

# Handbook on Safety of

## Drinking Water and Food for Disaster Relief



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When urban infrastructure is damaged by a terrible disaster, and water and electricity supplies are no longer available, environmental hygiene deteriorates. Once humans have consumed unclean water and food, it is easy for them to be infected by bacteria or viruses. There is a chance that foodborne diseases could break out and spread in the community, endangering public health and safety. Therefore, residents should be aware of personal hygiene and safety of drinking water and food. Meanwhile, they should handle food and cooking appliances in compliance with the principles regarding food safety and hygiene in order to minimise the risk of an outbreak of foodborne disease.



# Chapter 1 - Safety of drinking water

When a disaster occurs, it may cause damage or pollution of the water supply system, or the water-pumps may fail to operate normally due to insufficient or malfunction of electricity supply. This may then lead to a large-scale water suspension. In response to an emergency as such, the following may be done.

## During water suspension:

- ◆ Drinking water must be boiled before drinking. Bottled water which has not been polluted by the flood may also be consumed.
- ◆ For consumption, washing of utensils and food preparation, water from a safe and reliable water source must be used.
  - Extract and use drinking water provided at designated water supply sites in compliance with the instructions of the civil defence unit and the Macao Water Supply Company Limited;
  - Food may be cooked with bottled water that has not been immersed in polluted water.
- ◆ Do not drink water from a water source of which the water quality is unknown or which has been polluted.
  - Do not drink rain water, well water, stream water, swimming pool water, or water from fire hose directly or use such water to cook. The water sources mentioned above may contain impurities, pathogens, and viruses. Thus, water safety is not safeguarded;
  - Bottled drinks or water which has been immersed in seawater or rainwater may not seem unusual in appearance, but they may be contaminated by polluted water that has permeated into bottles through the gaps around screw caps or pull rings, making these bottled drinks non-drinkable;
  - The water in a toilet tank may contain detergent and disinfectant. It must not be used for cooking, but it can be used for the purposes of personal and environmental hygiene;
  - Do not drink water from melted frost or ice in a refrigerator.



## ! Attention !

Water from a fire hose or a fire cistern only serves the purposes of fire control and disaster relief. Since the water remains static for a long period of time, the residual chlorine contained is not enough to keep the water clean. Therefore, the water is not suitable for drinking.

### ◆ Store drinking water in clean and sterilised containers or buckets

- Temporary water storage containers should be covered as much as possible to prevent the breeding of pests and contamination;
- Do not use unclean trash cans to transport and store water. Otherwise the risk of infection of water-borne disease will increase;
- Please read Chapter 3 for details about the sterilisation of containers or utensils.



### When water supply is restored:

- ◆ When the water supply is restored, tap water may carry unusual colour and odour. Water accumulated in pipes must be released. Tap water is only usable when it becomes clean and odourless again.
- ◆ When releasing the water accumulated in pipes, stop using the tap water and notify the water supply company to investigate the cause if the water quality is abnormal (for example, if the water smells of petrol, a layer of oil is formed on the water surface, there is an excessive amount of mud and sand in the water, or if the water smells of excrement).
- ◆ When the water supply is restored, tap water should be heated to the boiling point before consumption.



## Chapter 2 - Food safety



After a disaster, some food may be damaged or polluted in varying degrees due to power outage and flood. To prevent the food exposed to food safety risks from being eaten mistakenly or to prevent a larger issue with public hygiene caused by the lack of hygienic conditions in handling of food, we can adopt the following measures to reduce the risk of gastrointestinal discomfort after the disaster.

- ◆ As the work of disaster relief and restoration is being carried out, only food that has been cooked thoroughly or solid food that has not been damaged should be eaten. Do not eat or supply cold and perishable food which carries a high food safety risk.
- ◆ It should be ensured that the food distributed for disaster relief is safe and hygienic.
  - Do not cook a large amount of food at the same time. Be aware of the safety of ingredients, drinking water, and utensils as well as the time and conditions in which they are transported and stored;
  - It is best to limit the duration of the interval between the point of time when food is thoroughly cooked and the point of time when such food is served within no more than 2 hours;
- ◆ Do not eat non-prepackaged food that has been immersed in polluted water. The food must be disposed of and destroyed immediately.
  - Food that has been contaminated should not be cooked, served, and sold in stores. If there is any doubt about the safety of food, please dispose of them immediately to prevent food poisoning.



◆ Prepackaged food and beverages which have been affected by the flood can be handled by the following methods.

- In the precondition that the seals of the following products are not damaged, and the outer appearance and labels thereof remain intact, the stains on the surface of the outer packages must be removed by correct washing methods. After the food is sterilised by appropriate methods (see Note 1), **examine whether the food has deteriorated in quality. If the quality of the food shows no abnormalities, the food should be labelled "To be used first" and should be eaten as soon as possible.**

Outer Package	Picture for Illustration
Canned food products: Top and bottom double seamed cans	 <p>#Not all canned food products can be used even if they have been handled properly. Only those cans with double seamed tops and bottoms can be used. We should discard the canned food products if the seams of the cans are damaged, the cans are swollen or show any signs of food leakage.</p>
Food products packaged in retort pouches	 <p>#We should also discard the items if the seals of the pouches are damaged or if there are any signs of food leakage.</p>

- The following items are not categorised as prepackaged products wrapped in water-proof sealed packages: food packaged in paper bags, plastic bags, hemp bags, nylon bags, self-made cans and bottles, bottled milk and soy sauce, boxed infant formula, and food stored in metal cans with ring-pull lids, etc. They should be discarded directly. Do not wipe them clean and use them for supply again.

Outer Package	Picture for Illustration
Screw-caps	
Snap lids	 
Pull tops	



Crimped caps



Food packed in plastic, paper, cardboard, cloth and similar containers



Home-canned food



- ◆ Before the power is restored in a power outage, keep the doors of refrigerators and freezers closed tightly.
  - After the power outage, the food inside the refrigerators with a cooling temperature below 5°C can remain safe and hygienic for 4 hours; the food inside the freezers with a cooling temperature below -20°C can remain safe and hygienic for a maximum of 48 hours.
  - However, since the temperature inside the refrigerators and freezers increases over time, the risks of food deterioration and spoilage increase correspondingly.
- ◆ If power supply is recovered in a short period of time and the food in refrigerators and freezers is not found to be deteriorated when examined, the food should be labelled “To be used first” and should be eaten as soon as possible.
  - Food which is found to be discoloured, decayed, rotten or foul-smelling should be thrown away immediately, and the refrigerators or freezers should be cleaned and sterilised thoroughly.
- ◆ Perishable food stored at a temperature of 5°C or above must be thrown away. If there is a prolonged power outage, perishable food must be disposed of even though no abnormalities are observed.
  - Colourless, tasteless and odourless bacteria and toxins may have been produced in a large number after a long period, and thus they will harm physical health when eaten.
- ◆ All food that has not been stored in an appropriate temperature should be thrown away, including hot food.
  - Cooked food should not be stored at room temperature for more than 2 hours. Otherwise, they should be thrown away.
  - It is suggested that an excessive amount of food should not be handled and cooked all at the same time. Store hot food in a temperature higher than 60°C or freeze it in a temperature lower than 5°C.
  - Shorten the period in which food is delivered, displayed, and distributed for consumption to residents as much as possible.

- ◆ When clearing and throwing away damaged, polluted or perishable food, the food must be categorised, packaged, handled and destroyed properly. The food must then be disposed of at designated sites to prevent it from being picked up by others, so as to avoid causing repeated pollution to environmental hygiene. (Please follow the instructions of the Municipal Affairs Bureau for handling and disposal of garbage).



### ! Attention !

Those who continue processing, supplying and selling abandoned, decayed or deteriorated food to others for consumption are in violation of the "Food Safety Law". The Department of Food Safety of the Municipal Affairs Bureau will pursue prosecution in this regard. Those who are found guilty shall be liable to a maximum fine of MOP 600,000 or imprisonment of 5 years.

## Baby Care:

- ◆ When the supply of electricity and tap water is suspended, water sources used to prepare infant formula must be clean, safe and reliable. Ensure that the container used to heat drinkable water, milk bottles and formula have not been contaminated.
- ◆ Drinking water used to prepare infant formula must be heated thoroughly to the boiling point 100°C. Then use it after it is cooled down.
  - Bottled distilled water used to prepare infant formula must be boiled before using.
- ◆ The temperature of the water used to prepare infant formula must not be lower than 70°C. Feed baby when the milk is cooled down to a suitable temperature.
- ◆ Prepared infant formula must be consumed within 2 hours. Otherwise, the formula must be thrown away.



## Chapter 3 - Cleaning, sterilisation, remedy and maintenance

- ◆ Before conducting cleaning and sterilisation, please wear protective clothing and gloves to protect skin from being irritated or infected due to contact of disinfectants or pollutants. Fully consider the availability of adequate water for use.
- ◆ When clearing and throwing away damaged, polluted or perishable food, the food must be categorised, packaged, handled and destroyed properly. The food must then be disposed of at designated sites to prevent it from being picked up by others, so as to avoid causing repeated pollution to environmental hygiene. (Please follow the instructions of the Municipal Affairs Bureau for handling and disposal of garbage).
- ◆ It is suggested that the cooking utensils and containers that have been immersed in flood water should be thrown away.
  - Dining utensils that are damaged on the surface (e.g. cracks and gaps, etc.);
  - Wooden tools (e.g. wooden cutting boards, wooden utensils and equipment, etc.), plastic cutting boards, and disposable utensils (e.g. disposable plastic bowls and plates and paper bowls and plates, etc.). Since the polluted water has penetrated into the materials, it is hard to remove the odour, bacteria and harmful contaminants of the polluted water by merely washing the surface.



- ◆ Use food-grade bleach to wash and sterilise all cooking utensils and containers thoroughly. (see Note 2)
  - Bleach and water must be prepared in the proportion instructed by manufacturers. Otherwise, the excessive residual chlorine will be harmful;
  - If fuel conditions permit and water resources are safe, it is best to wash cooking utensils and containers with hot water and air-dry them afterwards;
  - Clean and safe drinking water must be used in the cleaning and sterilising of utensils..
- ◆ Clean and sterilise the surroundings thoroughly with bleach
  - Table surfaces, floors, walls, ceilings, trash cans and waste disposal areas should be cleaned and air-dried.
- ◆ Equipment (including freezers, refrigerators, warm water tanks, insulated cabinets, cutting machines, and mincers, etc.) must be washed and sterilised by the specific methods and with specific disinfectants as suggested by manufacturers or in accordance with the user manual. Improper handling of equipment will lead to equipment damage and thus affect food safety.
- ◆ If the equipment and containers used to display and store food have been damaged, they must be repaired or replaced as soon as possible.
  - Using ice cubes and dry ice for chilling and freezing food in place of refrigerators and freezers is not recommended.



## Advice to the public

- ▲ Be aware of personal hygiene. Always use soap and water to wash both hands, and scrub hands for at least 20 seconds in the process;
- ▲ Drinking water and food should be heated or cooked thoroughly before consumption;
- ▲ High-risk groups (e.g. infants, children, the pregnant, the elderly and patients with chronic diseases) should try not to eat out, so as to avoid eating unclean food;
- ▲ If any symptoms of gastroenteritis such as vomiting, diarrhoea, and fever among others are displayed, medical advice should be sought immediately.



## Advice to the trade

- ▲ Staff members and customers must be provided with hygienic and safe beverages, food, condiments and tableware for consumption;
- ▲ Do not distribute and sell contaminated or decayed food to avoid breaching the “Food Safety Law”;
- ▲ Keep kitchens, storehouses, and dining environment hygienic and clean. Remove strange odour in the store and find out the causes. Bad odour may be caused by rotten food or dead pests or rodents. Thus, it is necessary to wash and sterilise every single corner in the store;
- ▲ Ensure that electronic appliances operate normally. Store food at an appropriate temperature. When food is stored, place cooked food above raw food to avoid cross-contamination;

- ▲ If there is insufficient clean water supply, inadequate refrigerating and insulation appliances, bad environment and hygiene in the store, or any situation where food safety cannot be ensured, the store owner should consider suspending the operation or not supplying some of the food to prevent the occurrence of foodborne disease and maintain good reputation in the industry;
- ▲ The trade operators who have been affected by flood should suspend operation before cleaning and sterilising of the establishments are completed;
- ▲ Be aware of rainstorm warning, seawater intrusion or storm surge signals.

References:

- 1) FDA (U.S.). Food and Water Safety during Power Outages and Floods.
- 2) USDA (U.S.). A Consumer's Guide to Food Safety: Sever Storms and Hurricanes.
- 3) CDC. Food, Water, Sanitation, and Hygiene Information for Use Before and After a Disaster or Emergency.
- 4) CDC. Keep Food and Water Safe After a Disaster or Emergency.
- 5) 市政署《停電及水浸期間之食品安全衛生指引》
- 6) 市政署《水浸後廚房用具和餐具、設備、食品製作區、食品貯存區及用餐區的清潔消毒》
- 7) 市政署《停電及水浸後之食品安全衛生：常見問題集》

Note 1 - A correct way to wash the food packaged in cans and cooking bags that have been immersed in flood but have not been damaged

1. Remove the food labels and any removable wrappers;
2. Wipe out the dirt and mud on the cans;
3. Wash the cans and cooking bags thoroughly with clean drinking water and detergent. It is the best to wash them with hot water if the conditions permit;
4. Place the washed cans and cooking bags in clean water, heat them until the water boils, and then continue heating for another 2 minutes;
5. Immerse the heated cans and cooking bags in food-grade bleach for around 15 minutes. The bleach and clean water must be prepared in the proportions as instructed by the manufacturers. Otherwise, the excessive residual chloride will be harmful to health;
6. Air-dry washed and sterilised food packaged in cans and cooking bags for around 1 hour. Do not store them nor open them for consumption before they are fully dry;
7. Mark information including the expiration date and food types with a marker pen;
8. Food that has been washed must be eaten as soon as possible. It is not appropriate to store it for too long.



Note 2 - Sterilising dining utensils and appliances

- ▲ Heat sterilisation: Heat safe and clean water to provide heat for sterilisation purposes.

Methods	Effective temperature	Minimum length of time
Disinfection by immersion in hot water	$>80^{\circ}\text{C}$	2 minutes
Disinfection by steam	$>77^{\circ}\text{C}$	15 minutes
	$>94^{\circ}\text{C}$	5 minutes
Mechanical disinfection by dishwasher	80 ~ 90 $^{\circ}\text{C}$	40 seconds

- ▲ Chemical sterilisation: Common sterilisation method involving the use of chemicals containing chlorine (e.g. diluted bleach). The dining utensils must be fully immersed in the disinfectant. When the chemical sterilisation is completed, the dining utensils should be washed with clean water to remove the residual disinfectant on the surface.

Chemical disinfectant	Specific conditions	Effective concentration (ppm)	Minimum length of time
Chlorine compounds	Water temperature $\geq 49^{\circ}\text{C}$	25 ~ 49	1 minute
	$\text{pH} \leq 10$ and water temperature $\geq 38^{\circ}\text{C}$	50 ~ 99	
	$\text{pH} \leq 8$ and water temperature $\geq 24^{\circ}\text{C}$	50 ~ 99	
	Water temperature $\geq 13^{\circ}\text{C}$	100	
Iodine Compounds	$\text{pH} \leq 5$ and water temperature $\geq 24^{\circ}\text{C}$	12,5 ~ 25 or according to the instructions of the manufacturers	
Quaternary ammonium and its compounds	Hardness of water $\leq 500$ and water temperature $\geq 24^{\circ}\text{C}$	200 or according to the instructions of the manufacturers	

# Guidelines on proper hand washing for food handlers

## **Objective:**

Proper hand washing is an effective way to prevent foodborne disease. This guideline is intended to remind the food industry when and how to wash hands properly in order to minimise the risk of foodborne disease.

## **Scope:**

All food handlers engaged in premises for production and sale of food.

## **Content:**

### **I. When to wash hands:**

Food handlers must wash their hands in the following situations:

- Before commencing or re-commencing handling of food;
- Before handling cooked food or ready-to-eat food and after handling raw food;
- After coughing or sneezing;
- After touching bare body parts such as hair and nose;
- After cleaning or handling garbage;
- After using the toilet;
- After eating or drinking;
- After smoking;
- After touching animals.

### **II. Steps for hand washing:**

1. Wet hands with water;
2. Apply liquid soap and rub hands together to make a soapy lather;
3. Rub the palms, back of hands, fingers, finger tips, between fingers and wrists for at least 20 seconds. Do not rinse hands while rubbing;
4. Rinse hands thoroughly with water;
5. Dry hands thoroughly with a clean towel\* or a disposable paper towel, or a hand dryer.

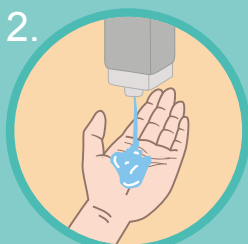
\*Never share towels and store personal towels properly. Wash towels and disinfect them at least once daily, and preferably, prepare towels for frequent replacement.

# 正確洗手的步驟

Passos para lavar correctamente as mãos



沖濕  
Molhar



梘液  
Sabonete líquido



20 秒  
20 segundos



清洗  
Lavar



抹乾  
Secar



節約用水  
Poupar água

「食安資訊」手機應用程式  
Aplicação para telemóveis  
"Informação sobre Segurança Alimentar"



Android手機版本  
Google play



iOS手機版本  
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