Risk scales: benefits of vaccines far outweigh the risks

How to use this document

The illustrations in this document can be used to support the message that the benefit of vaccines far outweighs the risks.

The risk of adverse events following vaccination needs to be compared with the risk associated with the disease. The risk of side-effects of the treatment used to alleviate the symptoms of the disease can also be taken into account.

This document illustrates both of these types of risk comparisons for three types of vaccines that are used to prevent highly infectious diseases: measles vaccine, pneumococcal conjugate vaccine and Hib vaccine.

Use it as a fact sheet or as inspiration to prepare messages or prepare for a meeting with key stakeholders.

How was this document developed?

This document is part of a WHO series of supporting documents concerning events that could erode confidence in vaccination. Such events can be related to vaccine safety, adverse events following immunization, changes in the vaccination programme, negative public debate, outbreaks or pandemics.

All documents were developed based on scientific evidence, laboratory research and fieldwork within psychology, social and behavioural science and communication and lessons learnt in countries. For an introduction to the theoretical background and evidence, refer to the WHO publication Vaccination and trust, available here: www.euro.who.int/vaccinetrust.

The supporting documents are intended for use by national

- ministries of health
- centers for disease control
- immunization programmes
- regulatory authority institutions.
# Measles

**Possible unwanted side effects of measles vaccine**

**VERY COMMON**
- Mild, local reactions, such as redness and pain at the injection site, occur in more than 10% of vaccinations.

**COMMON**
- Fever occurs in 5-10% of vaccinations.
- Rash occurs in 5% of vaccinations.

**RARE**
- Fever with convulsions occur in less than 0.1% of vaccinations.

**VERY RARE**
- Inflammation of brain and spinal cord (encephalomyelitis) occurs in 1 out of 1 million vaccinations.
- Low blood platelet count (thrombocytopenia) occurs in 1 out of 30 000-40 000 vaccinations.
- Serious allergic reaction (anaphylaxis) occurs in 3.5 out of 10 million vaccinations.

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**Possible complications of measles**

**OTITIS (EAR INFECTION)**
- 7-9% of infected people.

**DIARRHEA**
- 6% of infected people.

**CHRONIC AND PROGRESSIVE BRAIN INFLAMMATION (SSPE)**
- 1 out of every 100 000 infected people.

**PNEUMONIA**
- 1-6% of infected people.

**INFECTION THAT CAUSES BRAIN SWELLING (ENCEPHALOMYELOMELITIS)**
- 1 out of every 2000 infected people.

**DEATH**
- 0.1-1 out of every 1000 infected people.

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**Possible complications of the disease and possible side effects of its treatment**

**Common side effects**
- Irritation and inflammation inside the nose (rhinitis).
- Severe shortness of breath (dyspnea).
- Coughing, heaviness and tightness in the chest or wheezing (paroxysmal bronchial spasm).
- Bleeding from the gastrointestinal digestive tract (gastrointestinal haemorrhage).
- Indigestion or upset stomach (dyspepsia).
- Abdominal pain.
- Ulcer.
- Other.

**In addition**
- Liver and kidney damage may occur in case of an overdose.
- Serious complications may occur in combination with other drugs.

**Most common unwanted side-effects of paracetamol**
(often used to treat fever in measles patients)

**Common**
- [One or more of the following occurs in 1-9% of people who use the drug]:
  - Irritation and inflammation inside the nose (rhinitis).
  - Severe shortness of breath (dyspnea).
  - Coughing, heaviness and tightness in the chest or wheezing (paroxysmal bronchial spasm).
  - Bleeding from the gastrointestinal digestive tract (gastrointestinal haemorrhage).
  - Indigestion or upset stomach (dyspepsia).
  - Abdominal pain.
  - Ulcer.
  - Other.

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# Possible complications of the disease and possible side effects of its treatment

## Possible complications of *Haemophilus influenzae* type *B* (Hib) infection

### Inflammation of joints (septic arthritis)
- **Can lead to:**
  - Meningitis occurs in 10-30% of cases.
  - Bacterial skin infection (cellulitis) in 10-30% of cases.
  - Bone infection (osteomyelitis) in 5-10% of cases.
  - Pneumonia in 5% of cases.

### Meningitis occurs in 50-65% of all invasive Hib cases
- **Can lead to:**
  - Death in 2-5% of cases.
  - Long-term effects such as hearing loss or other chronic neurologic conditions, in 15-30% of those who survive.

### Pneumonia
- **Can lead to:**
  - Death.
  - Collection of pus inside the body (empyema and abscess).
  - Inflammation near to the heart (pericarditis).
  - Collapse or closure of the lung (atelectasis).
  - Blockage of respiration (endobronchial obstruction).

### Inflammation at the back of the tongue (epiglottitis)
- **Occurs in 14.7 out of every 100 000 infected children (0-4 yrs).**
- **Can lead to:**
  - Death.
  - Respiratory failure.
  - Pneumonia.
  - Meningitis.

### Bacterial skin infection (cellulitis)
- **Progresses rapidly.**
- **Involves face, head or neck.**
- **Requires antibiotic treatment.**

## Possible unwanted side-effects of anti-inflammatory therapy with dexamethasone (commonly used to treat Hib and prevent hearing loss)

### Very common
- **Mild soreness at the injection site occurs in more than 10% of vaccinations.**

### Common
- **Fever occurs in 2% of vaccinations.**

### Rare (occurs in less than 1%):
- Cardiac arrest.
- Enlarged liver (reversible hepatomegaly).
- Blood clot inside deep veins (thromboembolism).
- Severe depression.
- Other.

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1 Hib: *Haemophilus influenzae* type *B* – a bacteria which can cause serious diseases like meningitis.

### PCV

**Possible complications of the disease and possible side effects of its treatment**

#### EAR INFECTIONS
- Repeated ear infections requiring ear tubes.

#### MENINGITIS
**Can lead to:**
- Death (1 in 10).
- Inflammation of the protective coverings of the brain and spinal cord.
- Hearing loss.
- Developmental delay.

#### PNEUMONIA
**Can lead to:**
- Death.
- Collection of pus inside body/thoracic cavity (empyema and abscess).
- Inflammation near to the heart (pericarditis).
- Collapse or closure of the lung (atelectasis).
- Blockage of respiration (endobronchial obstruction).

#### SEPSIS
**Can lead to:**
- Death (4 in 100).
- A severe blood infection that can lead to organ failure and death.

#### SINUS INFECTION

#### Most common unwanted side effects of paracetamol
(commonly used to treat a mild case of pneumonia)

**COMMON** (occurs in 1-9%):
- Irritation and inflammation inside the nose (rhinitis).
- Coughing, heaviness and tightness in the chest or wheezing (paroxysmic bronchial spasm).
- Bleeding from the gastrointestinal tract (gastrointestinal haemorrhage).
- Indigestion or upset stomach (dyspepsia).
- Abdominal pain.
- Ulcer.
- Other.

**IN ADDITION**
- Liver and kidney damage may occur in the case of an overdose.
- Serious complications may occur in combination with other drugs.

#### Possible unwanted side-effects of basic antibiotics
(commonly used to treat a mild case of pneumonia)

**COMMON** (occurs in 1-9%):
- Upset stomach, diarrhea, nausea, vomiting, abdominal pain.
- Impaired hearing.
- Eye problems, including drooping eyelids, blurred vision.
- Difficulty in speaking or swallowing, muscle weakness.
- Signs of liver problems.

**RARE** (occurs in 0.01-0.1%):
- Fast/irregular heartbeat.
- Severe dizziness.
- Fainting.

**IN ADDITION**
- Serious complications may occur in combination with other drugs.

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*If we would compare with the treatment of a more serious case of pneumonia or other diseases caused by Streptococcus pneumoniae, such as meningitis and sepsis, the possible side-effects of the treatment would be even more serious.