SAVING LIVES
CHANGING LIVES

From the School Gate to Children's Plate: Golden Rules for Safer School Meals

Guidelines

May 2019 ***(updated March 2020)***

WFP
World Food Programme

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Acronyms

CO	Country Office
FAO	Food and Agriculture Organization
FATTOM	Food, Acidity, Temperature, Time, Oxygen, Moisture
FEFO	First Expiry First Out
FIFO	First In First Out
NSFP	National School Feeding Programme
SF	School Feeding
UNICEF	United Nations International Children's Emergency Fund
WFP	World Food Programme
WHO	World Health Organization

1. INTRODUCTION

Foods may contain the nutrients necessary for humans' physical and mental growth and well-being. However, improper handling and cooking practices can affect the properties and safety of the food consumed, and lead to its contamination with pathogenic microorganisms, toxic chemicals or foreign matters.

Every year more than 564 million people fall ill globally by foodborne diseases, of which more than 163 million are children below 5 years old[1].

Foodborne illnesses are preventable, and for the millions of school meals served to schoolchildren across the world each day, food safety is of vital importance.

The hazards that present a risk for human health may occur in the different stages of the food chain. Food safety encompasses the whole process of food production, selection, handling, transportation, storage, preparation and consumption of the food in ways that prevent contamination and reduce the risk of food-borne diseases.

Simple measures to assure food supply management and basic hygiene rules adopted by food handlers and cooks, from the schools' gate to children's plate, can significantly prevent food contamination and reduce cases of foodborne illnesses.

These guidelines were designed based on a collection of documents from each regional bureau including government guidelines and the 5 Keys to Safer Foods of the World Health Organization (WHO).

It is intended for school feeding programme managers responsible for the overall quality and safety of the food provided in schools, and for the people responsible in designing training for cooks and food handlers at school level. The reader learns basic food safety principles and good practices for the selection, storage, preparation, and serving of food. Food handlers are recommended to follow / incorporate it in their daily routine.

The objective is to reduce the risks to acceptable levels and prevent food contamination by improving existing handling practices, with the goal of serving safe meals to school-age children. Each section concludes with suggestions to adapt the content to local needs and facilitate training.

These guidelines could also be used as a basis for reinforcing national or regional regulations regarding food safety and quality in school environment along with training material used by national and regional authorities.

[1] Source: WHO estimates of the global burden of foodborne diseases

How is this document organized?

Section 1 provides the definitions of the key concepts and terms used in the document.

Section 2 provides three fact sheets, which summarizes the essential messages and good handling practices that can apply to any context. These can be adapted and used to train food handlers on good personal hygiene and food handling on their first day at work. They have been designed to help overcome language difficulties.

1. *Ready to cook? Before you start working with food;*
2. *Working with food? Golden rules for food handling and preparation;*
3. *Washing hands effectively.*

Section 3 presents essential information to understand food hazards, occurrence of foodborne diseases and how food can be contaminated, and microorganisms grow in food.

Section 4 addresses food handlers' personal hygiene and health condition required to ensure food safety.

To ensure all the necessary conditions for safe and healthy food, it is essential to apply proper, hygienic handling practices during the entire process of food preparation.

Food preparation encompasses the following processes, which are addressed in **Sections 5 to 9**:

5. *Food Reception;*
6. *Storage;*
7. *Meal Preparation;*
8. *Service (Distribution and Consumption)[2];*
9. *Cleaning and Waste management.*

Acknowledgments

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Note on the March 2020 update: This version includes a revision of the content on Diary products to align with existing WFP corporate guidance on the use of milk in WFP programmes.

[2] In central kitchen models, whereby meals are prepared in a central kitchen and delivered to the schools in the vicinity to be distributed and consumed, an additional step is the storage and delivery of meals. Additional guidance is under preparation for central kitchens, including food transportation and delivery.

Concepts and definitions

The below definitions describe the basic food safety terminology used in this document. They will enable the understanding and further transfer of knowledge from program managers and trainers to front-line practitioners.

BLEACH: [a] (chlorine) A strong smelling liquid containing chlorine that is used for disinfecting food contact surfaces and sanitizing plates and utensils.

CLEANING: Removal of soil, food residue, dirt, grease or other objectionable matter.

DISINFECTION: [a] The reduction by means of chemical agents and/or physical methods, of the number of microorganisms in the environment, to a level that is safe.

FOOD QUALITY: Food quality is the quality characteristics of food that is acceptable to consumers. This includes external factors such as appearance (size, shape, color, and consistency), texture, aroma and flavor, internal (biological, chemical, physical) to ensure that the food is in line with existing standards, including national or regional ones.

FOOD SAFETY: All measures to ensure that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use. [a] In the context of school meals, food safety refers to conditions and practices that ensure food is not contaminated with physical, chemical and/or biological hazards that could cause harm to children. It encompasses the whole process of food production, selection, handling, storage, preparation, service and consumption of the food in ways that prevent contamination.

FOOD CHAIN:[b] The food chain extends from the farm, or primary production, to the final consumer ("from the farm to the plate") and includes production, processing, manufacturing, transformation, packaging, storage, transportation, distribution, and sale and/or provision of food products. At each of these stages, there is a responsibility to keep food under the same safety conditions and appropriateness until the moment of its consumption.

The main purpose of food hygiene is thus, to ensure all the necessary conditions and measures required to guarantee that food is safe and appropriate at all stages of the food chain to prevent food contamination and reduce the risk of acquiring food-borne diseases.

FOODBORNE DISEASE: [a] A general term used to describe any disease or illness caused by eating contaminated food or drink. Traditionally referred to as "food poisoning".

FOOD HYGIENE: [a] All conditions and measures necessary to ensure the safety and suitability of food at all stages of the food-chain.

FOOD HANDLERS (cooks, storekeepers, helpers): [a] Any person who handles food directly as well as the equipment and utensils used to prepare or serve food and/or surfaces that come in contact with food. Food handlers are expected to meet food hygiene requirements.

CONTAMINANT: [a] Any biological or chemical agent, foreign matter, and other substances not intentionally added to food, which may compromise its safety and suitability. There are three types of contaminants: biological, chemical, physical.

DIRECT CONTAMINATION: [b] Contaminants are directly added to the food and affect it through the person that handles it. This type of contamination is probably the most simple and common form of food contamination. A typical example is when a food handler is sick *and* sneezes over the food or continues to prepare food. [c] The contamination of food may occur at any stage in the process from food production to consumption ("farm to fork") and can result from environmental contamination, including pollution of water, soil or air.

CROSS CONTAMINATION: [b] Contamination caused by the transmission of a hazard present in a food to another food that is safe, via surfaces or utensils that have contact with both, without the requisite cleaning and disinfection.

FOOD SAFETY HAZARD: [b] A food safety hazard is a food condition, or a biological, chemical or physical agent in food with the potential to cause an adverse health effect. There are three main types of hazards associated with food safety.

a. **BIOLOGICAL HAZARDS:** [b] These are related to microorganisms and the chemicals (toxins) they produce. These microorganisms or microbes are very small living beings that cannot be seen with the naked eye.

b. **CHEMICAL HAZARDS:** [b] Chemical hazards occur when chemicals are present in food at levels that can be hazardous to humans and can occur along the entire food chain. Food production processes can lead to substances entering the food at any moment. Toxic substances may also occur in natural form (such as mycotoxins).

c. **PHYSICAL HAZARDS:** Presence of foreign objects in food that might cause injury if consumed with the food or that can be a source of microorganisms.

DANGER ZONE: [a] The temperature range between 5 °C and 60 °C, in which microorganisms grow and multiply very fast.

MICROORGANISMS: [a] Microscopic organisms such as bacteria, mold, viruses and parasites, which may be found in the environment, in foods, and on animals.

PATHOGEN: [a] Any disease-causing microorganism such as bacteria, viruses or parasites. Often referred to as a "germ" or "bug".

PERISHABLE FOOD: [a] Food that spoils within a short amount of time.

PEST CONTROL: [a] The reduction or elimination of pests such as flies, cockroaches, mice and rats and other animals that can infest food products.

READY TO EAT: [a] Food that can be eaten without any further preparation or cooking.

RISK: [a] Is the severity and likelihood of harm resulting from exposure to a hazard.

RISK ASSESSMENT: . Overall process consisting of analyzing and evaluating the risks that are associated with every hazard that has been identified.

RISK MANAGEMENT: Process that, in consultation with all interested parties, considers risk assessment and other factors relevant for the health protection of consumers and for the promotion of fair-trade practices, and, if needed, define appropriate prevention and control measures. In the case of school meals, this process has for objective the reduction of foodborne risks in children, and involves the understanding of the nature and importance of hazards and exposure by food handlers (cooks, storekeepers, etc.) to develop possible risk management options, which can include alone or in combination:

a. Avoid the risk entirely by eliminating the hazard,
b. Reduce the risk to acceptable levels

TOXIC: [a] Harmful or poisonous.

UTENSILS: [a] Objects such as pots, pans, ladles, scoops, plates, bowls, forks, spoons, knives, cutting boards or food containers used in the preparation, storage, transport or service of food.

a. WHO. 2006: Five Keys to Safer Food Manual, Paris.
b. Pan American Health Organization (PAHO). 2017: Food handlers' manual, Instructor.
c. http://www.who.int/topics/foodborne_diseases/en/)

2. SUMMARY: GETTING STARTED

Before you start working with food – ready to cook?

Your personal hygiene is essential for children's health! This is what you need to do to keep food safe:		
		
Tell your manager if you have vomiting or diarrhea and do not work with food.	Wear clean clothes *(and apron/full uniform).*	Tie your hair back and wear a hat or hairnet.
		
Take off your watch and jewelry.	Cover cuts with waterproof dressing.	Always wash your hands, use soap and clean running water.
ARE YOU FIT TO COOK? Go for medical check-ups every 6 months (*or as required by the programme's rules*).		

Figure 1: Before You Start Working with Food – Ready To Cook?

When you are working with food – golden rules

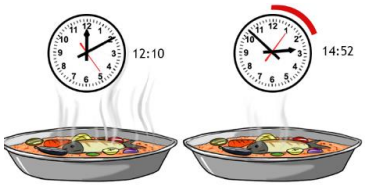
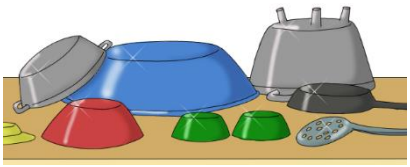
You have a key role to play to keep food safe at all times. To reduce food contamination and food-borne diseases, make sure you:		
		
Check the quality of food ingredients. Only use safe water to wash and prepare food or treat it to make it safe.	Wash hands regularly during food preparation with soap and running water.	No eating or drinking, no smoking in the kitchen.
		
Use clean kitchen equipment and dishes to prepare and serve food. Wash all dishes and utensils with detergent and clean water between the different stages of preparation.	Do not mix raw and cooked food, clean and dirty foods.	Cover food being prepared and food waiting for being served.
		
Avoid touching your face, coughing or sneezing over food.	Keep cooked food hot until serving to prevent harmful bacteria from growing. Avoid leaving cooked food at room temperature before serving it.	Store clean kitchen utensils and service equipment in a clean area, away from the ground, and upside-down.

Figure 2: Golden Rules when Working with Food

Other messages may be essential in some contexts:

- Clean, sanitize and thoroughly rinse with clean water, dishes, utensils, cutting boards and work surfaces. Use separate containers for scraping residues, washing, and rinsing - and, where appropriate, sanitizing
- Wash serving dishes and cups with soap and clean water between each use.
- Wash and disinfect utensils to be utilized. Use proper disinfectant concentrations for cleaning and sanitizing food utensils;
- Work on clean surfaces and clean the kitchen counter regularly;
- Wash vegetables and fruits with clean water before cooking;
- Clean the kitchen entirely after cooking: floor, kitchen counter. Walls and ceiling should also be cleaned periodically;
- Empty the trash can with lid at the end of the service;
- Respect safe storage conditions: Previously opened bags to be closed, no holes in the walls (or covered with mosquito nets), mosquito nets/mesh screen to cover windows, food products stored above ground (on pallets);
- Keep animals away from the kitchen and premises where food is handled or served;
- Wear clean footwear, free from dirt and preferably closed.

Washing hands effectively

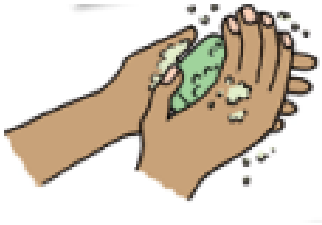
		
Wet hands under running water.	Put soap onto your palms.	Rub your hands together palm to palm to make a lather.
		
Rub the palm of one hand along the back of the other and along the fingers. Repeat with the other hand.	Put your palms together with fingers interlocked and rub in between each of the fingers.	Rub around your thumbs on each hand.
		
Then rub the fingertips of each hand against your palms.	Rinse hands under running water.	Dry hands thoroughly, preferably with a clean dry towel or air.
Rub hands together for at least 20 seconds.		

Figure 3: How to Wash Hands Effectively

When to wash your hands?

			
Before and handling and preparing any food.	After touching raw meat, fish, eggs, fruits and vegetables.	Before and after serving food.	**Before and after eating.**
			
After handling waste.	After using the toilet.	After coughing or blowing nose.	**After any cleaning.**
	Children too should always wash hands with soap before eating!		

Figure 4: When to Wash Your Hands?

3. FOOD CONTAMINATION AND FOODBORNE DISEASES

In this section, you will learn about food hazards, how food can get contaminated, how microorganisms grow in food, and about foodborne diseases. You will also learn how to consider risk when selecting the types of food commodities to be included in the school meals.

Golden Rules

- Food safety is a shared responsibility: we have all a role to play, from the supplier to the school children consuming the meals. Cooks and storekeepers are on the front line to ensure safe meals are served in schools. School personnel, including school management and teachers, and school meals committee members where they exist, play also an essential role to promote and ensure food safety and quality.
- Food Safety is crucial, and we should always thrive to deliver good nutritious and safe meals to the children.
- Food commodities have different food safety risks depending on their natural conditions, how they are produced, and how we prepare them. It is important to be aware of these different levels of risk when selecting, handling and preparing food ingredients for school meals.
- Food borne illnesses can be avoided by taking simple steps every day. These are reflected in WHO's manual on the five keys to safer food, listed below.[3]

1. **Keep clean;**
2. **Separate cooked and raw foods;**
3. **Cook thoroughly;**
4. **Keep food at safe temperatures;**
5. **Use safe water and safe raw materials.**

What are food hazards?

Foodborne diseases are caused by food hazards: dangerous microorganisms, toxic chemicals or foreign matter present in the food with the potential to cause an adverse health effect. There are three main types of hazards associated to food safety. Graph 1 gives common examples for each type.

1. BIOLOGICAL HAZARDS:

These are related to microorganisms and the chemicals (toxins) they produce. These microorganisms or microbes are very small living beings that cannot be seen with the naked eye. Dangerous microorganisms make people ill and can even kill. These are called "pathogens".

Most of these microorganisms do not change the appearance of the food. Some spoilage microorganisms do change the appearance of food and are dangerous. An example is a green mold on bread which can produce toxins. But it must be stressed that dangerous bacteria may not always make the food smell, taste or look different.

2. CHEMICAL HAZARDS:

Food production processes can lead to substances entering the food at any moment. Chemical hazards occur when chemicals are present in food at levels that can be hazardous to humans. Chemicals can be artificial or natural: toxic substances may also occur in natural forms, such as mycotoxins or food allergens. Toxic chemical substances are particularly dangerous, some of them can be fatal.

3. PHYSICAL HAZARDS:

Foreign objects in food might cause injury if consumed with the food or can be a source of microorganisms. Some physical hazards may be naturally present in the food, for instance, fishbones.

[3] WHO (2006): Five Keys to Safer Food Manual, the manual is available in many languages https://www.who.int/foodsafety/publications/5keysmanual/en/

Graph 1. Examples of Food Safety Hazards

Biological hazards	Chemical hazards	Physical hazards
Infectious bacteria: • Salmonella; • *Escherichia coli;* • Listeria; • Vibrio. Toxin-producing bacteria: • *Clostridium botulinum;* • *Staphylococcus aureus;* • *Bacillus cereus.* Other: • Mould; • Parasites (i.e.roundworm, trichinella, taenia*);* • Viruses (e.g. Hepatitis A); • Prions (e.g. mad cow disease syndrome)	• Naturally occurring toxins such as cyanides in raw cassava and almonds; • Allergens; • Toxins of microbial origin such as aflatoxin, which is caused by mold growing on the food; • Residues of products used in food processing such as food additives, packaging materials; • Residues of chemical products used in agriculture, such as pesticides and fertilizers; • Residues of veterinary medicine such as antibiotics and disinfectants; • Environmental contaminants such as heavy metals (mercury, lead), poly- chlorinated biphenyls (PCB), dioxin, radioactive nuclides.	• Glass, Plastic; • Metal, metal fragments from worn or chipped utensils and containers; • Wood; • Stones; • Jewelry, ear plugs, etc.; • Nails, false nails, nail polish; • Insects; • Pest droppings; • Hair; • Toothpicks; • Non- edible parts of the food: Bone chips.

How is food contaminated?

There are many opportunities for a food to become contaminated. Contamination is the presence of materials or conditions in the food that can be harmful to human health. Foods can become contaminated in a variety of points as the food flows from the farm to the table, and through all the stages of food preparation. Any measures to prevent and control contamination must begin at harvest and continue until the food is consumed (farm to fork approach).

Microbial contamination can occur from various routes:

- in the environment: In the air, soil, and water, on food, contaminated utensils or garbage.
- in human beings and animals (dogs, fish, cows, chickens, and pigs; rats, insects): on skin, on infected wounds, on hair, on hands, in the nose, in ears, in saliva, in feces and vomit.

Microorganisms – germs or microbes – rely on someone or something to move them around.

- Parasitic infections, which have direct life cycle and do not need an intermediate host to infect a new host and are spread via faecal contamination of food and drinks are often referred to as faecal orally transmitted parasites. Infections acquired through direct ingestion of infective eggs or cyst is intimately linked with the level of personal hygiene and sanitation in the Community. The lack of latrines and adequate sewage disposal facilities has been known to contribute to the spread of the infective stages of the parasite.
- Intestinal worms are parasites that live in the human intestines or in the veins around the bladder. These worms are transmitted by eggs excreted in human faeces or urine, which contaminate the soil or water sources in areas that lack adequate sanitation[4]. The worms consume part of the nutrients and vitamins that children ingest. Children are most vulnerable to worm infections, as their immune system is not yet fully developed. Untreated worm infections prevent children's healthy growth, cause poor nutrition and reduce their capacity to concentrate and

[4] https://www.who.int/intestinal_worms/more/en/

learn. A single dose of deworming treatment drastically reduces the number of worms in each child. Regular treatment contributes to good health and nutrition for children of school age. Children need these deworming medicines to grow healthier and learn better in school.[5]

A common way to contaminate food directly is through the people who handle it. Cross-contamination happens when harmful bacteria are spread onto food from other food, surfaces, hands or equipment. The most frequent cases of cross-contamination occur when the handler allows a raw food to come into contact with a food ready to be consumed, by using the same cutting boards or kitchen utensils. Cross-contamination is one of the most common causes of food poisoning.
Aside microorganisms there is also

- Chemical and physical contamination (e.g. from the use of unclean non-food containers to store food- e.g. incident of kids' intoxication in India due to use of pesticide containers to store veg. oil by the school cook).
- Physical contamination (e.g. from foreign matters entering food products : pest, dust, sand etc.)

Common points that result in contamination include:

- Using the same knife and board to cut raw meat and foods ready to eat;
- Placing dirty utensils and equipment in the hand-wash basin;
- Re-using a dirty cloth to wipe cutlery, and tables;
- Using a dirty towel for drying equipment, utensils or hands;
- Dirty hands;

- Storing food uncovered or on the floor;
- Storing raw food above ready to eat food;
- Keeping cleaning chemicals next to foods;
- Garbage improperly stored and disposed of, because it provides an ideal environment for the growth of germs and pests;

- Not washing fruits and vegetables to remove soil and other residues;
- Contaminated food and water.
- Mixing leftover food with fresh food.

- Vectors such as birds, flies, cockroaches, rats or mice, and ants. They carry microorganisms, which they deposit on food. Pets and domestic animals can also be a source of contamination;

[5] https://www.globalpartnership.org/content/guidelines-school-based-deworming-programs

How do micro-organisms grow? Favorable factors for microorganism reproduction

Bacteria need six conditions to grow. You can remember these conditions by thinking of the word

FATTOM:

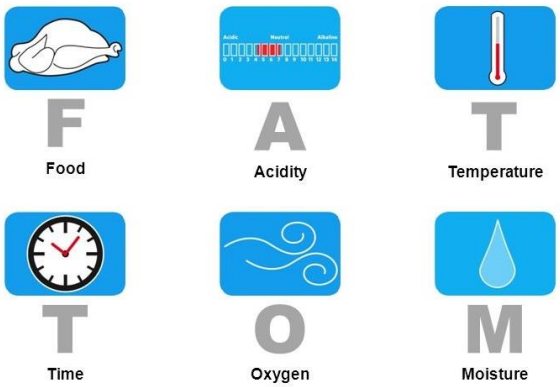


Figure 5: Six Conditions for Bacteria to Grow: FATTOM

Food: Germs need foods rich in nutrients (protein, sugar, and fat) to grow. They prefer high-protein foods like meat, eggs, dairy products; cooked vegetables, and cooked grains, such as rice.

Acidity: Bacteria grow best in an environment that is neutral or slightly acidic. That is why acidic foods, like vinegar and fresh fruits (especially citrus), seldom provide a favorable climate for harmful bacteria.

Temperature /warmth: Bacteria grow and reproduce quickly between the temperatures of 5° to 63°C. This range is known as the temperature danger zone. Bacteria growth is limited when food is held above or below the temperature danger zone (see figure 6).

Time: On average, under ideal conditions, bacteria may double in number every 20 minutes. Holding food at temperatures below 5°C or above 63°C, can slow down the growth of most spoilage and pathogenic microorganisms. Letting food stay too long at temperatures that are good for pathogen growth is one of the main ways for food to become unsafe.

Oxygen/air: Most bacteria need air to survive but there are others grow that very well in the vacuum i.e. canned foods.

Moisture/water: All microorganisms must have an abundant supply of water to grow. Food that contains a lot of water, such as fruits and fresh meat, is a good source of bacteria.

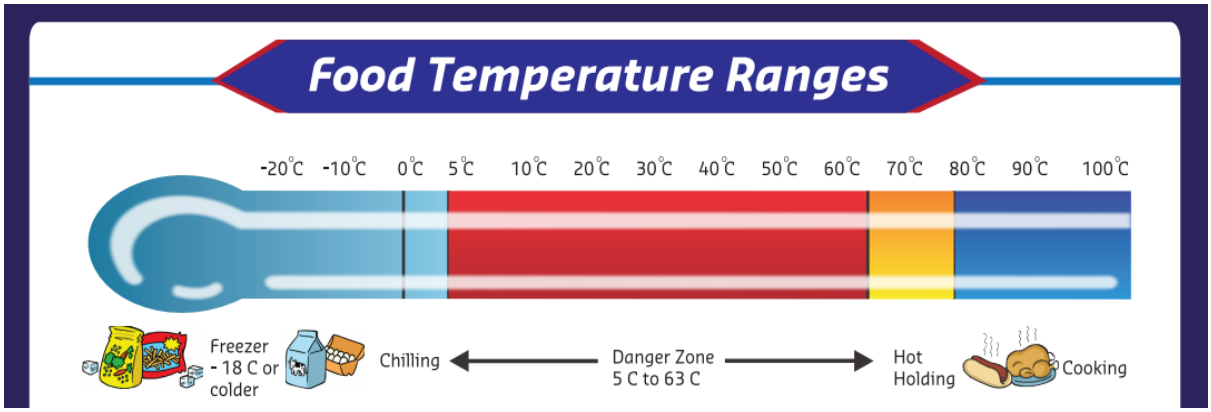


Figure 6: Temperature ranges including danger zone (5 to 63° C)

How do microorganisms get us sick? Foodborne diseases

Foodborne diseases are those illnesses due to the consumption of contaminated or spoilt foods. It is a major global health concern, caused by bacteria, viruses, parasites, toxins, or chemicals. It can cause stomach aches, vomiting, diarrhea, and fever, and in some cases, can be deadly (see Graph 2 for examples of common foodborne diseases).

These illnesses tend to affect more infants, young children, pregnant women, the elderly and the sick. Pregnant and lactating women are especially vulnerable to a range of foodborne diseases, including listeriosis and toxoplasmosis.

Depending on the cause, symptoms may occur very quickly after eating the food or may take days or even weeks to appear. In most cases, symptoms occur 1-3 days after the food has been eaten. Foodborne diseases can lead to long-term health problems and contribute to malnutrition. Very severe diseases, including cancer, arthritis, and neurological disorders can be caused by contaminated food.

Importantly, Foodborne Diseases are preventable. Proper food handling and personal hygiene are key to prevent foodborne diseases. You can stop microorganisms from making school children and your family and community members sick by applying five key principles described further in following sections[6]:

1. Keep clean;
2. Separate cooked and raw foods;
3. Cook thoroughly;
4. Keep food at safe temperatures;
5. Use safe water and safe raw materials.

[6] WHO (2006): Five Keys to Safer Food Manual, Paris

Graph 2. Common foodborne diseases

FOOD BORNE DISEASES	SOURCE	SYMPTOMS
Salmonellosis and Typhoid Fever	Raw meats, especially chicken, shellfish, eggs, uncooked dry fruit (and other dry foods), fresh fruit and vegetables. In general, typhoid fever is associated with contaminated residual waters, or crops irrigated with contaminated water.	Non-typhoid salmonellosis: Nausea, vomiting, abdominal cramps, diarrhea, fever, headache. Typhoid fever: High fever, lethargy, gastrointestinal symptoms (abdominal pain and diarrhea), headache, muscle pains, loss of appetite. In some cases, typhoid fever manifests itself by pink spots on the skin.
Staphylococcus aureus	Meat and meat products. Free-range poultry and eggs, salads, milk and dairy products, bakery products (cream-filled cakes, cream-filled and chocolate pastries).	Nausea, abdominal cramps, vomiting and diarrhea. In more serious cases, dehydration, headache, muscle cramps, and possible transitory blood pressure and pulse changes. Serious cases may require hospitalization.
Enterocolitis caused by E. coli	All foods and liquids contaminated with feces. A person infected with E.coli fails to wash their hands thoroughly after using the toilet and before handling food.	Watery diarrhea, vomiting and low fever.
Gastroenteritis caused by Clostridium perfringens	All foods that are not consumed or refrigerated right after being cooked are susceptible to contamination by C. perfringens. Meat and vegetables are foods most commonly involved.	Watery diarrhea and abdominal cramps.
Listeriosis caused by Listeria monocytogenes	Unpasteurized cheeses (particularly soft cheeses), unpasteurized milk, fish, cooked shrimp, smoked shellfish, meats, sausages, raw vegetables and ready to eat foods.	Fever, muscle pains, nausea and vomiting, and diarrhea. When more severe cases of infection occur, and spread to the nervous system, symptoms may include headaches, stiff neck, confusion, loss of balance, and convulsions. Pregnant women may feel mild symptoms, similar to those of a cold. However, they may have miscarriages, and affect live births and may also lead to death.
Cholera caused by Vibrio Cholerae	Fish or shellfish from contaminated waters, contaminated drinking water, raw vegetables and salads irrigated or washed with contaminated water, or any food contaminated by remaining at a temperature that favors bacterial proliferation.	Usually, the disease starts with abdominal pain and diarrhea (which may vary from mild to severe). Vomiting in some cases.

How do we think of risk when selecting food items to be served in schools?

All foods have different food safety risks depending on their inherent characteristics (e.g. if the food composition supports microbial growth), their level/ form of processing (raw, pasteurized, cooked, dried etc.), and the way we prepare them. Unprocessed animal source foods (i.e., meat, milk, eggs, fish and seafood), and fresh fruits and vegetables are the most common causes of foodborne disease [7] as they provide ideal conditions for microorganisms' growth. Hence, their consumption is associated with higher risk.

Understanding the associated food safety risk is important when selecting, handling and preparing food ingredients for school meals. High-risk foods need particular attention. Their use is not recommended in school environments with poor hygiene conditions or without the ability to maintain refrigeration (cold chain) in their supply, from farm to fork.

Graph 3 gives a three-level risk classification of the main ingredient groups received and used in school canteens. This classification considers the absence of cooler boxes and refrigerators in school kitchens. For a detailed list and examples, refer to Annex 1.

Graph 3. Food ingredients risk classification

High-Risk foods: Have a very short shelf life (2-5 days) and refrigeration is pre-requisite for their safe storage (i.e. perishables), otherwise pathogenic microorganisms can grow. Their mode of handling and their adequate cooking are critical as they may contain pathogenic microorganisms, bacterial toxins or harmful chemical contaminants. Epidemiological data indicate frequent and severe foodborne outbreaks from their consumption.	**Examples**: raw meats, fish, poultry, fresh milk and fresh cheese, cooked rice and cooked pulses. Other examples include tofu, dried meat. These foods pose a particularly high risk if they are not processed, handled and cooked adequately.
Medium-Risk foods: Can be safely kept in room temperature for medium to long periods (few weeks up to several months). Dried or canned processed foods may contain hazardous chemicals or microorganisms but do not normally support microbial growth due to their state or properties. Epidemiological data indicate few mild or severe foodborne outbreaks associated with their consumption.	**Examples**: fresh vegetables, fruits, canned meat and canned fish.
Low-Risk foods: Unlikely to contain hazardous substances or microorganisms and do not normally support the growth of pathogenic microorganisms. Epidemiological data indicate no or rare and mild foodborne illnesses associated with their consumption.	**Examples**: dry cereals and pulses, flours, packaged bread, fats and bottled edible oil.

[7] Delia Grace (2015): Food Safety in Low and Middle Income Countries. Int. J. Environ. Res. Public Health 2015, 12, 10490-10507; doi:10.3390/ijerph120910490
https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=9&cad=rja&uact=8&ved=0ahUKEwiht6X99IfcAhXL3KQKHTRWDOQQFgiLATAI&url=http%3A%2F%2Fwww.mdpi.com%2F1660-4601%2F12%2F9%2F10490%2Fpdf&usg=AOvVaw3RyEaKC9ts6-K-v3CQwqVA

To reduce foodborne risks in school meals, you can consider, alone or in combination:

a. Avoiding the risk entirely e.g. do not use the ingredient or food material, do not eat the food, change to another product;
b. Reducing the hazard to acceptable levels through improved raw materials choices and improved preparation processes or sanitation. This is the focus of these guidelines.

Considerations to tailor the content to your context

- For simpler language, use the terms usually used in the country, e.g. “germ” for microorganisms and “poisons” for toxic chemicals.
- Insert local foods in the general risk tables. By using the criteria of risk or likelihood of a hazard to cause harm, think of local foods that are used in school meals and organize them in the table based their likelihood to foster ideal conditions for growth of microorganisms or the increase of chemical contaminants.
- Become familiar with dangerous microorganisms and chemical contaminants specific to your region.
- It may be useful to elaborate on some of the chemical contaminants that are a hazard in a specific geographical area (e.g. methylmercury, arsenic).
- Consider citing food incidents reported in your country or region to emphasize the potential risks. This data is available within WFP.
- Share real and compelling cases of foodborne illness/ incidents in school meals from your region/country. It will build-up the tangible arguments on why food safety management at school canteens is a must, and the repercussions of poor hygiene practices for example, in India in 2013, at least 22 schoolchildren died after eating a free school lunch contaminated with insecticide (https://www.bbc.com/news/world-asia-india-23337445)

4. PERSONAL HYGIENE AND FITNESS TO WORK

This section summarizes the good personal hygiene practices to help prevent dangerous germs from spreading to food, the importance of being 'fit for work' and what to do when someone involved in school food handling and preparation is sick or injured.

While most microorganisms do not cause disease, dangerous microorganisms are widely found in soil, water, animals **and people**. Everybody carries microorganisms. They are present in the skin, hair, nails, in saliva, inside the body and also on wounds. The slightest contact can transfer them to food. Microorganisms can then be transmitted to consumers through the food, and make them ill.

Golden Rules

- Personal hygiene and being in **good health** are crucial for food handlers. Practicing good personal hygiene is key in preventing food contamination and occurrence of food-borne illnesses; it must be made a daily routine.
- Everyone is responsible for their own cleanliness: Food handlers but also children and those who might eat the food or enter the food storage, preparation or service areas, and all school personnel

Everyday Good Hygiene Practices

Your personal hygiene is important. This is what you need to do to keep food safe at all times:

Key Hygiene Practices	WHY?
Wash hands with soap and clean water, then dry thoroughly (*see Figure 3*). Do this frequently, particularly in the moments listed below (*Figure 4*): - Before handling and preparing any food; - After touching raw meat, poultry, fish, eggs, or fruits and vegetables and live animals; - Before and after serving food; - Before and after eating; - After handling food and non-food waste; - After using the toilet; - After coughing or blowing nose (*see Annex 5)* - After any cleaning.	Washing hands with clean water and soap is one of the best ways to prevent harmful bacteria or viruses from spreading into food.
Cover hair while preparing, cooking and serving food. If hair is long, tie it in a bun, so that the cover/hat prevents hair from falling into food.	Hair is not tied back or covered, it is more likely to fall into food and staff are more likely to touch their hair.
Keep fingernails short and clean. Avoid using nail polish and false nails.	Increase hand washing efficiency ; nail polish and false nails may contaminate in the food
Avoid touching your face, coughing or sneezing over food, and wash your hands if you do so. Do not eat, drink, spit, smoke cigarette or chew tobacco/gum when working with food. Do not consume alcohol.	Harmful bacteria can be spread from someone's face or mouth to their hands and then onto food. All lead to touching the face or mouth

Key Hygiene Practices	WHY?
Shower or wash daily, specifically before entering food preparation premises	To reduce the overall microbial load on ones' body/ skin
Wear clean clothing and aprons in the work area. Wear clean footwear, free from dirt and preferably closed. Try to have shoes exclusively for the working area. Do not wear jewelry (rings, bracelets, earrings, threads, watches, etc.) -except a plain wedding band. Ensure daily washing of workwear, aprons, chef hats, face masks, towels. Handbags, mobile phones, shoes and other personal effects must be stored away from cooking areas.	Personal items such as clothes, shoes and jewelry can be a source of food contamination as they contain germs and dirt collected during daily activities. Light colored clothing allows a better view of stains. Aprons help to stop dirt and bacteria from getting onto work clothes and can be removed easily for washing. Closed shoes better protect the feet.

Food Handlers' Personal Health: What to do if a person is sick or injured?

- People suffering from stomach illnesses (vomiting, diarrhea) or a respiratory disease could spread harmful bacteria or viruses to food and thereof to the children indirectly. They should not be engaged in food preparation while ill and ideally for 48 hours after the symptoms stop.
- **If you are sick:** avoid going to school or report it immediately to the person in charge of school meals preparation and go home straight away, as you can contaminate food.
- **If you have a wound**: treat open wounds with anti-bacterial products and cover affected area completely with water-proof bandages that cannot be removed inadvertently during food preparation. One should not handle food if the injury is still bleeding.
- If a cook or food handler is not 'fit for work', managers should move them out of food handling areas or send them home.

It is recommended to check national legislation to ensure compliance.

A good practice is having a medical and dental screening before hiring new staff who are expected to handle food in schools. This screening shall include:

- Physical examination;
- Dental examination;
- Visual and hearing screening;
- Laboratory investigations – genotype and blood group, urinalysis, stool microscopy, hematocrit, typhoid screening.
- Mental health examination.

Considerations to tailor the content to your context

- In many countries, UNICEF and other stakeholders have developed materials to promote hand-washing in schools, which can be used to train cooks and other food handlers.
- In countries where medical certificates are mandatory for cooks/ food handlers involved in school meals preparation, the training should include detailed information on medical certification requirements. In other places, the importance of health should be covered, and cooks/food handlers encouraged to have regular medical checks.

5. RECEIVING AND MANAGING RAW MATERIALS

Food ingredients can get contaminated along the entire supply chain, from the farm to the children's plate. Purchasing, accepting and utilizing quality ingredients, including water, is key to guarantee school meals' safety and nutrition quality. In this section you will learn how to control the quality of raw ingredients for school meals and how to make conscious choices while accepting them.

Golden Rules

- Quality of raw ingredients and water defines final quality of the meal. Care in the selection of raw materials may reduce significantly the risk of contamination.
- For drinking and preparing food, use only safe water or treat it to make it safe.
- Prefer purchasing from reputable suppliers. Ensure they meet set food quality criteria where available, and good practices for food storage and transport.
- Always select fresh and wholesome foods.
- Purchase and accept ingredients - including community contributions - only after careful visual inspection and assessment of storage practices.
- Visual inspection of food products during delivery and before use should be systematic. Visual inspection guides with pictures, based on Quality Parameters for Local Foods are a useful tool to that end (*see Annex 6 for additional guidance*).
- Plan reception and frequent inspection of storage to ensure that there is enough storage space available or that food will be consumed immediately.
- Delivery of goods should not be made during cooking or serving times to allow proper inspection and to separate raw ingredients from cooked food.
- Do not receive or use packaged food beyond the expiration date printed on the package.
- Everyone has a role to play in food safety and quality control. Be alert, make conscious choices while choosing and receiving ingredients including water.

Receiving and controlling fresh ingredients (vegetables, meats and dairy)

- Check transport means are clean and that products transported were packaged in clean containers (bags, crates, basket, etc.) covered from the weather.
- Check that fruits and vegetables are separated during transport from other perishables (meats, fish and dairy) or non-food items (cleaning supplies, fuel, etc.) to avoid cross-contamination.
- After inspection, accept and store meat and vegetables covered in separate containers.
- Keep records of acceptance or rejection for all fresh ingredients.
- It is a good practice to also check the weight of bags/containers at delivery.

Green leafy vegetables, pre-cut vegetables and tubers (pumpkin, gourds, cassava, etc.)

- Accept ingredients free from discoloration, shrinking, slime, off-odor, visible evidence of insect infestation and/or bruising.
- Do not procure produce immersed in water, as fruits and vegetables can absorb water with any pathogen.
- Do not procure fruits or vegetables with evident traces of pesticides.
- After receipt, store them in separate and clean containers from meats, away from direct sunlight and covered.

REJECT: Spoiled, bruised or infested vegetables

Fresh Meats (Pork, Lamb, Beef, Chicken, Duck), Fish

- If suppliers cannot assure cold chains for the transport of fresh meats, and if meats are processed and transported from the slaughterhouse to the schools for a period longer than 1-2 hours at room temperature, this ingredient should be avoided.
- Color must be visually acceptable (vivid red, no browning), be free from foul smell, tender-firm texture, non-slimy, non-watery, more muscle than fat.
- For Fish – glossy appearance, bright and clear eyes, pinkish-deep red gills, firm clear skin, no off-odor
- Ensure raw meat is always kept covered, free from access to flies and domestic animals.
- Cook within 1-2 hours of receipt, the earlier the better.

REJECT: stale meats or meats that are hot/warm to the touch

Dried meat and fish

- Dried meats must be free from stains, odors, signs of mold, slime, or other contamination;
- The meat pieces must be uniformly, thoroughly cured;
- If commercially packaged, always check expiry/best before date.

Eggs

- Buy eggs from a reputable supplier.
- Check eggshell for cracks, discoloration, brittle surface and dispose of them. Egg freshness can easily be tested using a bowl of water (see Annex 8).
- Store eggs in a cool, dry place.

REJECT: cracked and dirty eggs; eggs for which the "best before" date is past (if indicated on the product).

Dairy Products

- Schools are highly recommended to opt for processed dairy products validated by technical staff, such as pasteurized, UHT (Ultra-High Temperature), fermented and ripened products as they are safer than raw dairy products. Technical validation is required to ensure production conditions are met and product is safe (i.e. UHT milk reached necessary temperature and time during UHT process).
- Pasteurization and UHT are heat-treatment processes that kill harmful bacteria at a specific temperature and time. If the correct temperature, time and packaging conditions are met, UHT milk is stable at room temperature, while pasteurized milk must be kept refrigerated.
- Do not accept pasteurized milk unless cold chain is ensured throughout the entire supply chain. Pasteurized milk should be avoided if there is no refrigeration at schools.
- While schools provide on-site cooking facilities, the preparation of milk (i.e. the reconstitution of milk powder) on-site should be avoided given the risk of unsatisfactory hygiene and sanitation conditions.
- Raw milk (i.e. not pasteurized or heat-treated milk) should be avoided in any circumstances. Contaminated raw milk can be a source of harmful bacteria, such as those that cause undulant fever, dysentery, salmonellosis.
- Any packages of dairy products that are opened must be consumed immediately.
- Open bottles and tetra packs (i.e. UHT milk) should be consumed immediately or stored in the refrigerator, and in no case brought back home.
- Accept processed dairy products only within the best before date. Reject the product if the date is missing or the best before date is near.
- Check for off-taste, discoloration, bad odors, abnormal or damaged packaging appearance. If these characteristics are present, report to school management and dispose immediately.

REJECT: Raw milk, puffed/blown up containers, sour of curdled milk; off-odor/taste; expired or near expiry processed milk.

Additional guidance on the use of milk in school feeding programmes is available in *The use of milk in WFP operations – Position paper* (June 2017)

Tofu

- Tofu is considered as a low acid perishable food and should be received and controlled in a similar way to a pasteurized dairy product.

Receiving and controlling dry commodities and processed foods

Dry Cereals and Pulses, Canned Foods (fish, meat, pulses), Packaged Food (oil, salt, sugar, spices, sauces)

- For rice, lentils, other grains, ensure that they arrive in sealed sacks.
- Check grains and pulses visually for signs of infestation (insects, parts of insects), mold and wetness (lumps, dark or black grains, musty smell).
- For maize, the person receiving food at the school level should verify the dryness of the grain to prevent mold growth. The salt method is an easy and inexpensive way to do it when there is no access to a moisture meter, although inaccurate (*see Annex 7*).
- Re-bagging of spilt grain should be avoided if possible. But, if re-bagging is needed, then cleaning procedures of the grain need to be in place.
- Inspect containers of packaged food for cracks, leaks.
- Check for Best Before Date, particularly for processed and packaged sauces (soy, fish, oyster), canned products (fish), oil (discard if label/data/date is absent).

REJECT:

- Wet, moldy or stained, or infested grain (gnaw marks, droppings, insects).
- Opened packaging
- Swollen/bulged/leaky cans and bottles, broken/tampered bottle seals, cracked surfaces; cans with rust that will not wipe off.
- If canned content has any off-odor, bad smell is observed after opening the lid, discard the contents and container immediately.

Water quality

KEY PRINCIPLES:

Schoolchildren, teachers and food handlers need water supply that is safe, accessible and of sufficient quantity for drinking, food preparation and personal hygiene.

- Safe water is needed to drink, wash and prepare ingredients, add to foods, make ice, clean utensils and wash hands. Use only safe water or treat it to make it safe.
- Safe water means it is free of harmful organisms and toxic chemicals at levels that could cause illness (see Annex 9).
- Disinfection is a treatment process that ensures drinking water is free from harmful microorganisms (see Annex 9 for more information on water treatment methods).

Whenever possible, water for drinking and food preparation should be obtained from pumps constructed and managed by the government or aid agencies, an organized tanker supply, or specially constructed tanks.

Drinking water from unprotected sources is to be treated to ensure microbiological safety and meet WHO Guidelines for Drinking-water Quality or national standards and acceptance levels. In cases where access to safe drinking water is not

guaranteed or inconsistent, schools need to install and use simple water treatment systems, filters or water boilers. This should be the case when:

- water is collected from unsafe sources (see box 1),
- children bring water to schools in jerrycans as they come to school,
- or containers used to carry the water are not clear.

In an emergency, all water – even that supplied to schools by the government or relief agencies for drinking – should be treated first.

NEVER re-use containers that have been used for chemicals to store and transport water.

Box 1*: Water Collection and Unsafe Water Sources*

Because drinking-water supplies are often scarce, people are forced to draw water from rivers, ponds, leaking pipes, tanks and wells that are damaged and contaminated. Children using these familiar sources may not realize the danger to their health or personal safety. Places to avoid include those where:

- People are defecating in or near water sources
- Animals are using the same source
- Objects, corpses and animal carcasses have been disposed of
- The water source is near a damaged toilet
- Water is no longer treated due to dysfunctional treatment equipment
- There has been heavy rain or flooding, and storm-water drainage is poor
- Dirty surface water is entering springs and wells
- Sewage or agricultural chemicals are disposed of

Considerations to tailor the content to your context

Food baskets vary greatly across countries and programmes. This section needs to be tailored with the food commodities used to prepare the school meals in your country.

Availability and access to safe water vary considerably across programmes. Ensure the information provided, particularly regarding water treatment, is relevant to the context.

Where countries have developed quality standards and guides for the visual inspection of foods for school meals, these should be explained and used as a reference when discussing acceptability criteria. Otherwise, it is recommended to develop visuals with photos to demonstrate acceptable versus foods to reject. These visual inspection guides can be used during training and distributed in schools as a checklist/guide. Ideally, they should be based on Quality Parameters for Local Foods (see annex 6 for additional guidance).

To deliver fruits and vegetables that do not present any risk of contamination, suppliers should be educated further on how to check the produce they procure. Product specifications can be useful to establish a common basic understanding of quality requirements for foods to be used in school meals programmes.

6. STORAGE

In this section, you will learn about Good Storage Practices. Good Storage Practices provide protection from the sun, rain, humidity, animals, birds and pests and therefore can preserve the safety and quality of food for an extended time and retain nutrients.

Golden Rules

- The storage area must be aerated, covered with a roof and well-lit for visual inspection
- The door must be provided with lock and key and must always be locked
- Fill gaps, holes in walls, roof. Windows must be covered with a mesh to facilitate ventilation and prevent access to rodents, birds and other animals into the warehouse.
- Make sure that floor and walls are clean thoroughly before stock arrival
- Do not store food under direct sunlight or in direct contact with the floor.
- Food must be stacked on wooden pallets or raised platforms/shelves and at a distance of at least 15 cm (5.9 in) from the ground level, walls, ceiling, and for easy inspection and cleaning. This will also allow for good air circulation and not cause food to go soggy or moldy.
- There must be a clear demarcation, separate storage areas for different commodities.
- Do not store chemicals, such as detergents and soaps, paints, cement, and insecticides, in the food storage area. Make sure they are clearly labelled.
- Empty chemicals or non-food packaging (e.g. pesticide bottles) should never be used for storing food products and vice versa. Confusion in this regard might lead to serious intoxication.
- Do not eat, drink, smoke inside the warehouse.
- To ensure use of food prior to spoilage or expiration, adopt:
    - FIFO – First In First Out- principle: prepare and consume the earliest purchased food items first. This principle means that food needs to be always labelled with the date at which it was purchased and stored, so that the oldest foods are used first.
    - FEFO- First Expiry First Out- principle: consume foods whose shelf life is the shortest, first.

Storing fresh ingredients

- Storage of raw fresh ingredients should be kept at a minimum.
- Cut vegetables or fruits, fresh meat, poultry, fish and dairy products should not be stored in schools at room temperature. Where cool boxes in proper conditions are available and properly used, these products can be stored for 4-8 hours (see Box 2).
- Never store them overnight at room temperature.
- Fresh raw ingredients and processed ingredients must be stored separately.

Box 2: Using a cold box to preserve fresh raw meats, fish, chicken and dairy

Figure 7: Example of an insulated or cold box

- A cold box can be a simple Styrofoam box with an airtight lid or an insulated box.
- It is recommended to practice temperature-control while handling fresh meats, poultry and fish as it keeps the food safe for a longer duration by preventing the growth of bacteria on the food surface. Ice to be used inside should be made from potable drinking water. Frozen gel/ice packs can also be used to keep the temperature cool inside the box. The temperature inside a cool box with ice or gel packs should be between +2 to +8°C always. These temperatures can help preserving fresh ingredients safe for a period of 6-8 hours when un-opened.

Food	Average Temperature	Time
Meats, Fish, Chicken	<5 °C	4 – 8 hours

Important points to remember:

- Only use potable water to make ice.
- The box must be impermeable, and lid should have an air-tight fit.
- Ice must be placed on all four sides of the box and on the top and bottom and firmly shut.
- Ice must not be allowed to melt into liquid as it is an indication of temperature increase which can lead to microbial proliferation.
- Gel packs when used need to be frozen solid before use. Punctured gel packs need to be discarded as the coolant present inside the pack is a hazard if it comes in contact with food/food surfaces.
- Meats must be stored in clean polyethylene bags or wrapped in plastic film so that their surface does not come in direct contact with the ice or cool pack
- The Box must be washed, cleaned, dried thoroughly before and after each use

Fresh fruits and vegetables:

- Do not store fruits and vegetables under direct sunlight or in direct contact with the floor. Keep them covered. Do not make stack fresh foods on top of each other to avoid moisture and mold.
- Use clean containers that help maintain the texture (for example, cardboards, sawdust, rattan baskets). The use of proper containers in which the products will be put in, transported and stored will reduce hand contact with the goods and exposure to contamination.
- Controlling the rate of ripening when storing fruits and vegetables is critical to managing the shelf life of the produce.
- It is recommended to separate low and high producers of ethylene. Ethylene is a chemical that fruits and vegetables produce naturally as they ripen. Fruits and vegetables produce different levels of ethylene and at the same time, some are very sensitive to it. This contributes to the acceleration of spoilage. Figure 8 provides examples of foods used in school meals programmes as per their ethylene production.[8]

[8] For a detailed list on ethylene sensitive products see: http://ucanr.edu/sites/Postharvest_Technology_Center_/files/230191.pdf

High Ethylene Producers	Low Ethylene Producers
• Apples • Bananas • Green Onions • Potatoes • Tomatoes • Stone Fruits • Mangoes	• Cabbage • Carrots • Green Beans • Eggplant • Onions • Watermelon • Sweet Potatoes

Figure 8: Examples of Foods Used in School Meals, as Per Their Ethylene Production[9]

Storing grains and processed foods

- Store cereals and pulses in air-tight containers in a dry airy place, away from sunlight to prevent exposure to moisture.
- Maintain dry conditions inside the warehouse and bags sealed to prevent grain exposure to moisture and reduce chances of aflatoxin.
- Periodically check inventory of non-perishables (grains, pulses, oil, salt) for signs of infestation, pests and mold contamination
- Store packaged food (edible oils, sugar, salt, dried spices) in cartons for easy stacking and distribution.

Pest control

- Effective pest control is essential to keep pests out of food storage and kitchen premises and prevent them from spreading harmful bacteria.
- The role of storekeepers and other food handlers is to prevent pests from spreading.
- Ensure that the facilities and equipment (building, furniture, windows) are properly maintained. Check your premises regularly for signs of pests.
- Prevent pests in the workplace by keeping doors and windows closed, installing mosquito screens and drains grates and covering holes where necessary.
- Prevent pests from nesting. This requires maintaining cleanliness and order always, including unseen spots, such as behind countertops and cabinets
- Keep external areas tidy and free from weeds to prevent nesting.
- Prevent animals from feeding on garbage and food residues by disposing of waste and leftovers properly. Make sure bins have close-fitting lids and are easy to clean and clean and disinfect regularly (refer to section on waste management).
- Clean and discard spillage of grains, lentils as they can attract insects and other pests.
- Store food correctly:
    - Maintain bags closed
    - Do not store an already opened can. If there is access to a refrigerator on the premises, store in a separate container; if refrigerator is not available, discard un-used canned food

[9] Sodexo expert mission for WFP Kenya: Mission report. September 2017.

- Clean and sanitize all the working areas frequently. This includes the receiving, storage, kitchen, serving and eating areas.
- Have rodent baits or traps placed in warehouses or storage rooms and check every day. BUT never let pest control bait/chemicals, including sprays, come into contact with food, packaging, equipment or surfaces, because they are likely to be poisonous to people.
- Check deliveries thoroughly for signs of pests. Do not accept a delivery if it shows signs of pests such as gnawed packaging or insects.

ACT:

- If you think any equipment, surfaces or utensils have been touched by pests, they should be washed, disinfected and dried to stop harmful bacteria from spreading.
- If you think food has been touched by pests in any way, throw it away

Considerations to tailor the content to your context

Storage conditions and cold chain availability also vary greatly. These guidelines have been developed for countries where cold chain is generally not available at the school level.

Most WFP Country Offices have already developed guidelines and training materials for storage. These should be used as the reference for any training for school cooks and food handlers.

Fumigation or any chemical pest control should be only done by certified agents and is generally not advised in schools. Guidelines should include country specific guidance on what to do and who to contact in case of pest infestation.

7. MEAL PREPARATION

In this section you will learn key principles for preparing and cooking safely; how to cook foods that need extra care; and hot holding.

Golden Rules

- It is essential to cook food properly, to a safe cooking temperature. Cooking thoroughly eliminates most dangerous bacteria. Raw food, especially dirty vegetables and meats, poultry and seafood and their juices can contain dangerous microorganisms which may be transferred onto other foods during food preparation.
- '**Time - temperature' management** from receipt, storage, cooking and serving, is crucial to ensure food safety. As a golden rule, limit the time food stays in the "danger zone" – between 5°C and 63°C or room temperature (see figure 9).
- If refrigerator/ice box is not available, try to substitute meats and other high-risk foods with lower risk ingredients (e.g. fresh live fish, processed dairy or eggs), or minimize the exposure time at room temperature (see annex 1 for more guidance on high-risk foods)
- Keep cooked food and ready-to-eat food completely separate from raw meat, poultry, fish, eggs and unwashed vegetables.
- It is very important to handle ready-to-eat food (e.g. fresh salads) carefully to protect it from harmful bacteria. This is because it will not be cooked or reheated before serving.
- Visually inspect all commodities before cooking them (see section 2). They have spent some time in the storing room since their reception and may not be suitable for consumption anymore.

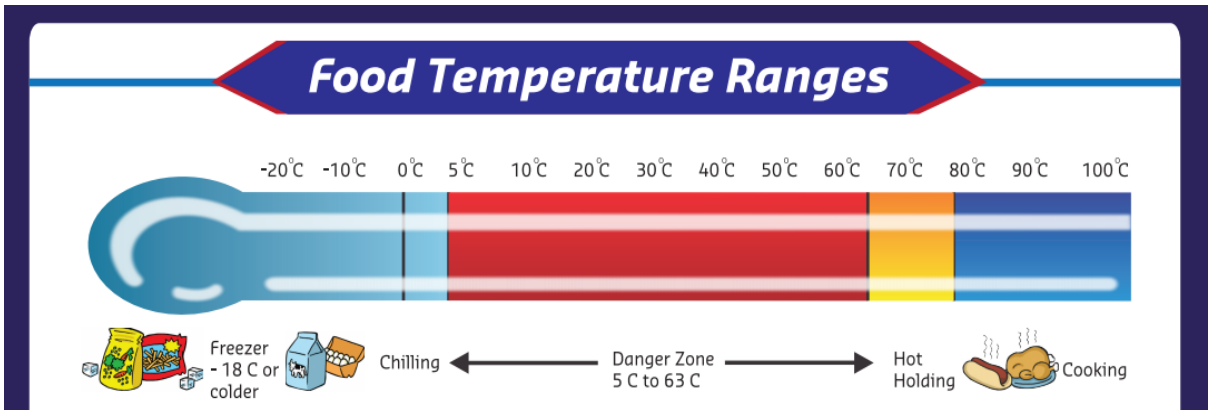


Figure 9: Temperature ranges including danger zone (5 to 63° C)

Cooking and keeping food at safe temperatures

- **Prepare food quickly and cook thoroughly.** Cooking temperatures can kill almost all dangerous microorganisms and play a role in keeping food safe.
- Ideally, use a thermometer to ensure that the centre reaches 75°C and hot food is kept at least at 65°C.
- If this is not possible, check visually that food is properly cooked. Different checks are suitable for different types of dish. You can use Graph 4 to check if food has been cooked thoroughly.
- Mince meats, large pieces of meat and poultry require special attention as it is more difficult to check their temperature.
- Soups and stews have reached a safe cooking temperature of 70°C when boiling. Stir them frequently. Stirring will help make sure the food is at the same temperature all the way through.
- It is very important to keep food hot (at 63°C or above) during all the preparation process and until serving to prevent harmful bacteria from growing. Avoid leaving cooked food at room temperature for more than two hours before serving. Microorganisms can multiply very quickly if food is stored at room temperature. By holding cooked food hot, at temperatures above 63°C, the growth of microorganisms is slowed down or stopped.
- Holding food hot before serving, at safe and consistent temperatures for extended periods of time, requires suitable equipment. It may be more practical to adjust food preparation schedules to reduce the time food needs to be kept in the danger zone and minimize serving food below safe temperatures.

ACT:

- If cooked food has been left at room temperature for more than two hours, it is very important to reheat it properly to kill harmful bacteria that may have grown since the food was cooked. Remember, reheating means cooking again, not just warming up. Always reheat food until it is steaming hot all the way through. You should only do this once.
- Food that has not been used within two hours, should either be reheated until it is steaming hot or chilled down as quickly as possible to 8°C or below. If you cannot do either of these things, throw the food away.

Graph 4. Check It – Check To Tell If Food Is Properly Cooked

Steamed Rice, lentils: Soft texture.	
Soups, gravies and stews: Roiling boil for at least one minute. Check that dishes bubble rapidly when you stir them.	
Vegetables: Roiling boil with steam arising.	
Pork: Color turns from pink to white, clear juices. Check they are steaming hot all the way through with no pink or red in the center.	 
Beef, lamb: Color change from dark red to dark brown, clear juices. The largest piece of meat in stews, curries etc. should be steaming hot all the way through with no pink or red.	 
Poultry (chicken): Color changes from pink to white. Check the thickest part of the leg. Juices should be clear, with no pink or red in them.	 
Fish: Flaky texture *(subject to local preference),* clear juices, piping hot. To check fish is cooked through cut into the centre of fish, or by the bone if there is one, to check that the color and texture has changed.	 

Eggs: Hard when boiled, opaque when fried, piping hot.	
Pies, pastries and combination dishes (e.g. contains meat and vegetables). Check they are steaming hot in the center.	

Everyday good kitchen habits to prevent contamination

- **Wash hands** with soap before and after handling food;
- **Keep kitchen and kitchen surfaces clean and clear**: remove food spillages, clean kitchen and serving premises before and after use. Clean cobwebs, any other foreign matter (plastic bags, pebbles, etc.) from the kitchen area before and after cooking;
- Protect kitchen areas from insects, pests and other animals;
- **Keep tools clean**: Wash utensils (*pans, ladles, knives, chopping boards, mortar and pestle*) before and after use, and between the different stages of meal preparation (*refer to Section 7*); do not store food and kitchen utensils on the ground;
- Always wear **clean clothing**, aprons, head gear while preparing food (*refer to Section 2*);
- Do not re-use tasting spoons, avoid using bare hands to taste or handle cooked food;
- **Keep raw foods (**raw meat, poultry, fish, eggs and unwashed vegetables), **separated from prepared and ready to eat foods.** Do not let raw food touch or drip onto cooked food. Raw food can carry harmful bacteria, which could spread onto cooked food;
- Never use the same utensils, chopping boards or containers for raw and cooked or ready-to-eat food. Make sure work surfaces, chopping boards, knives etc. are clean and disinfected if you have prepared raw food;
- **Cover food** being prepared and food waiting for being served at all times.

ACT:

- If you find dirty kitchen tools; presence of flies, animals, remove and clean before preparing or serving.
- Replace worn out chopping boards with deep knife marks

Foods that need extra care

Foods have different food safety risks depending on their natural conditions and how we prepare them. It is important to be aware of these different levels of risk when selecting and handling food ingredients for school meals. High-risk foods need particular attention. *See Annex 1 for risk classification of foods.*

Raw meats (e.g. pork, lamb, beef, chicken, duck and other birds, fish)

- Washing raw poultry, beef, pork, lamb, or veal before cooking is generally not recommended. Bacteria in raw meat and poultry juices can be spread to other foods, utensils, and surfaces through the water and sinks.
- Use a separate, clean chopping board, free from crevices/deep knife marks to cut meats. The use of separate cutting boards prevents cross-contamination; chopping boards with deep knife marks are difficult to clean and harbors bacteria.
- Never use the same chopping board or knives for preparing raw meat/poultry and for ready-to-eat food (unless they have been thoroughly cleaned and disinfected in between).
- If equipment/surfaces/utensils have been touched by raw food, always wash with soap, disinfect and dry them after use to prevent harmful bacteria from spreading (*refer to section 9 for details about cleaning and sanitation*);
- Utilize fresh meat immediately after chopping, do not leave it idle uncovered.
- Prepare raw meat/poultry/ fish and other foods in different areas. If this is not possible, separate by preparing them at different times and clean and then disinfect thoroughly between tasks.

If slaughtering of minor animals is done in the school premises (i.e. fish, frog, chicken)

- Ensure it is done in a separate, covered area to prevent cross-contamination.
- Ensure that sick animals are not slaughtered.
- Animal waste is to be disposed in a separate container and blood washed away (with no visible presence on the floor).
- Poultry and fish should be washed when slaughtered and eviscerated.
- All surfaces (wash knives, hands, cutting boards) in contact need to be washed including waste containers before and after use.

Eggs

- Check each egg before breaking it. Never use cracked or dirty eggs. They are not suitable for human consumption and should be disposed in a safe manner;
- Do not use eggs after the 'best before' date. Make sure you use the oldest eggs first;
- Cook eggs and foods containing eggs thoroughly until they are steaming hot.

Green leafy vegetables, fresh pre-cut vegetables (*pumpkin, gourds, cassava, etc.*)

- Discard dead, wilted, dried, discolored leaves, vegetables;
- Chop-off roots with soil and dispose separately;
- Wash thoroughly, preferably under running water, to remove soil, insects, other visible stains;
- As a chemical disinfection measure, chlorine solution in the form of commercial bleach (Sodium hypochlorite) can be used for the immersion of already washed vegetables, in concentrations of 100-200 ppm. This is equivalent to a tablespoon of bleach to five liters of water. (do not use this spoon to prepare or consume foods);
- Leave the vegetables for 15 minutes. A longer time is not necessary, as leaves will wilt and acquire a chemical aftertaste. This is followed by rinsing for a few minutes;

- Chopping is to be done immediately after washing, with careful inspection. Where possible, use a designated, clean chopping board for vegetables (to be washed before and after use). You can mark each chopping board to differentiate them easily.

Tubers (Potato, onion, garlic, ginger etc.)

- Ensure that soil on the surface is washed off and cleaned well before peeling and chopping;
- After peeling, vegetables need to be used on the same day. Do not store pre-cut vegetables at room temperature for use the next day;
- If sprouting is visually observed on the surface, then discard (sprouting creates a favorable environment for the proliferation of microorganisms).

Dry grains and pulses, packaged bread

- Visually inspect and do not cook with ingredients which present discoloration, mold formation or infestation;
- Grains and pulses: check and remove stones, chaff other physical contaminants and use a sieve for flours to separate stones, other foreign material;
- Grains should always be washed before cooking to remove dirt, fumigants etc.;
- After each use, ensure the remaining commodities are stored in air-tight containers in a dry airy place, away from sunlight to prevent exposure to moisture;
- Cooked cereals and pulses should not be left waiting at room temperature. Rice can contain spores of a type of harmful bacteria that may not be killed by cooking or reheating. If cooked rice is left at room temperature, spores can multiply and produce toxins that cause food poisoning. Reheating will not get rid of these.

Considerations to tailor the content to your context

How safe food preparation and handling practices are applied depends greatly on the infrastructure and equipment available and the types of foods prepared. Make sure the practices and control points recommended are relevant to the context.

Box 3: Ideal school kitchen infrastructure

- Have a roofed, well-ventilated, easy-to-clean light-colored floor surface.
- Must always be located away from toilets
- Have a raised platform or bench for washing and preparing ingredients. It allows better visual inspection, is more comfortable to food handlers, and more importantly, reduces the risk of contamination from soil.
- Have cabinets with doors to store packaged ingredients like salt, sugar, oil, spices, etc; as well as separate cabinets with locks to store cleaning and sanitation supplies.
- Have separate chopping boards for fresh vegetables and meat *(preferably easy to dry food-grade plastic surfaces)*
- Have minimum materials for sanitation
- Display Food Safety Posters in the kitchen as easy reminder for following good practices
- Have smoke-free stoves. Daily inhalation, exposure to smoke can cause respiratory problems
- Have access to fire extinguishers and first aid toolkit *(cotton, alcohol, band-aid, burn creams, etc)*
- There should be controlled movement into the kitchen. Only cooks and other authorized people should be allowed to prevent cross contamination

8. SERVICE: MEALS' DISTRIBUTION AND CONSUMPTION

Golden Rules

- The school's director and teachers should ensure that children have soap for hand washing and that the area dedicated to the meal is adequate.
- Keep food at safe temperatures until serving. Ensure food is kept hot to the touch and try to serve the food in 2 hours or less;
- Keep everyone's hands clean (food handlers and children). People responsible for serving the meals (including children when this is a common practice), need to properly wash hands after cleaning and before serving food;
- The person who serves the food should preferably be an adult trained on basic food hygiene. Making school children responsible for serving meals or cleaning bathrooms should be avoided as it presents risks for personal and others' safety and health.

Good practices

Serving areas

- Ensure food is served in a clean, covered or shaded, well-ventilated area;
- If enclosed designated location, make sure the door and windows are covered with mesh to prevent entry of birds, animals;
- Keep the canteen's door closed, and locked when not in use;
- If the food is consumed in open-air or semi-open spaces, ensure the designated area is shaded, protected from wind and dust, and equipped with mats so that children do not eat in direct contact with the floor.

Before serving

- **KEEP CLEAN:** children eating the meals and people serving the food must wash hands with soap before serving the food.
- Assure availability of clean serving and eating utensils (plates, cutlery);
- Inspect general cleanliness of the serving area, particularly if surfaces for the preparation and serving are shared (tables, chairs, plates, cutlery);
- Thoroughly clean serving area before and after use;
- If available, before serving spread a clean tablecloth (to be removed and cleaned after serving) especially when eating on the floor;
- For ease in serving, transfer food into smaller clean containers with lids to be taken to the serving area;
- Cooks along with the school management need to make sure the food is cooked thoroughly before serving. Any uncooked or partially cooked food should be removed from the serving area and discarded.

During Serving

- Reheat until food is hot to the touch if serving time is being prolonged for over 2 hours after cooking or food is getting cold;
- Finish serving within 2 hours of cooking, earlier the better, plan cooking schedules in advance;
- Containers must be opened only before the serving of food to children;
- If eating utensils are going to be reused during the day, ensure they are washed with water and soap and air dried;
- Visually check the cleanliness of each serving bowls and cutlery for any indication of dirt and soap residue. If cutlery is not clean, request for clean, fresh set and/or drop it in the washing designated area;

- Respect the portion sizes to be served for each age group;
- Food on the floor or furniture must be cleaned and mopped immediately.

After Serving

- Leftover food should not be stored/re-heated and served the next day;
- Ensure that food dropped on the floor is cleaned immediately;
- Wash serving area premises thoroughly;
- Keep the door locked to avoid entry of animals.

ACT:

- Dispose-off leftover food if it cannot be refrigerated;
- Children should be discouraged to bring left-over food back home. Where this is a common practice, it is important to sensitize parents about the dangers of food kept at room temperature (and dirty containers) for extended periods of time. Parents could be sensitized on how to re-heat food where relevant.

9. CLEANING, SANITATION AND WASTE MANAGEMENT

Keeping kitchen premises clear and clean throughout all stages of the operations makes them safer. Effective cleaning is essential to get rid of harmful bacteria and to stop them spreading to food. In this section you will learn how to keep the working materials and environment clean, and good practices to manage waste.

Golden Rules

- Cleaning and sanitation are daily tasks and should include:
    - Surfaces that have contact with foods (containers, utensils, dishes, working surfaces). Work surfaces, utensils and equipment need to be washed thoroughly between tasks.
    - Kitchen and service areas (walls, floor, ceiling, tables, chairs).
- When cleaning, move food out of the way, or cover it.
- Make sure that cleaning and sanitizing chemicals do not contaminate food. Follow the manufacturer's instructions on how to use cleaning chemicals. This is important to ensure chemicals work effectively and do not contaminate the food. Check that any cleaning chemicals used are suitable for surfaces touched by food.
- Cleaning procedures should be followed before and after food preparation, and often during the process. A cleaning schedule is a useful tool to help you clean effectively. Cleaning schedules should cover responsibilities, methods, utensil handling and sanitizing aids, etc. to effectively control contamination. These should be continuously monitored for their effectiveness. Annex 10 provides an example of a cleaning schedule.

Cleaning and sanitizing utensils and equipment

- Clean, sanitize and thoroughly rinse, with clean water, dishes, utensils, cutting boards and work surfaces.
- Use separate containers for scraping residues, washing, and rinsing - and, where possible, sanitizing (figures 10 and 11).
    - Scrape off solid residues.
    - Use clean water and food-grade detergent for washing (remove dirt and germs). Remember to discard and refill fresh water for washing, rinsing, sanitizing frequently to prevent contamination.
    - Rinse with clean, preferably running water, to remove dirt and detergent residues
    - Sanitize by immersing in warm water with appropriate chemical sanitizer as required by each product's instructions. Chemical disinfectants and sanitizers only work if surfaces have been thoroughly cleaned first.
    - Air-dry (do not use drying cloths).

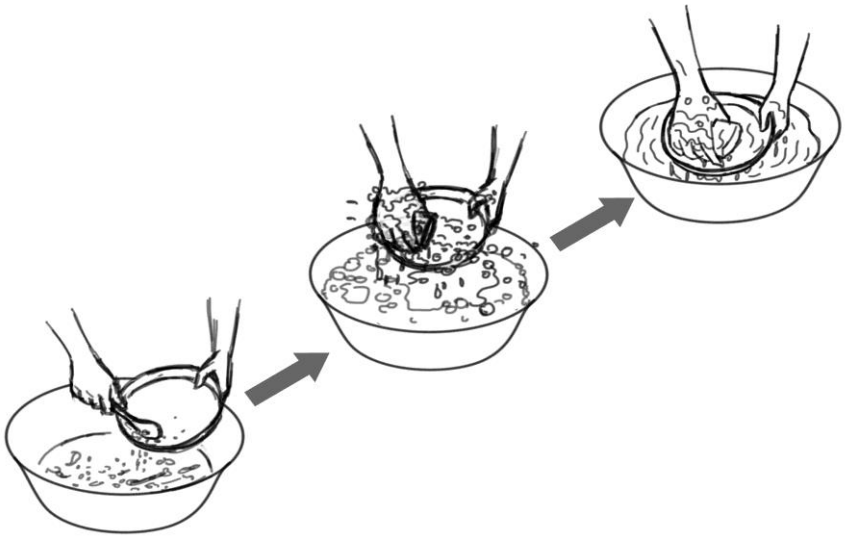


Figure 10: Steps for manual washing of dishes: one bowl for scrapping residues, one for washing and one for rinsing (Madagascar)

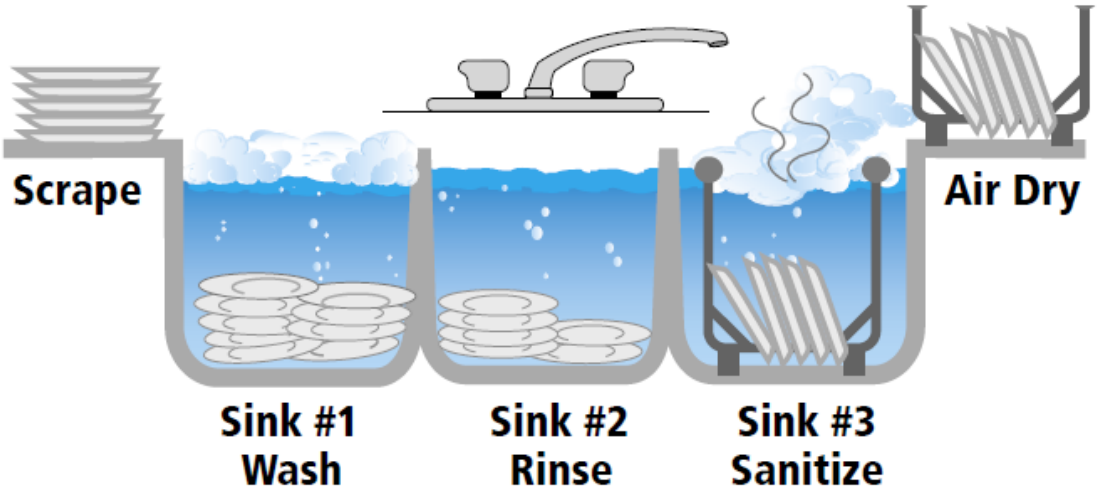


Figure 11: Steps for manual washing of dishes, equipment and utensils, including sanitation

- Wash work surfaces with hot soapy water thoroughly between tasks.
- Use a new cloth (or one that has been washed and disinfected) to clean work surfaces before preparing ready-to-eat food.
- You also need to clean and then disinfect surfaces or items that have been touched by raw food, or leaks or spills from these.
- Store **clean and dry** kitchen utensils and service equipment
    - in a clean area free from contamination, on elevated platforms;
    - upside down (ideally in a closed and clean cabinet);
    - separated from storage of food and cleaning supplies.
- Protect kitchen areas from insects, pests and other animals.

Cleaning and sanitizing kitchen and food handling premises

- Clean and disinfect the floor. If there is dirt on the floor, avoid dry sweeping as mud, dust particles can come in contact with ingredients, utensils and contact surfaces.
- Wash and disinfect sponges, dishcloths and floor cloths. Dishcloths should only be used if they have been washed and cleaned beforehand (see box 4).
- Empty the kitchen dustbin into a refuse container or appropriate facility, then wash, disinfect and stow it away.

Box 4 Re-usable cloths:

Cloths can be one of the top causes of cross-contamination in the kitchen. It is essential to use them safely to prevent bacteria and allergens from spreading.

While it is recommended to use disposable cloths wherever possible, and throw them away after each task, this is often not feasible. If using re-usable cloths, these are good practices to follow:

Make sure re-usable cloths are thoroughly washed, disinfected and dried properly between tasks (not just when they look dirty).

Take away re-usable cloths for thorough washing and disinfection after using them with raw meat/poultry, eggs or raw vegetables – and surfaces that have touched these foods.

Always use a new or freshly cleaned and disinfected cloth to wipe work surfaces, equipment or utensils that will be used with ready-to-eat food. This is because the food will not be cooked, so any bacteria on the food will not be killed.

If you wash and disinfect cloths by hand, make sure all the food and dirt has been removed by washing in hot soapy water before you disinfect them. After washing, you can disinfect by using boiling water or a disinfectant, following the manufacturer's instructions.

If you notice dirty cloths, remove them for cleaning immediately. If you think someone has used a dirty cloth, wash, disinfect and dry any equipment, work surfaces or utensils it has touched.

Waste Management

Regular and adequate collection of waste is very important. Waste is a source of contamination and an important by-product from the cooking process. It needs to be appropriately managed and if possible recycled. Food waste can contaminate food preparation areas with bacteria. If left too long, waste can smell, attract pests and can be a risk to food safety.

- Provide bins with lids for the kitchen, serving and washing areas. Closed dustbins help prevent contamination from pests - flies, animals, birds;
- Clean waste bins daily;
- Ensure waste is disposed as soon as possible;
- Waste must be kept in covered containers. Waste disposal area shall be located away from the food preparation area to avoid contamination.
- Separately discard organic wet waste and dry waste like plastic or glass. Separating organic and non-organic waste helps to ease recycling process.
- If possible, have separate colored waste collection boxes depending on characteristic of the waste (e.g.: Green for Organic, Brown for Paper, Yellow for Plastic bottles, bags);
- Avoid burning or burying solid waste, as the smoke from burning plastic is dangerous for health and causes environmental pollution. But, if waste has to be burned in or near the school grounds, this should only be undertaken when the schoolchildren are absent;
- Standing waste water should promptly be drained as it is a source of waterborne contamination and infestation with insects;
- Make provision in the school garden for recycling organic waste (vegetable peels, seeds, damaged parts) for generating compost/manure.

10. ANNEXES

Annex 1: Risk Ranking of Food Commodities

This below table is a decision- making tool for the selection of foods to be included in school meal programmes, while understanding the associated safety risk and the required risk reduction measures in-place.

The level of risk is estimated considering:

- the food stability/ perishability in the given state and as supplied to the school (i.e. prior to any cooking);
- the storability in room temperature or need for refrigeration (cold chain);
- the most likely hazards associated/ known for each food type;
- and the hazards' pathogenicity/ severity of illness when/if those occur (acute or long-term toxicity/ adverse effects).

If the School Meals Officer is confronted with a high-risk food, s/he should liaise with the local authorities in charge and the nearest food technologist for advice. In any case, the context in which the School Meals programme is implemented is paramount and could increase or decrease the risk of certain food products, please liaise with the nearest food technologist for any questions.

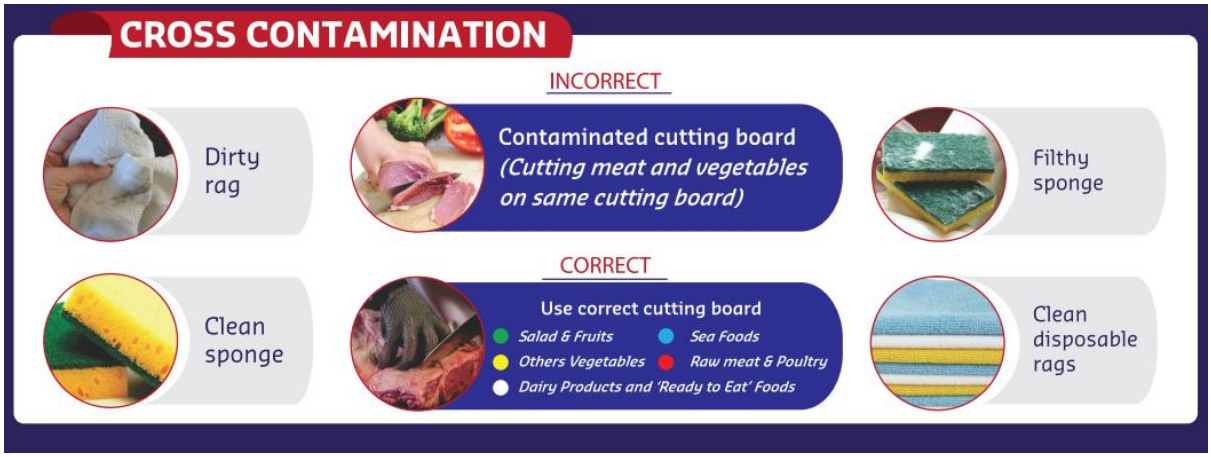
Food handlers should follow general hygiene practices for storing, preparing and distributing food, along with WHO's 5 Keys to Safer Foods.

Food Category	Examples of Foods Included	Level of Risk	Risk Reduction Measures
Fresh Meats		Very High	Refrigeration at max. 4 °C (40 °F) throughout the supply chain. Avoid where there is no cold chain. Cook thoroughly, until juices are clear.
Fresh Fish		Very High	Refrigeration at max. 4 °C (40 °F) throughout the supply chain. Avoid where there is no cold chain. Cook thoroughly.
Unpasteurized Dairy products	Cheese, Yogurt & Sour Milk, Fresh Milk	Very High	Refrigeration at max. 4 °C (40 °F) throughout the supply chain. Cheese and yogurt to be visually inspected for off flavors/taste and mold formation before consumption. Avoid where there is no cold chain. Milk should be consumed on the same day produced and boiled before consumption.
Pasteurized Dairy Products	Pasteurized Milk	High	Refrigeration at max. 4 °C (40 °F) throughout the supply chain. For pasteurized milk, consume on same day or store in a refrigerator. Avoid where there is no cold chain.
Processed Meats	Salted/Dried/ Smoked	High	Procure from trusted local sources and consume quickly
Processed Fish	Salted/Dried/ Smoked etc.	High	Procure from trusted local sources and consume quickly
Eggs		Medium	Should not be dirty or cracked. Cook thoroughly.
Fleshy vegetables	Eggplant, Carrot, Cucumber, Tomato	Medium	Thorough wash with clean water. Cook Thoroughly
Leafy vegetables	Spinach, Leaves, Cabbage	Medium	Thorough wash with clean water. Cut just before preparation. Cook Thoroughly
Tubers	Potatoes, Sweet potatoes, Cassava,	Medium	Cook Thoroughly
Fruits	Mango, Banana, Pineapple, Apple etc.	Medium	Thorough wash with clean water & cut just before serving, peeling is highly recommended.
Fruit Juices	Industrialized / Fresh	Medium	For fresh fruit juices, only use boiled water and consume immediately after preparation. For externally purchased fresh fruit juice, consume immediately and source from reputable sources. For industrialized juice, ensure packaging is undamaged and sound.
Tea/Infusions	Leaves, Fruit, Flowers, pre-packed tea bags	Medium	Use boiling water for preparation. Serve right after preparation.

Food Category	Examples of Foods Included	Level of Risk	Risk Reduction Measures
Nuts	Groundnuts, Walnuts, Hazelnuts etc.	Medium	Ensure proper drying. Beware of aflatoxin & allergic reactions.
Fermented Foods	Fermented fish or shrimp paste, fermented bamboo shoots, kimchi, fermented soybeans	Medium	Store in dry, away from direct sun light. Do not consume if presents off-flavors or odors, slime or mold.
UHT Milk		Medium	Ensure packaging is undamaged and properly closed. After opening, consume on same day or store in a refrigerator.
Canned Food	including Canned Meat, Fish, Vegetables & Pulses	Medium	Store in dry, away from direct sun light. Do not consume if can is dented or blown. Need to come from reliable suppliers and can present a high risk in contexts with weak food safety regulatory bodies and controls. Ask for advice from your nearest food technologist.
Powder Milk, Super Cereal/ Super Cereal Plus		Medium Low	Use boiling water only. Ensure packaging is properly closed. Store in dry and airy conditions and sealed containers.
Processed Foods	High Energy Biscuits, Date Bars, Biscuits & Sweets, Crackers Confectionary, etc.	Low	Ensure packaging is undamaged and properly closed
Textured Soy Protein		Low	If included in the programs.
Dried Pulses		Low	Protect from insect pest infestation¸ storage in dry and airy conditions.
Dried Fruits		Low	Visual inspection for mold. Protect from insect pest infestation¸ store in dry and airy conditions and sealed containers.
Cereals & Grains	Maize, Wheat, Rice etc.	Low	Protect from insect pest infestation¸ storage in dry and airy conditions. Maize & other cereals can be a high-risk product in regions with high aflatoxin. So, reject any product that presents damage by insects and/or mold
Flours	Fortified & Non-Fortified	Low	Protect from insect pest infestation¸ storage in dry, airy conditions, elevated from the floor and direct sunlight.
Bread		Low	Store in a cool, dark and dry place. Ideally in a pantry box or sealed bag. Ensure that there is no presence of mold.
Vegetable Oil		Low	Store away from heat or sunlight, in dark place. Do not use any foreign object to mix the oil.
Iodized Salt		Low	Storage in original and/ or sealed packs and in cool, dark and dry place
Sugar		Low	Storage in dry conditions.

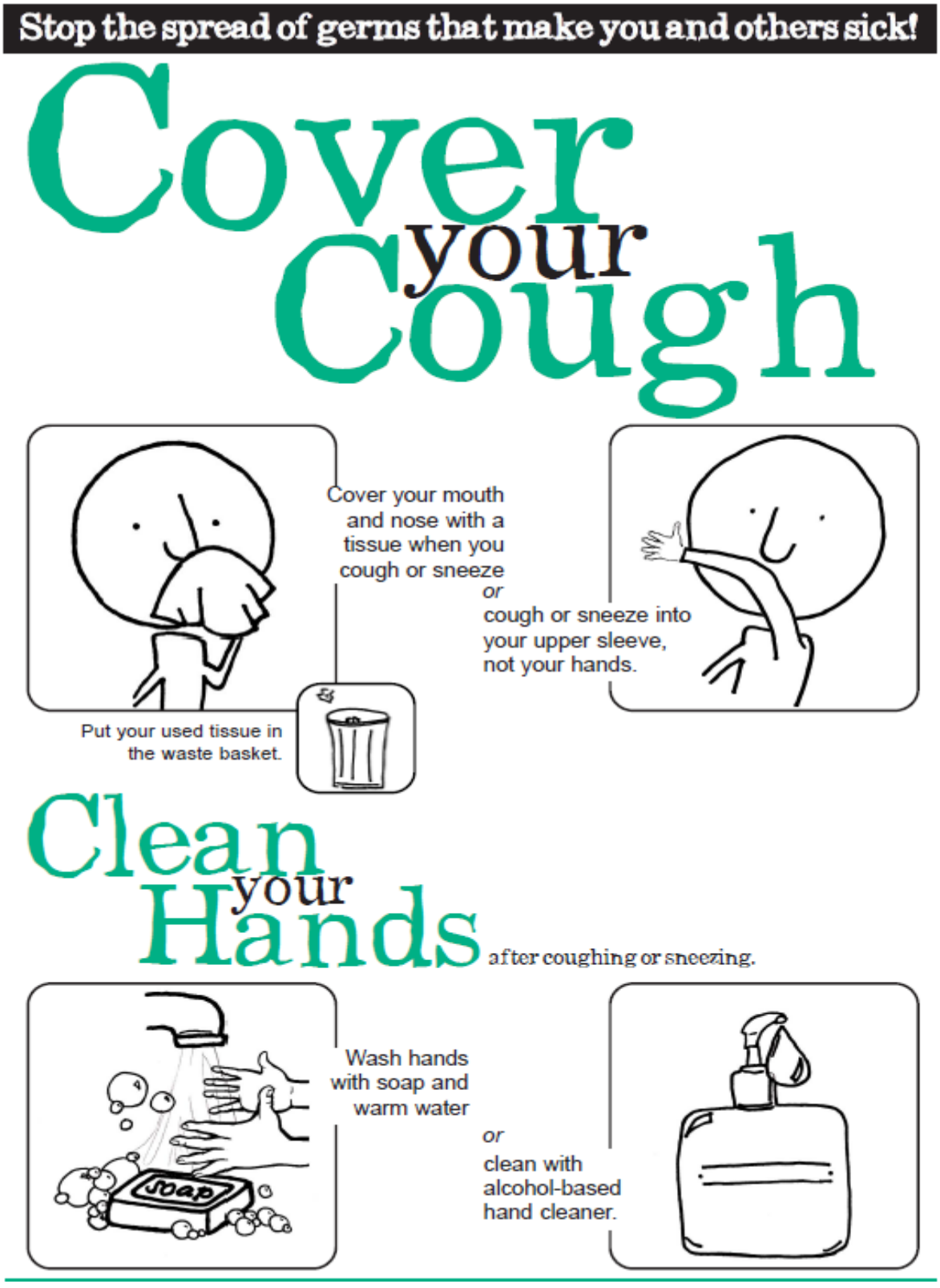
Annex 2: Personal Hygiene Visuals used in Odisha state, India

Annex 3: Cross Contamination Visuals used in Odisha state, India



Annex 4: Education Material Developed by WFP and the Government of Kenya

Annex 5: Coughing[10]



[10] *Source:* http://www.health.state.mn.us/divs/idepc/dtopics/infectioncontrol/cover/gen/cycpgeneng.pdf

Annex 6: Defining Quality Parameters for Local Foods

This section is provided for inserting details of the grades and standards that apply to the specific food in your country. Consult your National Standards Bureau and/or Ministry of Health/Agriculture. Sometimes it is also possible to traces these grades and standards on the internet.

- Collect data specific to that product / commodity *(preferably physical, chemical, microbiological parameters)*
- If available, refer to national quality guidelines or Codex Alimentarius. This will help provide first-hand information
- Discuss and share information with corresponding country office focal point for food safety and quality assurance and/or risk classification.
- Request for good handling practices and general specifications to be tailored for that product from food safety and quality focal point.
- Add the new Specifications and Good Handling Practices for this product to your guideline and train cooks, school staff and fresh food handlers on the good practices.

Annex 7: Measuring grain moisture content: the salt method[11]

The staff of grain collection points and warehouses need to know when grain is dry enough for safe storage, i.e. at a moisture content of 14% or lower for most cereals and pulses. There are simple and inexpensive approaches to doing this which are not accurate but are adequate for some purposes. In all cases, it is important that grain is sampled and handled carefully before its moisture content is determined, in particular the sample should be assessed for moisture content immediately after it is drawn.

Dry salt will absorb moisture from grain. This principle can be used to help determine whether a grain sample has a moisture content above or below 15%.

Materials required

A clean dry glass bottle of about 750ml capacity, with a cap that makes it airtight some common salt

How to do it

- It is important first of all to make sure the salt is dry. Place the salt in hot sun in a thin layer on some plastic sheeting, until the salt is hard at least 3 or 4 hours. Turn the salt at intervals during this time. Alternatively, this can be done for a much shorter period in an oven. Store the dry salt in a sealed container. Fill one-third of the dry bottle with the grain sample (250g to 300g). Add 2 or 3 tablespoons of salt (20g or 30g). Close the bottle tightly with its cap. Shake the bottle vigorously for 1 minute. Leave the bottle to rest for 15 minutes.
- If after 15 minutes the salt sticks to the side of the bottle then the moisture content of the grain is above about 15% and so is not safe for storage. If the salt does not stick to the bottle then the moisture content is below 15% and so is safe for storage.

[11] WFP & NRI, 2012 : Training Manual for Improving Grain Postharvest Handling and Storage. http://www.wfp.org/content/p4p-training-manual-improving-grain-postharvest-handling-and-storage

Annex 8: Testing Eggs Freshness with A Bowl of Water[12]

Method: simply fill a bowl of water double deep as the egg is tall. There are 3 things that can happen with this method.	
The egg will float to the top of the water. **It is old and must be discarded.** **It is not safe for consumption anymore.**	
It will stand straight up and down. **it is probably between 1 and 3 weeks old and is still consumable.**	
The egg will sink to the bottom and lays flat on its side, **it is less than a week old and extremely fresh.**	

[12] https://15acrehomestead.com/methods-testing-eggs-freshness/

Annex 9: Water treatment & WHO Drinking Water Standards

Water treatment makes water safe and pleasant to drink. Depending on local circumstances, common types of recommended treatment are:

a. Disinfection by heat (boiling)

It is a very effective though energy consuming method to destroy various pathogens such as viruses, cysts and worm eggs. The water should be brought to a rolling boil for a minimum of 3 minutes and preferably up to a period of 20 minutes depending on the source, the altitude, the purpose to be used and the microbes to be inactivated. Boiled water should be stored, handled carefully and consumed within 24 hours to avoid recontamination (for details of minimal times and temperatures see http://www.who.int/water_sanitation_health/dwq/Boiling_water_01_15.pdf) .

b. Chemicals (chlorine)

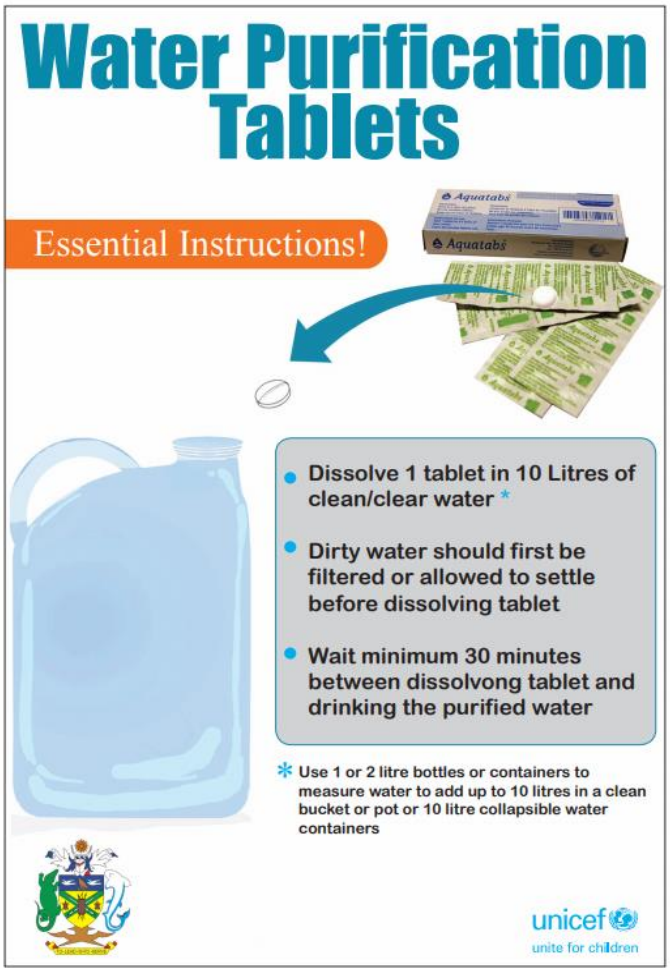
If chlorine tablets are used, the recommended dosage and treatment procedure must be followed. An example are Aquatabs	

Figure 12: Water Purification Tablets - Essential instructions

c. Filtration by passing the water through a ceramic or sand filter

Where filtration is used, for example sand filters or the two clay-pot system, filters must be cleaned regularly. More information can be found in the latest Drinking-water Quality Guidelines produced by the World Health Organization.[13]

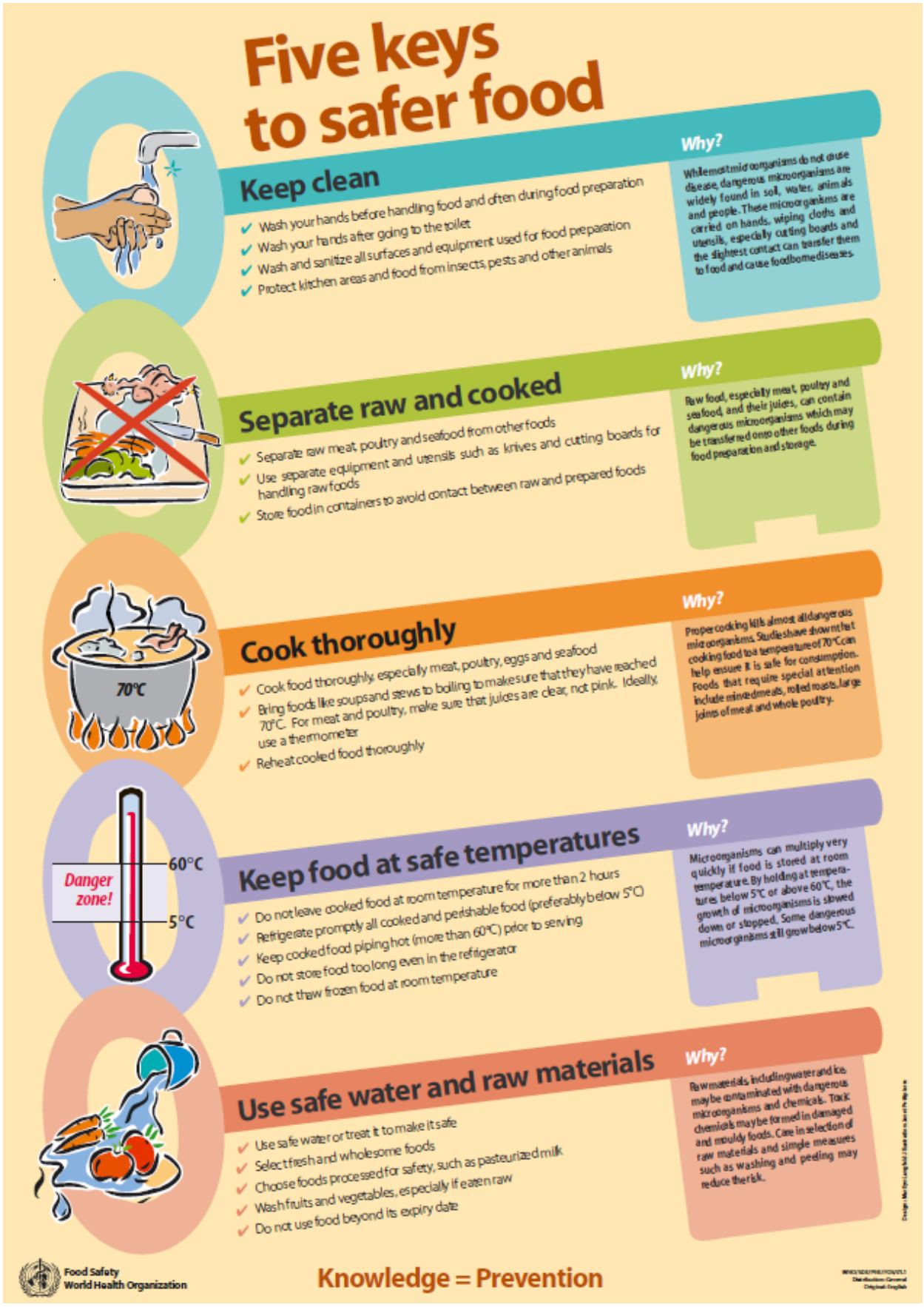
[13] https://www.who.int/water_sanitation_health/water-quality/guidelines/en/

Annex 10: Example of a Cleaning Schedule

Fill in details of all the items and surfaces you clean

Item	Frequency of cleaning					Precautions e.g. wear gloves or goggles	Method of cleaning
	After use	Every shift	Daily	Weekly	Other		
Work surface						Wear gloves	1. Remove any obvious food and dirt. 2. Wash the surface with hot soapy water (detergent diluted according to manufacturer's instructions) to remove grease and any other food and dirt. 3. Rinse with clean water to remove the detergent and loosened food and dirt. 4. Apply a disinfectant. Make sure you leave it on for the contact time recommended by the manufacturer. 5. Rinse with clean water to remove the disinfectant. 6. Leave to dry naturally or use a clean disposable cloth.
…						…	…

Annex 11: Five Keys to Safer Food



Annex 12: Food Safety and Quality 2-Pager

A complex Supply Chain

Millions of meals are served to children every day across the world through the school meals programme. The provision of these meals involves a complex supply chain for a diverse food basket of perishable and non-perishable commodities, and in some cases processed products.

Governments and a number of stakeholders are increasingly interested in the quality and safety of food for school meals as there are numerous food safety incidents reported. In the East and Central Africa, food safety is an increasingly important issue as we integrate and promote the use of fresh food including milk in school meals.

Examples of reported incidents include:

- contamination of maize with aflatoxin (a type of mold that is considered poisonous if consumed in large quantities);
- short shelf life or expired ready-to-use foods;
- rancidity in High Energy Biscuits due to high temperatures;
- overfortification of the Corn Soya Blend with vitamin A and iron that make it turn green upon cooking; and
- infestation of cereals and pulses.

Food Quality and Safety

School meals should meet quality, safety and nutritional requirements. Food safety refers to conditions and practices that ensure food does not get contaminated with physical, chemical and/or biological hazards that could cause harm to the children. It encompasses the whole process of food production, selection, handling, storage, preparation and consumption of the food in ways that prevent contamination.

Shortcomings in the process from procurement to consumption can result to serious consequences that include food borne illnesses and even fatalities in severe cases. This leads to poor concentration in class and even absenteeism from school. Other long-term negative effects arising from mycotoxins include stunted growth, slow mental development, impaired cognitive ability and liver cancers.

The quality and safety of the food served to children is therefore a top priority, it is both a legal requirement and the duty of governments and stakeholders to ensure the delivery of good quality and safe food that contributes to the students' learning and wellbeing, and does not expose them to both short and long-term health risks.

With the emphasis on home-grown school meals (HGSM) in most countries, food procured locally and consumed in schools must meet the threshold required by national laws and general standards of quality and safety. The challenges with the HGSM model is that local communities lack resources to enforce safety and quality standards. Centers with capability ascertaining quality are located in state capitals which are a long way from rural communities. This leads to consumption of food without the requisite checks.

Stakeholders

Addressing the quality and safety risks in school meals programmes requires the engagement of all stakeholders ranging from the government, cooperating partners, suppliers, manufacturers, inspections companies, shippers, truckers to warehouse managers, smallholder farmers, school staff, community and students. All stakeholders need to know what it means to integrate food quality and safety along school meals supply chain, the benefits and the potential risks when no controls are put in place.

World Food Programme

Critical Quality and Safety Control Points
for Food Quality and Safety in School Meals

To mitigate against the quality and safety risks, control measures that include minimum requirements, conditions and practices must be identified and activated to preserve the safety and quality of food at critical points at which potential hazards are likely to enter the school meals supply chain. Critical control points include the following:

Procurement
Food purchased should be of the right standard and safe from physical, biological and chemical contaminants. The traders should ensure the food has been subjected to quality and safety checks, while the school should verify the documentation accompanying the food to ascertain the same before receipt. The fruits and vegetables should not have physical, temperature related and/or pathological defects.

Packaging and Transportation
A well-designed system of packaging, labelling and transportation should be in place to maintain the integrity of the food. Special consideration should be put in place for movement of food in long distance and high temperature zones. Food should not be transported together with non-food materials and the trucks, pick-ups, carts and containers carrying food must be clean and adequately prepared to carry food. During offloading and delivery, food must be lifted and not dragged.

Storage
Appropriate storage with suitable stacking, ventilation, light and temperature control, and arrangement to allow for the principle of 'first in first out' should be in place. The storage should discourage the growth of micro-organisms and insects; prevent losses due to leakages, rodents and livestock, oxidation of oil and products containing fatty acids; loss of nutrient content of fortified products; and provide easy access to handling or inspecting of food.

Food Preparation
Safe water should be available for food preparation and cleanliness of kitchen (including equipment) to mitigate potential hazards of food contamination and transmission of diseases through handling by the cooks and servers. Emphasis should be placed on clean utensils and appropriate serving modalities that include designated area with handwashing facilities.

Personnel
All cooks should have valid medical certificates, be clean, physically fit and knowledgeable in food preparation. The school should provide full uniform — including head gear and an apron — and regular training on food preparation and hygiene.

Waste Disposal
Adequate drainage, waste disposal system and facilities to avoid cross-contamination of food and portable water should be in place.

Health and Hygiene Education
To reinforce the messaging on food safety and quality, the school meal platform should provide a forum for health, hygiene and nutrition education that focuses on the development of knowledge, attitudes, values and life skills need to make the most appropriate and positive health-related decisions. The system needs to ensure the school community change their behaviour and make food safety part of their daily activities.

Photo credits: WFP/Karel Prinsloo (front); WFP/Petterik Wiggers (back, left); WFP/Maria Kataljsto (back, middle); WFP/George Fominyen (back, right)

WFP is institutionalizing food quality and safety throughout all the operations it supports globally.



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