

## Review Article

# Food safety courses for nutritionists and other health professionals through intersectoral cooperation

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The present paper describes the development of a food safety course that was initially given as part of the Master of Science programme in community nutrition at the South-East Asian Ministers of Education Organization, Tropical Medicine Regional Centre for Community Nutrition at the University of Indonesia. This course is an example of intersectoral collaboration between industry, government and academia. Several years later the course was rolled out to other countries.

**Key words:** Food safety, intersectoral cooperation, nutritionist .

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## Introduction

The World Health Assembly stated that foodborne diseases are a widespread and growing public health problem, both in developed and developing countries. It has been reported that in 1998 alone 2.2 million people, including 1.8 million children, died from diarrhoeal diseases. Repeated episodes of foodborne diseases can lead to malnutrition, with serious impact on the growth and immune system of infants and children.<sup>1</sup> There have been some devastating outbreaks of salmonellosis, cholera, enterohaemorrhagic *Escherichia coli* infection, hepatitis A and other diseases in both developed and developing countries.<sup>2</sup>

It has been shown that the epidemiology of diarrhoeal diseases in developed countries is linked to contaminated food,<sup>3</sup> and it is likely that this is also one source of the problem in developing countries. Contaminated weaning foods can be a source of *E. coli*<sup>4</sup> and the problem of weaning and foodborne disease has been reviewed elsewhere.<sup>5</sup> Changing patterns of food consumption have been linked to changing patterns of foodborne disease.<sup>6</sup> Chemicals in the environment, and food adulteration also pose a problem for food quality, particularly in developing countries.

The role of food producers and processors in illness could be reduced if food handlers were better educated and trained in safe food handling and consumers were better advised in the choice of their food.<sup>1</sup> Thus, food safety must be addressed when dealing with health and nutrition problems in all countries, but it is particularly important in developing countries.

The course described in the present paper does this by educating health professionals so that they can in turn raise

general awareness of the problem. Knowledge of food safety is the basis for developing intervention strategies from farm to table to prevent foodborne diseases. Such interventions involve inspection at a governmental level and educational campaigns directed at food handlers, process operators and those preparing food. Because the food chain varies widely between countries, the points of intervention may also vary. In Indonesia for instance, foods purchased from street vendors are a significant part of the average diet.<sup>7</sup> Nutritionists must be equipped with information about the relevant local conditions that influence food safety and be able to identify points at which contamination of foods can occur or that favour the survival and growth of microorganisms. These identification skills have been put to use in developed countries using a systematic approach called 'hazard analysis critical control point' (HACCP).<sup>8</sup> The acquisition of these skills is essential for all nutritionists and other health professionals.

## The need for intersectoral cooperation in food safety education

The World Health Organization (WHO) has been a prime mover in the realm of food safety and it organized a consultation on health education in food safety in 1987.<sup>9</sup> The

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conclusions were endorsed by the Food Agriculture Organization/WHO International Conference on Nutrition held in Rome in 1992, which recognized food safety as an important and integral part of its aims.<sup>10</sup> The Plan of Action for Nutrition was itself designed to provide guidelines for governments acting in partnership with non-governmental organizations, the private sector, local communities and the international community including international organizations.

The Industry Council for Development (ICD) was approached by Institute of Technical Cooperation (GTZ) in 1991 for assistance with integrating food safety into the South-East Asian Ministers of Education Organization, Tropical Medicine (SEAMEO-TROPMED) Regional Centre for Community Nutrition MSc Programme.

### **South-East Asian Ministers of Education Organization, Tropical Medicine, Regional Centre for Community Nutrition at the University of Indonesia**

The South-East Asian Ministers of Education Organization was established in 1965 in order to promote professional, academic and cultural exchange in the region. One of the SEAMEO networks is the SEAMEO TROPMED Regional Centre for Community Nutrition at the University of Indonesia (RCCN UI) in Jakarta, and since 1970 it has fulfilled its mission by providing training, research and consultancy services in community nutrition at an international level.

The Centre is financed by the Indonesian Government; technical support is given by the Ministry for Economic Cooperation of the Federal Republic of Germany through the GTZ with supplementary support from the Canadian International Development Agency (CIDA). It runs MSc programmes and doctorate programmes. Some of the components of the Master's programme are run as short courses, open to suitably prepared professionals from the region. Food safety is among these short courses and is also part of the obligatory curriculum for the Masters degree programmes. The mandate of the SEAMEO-TROPMED Regional Centre is to strengthen institutions and programmes that improve and secure the local nutritional situation, thus the training programme addresses the needs of institutions, not individuals.

### **Course design, structure and objectives**

#### ***Course design and structure***

The course design was modular, to allow it to be adapted to local needs. Although it was designed for nutritionists in Indonesia, it can readily be adapted to other countries and courses for other professionals such as food or public health inspectors and home economists. It emphasizes practical knowledge and skills that nutritionists can use to recognize unsafe food and food preparation practices, and shows how this knowledge can be applied to develop intervention strategies.

The teaching material includes lectures, tutorials, syndicate groups, videos, a field exercise among the local street vendors, and a visit to a local food factory or large-scale catering operation. Because an interactive approach is essen-

tial to encourage and involve the students and help them to acquire skills, the course also includes group work such as field studies and classroom exercises.

The presenters were drawn from ICD member companies, from the staff in various departments of the University of Indonesia, from the Ministry of Health, National Agency of Drug and Food Agency, Ministry of Agriculture and other relevant government departments in Indonesia. Speakers have also been invited from Bogor Agriculture University in Indonesia and from the Indonesian Consumers' Organization together with a representative from the WHO office in Jakarta or Geneva.

In addition to formal teaching material, the students had to read a recent paper or book each evening and comment on it the next morning. This exercise in critical interpretation (called the 'morning vitamins' session) has been regularly used in the nutrition course in Jakarta. It is an excellent supplement to practical work and can sometimes replace practical sessions.

#### ***Course objectives***

The overall objective of the food safety course is to teach nutritionists the basic principles of food safety so that they will be able to recommend foods that are safe as well as nutritious. At the end of the course the participants will be able to (i) understand what safe foods are and how food safety can be achieved; (ii) recognize unsafe foods and preparation practices; (iii) understand the effect of infection on nutrition; (iv) intervene in preventing foodborne diseases; and (v) teach the principles to others.

#### ***The participants***

The course is designed for 20–25 participants to allow effective interaction between teachers and students. Although the course is intended primarily for MSc nutritionists, other food professionals such as government officials and managers from local food companies have been invited to attend. It is important to have such a mix of participants from different sectors of the food profession because inter-sectoral collaboration works best if all sectors receive the same 'message' about the preventive approach towards food safety. This view has long been held by WHO.<sup>9</sup>

Over the 9 years from 1993 to 2001 a total of 188 participants (Fig. 1) have attended the course in Jakarta (104 MSc students and 84 short course participants, consisting of 50 Indonesian government officers; 24 academics from South East Asian countries and 10 participant from local food manufacturing industries).

### **Evaluation and peer review of the course material**

#### ***Evaluation***

Because this course was an innovation in the teaching of nutrition in Indonesia, it was evaluated by feedback from students; observers; Director/Faculties of SEAMEO-TROPMED RCCN UI at the University of Indonesia; the GTZ team leader; and the course facilitators and tutors. Evaluators used a questionnaire to score each module on a

scale of 1–5 in terms of presentation, increase in knowledge, relevance, degree of difficulty and time allotment on a scale of 1–5. The objective of each module, the content, as well as the questionnaire was fully explained (Tables 1–3). Students,

observers and presenters were also asked to suggest ways to improve the course.

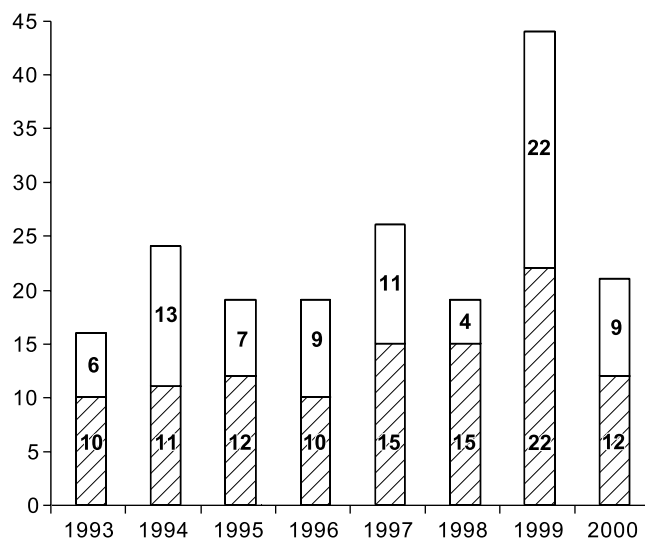
The reaction to the courses was very positive. Table 4 shows the average ratings for each module of the food safety course in 1999. These show good scores in terms of presentation, increase of knowledge, relevance to nutritionists and time allotment; the course was also considered to be pitched at the right level of difficulty. In addition to the numerical evaluation, the following points were made.

(1) The course was a breakthrough in the graduate training of nutritionists in Indonesia. Previously food safety was not considered to be an important topic to nutritionists, but it is now.

(2) The involvement of the food industry in the Nutrition Graduate Training Programme was a very positive contribution. The students now realize that 'knowing only science' is not enough; science must be combined with the technical knowledge and skills of the food industry.

(3) The interactive teaching style, the field work and the outside visits were very much welcomed by all participants.

(4) The industrial competitors, Unilever, Nestle and Mars, are all members of ICD and worked together efficiently at the professional level to build the course and to share information on food safety in a way that exceeded the participants' expectations.



**Figure 1.** Course participants 1993–2001 in at South-East Asian Ministers of Education Organization, Tropical Medicine, Regional Centre for Community Nutrition at the University of Indonesia. (□), short course participant; (▨), MSc student.

**Table 1.** Modules of the food safety course

Module	Topics
Basic food microbiology	The nature of microorganisms, including those harmful, those beneficial and how they grow. Microbiology, including those pathogens likely to be present on raw food materials.
Foodborne pathogens	Infectious pathogens, where they come from and the diseases they cause. Toxicogenic pathogens, the nature of the toxins and the symptoms of the illnesses they cause.
Significance of foodborne disease	The impact of diarrhoea on nutritional status, especially in young children The clinical, social and economic impact of foodborne disease.
Chemical contaminants	Synthetic chemical contaminants such as pesticides or antibiotics and naturally occurring toxicants such as mycotoxins.
Factors affecting survival and growth of microorganisms	Describes how the main factors in traditional food preservation, namely the lowering of water activity or pH, can be manipulated to prevent the undesirable survival/growth of microorganisms in food. The basic principles of thermal processing and irradiation are described.
Epidemiology of foodborne disease	The distribution and occurrence of foodborne diseases and the factors that promote their spread.
Potential local problems of significant foodborne disease	Discussion of local food preparation practices, traditions and beliefs, including the safety of street foods. Epidemiology of street food in Indonesia.
The HACCP system	The HACCP system and definitions. Identification of hazards and critical control points. Group exercise to do a HACCP study on a process.
Application of the HACCP system	The HACCP system and definitions. Identification of hazards and critical control points. Group exercise to do a HACCP study on a process.
Biotechnology and food safety	Biotechnology and food safety

HACCP, hazard analysis critical control point.

**Table 2.** Questions put to the evaluators

Question	Explanation
Presentation of the subject matter	During the teaching activities, teachers try to communicate professional subject matter (information, research, results, concepts etc.). In this question you are asked to give your opinion about the way in which this subject matter was presented.
Increase of your knowledge and/or skills	To what extent did this teaching activity increase your knowledge and/or skills of each of the subject matters presented?
Relevance to your daily work	Relevance, by its definition, has to do with the degree to which the teaching activity helps to solve problems. In this question you are asked to give your opinion about the problem-solving capacity of the teaching activity for your daily work.
Degree of difficulty	Give your opinion of how difficult it was to follow the various subject matters presented.
Time allotment	The amount of time that students spend on specific topics in the course has been decided by the course faculty. In this question you are asked whether in your opinion this amount was right.

**Table 3.** Question scores

Question	Scoring				
	1	2	3	4	5
Presentation stimulating	Very		Stimulating		Boring
Increase of knowledge	Very much		Just right		Not at all
Relevance	Very much		Relevant		Not at all
Degree of difficulty	Very tough		Just right		Very easy
Time allotment	Too much		Enough time		Too little

**Table 4.** Average scores given by the evaluators for course in 1999

Module	Presentation subject matter	Increase of knowledge	Relevance to the objective of the training programme	Degree of difficulty	Time allotment
	(1-5)	(1-5)	(1-5)	(1-5)	(1-5)
Lecture					
Module 1	4.43 ± 0.51	3.95 ± 0.92	4.62 ± 0.59	3.38 ± 1.24	4.00 ± 0.86
Module 1	4.27 ± 0.70	3.93 ± 1.14	4.44 ± 0.63	3.44 ± 1.03	3.87 ± 0.83
Module 2	4.00 ± 0.73	3.80 ± 1.06	4.40 ± 0.75	3.50 ± 1.28	4.00 ± 0.88
Module 3	4.43 ± 0.51	4.42 ± 0.94	4.48 ± 0.60	3.29 ± 1.23	4.20 ± 0.83
Module 4	4.05 ± 0.50	3.86 ± 1.06	4.19 ± 0.68	3.29 ± 1.15	3.85 ± 0.81
Module 4	4.40 ± 0.50	4.26 ± 0.81	4.30 ± 0.86	3.40 ± 1.10	4.16 ± 0.83
Module 5	4.00 ± 0.55	4.00 ± 1.00	4.20 ± 0.70	3.33 ± 1.11	4.00 ± 0.73
Module 6	4.50 ± 0.52	4.19 ± 0.98	4.53 ± 0.51	3.25 ± 1.13	4.00 ± 0.82
Module 7	4.60 ± 0.60	4.45 ± 0.60	4.35 ± 0.59	3.25 ± 1.18	3.95 ± 0.78
Module 8	4.22 ± 0.65	4.06 ± 1.00	4.28 ± 0.67	3.33 ± 1.24	4.06 ± 0.83
Module 9	4.24 ± 0.77	3.86 ± 1.28	4.29 ± 0.85	3.38 ± 1.12	3.75 ± 0.97
Module 10	4.21 ± 0.63	4.16 ± 0.76	4.16 ± 0.83	3.37 ± 1.01	3.95 ± 0.85

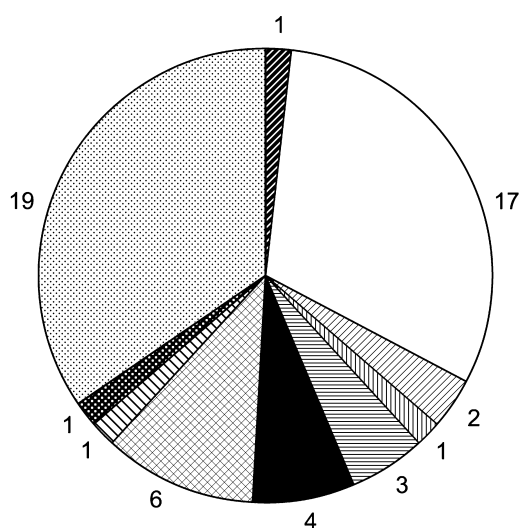
**Peer review of the course material**

After the course had been tested three times and improved in the light of experience each year, WHO initiated a review of the material by experts in food safety or nutrition around the world. Overall, their comments were also very positive and any suggestions were included in the material before the fourth course was given in 1996. As a result of the peer review and the subsequent revisions, WHO approved the material and allowed it to display the prestigious WHO logo.

To maintain the quality of the material, suggestions and needs from the participants were collected; then, based on

their inputs, the ICD and WHO revised the 1996 version and added some new modules on safe potable water, good hygienic practices, food allergy and food biotechnology.

The teaching package includes overhead transparencies and textbooks. All text and overheads are available on diskette in POWERPOINT® format so that they can be modified and updated according to the needs of other courses in other regions. In 1999 the ICD/WHO made the module available on CD-ROM. In line with the cascade of courses in other countries, translations into Indonesian, Vietnamese, Lao, Spanish and Portuguese were done in 1998.



**Figure 2.** Trainers of food safety course (1996-2000) by country of origin.

### Transfer of course ownership and maintenance of motivation

After running the course successfully for 5 years in Indonesia, a further 2-day module has been added to 'train the trainers' to set up and run the course in other countries. Figure 2 shows the progress of the rolling out of the course to other countries. Also, approximately 550 copies of the newsletter *Food Safety Matters* has been launched in order to keep the vital food safety messages alive among the course alumni and to achieve the following objectives: (i) to help maintain a high awareness of food safety issues among nutritionists and other professionals in South-East Asia; (ii) to encourage fellow nutritionists to share information on food safety; (iii) to remind nutritionists that almost all foodborne diseases are preventable; and (iv) to remind nutritionists of the expertise available through the SEAMEO TROPED RCCN UI, ICD and WHO.

### Conclusions

The development of this course by a unique team drawn from academia, government bodies, the food industry, international aid agencies and WHO, is a small but significant step towards providing trained nutritionists who in turn will

help achieve the goals of food security and health for all, as stated by WHO and endorsed by the joint FAO/WHO International Conference on Nutrition.<sup>9</sup>

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