

This report contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of the World Health Organization

Health surveillance and management procedures for food-handling personnel

Report of a
WHO Consultation

World Health Organization
Technical Report Series
785



World Health Organization, Geneva 1989

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**WHO CONSULTATION ON HEALTH SURVEILLANCE AND
MANAGEMENT PROCEDURES FOR FOOD-HANDLING PERSONNEL**

Geneva, 18–22 April 1988

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In 1984, a Joint FAO/WHO Expert Committee on Food Safety, in its report on the role of food safety in health and development (4), noted that: "It is not easy to maintain control over food handlers. There is often a rapid turnover and it may be difficult to keep track of them. Medical examinations are costly and do not guarantee the detection of more than a small proportion of carriers of pathogenic organisms. Also infections may occur after the examinations. . . Screening for pathogens in stool specimens from food-handlers is

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WHO Library Cataloguing in Publication Data

Health surveillance and management procedures for food-handling personnel: report of a WHO consultation.

(World Health Organization technical report series; 785)

1. Food handling – standards
2. Food contamination – prevention and control
3. Food poisoning – prevention and control

I. Series

ISBN 92 4 120785 X

(NLM Classification: WA 695)

ISSN 0512-3054

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PRINTED IN SWITZERLAND

89/8012 – Schüler SA – 7500

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not cost-beneficial and is not recommended, and the identification of a carrier is not likely to make a significant contribution to the control of foodborne diseases. A much more effective preventive measure, the education of food-handlers in hygienic practices, is most often neglected." These views were reinforced in 1987 by the Second Meeting of the WHO Regional Working Group on Food Safety, held in Kuala Lumpur, Malaysia (5), which questioned the relevance of the routine medical examination of such personnel.

Despite the conclusions of these meetings, the debate has continued among health professionals and public health authorities on the relative merits, costs and benefits of the health surveillance of food-handling personnel, and there is no uniformity in the procedures adopted by countries in undertaking such surveillance. There is still uncertainty as to whether, and under what circumstances, routine medical examinations are cost-effective in preventing or at least minimizing food contamination.

In addition, new foodborne pathogens (such as *Campylobacter* spp, *Vibrio cholerae* non-01, *Vibrio vulnificus*, *Escherichia coli* 0157:H7 and *Listeria monocytogenes*) have emerged in recent years and their significance needs to be examined in relation to their possible implications for the health surveillance of food handlers.

The task of the Consultation was therefore to review systematically those foodborne diseases that may be transmitted by food-handling personnel via food to the consumer, and to determine the kinds of food contamination that can be prevented and the kind of health surveillance of such personnel necessary for the purpose. In view of the great importance of the education of food-handling personnel in preventing contamination of food, the Consultation was also requested to consider ways and means of achieving this.

2. THE POTENTIAL OF FOOD-HANDLING PERSONNEL TO TRANSMIT DISEASES VIA FOOD

The ability of food-handling personnel to transmit disease is related to the degree of contact that they are likely to have with particular sorts of food. The risks they pose clearly vary widely, which raises the question whether all such personnel should be treated in the same way.

2.1 Factors that commonly contribute to the occurrence of outbreaks of foodborne disease

Investigations of outbreaks of foodborne disease throughout the world show that, in nearly all instances, they are caused by failure to observe satisfactory standards in the preparation, processing, cooking, storing or retailing of food.

Organisms may be introduced into the food chain from a variety of sources, and at different stages. Gastrointestinal pathogens may be derived from animal sources, the environment or, occasionally, from humans. Many raw foods, particularly of animal origin, are heavily contaminated with organisms of various kinds and attempts to reduce microbial loads at various stages of production have generally been unsuccessful. The elimination of pathogenic organisms therefore depends largely on the correct application of processing technologies, such as pasteurization, irradiation, cooking, freezing and pickling at the industrial, retail and domestic levels.

Thus the prevention of outbreaks of foodborne disease depends on the correct application of these technologies, especially in terms of time and temperature control, and on proper storage and the prevention of cross-contamination (4). Specific factors that contribute to the occurrence of outbreaks of foodborne disease are listed in Section 6.

2.2 Classification of food-handling personnel according to the potential risk

The term food-handling personnel, in its broadest sense, includes all those who may come into contact with part or all of an edible end-product at any stage from its source, e. g., the farm, to the consumer. This concept is embodied in the definition contained in the report on the WHO Working Group on Health Examinations of Food Handling Personnel (2): "... a person in the food trade or someone professionally associated with it such as an inspector who, in his routine work, comes into direct contact with the food itself in the course of its production, processing, packaging or distribution, including producers of raw milk for direct consumption." This definition recognizes that responsibility for the application and control of food-handling techniques extends from management to the consumer. Not all, however, actually come into contact with food; equally, those who do have such contact are not necessarily in

a position to transfer pathogenic organisms from themselves to food in such a way that illness might result. A distinction must therefore be made between those whose work could allow such transfer to occur and those for whom such a risk does not exist.

Those who present a risk of transmitting pathogenic organisms in this way can be defined as persons whose work involves touching unwrapped foods to be consumed raw or without further cooking or other forms of treatment. This category will include people involved in such activities as the preparation of salads, sandwiches, and cooked foods to be served cold, and the handling of cooked meats and meat products and of certain dairy products, including fresh cream and egg-based foods. In the wider context, workers in water-treatment plants should also be included. Street vendors, common in both developing and industrialized countries, also fall into this group, and may present special problems related to their way of life and difficulties in determining whether they have complied with control measures.

The nature of the work that they are to carry out must be taken into account in the assessment of, and training provided to, food handlers.

2.3 Food-handling personnel as sources of infections and intoxications

Food-handling personnel play an important role in ensuring food safety throughout the chain of production, processing, storage and preparation. Mishandling and disregard of hygienic measures on their part may enable pathogens to come into contact with food and, in some cases, to survive and multiply in sufficient numbers to cause illness in the consumer. Occasionally, food-handling personnel may transfer to food pathogens that they are carrying in or on their bodies, and such pathogens may survive and may multiply in the food and subsequently cause disease.

The sequence of events whereby a food handler may contaminate food in such a way as to cause foodborne disease is as follows:

1. Pathogens are shed in faeces, urine or discharge from the nose, ears or other areas of exposed skin in sufficient quantity.
2. Pathogens are transferred to the hands or exposed parts of the body which come into direct or indirect contact with the food.
3. The organisms survive for long enough to be transferred to food.

4. The food that is contaminated is not treated in such a way as to destroy the organisms before they reach the consumer.
5. Either the number of organisms on the food constitutes an infective dose or the nature of the food and its conditions of storage are such as to allow the organisms to multiply and produce an infective dose or to produce toxins in quantities sufficient to cause illness.

2.3.1 *Excretion of pathogens*

Gastrointestinal pathogens are excreted, often in very large numbers, in the acute phase of disease and in decreasing numbers and for variable periods of time during and after convalescence. In some cases excretion starts in the incubation period, as with viral hepatitis A, and may cease when the major clinical manifestations become apparent. Certain infections, such as typhoid fever, may not manifest themselves clinically at any stage but the organism concerned may be excreted for varying periods of time.

There is, therefore, a significant difference between those who are acutely ill from a gastrointestinal infection and carriers who continue to excrete the organism after the clinical illness is over. In the former case, the stools are characteristically loose and frequent, the concentration of organisms may be very high, and the organisms are likely to be easily and widely disseminated. Carriers, on the other hand, have recovered clinically, have normally-formed stools and excrete diminishing numbers of organisms as time passes. The potential risk of spreading organisms widely is clearly very much greater for those who are clinically ill than for carriers.

2.3.2 *Transmission of pathogens*

The hands are the most important vehicle for transfer of organisms from faeces, nose, skin or other sites to food.

Epidemiological studies of *Salmonella typhi*, non-typhi salmonellae, *Campylobacter* and *Escherichia coli* have demonstrated that these organisms can survive on fingertips and other surfaces for varying periods of time, and in some cases after hand-washing (6, 7). Staphylococci may well not be removed from the hands by washing when they form part of the resident flora.

2.3.3 Contamination of food

Certain organisms, for example viruses, *Campylobacter*, and protozoa, do not multiply in food and a sufficient dose must be transferred to cause illness without further multiplication. *Salmonellae*, *shigellae*, staphylococci, *Clostridia perfringens* and *C. botulinum* usually have to multiply in food before they are able to cause infection or intoxication; foods differ in their ability to support such growth.

2.3.4 Infections and intoxications potentially transmissible by food handlers

Staphylococcus aureus infection. The source of many cases and outbreaks caused by this organism is man. It is found frequently in the nose and in small numbers on the skin in clinically healthy persons, and in very much larger numbers in pus and in other lesions, such as infected eczema, psoriasis and otitis. In a substantial proportion of outbreaks, an overt clinical lesion on an exposed part of the body of a food handler can be found. In some circumstances the epidemiological evidence points to a food handler and, while no infected lesion can be found, other features, such as the similarity of the phage type present in the nose of the handler to that in the affected food, leads to the conclusion that the person was responsible for the contamination (8).

Typhoid and paratyphoid fevers. The reservoir of *Salmonella typhi* is man and that of *Salmonella paratyphi* usually man. There are recorded instances of transmission from overt cases of disease and from long-term symptomless faecal or urinary carriers (9). However, there have been numerous cases in which excretors have prepared and served food to their families for many years without causing infection.

Non-typhi salmonellosis. For the organisms responsible for this disease, food animals, poultry, wild animals, and the environment constitute the reservoir. Raw foods, including meat, poultry and vegetables, are frequently contaminated. Thus, the epidemiology of these infections differs from that of typhoid fever. The carrier state rarely lasts more than three months and chronic carriage is very rare.

Asymptomatic food handlers have not been unequivocally implicated in the causation of outbreaks (10). In the investigation of

outbreaks, where food handlers have been found to be excreting the organism, epidemiological evidence indicates that they have acquired it during the course of the outbreak and have been victims themselves rather than the source. Thus food handlers may be transmitters while clinically unwell, but as carriers with well-formed stools they do not constitute a much greater risk of transmitting disease via food than those workers who are not excretors of the pathogens.

Escherichia coli enteritis. Increasing numbers of serotypes of *E. coli* are now being associated with a variety of clinical syndromes, some of which include gastroenteritis. The origin and reservoirs of many of these organisms are not as yet fully known, and the epidemiology of many outbreaks is unclear. As most occur in countries with relatively poor standards of hygiene it is not yet possible to define with any certainty the part played by infected food handlers.

Shigellosis. A recent review of shigellosis in the USA found that the majority of the cases studied were caused by poor personal hygiene on the part of food handlers (11). Whether or not the handlers were themselves unwell is not discussed in detail, but in four of the five outbreaks cited, diarrhoea was recorded among the staff at the time of food preparation. Carriage of *Shigella* spp during and after convalescence is of short duration and rarely lasts longer than a month. Convalescent asymptomatic food handlers who are well versed in hygienic practices should not constitute a risk.

Cholera. While subclinical cases and the carrier state, which is generally of short duration, present potential hazards, no relationship has been demonstrated between food handlers who are not in the acute phase of the disease and transmission.

Viral hepatitis A. Asymptomatic pre-icteric food handlers are a well recognized source of outbreaks since they are capable of contaminating a wide variety of raw and uncooked foods, e.g., shellfish, salads, cold meats, fruit juices. Most authorities accept that convalescents are free from infection within seven days after clinical onset. Hepatitis B is not transmitted through food.

Other gastroenteric viral infections. While outbreaks have been associated with clinically ill food handlers, excretion of virus at a

level at which it can be detected in the stool (by electron microscopy, enzyme-linked immunosorbent assay, etc.) generally ceases 24-48 hours after the clinical onset. However, instances of apparent post-recovery transmission of Norwalk gastroenteritis have been reported (12) and this has led to the suggestion that food handlers with suspected gastroenteritis of this type should be prohibited from preparing food for at least 48 hours after recovery. Nevertheless, it was concluded that, in the case of Norwalk gastroenteritis, more evidence is required before the exclusion of clinically recovered food-handling personnel can be justified. This conclusion must also be seen in the light of the fact that, under routine conditions, it is difficult, and in many instances impossible, to diagnose Norwalk gastroenteritis with sufficient precision, since the diagnosis cannot be made on the basis of the clinical symptoms only.

Acquired immunodeficiency syndrome (AIDS). The human immunodeficiency virus (HIV) is not transmissible through food.

Amoebiasis. Most infections are symptomless, with excretion of cysts continuing for long periods. There is little justification for any action other than emphasizing the need for personal hygiene among food handlers in areas of high prevalence.

Enterobiasis. Infection is associated with few symptoms, especially in adults. Again, the need for personal hygiene should be stressed.

3. SELECTED DISEASES AND THEIR RELEVANCE TO FOOD SAFETY

A list of foodborne diseases of human origin of which the causal agent is shed in an infective form is given in Table 1, from which it can be seen that the diseases of man relevant to food safety are few in number. Moreover, the information obtained from a health examination is valid only for the time at which it is carried out; the same applies to the microbiological examination of faeces for pathogens.

Non-medically-qualified personnel, such as managers, supervisors and employers (preferably with the support of an occupational health nurse and, when necessary, a physician with

access to microbiological facilities), can play an important part in ensuring that food handlers are fit to work with food.

3.1 Gastrointestinal diseases

Non-typhoid salmonellae, shigellae and campylobacter are the causes of most gastrointestinal infections. Physical examination will not detect carriers of these or other agents of gastrointestinal disease; microbiological and serological tests will not detect all carriers and are of no practical value. Questioning may reveal a history of typhoid or paratyphoid which might suggest the possibility of a carrier state.

3.2 Staphylococcal and streptococcal infections

Obvious infective lesions of the exposed skin may be detected by non-medically-qualified persons. Occupational health nurses and/or physicians can detect chronic suppurative conditions of the ear and purulent gingivitis. Microbiological investigations of asymptomatic persons are not helpful.

3.3 Pulmonary infections

Pulmonary tuberculosis is usually detected by chest radiography. As human tuberculosis is not transmitted by food, there is no case for carrying out such screening or for microscopy of sputum for the purpose of preventing foodborne disease. Tuberculin testing of food handlers is also considered to be of no value for this purpose.

3.4 Viral hepatitis A

Sufferers from hepatitis A are thought to be most infectious up to two weeks before the onset of symptoms; the only worthwhile preventive measure is to exclude food handlers from work for a week after the onset of jaundice. Serological testing is of little help in the identification of infectious cases. With the expected availability in the fairly near future of a vaccine against hepatitis A, the immunization of food-handling personnel will provide an effective tool with which to prevent contamination of food with the virus of this disease.

Table 1. List of foodborne diseases of human origin, the causal agent of which is shed in an infective form^a

Disease	Etiological agent	Sources of infection and reservoirs		Excretion of agent by man during:			Remarks
		Human	Non-human	Incubation and acute stage	Convalescence	Symptomless carrier or chronic stage	
<i>Viral diseases</i>							
Rotavirus enteritis	Rotavirus (human)	+	?	+	+	—	
Epidemic viral gastroenteropathy	Norwalk and related viruses	+	—	+	—	—	
Poliomyelitis	Poliovirus	+	—	+	—	—	
	(R—inapparent infection)	+		(3–6 weeks)			
	+	+		+	—	—	
Viral hepatitis	Hepatitis A virus and A-like non-A non-B virus		Rarely, primates in captivity carry the virus				
<i>Bacterial infections and intoxications</i>							
Typhoid fever	Salmonella typhi	+	—	+	+	+	ca. 10% of untreated patients shed bacilli for 3 months and 2–5% become permanent carriers
				(from first week)			
Paratyphoid fever	S. paratyphi	+	+	+	+	+	
Salmonellosis (non-typhoid)	S. typhimurium and other serotypes	+	+	+	+	+	
Campylobacter enteritis	Campylobacter jejuni and C. coli	+	+	+	+	+	(unusual)
Enteritis due to Escherichia coli	Escherichia coli	+	+	+	+		Symptomless carrier

Yersiniosis	<i>Yersinia enterocolitica</i> and <i>Y. pseudotuberculosis</i>	+	+	+	+	?
Listeriosis	<i>Listeria monocytogenes</i>	+	+	+	?	+
Streptococcal pharyngitis	Group A streptococci	+	+	+	+	
Enterocolitis due to <i>Clostridium perfringens</i>	<i>C. perfringens</i> (= <i>C. welchii</i>)	+	+	+	+	+
Shigellosis	<i>Shigella</i> spp	+	+	+	+	+
Cholera	<i>Vibrio cholerae</i> 01	+	+	+	+	+
Protozoal diseases					(a few days only)	
Amoebiasis	<i>Entamoeba histolytica</i>	+	+	+	+	+
Giardiasis	<i>Giardia lamblia</i> (and other spp?)	+	+	+	+	+
Cryptosporidiosis	<i>Cryptosporidium</i> spp	+	+	+	+	+
Helminthic diseases						
Enterobiasis	<i>Enterobius vermicularis</i>	+	+	+	+	+
Hymenolepiasis	<i>Hymenolepis nana</i>	+	+	+	+	+

* (R) = reservoir; + = yes; - = no; ? = suspected.

3.5 Protozoal and helminthic infections

Infection with strains of *Entamoeba histolytica* is ubiquitous. Transmission of infection may take place by transfer of cysts. Examination for cysts is not helpful as adequate personal hygiene will prevent transmission.

For other protozoa, e.g., *Giardia lamblia*, and helminths, such as *Taenia solium*, the risk of transmission by an infected food handler is very low.

3.6 Sexually transmitted diseases

Sexually transmitted diseases are not disseminated through food. Routine microbiological and serological tests for such diseases are of no relevance in this context.

3.7 Acquired immunodeficiency syndrome (AIDS)

There is no evidence that food handlers infected with HIV play any role in the transmission of the disease (13–15). However, while AIDS itself is not transmissible through food, the disease may be associated with complicating infections, such as salmonellosis, which could be foodborne. Routine serological testing of food handlers for antibodies against HIV would not serve any useful purpose.

4. LIMITATIONS OF ROUTINE HEALTH EXAMINATIONS OF FOOD-HANDLING PERSONNEL

4.1 Routine medical or laboratory examinations

In some countries, public health codes require food workers to undergo some form of medical examination or screening test before they can be employed in food establishments or as vendors of foods. Periodic testing thereafter is also frequently required (usually one to four times a year). The content of the examinations varies and may include one or more of the following: (a) brief physical examination by a physician; (b) taking of a medical history by a physician; (c) taking of a throat swab for isolation of streptococci; (d) collection and testing of a blood specimen for evidence of sexually transmitted disease; (e) taking of an X-ray for evidence of tuberculosis; and (f) collection and examination of a stool specimen for parasites, salmonellae, shigellae, and other microorganisms.

4.1.1 *Physical examination*

Carriers of foodborne enteric organisms will not be detected by physical examination. Pustular lesions on the exposed skin surface can equally well be found by a trained nurse or manager. Apart from a general impression as to the standard of personal hygiene, other findings are irrelevant from the point of view of food safety. Such examinations are also costly in both time and money.

4.1.2 *Medical history*

The accuracy of a medical history depends on the understanding of the questions by, and the honesty of, the prospective employee. Complete histories, however, are not required for an assessment of suitability for working in the food industry. Short questionnaires can focus on the few conditions of relevance to food safety and need not be analysed by a physician. This is discussed in section 7.4.

4.1.3 *Throat swabs*

It is reported that, in some countries, pre-employment and/or periodic throat swabs are required from food-handling personnel so that they can be screened for the presence of streptococci. There is no justification for the continuation of this practice for food-handling personnel who show no clinical symptoms.

4.1.4 *Blood tests*

Such tests have traditionally been carried out in order to detect people suffering from syphilis. As there is no evidence that any sexually transmitted disease, including AIDS, can be transmitted by food, there is no case for continuing this practice.

4.1.5 *X-rays and skin tests for tuberculosis and other lung infections*

There is no evidence that *Mycobacterium tuberculosis* is transmitted through food, neither are other lung diseases, even with sputum production, more than aesthetically undesirable. Diagnostic X-rays and skin tests are therefore of no relevance.

4.1.6 *Examination of faeces for pathogenic bacteria and parasites*

The main factors to be taken into account in assessing the value of these tests are: (a) the number of specimens examined and the intervals between successive examinations; (b) the likelihood of finding a carrier; (c) the possible significance of carriers when detected; and (d) the costs of screening programmes as compared with the perceived benefits. Other factors to be considered in assessing the value of stool testing include the following:

- A negative result does not mean that there are no organisms in the specimen, only that none were detected by the test at that particular time.
- The specimen is only a very small part of the passed faeces, so that even if it does not contain organisms the remainder might.
- Excretion of salmonellae is intermittent, so that the chances of detecting a carrier by means of a single specimen are very low.
- The risk of agents of gastrointestinal foodborne disease being passed on by a person who has normally-formed stools (i.e., does not have diarrhoea) is minimal.
- Prospective employees have been known to send the faeces of another person for testing instead of their own sample either because: (a) they are constipated; or (b) they know that the other person has already passed the test.
- Testing takes at least 3–4 days, so that people may be taken on before the result is known or may decide to take another job instead.
- Testing may be counterproductive in that a sense of false security may be engendered on the part of both employee and employer, who can interpret a single negative result as meaning that pathogens are definitely not present.

Estimates of the number of carriers of non-typhi salmonellae in any population can only be extremely approximate. From a review of the literature (16), it has been estimated that, if the mean duration of excretion of salmonellae after recovery from clinical illness is 5 weeks and there are about 2 million cases per year in the USA, there are likely to be about 200 000 carriers at any one time in the country. In less highly industrialized countries the figure may be substantially higher, but facilities for testing may not be readily available and periodic examinations impossible. There is no evidence to suggest that an asymptomatic carrier of non-typhi salmonellae who has

formed stools and who washes his or her hands after defecating presents a greater risk in food handling than a person who is not an excreter (10). In the largest outbreak of milkborne salmonellosis on record, 5% of cases and 15% of contacts of cases were employed in the food industry, including hospital catering. No secondary cases were reported (17). In outbreaks traced to food handlers, contamination typically occurred during or immediately after an acute illness. Screening food handlers before employment or periodically during employment will not detect or prevent these acute illnesses. Carriers of *S. typhi*, who may cause foodborne outbreaks while asymptomatic, appear to be the only exception to this rule. Such screening might detect some chronic *S. typhi* carriers, but a great deal of effort would be needed to find even one carrier, and it is hard to justify the enormous expense that it would entail.

4.1.7 Conclusions

In view of the foregoing it was concluded that pre-employment and subsequent routine medical examinations of food handlers are ineffective and thus unnecessary. Examination may, however, be appropriate in the case of food handlers reporting sick or in the investigation of outbreaks of foodborne disease.

The development of the policy adopted in the State of Florida, USA, where similar conclusions have been reached, is described in Annex 1.

4.2 Costs and constraints

In countries where pre-employment and routine periodic medical examinations are mandatory, a very large number of workers have to be covered. The situation is further aggravated by high labour turnover, seasonal increases in the numbers employed and the employment of large numbers of part-time staff. In view of the high cost of medical and laboratory examinations, this means a very substantial financial burden for the countries or territories concerned. Thus, in Czechoslovakia, where the incidence of typhoid fever is low, the detection rate is such that the finding of one carrier required the examination of one million food handlers and an expenditure of US\$ 2.5 million. As a result of these findings, medical examinations of food-handling personnel are no longer mandatory. In Hong Kong and the USA, where no such legal provisions exist,

it has been estimated that the cost of examining a food handler is about US\$ 100. The Consultation was of the firm opinion that staff and financial resources should be put to better use in preventing foodborne illness by means of other activities, such as education and training.

4.3 Examination of food handlers during investigations of foodborne illness

Collection of specimens, e.g., nasal and throat swabs, and stool specimens, from food handlers may be required during outbreaks of foodborne illness. Physical examinations may be required for certain conditions, e.g., jaundice, open skin lesions.

5. SPECIAL PROBLEMS

5.1 Health surveillance requirements in international food trade

Some importers of food insist on medical examinations of food-handling personnel as one of the conditions imposed on the exporter. This is also sometimes demanded by governments. There was considered to be no justification for this demand.

5.2 Catering for international transport

Food prepared for consumption by passengers in aircraft, trains, ships, etc., crossing international boundaries poses special problems, since contamination may occur in one country and foodborne illness appear in another. International and interagency cooperation is vital in the investigation of any such outbreak.

5.3 Street vendors

Street vending is a traditional activity and is common in many societies. Opinions differ regarding the safety and acceptability of the various food items such vendors provide. Nevertheless, they perform a valuable service by supplying food to the public at low cost. Efforts should be made to assess the safety of the food sold by them and to ensure that certain standards and practices are observed.

5.4 Food handlers in establishments serving vulnerable groups

Food-handling personnel employed in institutions (such as health care establishments, nurseries, orphanages, and homes for the elderly) catering for vulnerable groups need not be required to undergo any medical examinations. It is, however, essential for them to be closely supervised so as to ensure that hygienic practices are observed in the handling of food.

6. EFFECTIVE PREVENTIVE MEASURES

Since health examinations of food-handling personnel are not effective in preventing the spread of foodborne diseases, alternative preventive measures need to be given due priority in the planning and implementation of food safety programmes (18). The most cost-effective measures are discussed below.

6.1 Surveillance of outbreaks of foodborne disease

Surveillance of sporadic cases and outbreaks of foodborne disease should be an integral part of every foodborne disease control programme; the procedures necessary for this purpose have been described in the literature (19). Surveillance provides the basic data for: (a) determining the predominant foodborne diseases in a community; (b) indicating the principal vehicles of transmission; and (c) identifying the main factors that contribute to the occurrence of outbreaks of foodborne diseases. These last include:

- improper cooling, e.g., leaving cooked foods at room temperature or storing foods in large containers in refrigerators;
- allowing several hours to elapse between preparation and eating of food;
- inadequate cooking or heat processing;
- inadequate reheating;
- improper hot holding, e.g., below 60 °C;
- handling of foods by colonized/infected persons;
- use of contaminated raw foods/ingredients;
- cross-contamination from raw to cooked foods;
- improper cleaning of equipment and utensils;
- use of food from unsafe sources.

The risk of foodborne illness is high wherever any of the above occur. Particular care must therefore be taken when operations in

which they might occur are performed, and educational and control measures should be directed to their recognition and elimination.

6.2 Use of the hazard analysis critical control point system within food establishments

A rational and up-to-date method of ensuring food safety is known as the hazard analysis critical control point (HACCP) system. This ensures that all food-handling operations are properly controlled and has proved to be more efficient and cost-effective than more traditional methods. It can be applied both in developing and industrialized countries, in food-processing plants, food service establishments and the home.

The HACCP system (20, 21) involves the following steps:

1. Identification of hazards and assessment of their severity and the risks that they pose.
2. Determination of the location or process that needs to be controlled (critical control point) in order to substantially reduce the identified hazard(s).
3. Establishment of effective control measures and specification of the criteria that ensure control.
4. Monitoring of each critical control point so as to determine whether the criteria are being met.
5. Implementation of appropriate and immediate corrective action whenever the monitoring shows that the safety and quality criteria at a critical control point are not being met.

For such a system to achieve its objectives, large numbers of people must be educated and trained. Scientific and technical professionals must be trained either to develop or to check a HACCP system. Food managers and supervisors must be made aware of the advantages of HACCP and should be encouraged to introduce it in the work that they supervise. Staff should be taught to monitor critical control points, and instructed in the action to be taken whenever the control criteria are not met.

6.3 Education and training in food safety

6.3.1 *Managers*

When food safety training programmes are formulated, priority should be given to the training of managers so that they can ensure

that their staff observe safe food-handling practices. Managers should organize the training of their employees and themselves supervise operational procedures (22).

Managers often lack understanding of the special food safety risks inherent in catering. Official inspections of premises by specialists in food hygiene do not relieve catering managers of their responsibilities in this respect and their job descriptions should include responsibility for ensuring food safety. Arrangements for the training of managers will vary from country to country and may be the responsibility, e.g., of the food industry, ministries and departments of health or labour organizations. Food inspectorates also have an important role in educating food personnel.

Examples of food safety subjects contained in training courses for managers are given in Annex 2.

6.3.2 *Food handlers*

Food handlers often have little understanding of the risks of microbial or chemical contamination of food or how to avoid them. The job is frequently of low status and poorly paid, which leads to poor motivation. Rapid staff turnover also causes problems. Food handlers should therefore receive suitable training in the basic principles of food safety, including the HACCP system.

Some essential information on safe food handling that personnel should be required to know is contained in Annex 3. Particular attention should be given to the importance of time and temperature control, personal hygiene, cross-contamination, sources of contamination and the factors determining the survival and growth of pathogenic organisms in food. The need to report illness immediately to the supervisor must be stressed.

Outline curricula for training courses for food-handling personnel are given in Annex 4.

At the end of the training period, the knowledge and understanding of food safety on the part of the food handler should be tested and it is suggested that a "health card" certifying an acceptable level of attainment should be issued to those who pass the test. A model for such a card is given in Annex 5.

The use of attractive and explicit poster-type displays in work-rooms is considered to be an effective way of reminding food handlers of various aspects of food safety.

6.4 Information and education on food safety

6.4.1 *Policy/decision-makers*

In any country, a successful food safety programme requires the formulation of explicit policies. To achieve this, a well informed body of senior policy-makers, e.g., legislators, ministry and department heads and other people in positions of influence, must become involved. Pressure groups that help to bring about policy changes are also target groups for education by the food safety programme.

The message that needs to be conveyed is that foodborne diseases are of great importance both to health and to the economy. Lack of data on the magnitude of the problem should not preclude emphasis on the adverse impact that foodborne diseases can have on such areas as tourism, absenteeism, and the cost of health care. Communications directed to this end need to be well formulated and executed by those with expertise in this field. Such communications should be concise, factual and appeal to policy-makers.

6.4.2 *Education of the public*

The greatest need is for education of the public; this may be focused on specific target groups, depending on the particular aspect covered. The most effective incentive for the food industry to improve food safety is consumer response, in the form of unwillingness to buy food from unhygienic premises and those with a poor reputation for food safety. Consumer education on acceptable standards in food service establishments may be undertaken through the mass media, including television, radio and the press. Workplaces and schools are suitable places for the provision of information on this subject.

A substantial proportion of transmission of foodborne disease occurs in the home so that the education of those involved in domestic food preparation is particularly important. WHO has drawn up a set of ten basic rules for safe food preparation in the home, which are reproduced in Annex 6.

Over the past 30 years, foreign travel has increased enormously. By the turn of the century, tourism is likely to have become one of the world's largest industries. There is therefore a need to provide advice to travellers on possible food-related hazards (23).

6.5 Provision and maintenance of facilities and services

For safe food-handling practices to be possible, appropriate facilities must be provided for hand-washing and for the sanitary collection and disposal of wastes. There should also be means of keeping food hot (above 60 °C), and some form of cold storage (below 10 °C).

In some places such facilities may be minimal or not readily available. There are, however, many examples of the use of local resources and initiatives to develop safe and acceptable alternatives, e.g. the use of charcoal heaters by street vendors to keep food hot. Such initiatives should be supported and included in local food-safety programmes.

7. MANAGEMENT AND HEALTH SURVEILLANCE IN THE FOOD INDUSTRY

7.1 Scope

The scope of the food industry is vast. It covers all activities from the production of raw food through processing, distribution and storage to supply to the consumer. In any branch of the industry, good management practices are essential in order to maintain the safety and quality of food.

7.2 Management commitment

Management commitment to a programme of optimum hygiene covering all aspects of the food industry, from supply to the production, processing and consumption of food products, is essential if foodborne disease is to be prevented. This commitment should be conveyed to employees, consumers, and government health officials.

Managers should encourage open discussion and reporting of hygiene problems by employees and respond with corrective measures. Effective teamwork is essential. Food handlers need reassurance that they will not suffer loss of pay if they report symptoms such as diarrhoea or infected skin lesions. Management should employ technical experts to advise on hygiene, or know where such advice can be obtained. Food-processing procedures and the appropriate support services should be designed so as to ensure

optimum hygiene conditions and good manufacturing practices, and should be regularly upgraded.

Managers should be committed to developing a good image of food safety and to the implementation of quality control programmes that meet or exceed recommended international codes of practice, such as those developed by the Codex Alimentarius Commission. It is further recommended that hazard analysis critical control point systems be designed and implemented throughout the industry as the best management tool available for preventing foodborne disease. One way that management can demonstrate its commitment is by responding to consumer complaints in a professional and responsible manner, something that should also increase consumer satisfaction.

It is imperative that companies involved in the food industry have clear, consistent policies to deal with incidents related to food safety and are prepared to take action to minimize problems and to allay public fears. Good management practices should also include an occupational health programme for improving working conditions and increasing product reliability. Finally, the food industry should be encouraged to develop long-term data bases to provide occupational health information relating to foodborne disease.

7.3 Education and training

Education and training are vital elements of food safety programmes in all sectors of the food industry. In any organization, however small, the instruction provided should ensure that all employees understand the basic principles of food safety and their own responsibilities in that respect within the organization.

Managers need to understand the various safety hazards that they may have to face and the means whereby they can be minimized through good operating practices. They must also be aware that employees who have gastroenteritis or open skin lesions must stay away from work while symptoms persist.

Food-handling staff should receive instruction in food safety and personal hygiene and should be required to undergo a test of their knowledge of the subject. Refresher courses should be given periodically throughout employment. Particular attention should be drawn to the need to report illness to the supervisor as soon as it occurs.

As already mentioned, it is suggested that food handlers be issued with a "health card". This should contain: (a) a certificate showing that the holder has passed a test in food safety; (b) an agreement with the employer concerning health matters; and (c) proof that the holder has undergone a health interview (see Annex 5).

7.4 Health interviews

Health interviews involve the completion of a questionnaire by the employee in the presence of a designated representative of the employer, such as an occupational health nurse, manager or supervisor. Such an interview ensures that the employee understands the questions that are being asked and allows a general assessment to be made of suitability for work in the food industry in terms of demeanour, appearance and cleanliness. The questions should be directed towards the identification of excreters, whether clinically unwell or asymptomatic, of organisms of importance in food safety. The interview should take place before employment but may be repeated in special circumstances, e.g., following a period of sickness or after a holiday in a country in which an epidemic of gastroenteritis has been reported. Medical advice need only be sought if the interviewer considers that a more detailed examination would be desirable. A model form for use in health interviews is given in Annex 7.

7.5 Reporting illness to management

Managers should encourage employees to report to their supervisors whenever they have diarrhoea, sore throat, fever, a cold, or open skin lesions, or are jaundiced. Supervisors should then use their discretion as to whether or not these persons should be subjected to certain restrictions or suspended from food-handling duties. Medical advice may be necessary in making this decision, and employees suffering from certain diseases, such as typhoid or cholera, must be cleared medically before being allowed to resume work that involves food handling.

7.6 Routine medical examinations

Routine medical examinations are not cost-effective and are unreliable in the prevention of foodborne disease.

8. CONCLUSIONS AND RECOMMENDATIONS

1. Food-handling personnel, who are either infected or colonized with pathogens, can contaminate food and thus transmit foodborne disease.
2. Their potential for transmitting foodborne disease varies according to the point in the food chain at which they work. Personnel whose work involves touching unwrapped foods to be consumed raw or without further cooking or other forms of treatment present the highest risk.
3. Personnel with diarrhoea, infected skin lesions in areas that could come into contact with food, or purulent conditions of the nose, ear, eye or other exposed sites should be regarded as possible transmitters of pathogens and should therefore not be permitted to handle unwrapped foods to be consumed raw or without further cooking or other forms of treatment.
4. Clinically healthy food-handling personnel who are asymptomatic excretors of enteric pathogens, such as non-typhi salmonellae, do not pose a much greater risk of transmitting disease via food than workers who are not excretors of these pathogens. Only known carriers of *Salmonella typhi* should be prevented from handling unwrapped foods to be consumed raw or without further cooking or other forms of treatment.
5. Food-handling personnel should be made fully aware of the need to report to management immediately if they are ill. If exclusion from work is then recommended, they should not suffer financial loss as a result.
6. As there is no evidence that the human immunodeficiency virus can be transmitted through food, routine serological testing for antibodies against the virus in food workers is not necessary.
7. Medical examinations of food-handling personnel are valid only for the time at which they are carried out; this also applies to the examination of faeces for pathogens. Pre-employment or routine medical and laboratory examinations of food-handling personnel are therefore of no value in the prevention of foodborne disease. For this reason, it is recommended that those governments, industries and institutions that rely at present on medical examinations of food-handling personnel for the prevention of foodborne disease should discontinue this practice.

8. An effective means of preventing the transmission of pathogens from food-handling personnel via food to consumers is strict adherence to good personal hygiene and to hygienic food-handling practices. It is recommended that education and training in good hygienic practices should be provided to all food-handling personnel.
9. When food safety training programmes are formulated, priority should be given to training programmes for managers, who will then be able both to train their staff in safe food-handling practices and to ensure that they are adhered to. Managers should facilitate the training of their employees in the basic principles of food safety and safe food-handling practices. The training received should be appropriate to the level of responsibility.
10. Official inspection of premises by food control authorities does not relieve managers of their responsibilities with regard to food safety measures.
11. It is recommended that WHO, in collaboration with the Industry Council for Development (ICD), the International Life Sciences Institute (ILSI) and other interested bodies, should develop training materials and programmes in food safety to be used for the education and training of management and food-handling personnel.
12. The systematic investigation and surveillance of episodes of foodborne disease are essential food safety measures. It is therefore recommended that public health authorities should develop a protocol for carrying out such investigations and surveillance. It is further recommended that foodborne surveillance data should be used to identify critical food-handling practices as a means of setting priorities.
13. Implementation and maintenance of the hazard analysis critical control point (HACCP) system in food establishments permits a fair degree of confidence that foodborne diseases will be prevented. For such a system to be implemented and for food safety to be achieved, large numbers of people must be educated and trained. Scientifically and technically trained professionals must be prepared either to develop or check a HACCP system. Food managers and supervisors must insist that such a system be introduced and maintained in the operations that they supervise. Food handlers should be taught how to monitor critical control points, and encouraged to take action whenever

the control criteria are not met. It is recommended that the HACCP system should be implemented in all food establishments. Food safety authorities and the food industry, as appropriate, should verify that such systems are properly designed and that critical control points are effectively monitored.

14. The major components of any food safety management system in the food industry are:
 - management commitment;
 - education and training of employees at all levels;
 - good teamwork;
 - appropriate use of health interviews;
 - good operating practices based on the HACCP system.
15. The management system proposed here can be applied in all sectors of the food industry in any part of the world. It can therefore be incorporated into the health education and food safety programmes that have already been started in some developing countries as a result of cooperation between governments, WHO and industry.
16. There is no justification for food importers requiring health certification of food-handling personnel in an exporting country. Such requirements should therefore be discontinued.

ACKNOWLEDGEMENTS

Thanks are expressed to the following staff members of WHO for their valuable contributions to the meeting: Dr L. Philip, Division of Public Information and Education for Health, and Dr M. Reid, Global Programme on AIDS.

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ADDITIONAL SELECTED READING

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Annex 1

HEALTH CARDS FOR FOOD WORKERS—FLORIDA POLICY¹

The health card for food workers dates back to 1946, when the Florida Sanitary Code required shellfish workers to demonstrate that their urine and faeces had been examined and found negative for organisms that caused typhoid fever, salmonellosis and dysentery. In 1958, the Sanitary Code was modified to require that all employees of food service establishments be “thoroughly examined” and “found not to be suffering from any disease in a communicable stage”.

The health card requirement was discontinued in 1974, when a more specific preventive strategy against foodborne illness was implemented. This strategy includes a mandatory training course that stresses basic sanitary procedures, such as ensuring that foods are maintained at the proper temperature and that employees frequently wash their hands to prevent contamination of foods. Managers are also required to be particularly observant of the health of their employees and exclude any employee suspected of illness from preparing or serving food.

The decision to discontinue the health cards was made after careful examination of all pertinent data and consultation with many authorities, including the Centers for Disease Control (CDC) in Atlanta, GA. The consensus of opinion was that a periodic health examination is totally ineffective in preventing foodborne illness for the reasons outlined below.

Outbreaks of foodborne illness, which have been closely studied for many years by CDC, are generally related to contamination of water or food resulting from improper processing, storage, preparation or serving.

The communicable stage of most diseases is transitory, i.e., a negative examination on a given day does not guarantee that a person will still be non-infectious one day, one week, or one month later. Food workers, managers, and the public are thus given a false sense of security by annual examinations.

¹ Condensed version of information provided by the State Health Office, Florida Department of Health and Rehabilitative Services, USA.

The costs of screening and physical examinations are generally passed on to the consumers, and far outweigh any possible benefit. If the requirement for health cards were to be reinstated, the economic impact would be staggering. There are over 40 000 facilities serving food to the public in Florida. Conservatively, each establishment employs an average of ten employees. The high employee turnover in the industry further exacerbates the problem, so that approximately 600 000 health examinations would be required each year for the restaurant industry. This would imply an annual expenditure of over US\$ 60 000 000 for health cards.

It is the view of the Centers for Disease Control, the US Food and Drug Administration and the Florida Department of Health and Rehabilitative Services, as well as of professionals in food hygiene and disease prevention elsewhere, that periodic routine health examinations should not be done on food workers, but that money be spent on training and educating both management and employees in methods of safe preparation and serving of food.

There is no reason to suspect that AIDS or other communicable diseases are spread through foods prepared and served in restaurants. The costs of implementing a health card screening programme would ultimately be passed on to the customer, who would receive no benefit or improved level of protection. Any funding would be better spent on training, emphasizing safe preparation and serving practices.

**EXAMPLES OF FOOD SAFETY SUBJECTS COVERED IN
COURSES FOR THE TRAINING OF FOOD MANAGERS**

1. Course for food service managers

According to the Centers for Disease Control, Atlanta, GA, USA, such a course should cover:

- (1) foodborne illnesses:
 - reports;
 - major pathogens;
 - factors affecting growth of microorganisms;
 - transmission;
- (2) factors contributing to outbreaks;
- (3) prevention of foodborne disease:
 - prevention of contamination;
 - inhibition of growth;
 - killing of microorganisms.

2. Course for retail food store managers

According to the Management Uniform Sanitation Training (MUST) Programme of the Food Marketing Institute, Washington, DC, USA, this should cover:

- (1) microorganisms;
- (2) foodborne illnesses;
- (3) food protection;
- (4) housekeeping, sanitation, maintenance and construction of premises and pest control;
- (5) cost-effectiveness.

ESSENTIAL INFORMATION FOR FOOD-HANDLING PERSONNEL¹

Information should be provided on:

1. Proper cooling methods for previously cooked liquid foods (soups, sauces and gravies).
2. Proper cooling methods for other foods (such as meats, dressings, beans, rice, stews).
3. Pre-chilling of potentially hazardous ingredients for preparation of salads (such as macaroni and potato salad).
4. Proper hot holding temperatures (60 °C or above).
5. Proper reheating temperature for potentially hazardous foods (70 °C or above).
6. Proper cooking temperature for meat and poultry (70 °C or above).
7. Use of a thermometer to determine the temperature of food during cooking, refrigerated storage or reheating.
8. The potential hazards of the preparation of foods in advance.
9. Avoidance of storage of potentially hazardous foods at room temperature.
10. Proper cold holding temperatures (10 °C or below).
11. Proper use of ice for cold storage.
12. Potentially hazardous foods.
13. Cross-contamination.
14. The need to wash hands after defecation or handling raw meat or poultry.
15. Proper storage and labelling of chemicals.
16. Protection of foods from contamination.
17. The importance of not working when suffering from diseases that can be spread through foods.
18. Use of proper utensils to eliminate unnecessary hand contact.
19. Proper sanitizing of utensils, work surfaces, cutting boards and tableware.
20. The nature of germs.
21. Personal hygiene.

¹ Adapted from material provided by Washington State Department of Social and Health Services, Olympia, WA, USA.

22. Failure of equipment or emergency routines.
23. Wash—rinse—sanitize.
24. Proper use of wiping cloths.

EXAMPLES OF OUTLINE CURRICULA FOR TRAINING COURSES FOR FOOD-HANDLING PERSONNEL

Three examples of such curricula are given here, taken from different sources.

Example 1¹

Types of foodborne illness.
Conditions that affect the growth of bacteria.
Bacteria that cause foodborne illness.
How bacteria reach food—contamination.
Personal hygiene.
Purchasing and storage.
Food preparation—cooking and serving.
Washing-up.
Waste disposal.
Premises.

Example 2²

1. Events that lead to bacterial foodborne illness:
 - contamination of food;
 - survival of microorganisms because of insufficient heating;
 - bacterial growth.
2. Procedures for preventing foodborne illness:
 - obtaining foods from safe sources;
 - prevention of contamination from raw foods;
 - prevention of contamination from food handlers;
 - prevention of contamination from other sources;
 - killing of bacteria, parasites and viruses;
 - prevention of bacterial growth.

¹ Adapted from HOBBS, B.C. & ROBERTS, D., *Food poisoning and food hygiene*, 5th ed. London, Edward Arnold, 1987.

² From Centers for Disease Control, Atlanta, GA, USA.

Example 3¹

Foodborne illness.
Temperature control.
Preventing the contamination of foods.
Approved food sources.
Cleaning and sanitizing.

¹ From Washington State, Department of Social and Health Services, Olympia, WA, USA.

Annex 5

MODEL FORM FOR FOOD-HANDLING PERSONNEL

Name

Address.....

Date of birth

I. Health interview.....

Date.....

Place

Comments.....

.....

Signature.....

II. Knowledge of food safety

It is hereby certified that Mr/Mrs/Ms/Miss.....
has passed the course in food safety

Date..... Signature..... Stamp.....

Results of examinations in knowledge of food safety

Date..... Signature..... Stamp.....

Date..... Signature..... Stamp.....

III. Agreement with employer:¹

I agree to report to the employer if I suffer from an illness involving any of the following:

- Hepatitis A (jaundice)
- Diarrhoea
- Vomiting
- Fever
- Sore throat
- Skin rash
- Other skin lesions (boils, cuts, etc., however small)
- Discharge from ear, eye, nose.

I agree to report to the employer before commencing work if I have suffered from any of the above conditions while on holiday.

I accept that I may be required to inform my employer when I return from abroad.

I have read (or had explained to me) and understood the rules on personal hygiene and hygienic food-handling practices.

I understand that failure to comply with this agreement could lead to disciplinary action.

Signature..... Date

¹ Adapted from: LONDON BOROUGH OF HOUNSLOW. *Health monitoring arrangements for food handlers*. Environmental Health Codes of Practice, No. 1.

GOLDEN RULES FOR SAFE FOOD PREPARATION

The following rules have been drawn up by the World Health Organization, to provide guidance to members of the community on safe food preparation in the home. They should be adapted, as appropriate, to local conditions.

1. Choose foods processed for safety

While many foods, such as fruits and vegetables, are best in their natural state, others simply are not safe unless they have been processed. For example, always buy pasteurized as opposed to raw milk and, if you have the choice, select fresh or frozen poultry treated with ionizing radiation. When shopping, keep in mind that food processing was invented to improve safety as well as to prolong shelf-life. Certain foods eaten raw, such as lettuce, need thorough washing.

2. Cook food thoroughly

Many raw foods, most notably poultry, meats, and unpasteurized milk, are very often contaminated with disease-causing pathogens. Thorough cooking will kill the pathogens, but remember that the temperature of *all parts of the food* must reach at least 70 °C. If cooked chicken is still raw near the bone, put it back in the oven until it is done—all the way through. Frozen meat, fish, and poultry must be thoroughly thawed *before* cooking.

3. Eat cooked foods immediately

When cooked foods cool to room temperature, microbes begin to proliferate. The longer the wait, the greater the risk. To be on the safe side, eat cooked foods as soon as they come off the heat.

4. Store cooked foods carefully

If you must prepare foods in advance or want to keep leftovers, be sure to store them under either hot (near or above 60 °C) or cool

(near or below 10 °C) conditions. This rule is of vital importance if you plan to store foods for more than four or five hours. *Foods for infants should preferably not be stored at all.* A common error, responsible for countless cases of foodborne disease, is to put too large a quantity of warm food in the refrigerator. In an overburdened refrigerator, cooked foods cannot cool to the core as quickly as they must. When the centre of food remains warm (above 10 °C) too long, microbes thrive, quickly proliferating to disease-producing levels.

5. Reheat cooked foods thoroughly

This is your best protection against microbes that may have developed during storage (proper storage slows down microbial growth but does not kill the organisms). Once again, thorough reheating means that *all parts of the food* must reach at least 70 °C.

6. Avoid contact between raw foods and cooked foods

Safely cooked food can become contaminated through even the slightest contact with raw food. This cross-contamination can be direct, as when raw poultry meat comes into contact with cooked foods. It can also be more subtle. For example, do not prepare a raw chicken and then use the same unwashed cutting board and knife to carve the cooked bird. Doing so can reintroduce all the potential risks for microbial growth and subsequent illness present prior to cooking.

7. Wash hands repeatedly

Wash hands thoroughly before you start preparing food and after every interruption—especially if you have to change the baby or have been to the toilet. After preparing raw foods such as fish, meat, or poultry, wash again before you start handling other foods. And if you have an infection on your hand, be sure to bandage or cover it before preparing food. Remember, too, that household pets—dogs, birds, and especially turtles—often harbour dangerous pathogens that can pass from your hands into food.

8. Keep all kitchen surfaces meticulously clean

Since foods are easily contaminated, any surface used for food preparation must be kept absolutely clean. Think of every food scrap, crumb or spot as a potential reservoir of germs. Cloths that come into contact with dishes and utensils should be changed every day and boiled before reuse. Separate cloths for cleaning the floors also require frequent washing.

9. Protect foods from insects, rodents, and other animals

Animals frequently carry pathogenic microorganisms which cause foodborne disease. Storing foods in tightly sealed containers is your best protection.

10. Use pure water

Pure water is just as important for food preparation as for drinking. If you have any doubts about the water supply, boil water before adding it to food or making ice for drinks. Be especially careful with any water used to prepare an infant's meal.

Annex 7

MODEL FORM FOR USE IN PRE-EMPLOYMENT HEALTH INTERVIEWS¹

Name of employee

Address.....

Telephone no.

1. Have you ever had typhoid or paratyphoid fever? YES/NO

2. Are you suffering from:

(a) Skin rash YES/NO

(b) Boils YES/NO

(c) Diarrhoea and/or vomiting now or within the last seven days YES/NO

(d) Discharge from the eye YES/NO

(e) Discharge from the ear YES/NO

(f) Discharge from the nose YES/NO

3. Have you ever lived abroad? YES/NO

If yes: where

when.....

Have you travelled abroad recently (in the last 3 weeks) YES/NO

If yes: where

when.....

Name, address and telephone no. of your doctor:

Name

Address.....

.....

Telephone no.

¹ Adapted from: LONDON BOROUGH OF HOUNSLOW. *Health monitoring arrangements for food handlers*. Environmental Health Codes of Practice, No. 1.

763	(1988) Evaluation of certain veterinary drug residues in food Thirty-second report of the Joint FAO/WHO Expert Committee on Food Additives (40 pages)	6.—
764	(1988) Rheumatic fever and rheumatic heart disease Report of a WHO Study Group (58 pages)	8.—
765	(1988) Health promotion for working populations Report of a WHO Expert Committee (49 pages)	8.—
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768	(1988) WHO Expert Committee on Leprosy Sixth report (51 pages).....	8.—
769	(1988) Learning together to work together for health Report of a WHO Study Group (72 pages)	9.—
770	(1988) The use of essential drugs Third report of the WHO Expert Committee (63 pages).....	8.—
771	(1988) WHO Expert Committee on Biological Standardization Thirty-eighth report (221 pages).....	26.—
772	(1988) Appropriate diagnostic technology in the management of cardio- vascular diseases Report of a WHO Expert Committee (41 pages).....	6.—
773	(1988) Smokeless tobacco control Report of a WHO Study Group (81 pages).....	11.—
774	(1988) Salmonellosis control: the role of animal and product hygiene Report of a WHO Expert Committee (83 pages).....	11.—
775	(1989) WHO Expert Committee on Drug Dependence Twenty-fifth report (48 pages)	6.—
776	(1989) Evaluation of certain food additives and contaminants Thirty-third report of the Joint FAO/WHO Expert Committee on Food Additives (64 pages)	8.—
777	(1989) Epidemiology of work-related diseases and accidents Tenth report of the Joint ILO/WHO Committee on Occupational Health (71 pages)	9.—
778	(1989) Health guidelines for the use of wastewater in agriculture and aquaculture Report of a WHO Scientific Group (74 pages)	9.—
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