

**TRAINING FOR THE HEALTH SECTOR**  
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**CHILDREN AND FOOD SAFETY**

 World Health Organization

**Children's Health and the Environment**  
WHO Training Package for the Health Sector  
World Health Organization  
[www.who.int/ceh](http://www.who.int/ceh)

WHO/HSE/PHE/AMR/09.01.04

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This presentation provides some of the basic information needed to understand how food contamination affects children. It stresses the ways children from preconception through adolescence are different from adults in their exposure to food contaminants.

### LEARNING OBJECTIVES

After this presentation, individuals will understand:

- ❖ Major foodborne risks for
  - Embryo / foetus
  - Breast and bottle-fed infants
  - Children and infants receiving complementary foods
- ❖ How to reduce food contamination during
  - Production
  - Storage
  - Preparation

<<READ SLIDE>>

### FOODBORNE DISEASES HOW LARGE IS THE PROBLEM?

- ❖ Only estimates are available
  - Reporting varies according to the source
- ❖ 1.5 billion cases diarrhoea annually (excluding China)
  - 30-70% are food-related
  - 1.8 million deaths mostly in children < 5 years
- ❖ Most of morbidity affects children
- ❖ Vicious circle of diarrhoea and malnutrition

<<NOTE TO USER: INSERT LOCAL/NATIONAL/REGIONAL ESTIMATES>>

**Definition of foodborne diseases:** Foodborne diseases are defined as diseases, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food. Every person is at risk of foodborne diseases.

Unfortunately, data on the incidence and severity of foodborne diseases in the general population are limited in most countries. Where such data are collected through surveillance programmes, most cases of foodborne diseases are not reported, either because medical treatment is not sought or, when treatment is sought, specimens are not taken to allow diagnostic tests to identify the foodborne pathogen. Also, certain pathogens transmitted via food may also be spread through **water** or by **person-to-person contact**, and this may obscure the role of food as a vehicle for transmission. In addition, some foodborne disease is caused by hitherto unknown pathogens, and thus cannot be diagnosed. Many pathogens, such as *Campylobacter jejuni*, *Escherichia coli* O157:H7 and *Cyclospora cayatanensis*, were not recognized as causes of foodborne disease twenty years ago. Nowadays, new pathogens are being recognized as a cause of foodborne disease.

Foodborne diseases that are nationally reportable in certain developed countries include typhoid fever, cholera, hepatitis A, *E. coli* O157:H7 infection, haemolytic uraemic syndrome, salmonellosis, and shigellosis. Reporting requirements are stipulated by local and national regulations. In developing countries (excluding China), foodborne pathogenic microorganisms are estimated to cause up to 70% of the roughly 1.5 billion annual episodes of diarrhoea, and a related 1.8 million deaths in children under the age of five (*Dr. G. Moy, WHO, personal communication*). In the United States it is estimated that 76 million illnesses, 325 000 hospitalizations and 5000 deaths result each year from foodborne diseases. While the figure for morbidity suggests that one in three persons becomes ill each year, foodborne disease is expected to be more prevalent among the young.

*References:*

- Käferstein, Food safety: a commonly underestimated public health issue. *World health statistics quarterly*, 1997, 50(1/2): 3.
- Mead, Food-related illness and death in the United States, *Emerging infectious diseases*, 1999, 5(5): 607.
- WHO. Food safety and foodborne illness. Fact Sheet. *WHO*, 2007. Available at [www.who.int/mediacentre/factsheets/fs237/en/](http://www.who.int/mediacentre/factsheets/fs237/en/)  
- accessed December 2009

## BURDEN OF DISEASE ESTIMATES

### ❖ WHO Foodborne Disease Burden Epidemiology Reference Group

- Estimate Disability Adjusted Life Years (DALYs)
- To express the years of life lost to premature death and the years living with disability

In 2006 WHO launched a new initiative to estimate the global burden of foodborne diseases. As part of this initiative, WHO established the Foodborne Disease Burden Epidemiology Reference Group. They are charged with estimating the global burden of foodborne disease, using DALYs (disability adjusted life years).

*Reference:*

•WHO initiative to estimate the global burden of foodborne disease. *First formal meeting of the foodborne disease burden epidemiology reference group*, 2008. Available at [www.who.int/foodsafety/publications/foodborne\\_disease/FERG\\_Nov07.pdf](http://www.who.int/foodsafety/publications/foodborne_disease/FERG_Nov07.pdf) - accessed December 2009

## Children and Food Safety

### DIFFERENT AND UNIQUE EXPOSURES

#### ❖ Unique exposure pathways

- Transplacental
- Breastfeeding
- Infant formula

#### ❖ Exploratory behaviours leading to exposures

- Hand-to-mouth, object-to-mouth
- Non-nutritive ingestion

#### ❖ Quantity and quality of food consumed

- Amount consumed is higher than adults
- More milk products and fruits and vegetables

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Children have unique exposure pathways. They can be exposed *in utero* to toxic environmental agents that cross the placenta. Such exposures can be biological (viral, bacterial, parasitic) or chemical (pesticides, toxins). They can also be exposed to pollutants that pass into their mother's milk. Neither of these routes of exposure occur in adults or older children.

Children also have pathways of exposure that differ from those of adults due to their size and developmental stage. For example, young children engage in normal exploratory behaviours including hand-to-mouth and object-to-mouth behaviours, and non-nutritive ingestion which may dramatically increase exposure over that in adults.

The amount of food that children consume per kilogram of body weight is higher than that of the adult because children not only need to maintain homeostasis, as adults do, but are growing. The average infant consumes 5 oz. of formula per kilogram of body weight (for the average male adult, this is equivalent to drinking 30 12 oz. cans of liquid a day.) If the food or liquid contains a contaminant, children may receive more of it relative to their size than adults.

In addition, children consume different types of food. The diet of many newborn babies is exclusively breast milk. The diet of children usually contains more milk products and certain fruits and vegetables than the typical adult diet.

#### References:

- American Academy of Pediatrics Committee on Environmental Health. Developmental toxicity: Special considerations based on age and developmental stage. In: Etzel RA, ed. *Pediatric Environmental Health*, 2<sup>nd</sup> ed. Elk Grove Village, IL: American Academy of Pediatrics, 2003.
- Mahoney DB, Moy GC. Foodborne hazards of particular concern for the young. In: Pronczuk J, ed. *Children's health and the environment: A global perspective*. Geneva, World Health Organization, 2005.

## Children and Food Safety

### MAJOR FOODBORNE HAZARDS

#### ❖ Biological

- Viruses
- Bacteria
- Protozoa
- Parasites
- Prions

#### ❖ Chemical

- Toxins
- Pesticides
- POPs
- Heavy metals
- Food additives
- Other

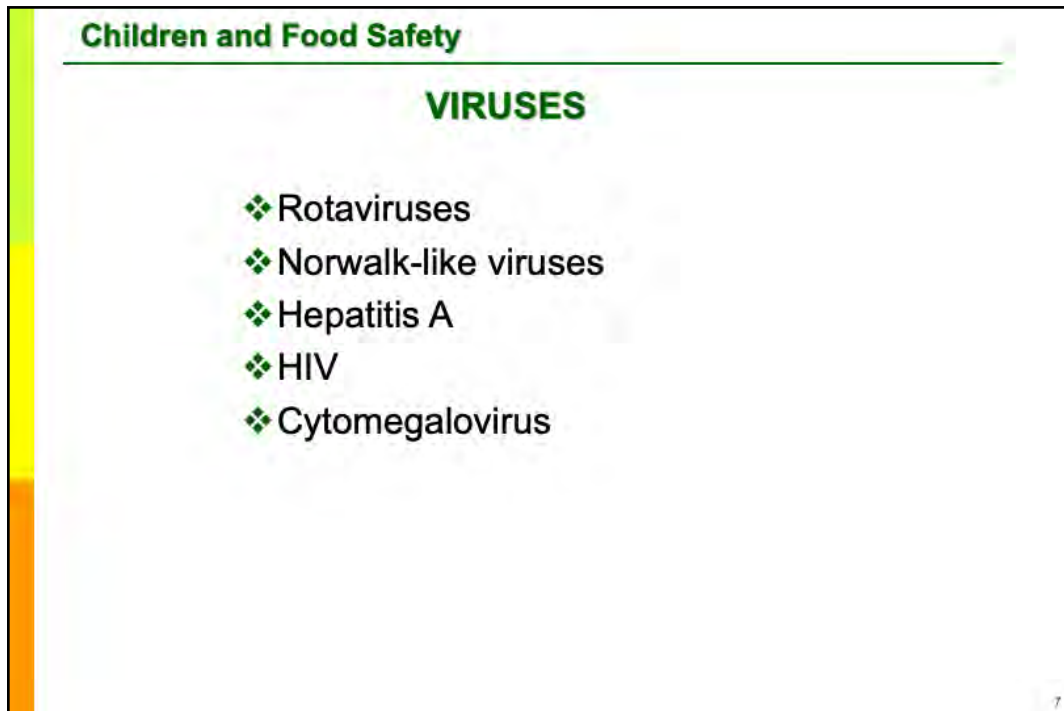
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The agents responsible for foodborne disease include viruses, bacteria, protozoa, parasites, and prions, as well as a wide range of chemicals, including toxins, pesticides, persistent organic pollutants (POPs), heavy metals, food additives, and any other chemical that may enter food. The adverse health effects of foodborne diseases range from mild gastroenteritis (including diarrhoea and vomiting) to life-threatening neurological, renal or hepatic syndromes, congenital anomalies and cancer. The risks posed by the presence of microorganisms and chemicals in the food supply are of concern worldwide. However, consumers' judgment of hazards and perception of food safety risks are often at variance with those of the scientific community. Consumers' perceptions in particular are shaped by a number of factors, including personal experience, access to information about food safety, trust in sources of information, and baseline food safety risk levels. Hence, while the public may be concerned about food additives and new technologies, they may fail to recognize the major risks resulting from food contaminated by pathogenic microorganisms.

#### References:

•Diagnosis and management of foodborne illnesses: A primer for physicians and other health care professionals. Available at: [www.ama-assn.org/ama/pub/physician-resources/medical-science/food-borne-illnesses/diagnosis-management-foodborne.shtml](http://www.ama-assn.org/ama/pub/physician-resources/medical-science/food-borne-illnesses/diagnosis-management-foodborne.shtml) – accessed December 2009

•WHO. Basic Food safety for health workers. WHO. Available at: [whqlibdoc.who.int/hq/1999/WHO\\_SDE\\_PHE\\_FOS\\_99.1.pdf](http://whqlibdoc.who.int/hq/1999/WHO_SDE_PHE_FOS_99.1.pdf) – accessed December 2009



We will begin with viruses because they are thought to be the cause of most foodborne diseases, both in developing and industrialized countries.

<<READ SLIDE>>

*Reference:*

•Diagnosis and management of foodborne illnesses: A primer for physicians and other health care professionals. Available at: [www.ama-assn.org/ama/pub/physician-resources/medical-science/food-borne-illnesses/diagnosis-management-foodborne.shtml](http://www.ama-assn.org/ama/pub/physician-resources/medical-science/food-borne-illnesses/diagnosis-management-foodborne.shtml) - accessed December 2009

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