAN FROM THE DISEASE ITSELF**

- The risks of natural infection are greater than the risks of immunization for every recommended vaccine
- Severe side effects from immunization are incredibly rare
- Immunization is the best protection against deadly diseases
- Immunization prevents individual illness and large-scale outbreaks

**FACT: THE BENEFIT OF IMMUNIZATION FAR OUTWEIGHS THE RISK**
COMMUNICATING WITH PATIENTS TO BOLSTER VACCINE CONFIDENCE

• Presume acceptance
• Listen
• Validate concerns
• Respond to concerns with positive messages about vaccines, information debunking myths
• Communicate risks of delaying immunization
• Share experiences about immunization
• Have follow-up conversations
• Provide additional resources about vaccines
ADDITIONAL RESOURCES

U.S. National Institutes of Health, National Institute of Allergy and Infectious Disease (https://www.niaid.nih.gov/)
• How do vaccines work? https://www.niaid.nih.gov/research/how-vaccines-work

European Centre for Disease Prevention and Control (www.ecdc.europa.eu)
ADDITIONAL RESOURCES

World Health Organization (https://www.who.int/)
• E-learning course on Vaccine Safety Basics http://vaccine-safety-training.org/
• Contraindications to common diseases https://www.who.int/immunization/policy/contraindications.pdf
• Recommendations for routine immunization https://www.who.int/immunization/policy/immunization_tables/en/


U.S. Centers for Disease Control and Prevention (www.cdc.gov)
• Vaccines Do Not Cause Autism https://www.cdc.gov/vaccinesafety/concerns/autism.htm