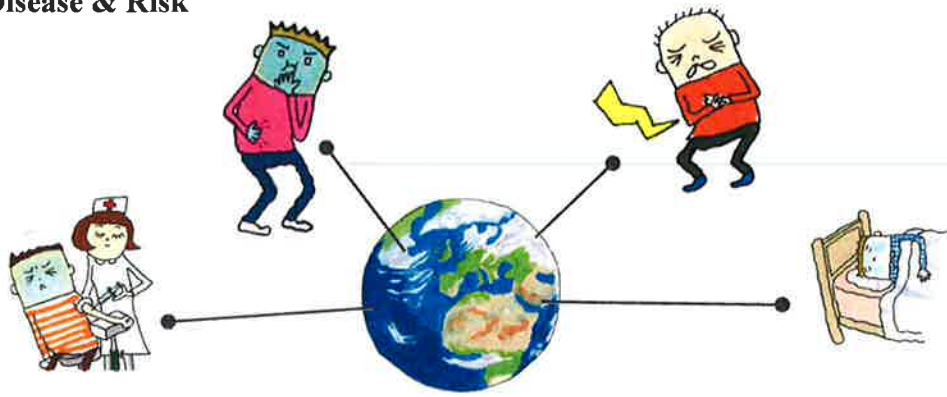
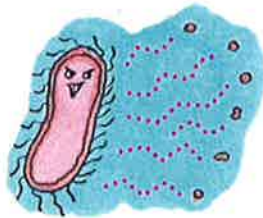


Foodborne Disease & Risk



Diseases caused by foodborne pathogens constitute a worldwide public health problem and preventing them is a major goal of societies.

Microbiological foodborne diseases are typically caused by bacteria or their metabolites, parasites, viruses or toxins.



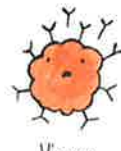
Bacteria Their metabolites



Parasites



Toxins



Viruses

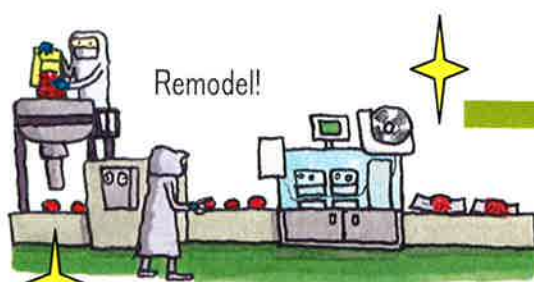
Poor hygienic practices



Poor sanitation

The health impact of different foodborne diseases varies between countries, and depends on foods consumed, food processing, preparation, handling and storage techniques employed, and sensitivity of the population.

While the total elimination of foodborne disease remains an unattainable goal, both government public health managers and industry are committed to reducing the incidence of illness due to contaminated food. However, reducing the number of illnesses will always have a cost to society.



“Cost” not only involves economic impact, but also includes cultural impacts, such as eating habits, etc. For example, banning a particular food commodity, such as unpasteurised milk, may be acceptable to some countries, but not to others.



Unpasteurised milk



All countries aim at reducing foodborne illness; however, most nations do not explicitly state to what degree they would like to reduce the number of foodborne illnesses in their country. Also, individual nations have different opinions about how to balance costs with reductions in foodborne illnesses.

Countries have traditionally attempted to improve food safety by setting microbiological criteria for raw or finished processed products. However, the frequency and extent of sampling used in traditional food testing programs may not provide a high degree of consumer protection. In most cases, a microbiological criterion has been set without estimating its effect on reducing the risk of foodborne disease.

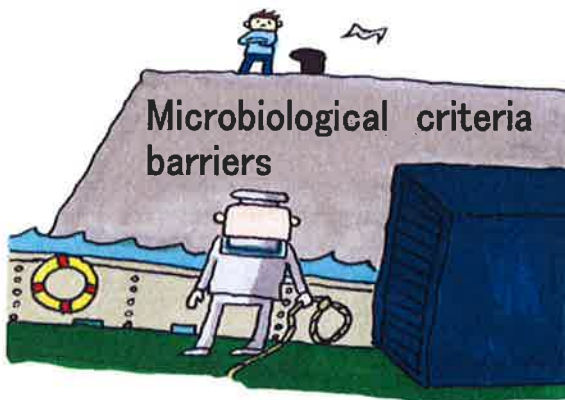


Traditional food testing programs may not provide a high degree of consumers protection.

Countries have been setting microbiological criteria for raw or for finished processed products.

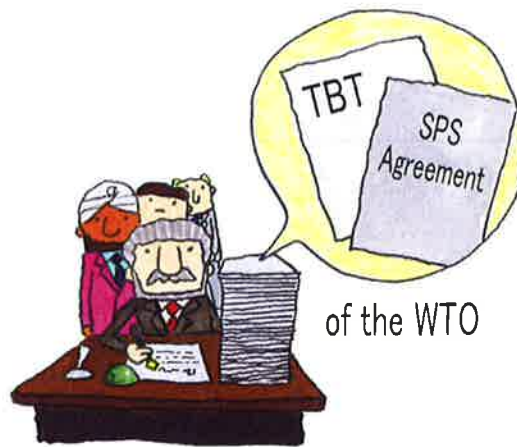


Consumers



Sometimes microbiological criteria established by national governments for different foods have been viewed by other countries as barriers to international trade, especially when a stricter level is imposed than is generally accepted at the international level for foods in trade.

More than 100 countries have signed the Sanitary and Phytosanitary (SPS) Agreement of the World Trade Organization (WTO). This agreement states that “whilst a country has the sovereign right to decide on the degree of protection it wishes for its citizens, it must provide, if required, the scientific evidence on which this level of protection rests.” It follows that if a country sets a microbiological criterion—or any other limit—for a particular health hazard in a particular food product, they must be able to explain, based on scientific data, consideration of risk and societal considerations, the rationale and justification for the criterion. Another WTO agreement, the Technical Barriers to Trade (TBT) Agreement, also requires that a country does not ask for a higher degree of safety for imported goods than it does for goods produced in its own country.



of the WTO

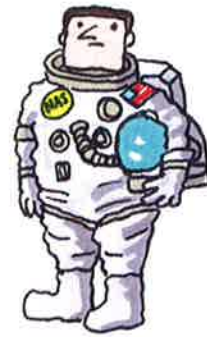


Good Practices and HACCP

Realising the many shortcomings and lack of food safety assurance provided by traditional inspection and sampling/testing of lots, the concept of Hazard Analysis & Critical Control Points (HACCP) was developed in the early 1970s.

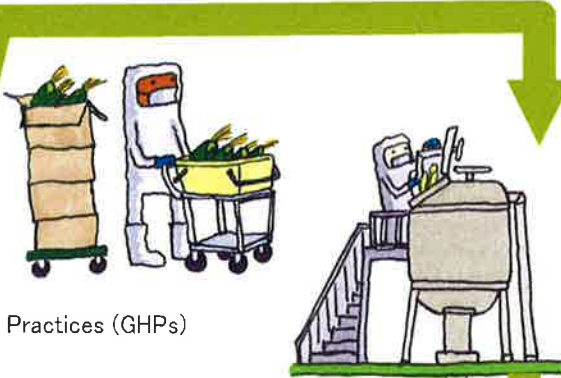
The HACCP concept has provided great improvements in the production of safe foods. The goal of HACCP is to focus on the hazards in a particular food commodity that are reasonably likely to affect public health if left uncontrolled, and to design food products, processing, commercialization, preparation and use conditions that control those hazards. To be successful,

HACCP was born because of the U.S. Apollo space mission.



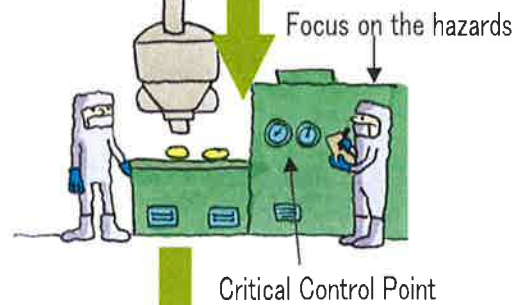
"Can you prove this food is 100% safe?"

Traditional inspection and sampling/testing of lots



Good Agricultural Practices (GAPs) and Good Hygienic Practices (GHPs)

HACCP is built on good production and manufacturing practices, such as good agricultural practices (GAPs) and good hygienic practices (GHPs), which minimize the occurrence of hazards in the product and the production environment. HACCP involves an assessment of hazards in a particular production sequence and defines steps where control measures that are critical for the safety of a product should be taken. Also, it will state limits, monitoring procedures and corrective actions.

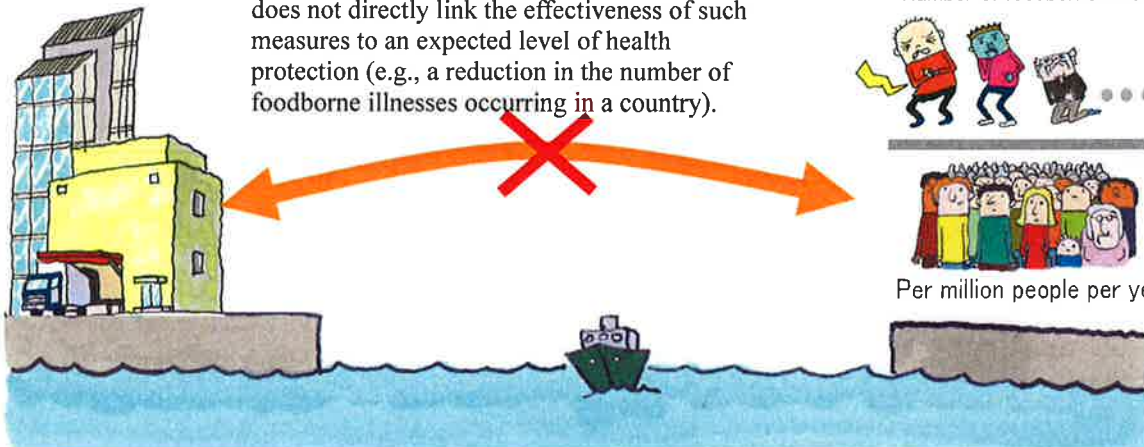


However, HACCP is plant/factory-specific and does not directly link the effectiveness of such measures to an expected level of health protection (e.g., a reduction in the number of foodborne illnesses occurring in a country).

Number of foodborne illnesses

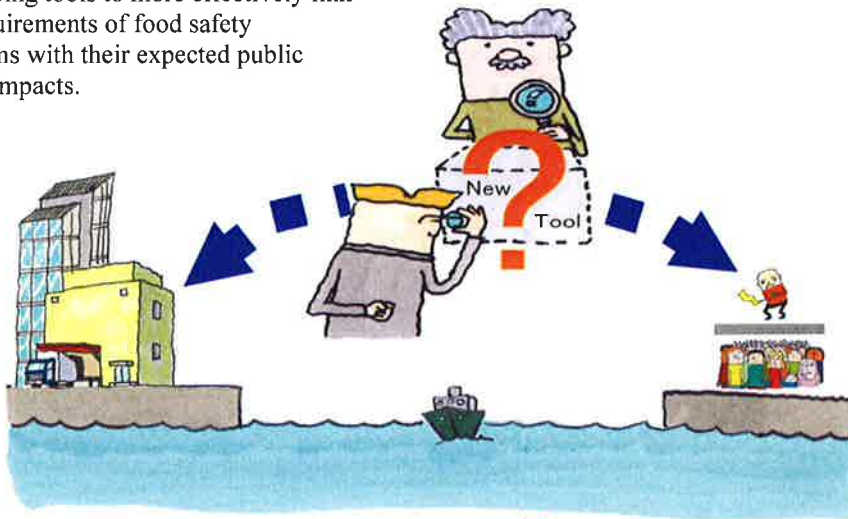


Per million people per year



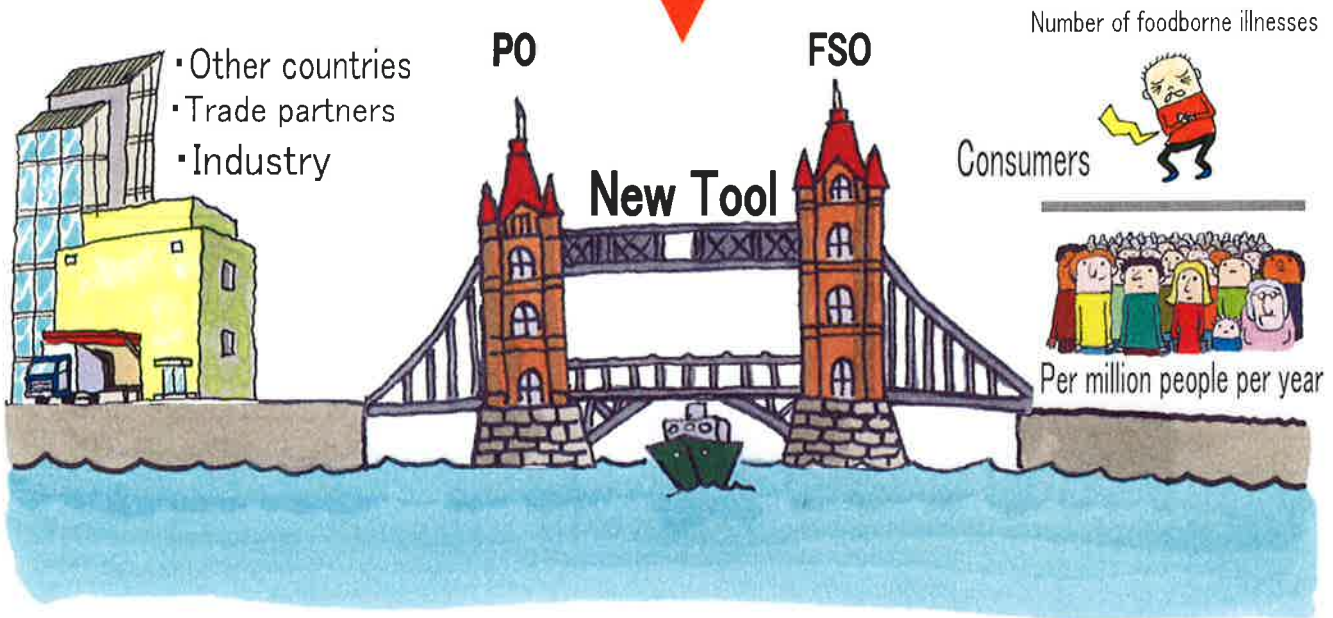
Setting Public Health Goals: The Concept of Appropriate Level of Protection (ALOP)

During the past decade, there has been increased interest and effort in developing tools to more effectively link the requirements of food safety programs with their expected public health impacts.



This document introduces two such tools: Food Safety Objectives (FSO) and Performance Objectives (PO).

These can be used to communicate food safety requirements to industry, trade partners, consumers and other countries. Good practices and HACCP remain essential food safety management systems to achieve FSOs or POs.



Setting goals for public health is the right and responsibility of governments. These goals may specify the maximum number of harmful bacteria that may be present in a food.



Where possible, the determination of this number should be based on scientific and societal factors.

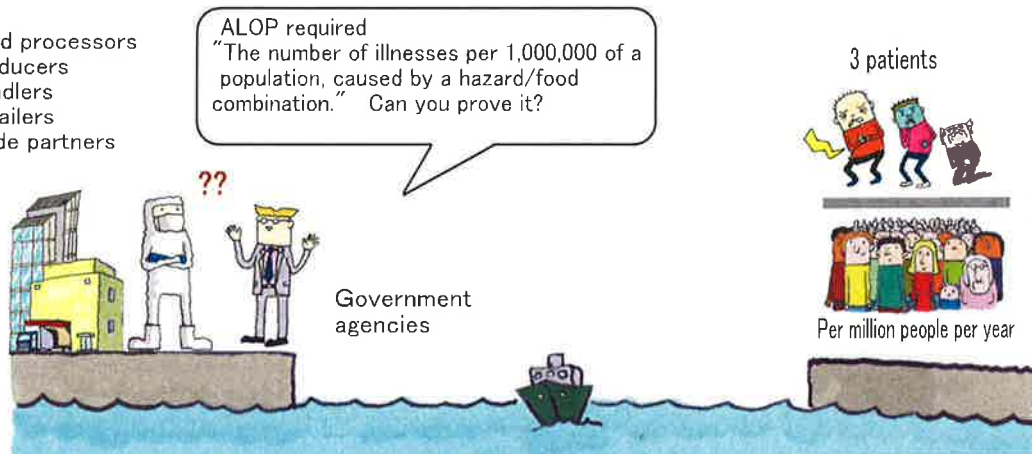
Costs may include industry investment for product reformulation and changes in processing, consumer costs due to increased prices or reduced availability of certain products, and/or regulatory costs in terms of surveillance.



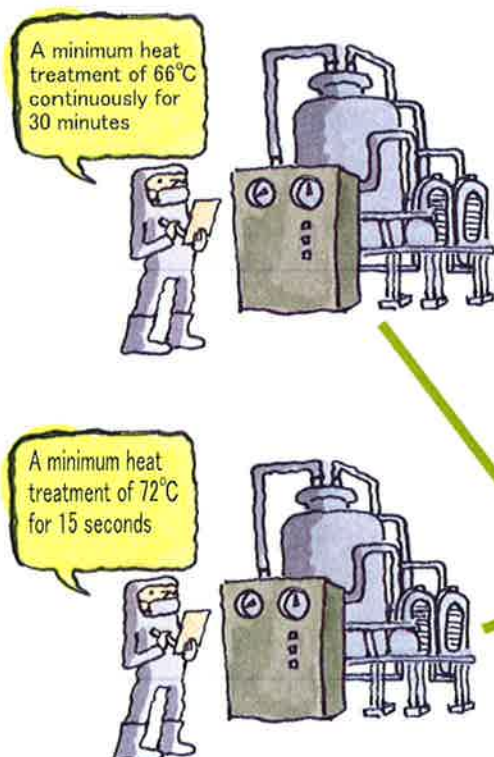
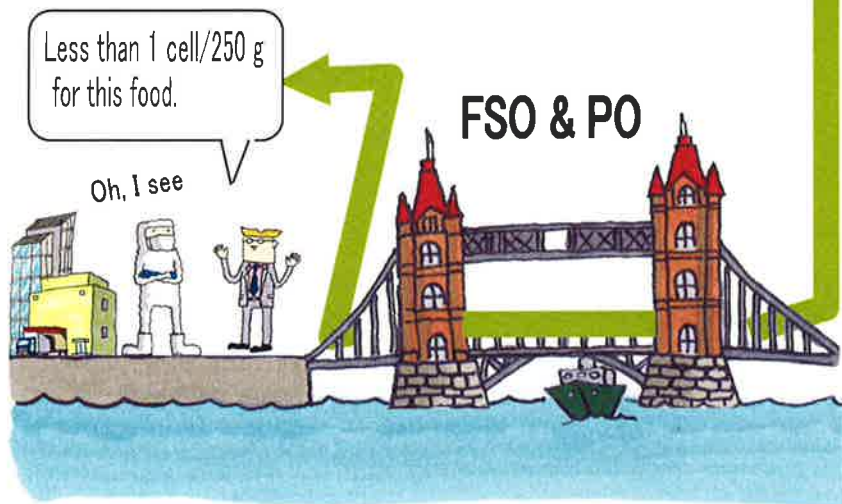
Food Safety Objectives (FSO)

When a government expresses public health goals relative to the incidence of disease, it does not provide food processors, producers, handlers, retailers or trade partners with information about what they need to do to reach this lower level of illness.

- Food processors
- Producers
- Handlers
- Retailers
- Trade partners



To be meaningful, the targets for food safety set by governments need to be translated into parameters that can be assessed by government agencies and used by food producers to process foods. The concepts of Food Safety Objectives (FSOs) and Performance Objectives (POs) have been proposed to serve this purpose. The position of these concepts appearing in the food chain can be seen in Figure 1.



An FSO is "the maximum frequency and/or concentration of a hazard in a food at the time of consumption that provides or contributes to the appropriate level of protection (ALOP)." It transforms a public health goal to a concentration and/or frequency (level) of a hazard in a food. The FSO sets a target for the food chain to reach, but does not specify how the target is to be achieved. Hence, the FSO gives flexibility to the food chain to use different operations and processing techniques that best suit their situation, as long as the maximum hazard level specified at consumption is not exceeded. For instance, milk is typically rendered safe by heat processing; however, in the future this may also be achieved by other technologies. This is important in international trade since different techniques may be used in different countries. The "equivalence" of these techniques in reaching a particular level of safety must be evaluated to ensure consumer protection without imposing an unjustified barrier to trade.

