

Foodborne disease:

*a focus for
health education*



World Health Organization
Geneva



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Selected WHO publications of related interest

Prices in Swiss francs*

Control of foodborne trematode infections.

Report of a WHO Study Group.

WHO Technical Report Series, No. 849,
1995 (165 pages) 26.–

Evaluation of certain food additives.

Fifty-first report of the Joint FAO/WHO Expert Committee on Food Additives.

WHO Technical Report Series, No. 891,
2000 (176 pages) 35.–

Evaluation of certain veterinary drug residues in food.

Fifty-second report of the Joint FAO/WHO Expert Committee on Food Additives.

WHO Technical Report Series, No. 893,
2000 (109 pages) 20.–

Food safety issues associated with products from aquaculture.

Report of a Joint FAO/NACA/WHO Study Group.

WHO Technical Report Series, No. 883,
1999 (62 pages) 14.–

Hazard analysis critical control point evaluations.

A guide to identifying hazards and assessing risks associated with food preparation and storage.

Bryan FL.

1992 (78 pages) 15.–

High-dose irradiation:

wholesomeness of food irradiated with doses above 10 kGy.

Report of a Joint FAO/IAEA/WHO Study Group.

WHO Technical Report Series, No. 890,
1999 (203 pages) 42.–

Preparation and use of food-based dietary guidelines.

Report of a Joint FAO/WHO Consultation.

WHO Technical Report Series, No. 880,
1998 (114 pages) 23.–

Principles for the toxicological assessment of pesticide residues in food.

Environmental Health Criteria, No. 104,

1990 (117 pages) 18.–

Summary of evaluations performed by the Joint FAO/WHO

Expert Committee on Food Additives (JECFA). 1956–1997 (first through forty-ninth meeting).

1999 (292 pages) 110.–

Strategies for assessing the safety of foods produced by biotechnology.

Report of a Joint FAO/WHO Consultation.

1991 (63 pages) 11.–

Further information on these and other WHO publications can be obtained from Marketing and Dissemination, World Health Organization, 1211 Geneva 27, Switzerland.

*Prices in developing countries are 70% of those shown here.

Preface

WHO has recognized the importance of education of food handlers and consumers for a number of years. In 1983, the Joint FAO/WHO Expert Committee on Food Safety, which discussed the role of food safety in health and development (Geneva, 1983), identified public education and community participation as essential pillars of strategies for improving food safety and for intervening to prevent foodborne disease. As a follow-up to this Expert Committee, a consultation on health education in food safety in 1987 gave further guidance in this regard. Since then numerous efforts have been made to promote health education in food safety, and several publications and educational materials have been developed for this purpose.

The present book is intended to highlight the public health aspects of food safety. It is an invitation to all who are concerned with food safety and public health education to make every effort to further educate consumers and train food handlers. It tries to capture the concept developed at the WHO consultation on health education in food safety, while at the same time reflecting the extensive experience of WHO's programme on food safety in terms of prevailing fallacies and the need for guidance.

At the time when the plans for this book were first laid some years ago, public health authorities were paying little attention to food safety and even less to health education in food safety. Today there is greater awareness and recognition of the importance of food safety for public health and development in some countries. This may be partly due to WHO's advocacy, but the subject has also received publicity as a result of some important events.

The large-scale outbreak of cholera in Peru and other Latin American countries in the early 1990s was a turning point in that it drew the attention of public health authorities to the link between food and cholera—a link that had previously been overlooked. The epidemic had devastating effects on the health and economy of several countries.

Within the context of the General Agreement on Tariffs and Trade (GATT), the Uruguay Round of Multilateral Trade Negotiations was successfully concluded in April 1994, resulting in liberalization of the food trade. According to the Agreement on the Application of Sanitary and Phytosanitary Measures the work of Codex Alimentarius Commission (through the establishment of standards, guidelines and recommendations) has been recognized as the reference for national food safety requirements. This implies that countries that are involved in international trade and that are members of the World Trade Organization can no longer reject foodstuffs which meet Codex standards,

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recommendations or guidelines without providing justification. Although these developments have concerned principally the regulatory approach to food safety and the need for countries to update their food control systems, they have nevertheless sparked off a debate regarding the responsibilities of consumers and food handlers in food safety and the need for definition of the degree of safety that should be expected from producers and processors.

Other controversial issues, such as the problem of bovine spongiform encephalopathy (BSE) and the use of hormones in food production, have also called into question modern methods of food production and the measures taken to ensure food safety. In addition, the problem of dioxin in animal feed has increased consumer concern.

Perhaps the most important factor in increasing the concern of public health authorities in some countries (mainly industrialized) has been the increasing incidence of foodborne illnesses and a series of outbreaks with fatal or severe health consequences. Some outbreaks were of massive proportions, affecting hundreds of thousands of people; others caused consternation and apprehension because of their severity or the number of deaths that resulted as well as their new epidemiological features. Weaknesses in investigation and surveillance systems for foodborne diseases in developing countries have meant that alarming figures or news about such outbreaks have been relatively scarce, but countries have been alerted worldwide to potential problems looming in the area of food safety and the potential increase and spread of foodborne illnesses.

The climate of concern among food control and public health authorities, as well as industries and consumers, has been an impetus for many governments to take a fresh look at their food safety programmes and to pay greater attention to information, education and training of food handlers. Nevertheless, the subject is far from receiving the attention that it deserves and in most countries the issue of food safety, and in particular health education in food safety, is frequently overlooked or receives low priority in public health programmes.

Even in countries where the authorities are conscious of the problem, very few have taken the step from recognition to action by developing a comprehensive, systematic and continuous programme of health education based on modern approaches to food safety. Several of the reviewers of this book requested examples of success stories regarding health education in food safety and failure to do so is an indication of the small amount of work that has been done in this area. Unfortunately, even where educational activities in food safety have been carried out, the activities have often not been properly coordinated with those primarily concerned, or the programme has lacked proper planning or evaluation that would have enabled improvements and adjustments to be made. Many attempts have also been based on traditional or outdated

approaches to hygiene education, with the result that some of these activities have done more harm than good.

Admittedly the situation has changed greatly over the last few years, and today in some countries there is a greater awareness among consumers. However, in many instances this change has been a consequence of negative publicity in the media, leading to a feeling of insecurity among consumers rather than to a sustained information and education campaign about consumer roles and responsibilities. While this book was in preparation new data became available that could not be included but that clearly supported the book's message. Therefore, the need to produce this book has persisted, and it is hoped that it will achieve its objectives of raising awareness of the need for health education in food safety and of prompting actions. Even if it succeeds only in stimulating scientific debate and research, it will have accomplished a great deal in enhancing the know-how of the scientific community and shaping its views in this important area.

Finally, the attention of the reader is drawn to the sad story of Dr Ignaz Semmelweis (1818–1865) and the lesson that we should learn from it. For years, thousands of women lost their lives simply because of the unwillingness of his peers to recognize the importance of his discovery and to follow his recommendations with regard to washing their hands in order to prevent perinatal infections. It is strongly hoped that this book can bring a change in health education in food safety and that the recommendations in it will be duly considered by the relevant authorities.

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Introduction

Foodborne diseases are a widespread public health problem and a significant cause of reduced economic productivity. Each year throughout the world, millions of people, particularly infants and children, suffer and die from foodborne diseases (1). While the role of food producers and processors in ensuring food safety should not be underestimated, many cases of foodborne illnesses, if not most, could be prevented—and many lives saved—if food handlers were better educated and trained in safe food-handling and consumers were better advised in the choice of their food.¹

The importance of food safety, and particularly the need for education about it, has been highlighted at many international meetings. The WHO/UNICEF International Conference on Primary Health Care (Alma-Ata, 1978) proclaimed that “education concerning prevailing health problems and the methods of preventing and controlling them” is an essential element of primary health care. Promotion of the food supply and proper nutrition were considered to be other essential components (2). The importance of the subject was reiterated at the World Summit for Children (New York, 1990), the United Nations Conference on Environment and Health (Rio de Janeiro, 1992) and the International Conference on Nutrition (Rome, 1992). In its Plan of Action, the Rome conference made the recommendation to “support consumer education to contribute to an educated and knowledgeable public, safe practices in the home, community participation and active consumer associations” (1).

In response to this call for the promotion of health education, including food safety, the Forty-second World Health Assembly passed a resolution (WHA42.44) in 1989 requesting WHO to support Member States in strengthening national capabilities in all aspects of health promotion, public information and education for health. It also requested that particular attention be paid to the development of new and effective methodologies and strategies. Later, the Forty-sixth World Health Assembly passed a resolution (WHA46.7) urging Member States to reduce foodborne diseases by the year 2000 and to remedy poor hygiene.

Independently of these developments, the General Assembly of the United Nations adopted on 9 April 1985 guidelines for consumer protection in which

¹ The term “food” is taken here to include drinking-water and water used in food preparation. In certain circumstances water is referred to as a separate entity.

it encouraged countries, and particularly developing countries, to develop consumer education programmes. The protection of consumers from hazards to their health and safety, the access of consumers to adequate information to enable them to make informed choices according to their wishes and needs, and consumer education are principles of these guidelines (3).

In spite of this recognition, food safety, and in particular the education of consumers and food handlers in food safety, has often been given very low priority in national health programmes. Further, the significance of food safety has often not been recognized in programmes for the prevention of diarrhoea. In a review of 67 articles that described and evaluated health education programmes in developing countries, none of the studies was designed to educate consumers/food handlers in food safety (4). Although the importance of food safety is being increasingly recognized, neglect of this subject in the past has perpetuated the high prevalence of diarrhoeal diseases. Many hygiene education programmes for the prevention of diarrhoeal diseases have not been very effective, since issues of food safety have not been considered.

One of the factors contributing to the scant attention to this subject is perhaps the insufficient awareness of health policy-makers and medical and health personnel of the health consequences of food contamination and the links between many diseases and food. The purpose of this book is therefore to:

- raise the awareness of health policy-makers of the importance of foodborne diseases for public health and outline the scope of food safety problems;
- highlight the importance of the education of food handlers and consumers for the prevention of foodborne illnesses;
- describe approaches used to select health education messages and key behaviours that need to be changed or reinforced;
- suggest possible partners or channels for implementation and communication, drawing on past experiences and initiatives or existing materials as examples of how objectives can be achieved.

The term “education” (in the context of the expression *health education in food safety*) is used in this book in its broadest sense and includes all types of activities, from communication and information to training, which enable the target audience to acquire the know-how and skills necessary to understand and manage food safety hazards. Strictly speaking, there is a distinction between training and education. Training is a process by which one is enabled to acquire a skill, while education—particularly health education—aims at influencing the way of life and empowering people to make a reasonable and informed choice without imposing preconceived values. The views expressed in the educational interventions do not necessarily represent the views of WHO. The initiatives and educational material presented in this book are given only as examples of efforts that have already been made.

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The book emphasizes microbial and parasitic foodborne illnesses as these account for most episodes of acute foodborne disease and because education can help consumers and food handlers to play a greater role in their prevention. The term “food handlers” is taken to mean all people who handle, prepare or serve food, be they domestic food handlers (preparing family food) or professional food handlers such as those working in food service or catering establishments (cooks, waiters), retail stores, supermarkets, cottage industries or small businesses (e.g. bakeries) or street food vendors. Depending on their tasks, other professionals such as nurses and flight attendants may also be food handlers. Food handlers working in medium and large industries require education and training in food safety. However, this book focuses on operations where regulatory agencies have little or no power to control the safety of prepared food and where the type of food prepared often changes.

- Chapter 1 describes the extent of the problem of foodborne diseases. It outlines the nature of foodborne diseases, trends, economic implications, emerging pathogens and factors that affect prevalence. By citing examples, the chapter demonstrates the formidable task that is before the health sector.
- Chapter 2 gives 10 reasons why health education in food safety is both necessary and effective. It calls for the systematic education and training of professional food handlers, and for increased consumer information.
- Chapter 3 explains the complexity of behaviours that have an influence on food safety and describes approaches that have been used in selecting behaviours as the focus for change. Particular emphasis is given to the Hazard Analysis Critical Control Point (HACCP) system, which is a modern approach to food safety assurance that also has applications for health education about food safety.
- Chapter 4 suggests strategies and partners for educational programmes and draws on initiatives from different countries as examples.
- Chapter 5 gives guidance in implementing educational programmes and the infrastructure needed for the design and planning of such programmes, without extending to behavioural sciences and educational methods, for which references to appropriate publications are provided (5–8).
- Following the conclusion, Annex 1 contains a series of tables on the characteristics, transmission and prevention of foodborne illnesses, while Annex 2 describes the issue of risk communication as an element of health education.

The information and examples in this book have been drawn from a wide variety of sources around the world. However, much of the work in the area of

health education for food safety has taken place in developed countries. Examples from these countries may predominate in some parts of the book because of the limited extent of this kind of activity elsewhere.

A number of other WHO books deal with related topics. *Education for health* (9) explains methods of education, *Safe food-handling* (10) is an application of food safety to food and catering establishments, and *Basic food safety for health workers* is a resource book for health workers (11).

The primary target audiences of this book are health policy-makers, the managers of food safety and health education programmes in both the public and private sectors, and consumer bodies. The book is also intended for those working in cooperation and development agencies, national and international organizations, academic institutions, nongovernmental organizations and all who have responsibility for public health protection and promotion.

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11. *Basic food safety for health workers*. Geneva, World Health Organization, 1999 (unpublished document WHO/SDE/PHE/99.1; available on request from Food Safety, World Health Organization, 1211 Geneva 27, Switzerland).

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CHAPTER 1

Foodborne diseases: a global health and economic problem

Foodborne diseases, usually either infectious or toxic in nature, are caused by agents that enter the body through the ingestion of contaminated food. These diseases are sometimes inaccurately referred to as “food poisoning”. They include a range of diseases of chemical and biological origin, including cholera and diarrhoeal diseases, as well as a number of parasitic diseases.

Foodborne diseases represent one of the most widespread and overwhelming public health problems of the modern world. They take a heavy toll of human life and cause a great deal of suffering, particularly among infants, children, the elderly and persons who are immunocompromised. The magnitude and consequences of foodborne diseases are often underestimated by public health authorities. Only in recent years, as a consequence of several life-threatening foodborne disease outbreaks (e.g. outbreaks of enterohaemorrhagic *Escherichia coli* infection, listeriosis, salmonellosis and cholera), has awareness increased in some countries of the significance of these diseases for public health. Nevertheless, resources for the prevention of foodborne diseases are lacking. Regrettably, the countries that bear the biggest burden of the problem are also the ones that have the fewest resources to prevent it. Due to the broadness of the subject, the lack of information in some parts of the world and the fragmentary nature of it in others, it is not possible to review or compare data from different countries. Thus, this chapter attempts to give an insight into the scope, magnitude, nature, and health and economic consequences of foodborne diseases and the factors that affect their prevalence. Some of the examples provided here are selected especially to illustrate faulty practices and to show the need for health education in food safety. Although this chapter deals separately with the problems of developing and industrialized countries, it should be realized that diseases have no boundaries and most of them occur worldwide, regardless of region or stage of development.

Magnitude and nature of foodborne diseases

Developing countries

Developing countries are affected by a wide range of foodborne diseases. Cholera, campylobacteriosis, *E. coli* gastroenteritis, salmonellosis, shigellosis, typhoid and paratyphoid fevers, brucellosis, amoebiasis and poliomyelitis are only a few examples (1). With poor or non-existent reporting systems in most countries, reliable statistics on these diseases are not available and their

magnitude is therefore difficult to estimate. The gravity of the situation can, however, be appreciated in view of the high prevalence of diarrhoeal diseases in infants and children. Each year some 1500 million episodes of diarrhoea occur in children under the age of five, and over 3 million children die as a direct result. Indirectly, many millions more die from the combined effects of diarrhoea and malnutrition (2). It was previously thought that contaminated water supplies were the main source of pathogens causing diarrhoea, but it is now recognized that food plays an equally important role. It is estimated that up to 70% of cases of diarrhoeal disease may be caused by contaminated food (3, 4). This includes drinking-water and water used for food preparation. It should be noted that the roles of water and food in transmission of diarrhoeal diseases cannot be dissociated as water is both an ingredient of food and drink and is also used for washing hands, food and utensils. Where water is contaminated and good hygienic practice is lacking, it is likely that food is also contaminated.

Pathogens which have been identified as the cause of diarrhoeal diseases include bacteria such as pathogenic *E. coli*, *Shigella* spp., *Salmonella* spp., *Vibrio cholerae* O1 and *Campylobacter jejuni*; protozoa such as *Giardia lamblia*, *Entamoeba histolytica*, *Cryptosporidium* spp; and also enteric viruses such as rotavirus (5). Infections due to pathogenic strains of *E. coli* are probably the commonest cause of diarrhoea in developing countries. They are responsible for up to 25% of diarrhoeal disease in infants and children and have been specifically associated with complementary foods¹ (3, 5). The frequent contamination of foods with *E. coli* and pathogens of faecal origin, as reported in the literature, signifies the contamination of food with faecal matter. Consequently, any pathogen known to be transmitted by the so-called faecal-oral route (e.g. rotavirus) can be transmitted through food (6). The role of food in the faecal-oral transmission of pathogens is shown in Fig. 1. Table 1 shows the pathogens that are frequently identified in children with acute diarrhoea seen at treatment centres in developing countries (5).

The contamination of complementary foods used in poor populations in developing countries is a daunting problem. Its role in diarrhoeal diseases and malnutrition has often been overlooked in the past. Numerous studies have shown that, in some populations, complementary foods are highly contaminated, that the level of contamination increases during the warm season and that complementary foods may often be more contaminated than adult foods (3).

¹ The period during which foods or liquids are provided along with breast milk is considered the period of complementary feeding. Any non-breast milk foods given to young children during the period of complementary feeding are defined as complementary foods. Sometimes the term "weaning" is used. As this term may imply a complete cessation of breast-feeding, it should not be used.