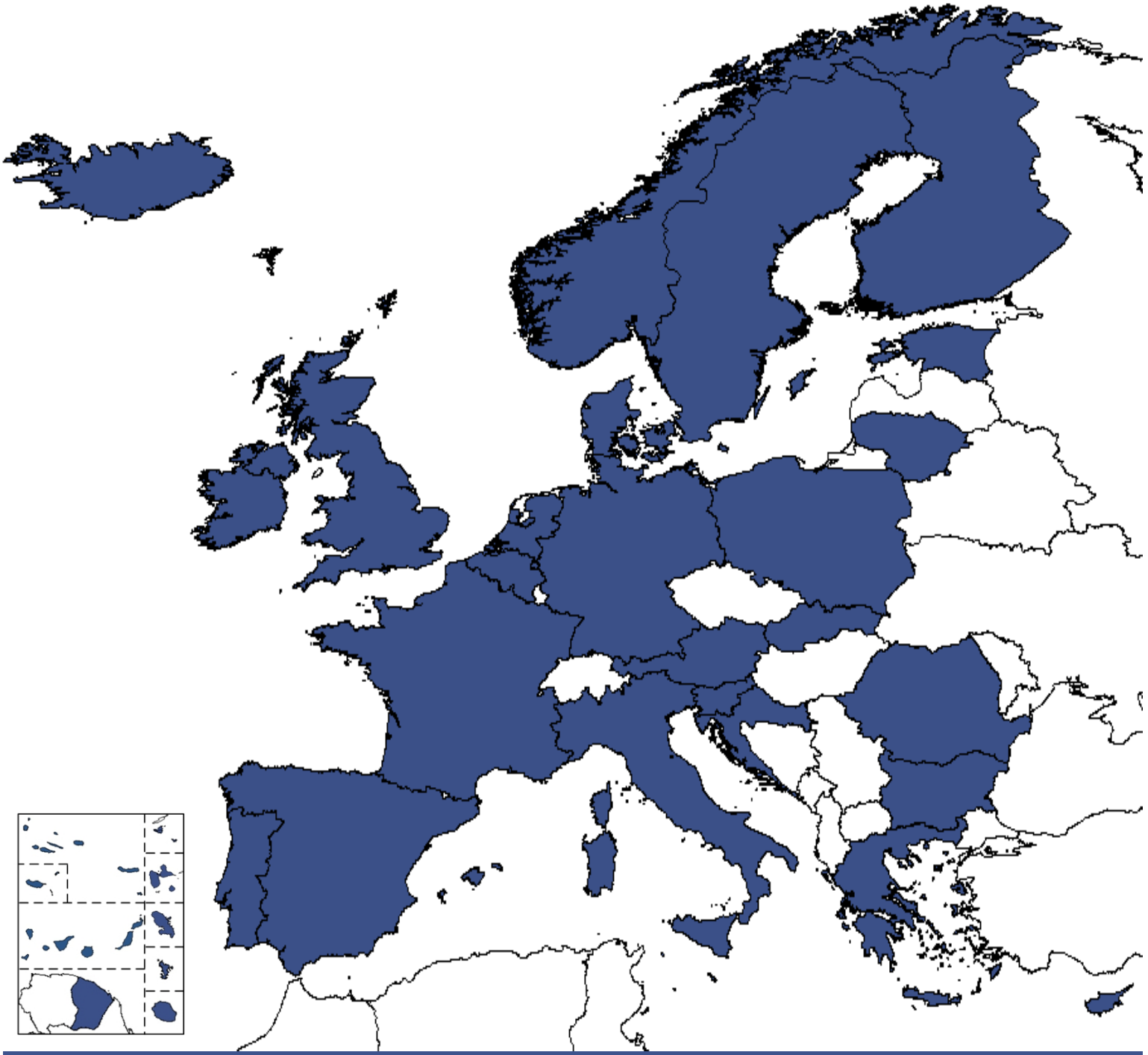
EU SHIPSAN ACT JOINT ACTION (20122103)

European Manual
for Hygiene Standards
and Communicable Disease Surveillance on Passenger Ships



Second Edition
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EUROPEAN COMMISSION DIRECTORATE GENERAL FOR HEALTH AND FOOD SAFETY

European Manual for Hygiene Standards and Communicable Disease Surveillance on Passenger Ships

EU SHIPSAN ACT joint action

Second edition
Larissa, April 2016

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Abbreviations

APS	Automatic Pump Shut-Off
CCP	Critical Control Point
CCTV	Closed-Circuit Television
CFU	Colony Forming Unit
CL	Critical Limit
CLIA	Cruise Lines International Association
CXR	Chest X-Rays
EC	European Commission
ECC	European Cruise Council
ECDC	European Centre for Disease Prevention and Control
ELDSNet	European Legionnaires' Disease Surveillance Network
EPIET	European Programme for Intervention Epidemiology Training
EU	European Union
EUMS	European Union Member States
EWGLI	European Working Group on Legionella Infections
EWRS	Early Warning and Response System
FAO	Food and Agriculture Organization
FCV	Feline Calicivirus
FIFO	First In — First Out
GDS	Gravity Drainage System
GI	Gastrointestinal Illness
HACCP	Hazard Analysis and Critical Control Point
HNIG	Human Normal Immunoglobulin
ICW	International Catering Waste
IHR	International Health Regulations
ILI	Influenza-Like Illness
ILO	International Labour Organization
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organization
IPM	Integrated Pest Management
ISO	International Organization for Standardization
IWA	International Water Association
LEG	Legal Requirement
MARPOL	International Convention for the prevention of pollution from ships
MDH	Maritime Declaration of Health
MMR	Measles-Mumps-Rubella
MMRV	Measles-Mumps-Rubella and Varicella
NTU	Nephelometric Turbidity Unit
OMP	Outbreak Management Plan
PHA	Port Health Authority
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
QUAT	Quaternary Ammonium Compound
RWF	Recreational Water Facilities
SOLAS	Safety Of Life At Sea
SSCC	Ship Sanitation Control Certificates
SSCEC	Ship Sanitation Control Exemption Certificates
ST	Recommended Standard
SVRS	Safety Vacuum Release System
TALD	Travel-Associated Legionnaires' Disease
TMV	Thermostatic Mixing Valve
UV	Ultra Violet
VOC	Volatile Organic Compounds
VPD	Vaccine-Preventable Disease
VSP	Vessel Sanitation Program
WHO	World Health Organization
WSP	Water Safety Plan

Table of contents

i. Introduction

In 2012, approximately 390 million passenger ferry trips were recorded through European ports and in 2013, 198 cruise ships were domiciled or participated in the European cruise ship market. The number of passengers embarked on their cruises from a European port reached 6 million in 2013, out of which around 5 million were Europeans. A considerable proportion of the European population travels in modern ships, which are becoming more complex and are designed to carry many more passengers and crew.

Ships move continuously from one country to another where different standards of sanitation are required. These differences can cause administrative difficulties for competent authorities of countries, as well as for ship companies, when trying to deal with the prevention and control of communicable diseases on board ships. Therefore, there is a need for standards regarding health related issues, which can be adopted and accepted by all European Union Member States (EUMS).

The EU SHIPSAN project (No A/790577) study revealed a diversity of approaches and practices in the conduct of ship inspections, differences in the competencies of inspectors and the legislation applied during inspections, and a lack of communication and training among many EUMS. Common inspection tools at a European level for hygiene inspection practices and port-to-port communication were recommended.

This document is Deliverable No 8 produced under work package 5 of the EU SHIPSAN TRAINET project. Ten working groups were established for the development of this document with participants/experts from 17 European countries. The European Centre for Disease Prevention and Control (ECDC), the World Health Organization (WHO), the International Maritime Organization (IMO) and the US Vessel Sanitation Program (VSP) also provided input. The European Cruise Council (ECC), the Cruise Lines International Association (CLIA) and individual cruise and ferry companies have also contributed to the development of this document.

The content of the European manual for hygiene standards and communicable disease surveillance on passenger ships (hereinafter called "manual") was based on expert opinion consensus reached during working group meetings and on EU legislation and International Health Regulations 2005 (IHR) requirements. The EU SHIPSAN project (No A/790577) study results, literature review and analysis of collected data on policies, guidelines and practices implemented by the EUMS were also used to develop this manual.

The EU SHIPSAN TRAINET project put into action a pilot implementation of the manual in 2010-11, before producing the first edition that was published in October 2011.

The current edition of the manual was produced after a second pilot implementation phase conducted in 2013 and 2014 in the framework of the EU SHIPSAN ACT Joint Action.

ii. Purpose and audience of the manual

This manual incorporates hygiene standards based on EU legislation and brings together best practice guidelines for passenger ships sailing within European waters.

The purpose of this manual is to collaborate with the industry and competent authorities in developing and implementing comprehensive hygiene programmes, using current legislative frameworks, in order to minimise the risk of communicable diseases. It also gives guidance on communicable disease surveillance on board ships. Compliance with the hygiene standards and best practice guidelines of the manual can help to improve and maintain: a) the hygiene level on board passenger ships sailing to or within the EU waters; b) the level of compliance with hygiene standards that are included in the existing EU legislation; and c) the safety of food, water and environmental conditions for passengers and crew.

This manual is intended for passenger shipping companies and public health inspectors in European ports, who are responsible for passenger ship inspections. Hygiene inspections of passenger ships are conducted by assessing conditions observed against the criteria contained within Chapters 1 to 10, of Part A of this manual, excluding the Annexes.

Training based on this manual is provided to port health officers of the competent authorities, as well as ships' crews, in order to promote consistent inspection practices in EUMS and to help industry with the implementation of EU legal standards and best practice.

iii. Manual structure and format

This document consists of two Parts:

Part A describes the standards for hygiene inspections and communicable disease surveillance on board ships. These standards are a compilation of existing legislation, procedures and best practice. Each chapter of the manual starts with a short introduction and continues with the detailed description of legal requirements and recommended standards. For each legal requirement or recommended standard, a numbered short phrase has been provided on the left side of the page. On the right side of each page the abbreviations "LEG" (legal requirement) or "ST" (recommended standard) are provided in order to assist the user to easily distinguish legal requirements from recommended standards. Legal requirements are necessities that must be implemented on board in order to comply with EU and international legislation. Recommended standards represent good practices, which are not currently legislated but the implementation of which will help ensure a high level of hygiene. References to legal documents of the EU and international legislation are provided at the end of each chapter.

Part B includes guidelines for the prevention and management of communicable disease on board passenger ships. Specific guidelines are given for dealing with Influenza-Like Illness (ILI), general considerations for influenza pandemics, vaccine-preventable diseases, Legionnaires' disease and gastroenteritis.

iv. Administrative procedures

The administrative procedures below are designed to be used by the trained competent authorised inspectors of competent authorities, who conduct the inspections against the criteria set out in the manual. They will also be of use to the passenger ship industry in order to prepare for possible inspections. The detailed administrative procedures are described in Annex 1 (page 212).

Participating authorities

Competent authorities in EUMS carry out inspections. The competent authority in an EUMS has the following responsibilities for inspections on passenger ships according to the manual: a) make the necessary arrangements for inspections according to the manual and the local rules at the port; b) authorise inspectors to conduct inspections according to the manual; and c) participate in developing the inspection schedule at a European level.

Inspection team — competency and authorisation

Only officers authorised as competent by their EUMS, who have undertaken appropriate training in their own EUMS and received additional training for the manual implementation (e-learning, face-to-face and on the job), conduct the inspections. The selection criteria for the inspectors who are involved in the inspections have been developed by the EU SHIPSAN ACT Joint Action (Annex 1, page 212). Professional activities, educational qualifications, ability to communicate effectively with the ship crew, previous experience, continuing professional development and scientific activities formed the basis of the criteria for selecting the inspection team members (Annex 1, page 212). The inspection team in each country is appointed by the EUMS, taking into consideration the criteria developed by the EU SHIPSAN ACT Joint Action.

In particular, inspections according to the manual are conducted by trained inspectors who have received training (e-learning, face-to-face and on the job) by the EU SHIPSAN ACT or EU SHIPSAN TRAINET project and fulfils the criteria included in the competency framework (Annex 1, page 212). The competent authority has agreed to participate in the inspections of passenger ships according to the manual. The inspector agrees to conduct the inspection according to the code of conduct included in Annex 2 (page 215).

An inspector has the following responsibilities: a) conducts inspections in the port or ports in his/her own EUMS based on the European manual for hygiene standards and communicable disease surveillance on passenger ships and according to the code of conduct (Annex 2, page 215); b) prepares inspection reports and records the inspection findings in the EU SHIPSAN ACT Information System; c) participates in meetings and teleconferences with inspectors of other EUMSs.

Technical expert (trainer/observer): a person who provides specific knowledge or expertise to the inspection team. Specific knowledge or expertise is that which relates to the organisation, the process or activity to be inspected, or language or culture. A technical expert does not act as an inspector in the inspection team but only gives guidance and advice during the inspection. They also provide guidance to the inspectors on how to complete the inspection report and to record the inspection findings in the EU SHIPSAN ACT Information System.

Inspectors-in-training will also participate in the inspections.

Inspection team is one or more inspectors conducting an inspection according to the manual, supported if needed by technical experts. One inspector of the inspection team is appointed as the inspection team leader. There must be at least one fully trained inspector in the team. The inspection team may include up to six members, e.g. two trainers/observers, two fully trained inspectors and two inspectors-in-training.

The team should undergo update training on a regular basis. Frequent meetings of the inspection team or teleconferences are important to ensure consistency of inspections and standardisation of procedures and to avoid subjective interpretation of the manual standards.

Newly authorised inspectors should participate in a minimum number and type of inspections together with competent and experienced authorised inspectors, before conducting inspections according to the manual.

Auditing of the inspection activities of personnel may be needed.

Frequency of inspections

It has been decided that the frequency of routine inspections is specified as one inspection every six months or according to the specific criteria defined by EU SHIPSAN ACT Joint Action. When scheduling inspections, a target factor developed by EU SHIPSAN ACT Joint Action will be considered.

Standardisation of inspections

Inspection procedures are described in Annex 2 (page 215). The use of a standardised inspection form (inspection outlines) during the inspection is considered necessary in order to ensure consistent implementation of inspection procedures, to reduce the subjectivity of the implementation of standards, and to record the inspection findings in a consistent manner. Standardised inspection forms (inspection outlines) are used for each topic (food safety, potable water safety, etc.). The inspection outlines are based on the hygiene standards included in the manual and generally based on existing European legislation. A summary table describing all record keeping included in the manual can be found in Annex 3 (page 225).

The standardised inspection report will include findings which are based on both legal requirements (LEG) and recommended standards (ST) as these constitute the overall standards. Part B of this manual is for guidance only and will not form part of inspections. Annexes provide supplementary material that can help both inspectors and the passenger shipping industry.

Scoring or grading or pass and fail system for the inspection results

The scoring system will be pilot-tested on an experimental basis. The inspection results will be graded (A, B, C, D). When a ship obtains a D grade, it will be considered that it has failed the inspection and a follow-up inspection will be conducted (Annex 2, page 215).

Deficiencies related to Ship Sanitation Control Certificates/Ship Sanitation Control Exemption Certificates (SSCC/SSCEC) under the IHR

If the port is authorised to issue Ship Sanitation Certificates according to IHR 2005 the results of the inspection according to the manual may be utilised to issue a SSCC/SSCEC, if this is requested by the master of the ship or the competent authority.

Legal requirements included in this manual, which represent "evidence of infection or contamination" should be recorded in the SSCC/SSCEC as set out in the IHR 2005 (World Health

Organization, 2007). These deficiencies will be noted in the SSCC/SSCEC issued at the time (during a joint inspection according to the manual and SSCC/SSCEC inspection) by the inspectors.

When it is decided that a ship is an affected conveyance, as defined in the IHR the inspecting authority can implement health measures, using their national public health legislation and/or the requirements set out in the IHR.

When needed the competent authority may also implement additional health measures, such as refusal of the departure of the ship, refusal of entry of the ship, isolation of the ship, in order to prevent the international spread of diseases. Where such additional measures are used they should be reported to the national authority responsible for implementing the IHR (the IHR National Focal Point). If a country implements such additional health measures, which 'significantly interfere'* with international traffic they must provide the WHO with the public health rationale and relevant scientific information to justify this action. WHO will then share this information, and information about the health measures implemented, with other countries and organisations.

Inspection categories

The definition of an "inspection" used in this manual is based on the Regulation (EC) No 854/2004, but has been modified since ship inspection involves not only food but water, waste management, Legionnaires' disease prevention and other issues of public health importance.

"Inspection" means the examination by competent authorities of establishments and the processing thereof, of businesses, and their management and production systems, including documents, finished product testing, of the origin and destination of production inputs and outputs, in order to verify compliance with the legal requirements in all cases (Regulation (EC) No 854/2004). Inspections according to the manual will also include assessment of compliance with legal requirements and recommended standards set out in part A, Chapters 1 to 10 of this manual. Annexes provide supplementary material that can help both inspectors and the passenger shipping industry. Guidelines are included in part B of the manual and do not form part of the inspection standards.

The following types of inspections can be conducted according to the manual: 1) routine short notice inspections, 2) follow-up inspections, 3) other types of inspections. Routine inspections will be conducted according to the specific frequency required (see paragraph "Frequency of inspections" on page 4. Follow-up inspections will be conducted in the following circumstances: a) when the ship received unsatisfactory inspection result, b) in order to check specific critical deficiencies cited during the previous routine inspection. The frequency of follow-up inspections will be determined by the severity of the non-conformities observed. In any case, any follow-up inspections will be conducted no later than four weeks after the previous routine inspection, when this is feasible, by the competent authority. Other types of inspections will be conducted in case of complaints or during outbreak investigations.

* 'Significant interference' generally means refusal of entry or departure of a ship on an international voyage, or its delay, for more than 24 hours.

Corrective action

A corrective action statement (Annex 4, page 228) detailing each deficiency identified during the inspection and the corrective action taken should be submitted to the competent authorities by the passenger shipping operator. Corrective action statement should be submitted 21 days after receiving the final inspection report. The corrective action statement may contain requests for clarification of items noted on the inspection report.

The information included in the corrective action statement sent by the ship representative will then be recorded in the EU SHIPSAN ACT information system.

Corrective actions will be based upon the specific manual legal requirements and recommended standards.

Protection of data confidentiality

Special provisions have been made to protect the confidentiality of data, by using software and by adopting policies to protect the network and the network-accessible resources from unauthorised access. Each user will need a unique password to access the data and will have different levels of access depending on authorisation given to them. This will help to protect sensitive data from companies, authorities and other persons.

The ships/shipping companies will have full access to their own data and will be able to analyse this information.

PART A

Legal requirements and recommended standards for hygiene and communicable disease surveillance

Definitions

General

Bulkhead: A transverse wall within a ship for interior compartmentalisation and/or division.

Cleaning: The removal of soil, residues, dust, grease or other objectionable matter [CAC/RCP39, 1993].

Competent authority: Any authority in a EUMS that is responsible for public health and hygiene inspections or communicable disease surveillance of passenger ships (e.g. port health authorities).

Deck: Any of the various underfoot platforms built into a ship, equivalent to floor.

Deckhead: The underside of the deck, equivalent to ceiling.

Disinfection: The reduction, by means of chemical agents and/or physical methods, of the number of microorganisms in the environment, to a level that does not compromise safety or suitability [FAO, 2003].

Hazard: A biological, chemical, physical or radiological agent that has the potential to cause harm [WHO, 2011].

International voyage: A voyage between points of entry in the territories of more than one country, or a voyage between points of entry in the territories of the same country if the ship has contacts with the territory of any other country on its voyage but only as regards those contacts [IHR, 2005].

Legal requirements: Necessities that must be implemented on board in order to comply with EU legislation.

Passenger ship/ship: Any seagoing or inland passenger ship (with more than 12 passengers) on an international voyage, sailing within the EU waters, providing accommodation and/or food (other than "prepacked" food items that are prepared on a licensed premise ashore) to passengers, and/or potable water from the ship water distribution system to passengers.

Personal Protective Equipment (PPE): All equipment designed to be worn or held by the worker to protect him against one or more hazards likely to endanger his/her safety and health at work, and any addition or accessory designed to meet this objective [Council Directive 89/656/EEC].

Recommended standard: Good practice not currently legislated, but their implementation is appropriate for maintenance of a good standard of hygiene. This definition includes appropriate alternative means or equivalent methods that achieve a comparable result.

Risk: A function of the probability of an adverse health effect and the severity of that effect, consequential to a hazard [Regulation (EC) No 178/2002].

Medical facilities

Hygiene Plan: A plan designed for medical facilities and equipment that includes appropriate provisions of disinfection, sterilisation, hand washing and correct use of personal protective equipment.

Surveillance

Case: Any person who has died (otherwise than as a result of accident, regardless of cause) on board or any person with a reportable illness as listed in Annex A of the ship communication form or a person with fever (≥ 38 °C (100.4 °F)) and symptoms as listed in Annex B of the ship communication form.

Communicable diseases: An infectious disease caused by a contagious agent, which is transmitted from person to person by direct contact with an infected individual or by indirect means such as exposure to a vector, animal, fomite, product or environment, or exchange of fluid, which is contaminated with the contagious agent [Decision No 1082/2013/EU].

Epidemiological surveillance: The systematic collection, recording, analysis, interpretation and dissemination of data and analysis on communicable diseases and related special health issues [Decision No 1082/2013/EU].

Isolation: Separation of ill or contaminated persons or affected baggage, containers, conveyances, goods or postal parcels from others in such a manner as to prevent the spread of infection or contamination [IHR, 2005].

Quarantine: The restriction of activities and/or separation from others of suspect persons who are not ill or of suspect baggage, containers, conveyances or goods in such a manner as to prevent the possible spread of infection or contamination [IHR, 2005].

Syndrome definitions

Gastrointestinal Illness (GI): Acute diarrhoea (three or more episodes of loose stools in a 24 hour period or what is above normal for the individual, e.g. individuals with underlying medical condition that may affect interpretation);

or

Vomiting and at least one of the following symptoms:

- one or more episodes of loose stools in a 24 hour period,
- abdominal cramps,
- headache,
- muscle aches,
- fever ≥ 38 °C (100.4 °F) [VSP, 2011].

Influenza-Like Illness (ILI): An acute respiratory infection with measured fever of ≥ 38 °C (100.4 °F) and cough; with onset within the last 10 days. [Global Epidemiological Surveillance Standards for Influenza. WHO, 2013].

Outbreak: The occurrence of cases of disease with a frequency in excess of what would normally be expected (for the specific itinerary and time). Normal expectancy is determined from historical/baseline data for the ship. A single case of a communicable disease long absent from a population or caused by an agent (e.g. bacterium or virus) not previously recognised in that community or area, or the emergence of a previously unknown disease, may constitute an alert for a possible outbreak and should be reported.

Outbreak definition for gastroenteritis: An increase in the number of cases of gastroenteritis above the number normally occurring on that ship over a defined period of time and itinerary.

Outbreak definition for ILI: An increase in the number of cases of ILI above the number normally occurring on that ship over a defined period of time and itinerary.

Pneumonia: Chest x-ray evidence of pneumonia.

Threshold for reporting gastroenteritis outbreak: For reporting purposes, two different thresholds should be used. An initial report should be prepared and sent to the competent authority at ports when the percentage of reportable gastroenteritis cases reaches 2 % or more among passengers or 2 % or more among crew. A second report should be sent when the number of reportable gastroenteritis cases reaches 3 % or more among passengers or 3 % or more among crew.

Signs and symptoms (required for illnesses and deaths)

Bruising or bleeding (without previous injury): noticeable and unusual bruising or bleeding from gums, ears, nose, or areas on the skin with no obvious explanation (such as injury), is vomiting blood, or has bloody stool or urine [US CDC, 2014].

Decreased level of consciousness: Condition of an ill person when he or she is not fully aware of the surroundings and may be confused about who he or she is, where he or she is going, or the time of day/week, does not respond normally to questions or painful sensations, or may appear to be sleepy, groggy, unresponsive, or difficult to awaken [US CDC, 2014].

Difficulty breathing or shortness of breath: unable to move enough air into or out of the lungs, or can do so only with an unusually great effort; gasping for air; feeling "short of breath" or unable to "catch" his/her breath; breathing too fast or shallowly, or using muscles of stomach, chest or neck to breath (especially for children) [US CDC, 2014].

Fever: A measured temperature of 38 °C (100.4 °F) or more. Fever may be considered to be present if a person has not had a temperature measurement but feels warm to the touch or gives a history of feeling feverish or having chills. Note that even though measured temperature is the preferred and most accurate method to determine fever, it is not always possible to do this. In certain situations, other methods of detecting a possible fever should be considered:

- Self-reported history of feeling feverish when a thermometer is not available or the ill person has taken medication that would lower the measured temperature.
- Appearance of a flushed face, glassy eyes, or chills if it is not feasible to touch the person or if the person does not report feeling feverish [US CDC, 2014].

Jaundice: Yellowish discoloration of skin, eyes and/or other bodily tissues or fluids [US CDC, 2009].

Persistent cough: A cough that is either frequent or severe enough to catch the attention of others on board the ship or a severe cough that lasts three weeks or more [US CDC, 2009].

Recent weakness or paralysis: New or recently occurring weakness or partial or complete inability to move the arms, legs, or the muscles used for swallowing or breathing [US CDC, 2009].

Severe diarrhoea: Diarrhoea accompanied by signs of dehydration [US CDC, 2009].

Severe vomiting: Vomiting accompanied by signs of dehydration* [US CDC, 2009].

Skin rash: abnormal areas on the skin that may appear as discoloured bumps or flat spots or areas, or blisters or bumps containing fluid or pus that are intact or crusted over. "Rash" includes insect bites or parasite lesions.

- Colour: ranges from light-coloured to red or pink, purple, or black, but can also be the same colour as the person's skin tone.
- Texture: can be flat, raised, blister-like, or crusted. In some diseases, such as chickenpox, areas with more than one of these characteristics can be found at the same time.
- Select the most appropriate description of the rash's appearance:
    - Maculopapular: A red rash with both flat red areas (macules) and small bumps (papules) that may run together.

***** Dehydration: signs of dry mouth, skin, or lips; weakness or light-headedness particularly when standing; tenting of skin or loss of turgor so that skin may shrivel and wrinkle; production of less urine; or abnormally dark urine.

- Vesicular/Pustular: Small bumps filled with fluid that can be clear or cloudy (vesicles) or filled with a thick, opaque fluid (pustules).
- Purpuric/Petechial: Red or purple discolorations caused by bleeding under the skin or mucous membranes; they do not blanch or fade with pressure. Petechial lesions appear as small, reddish freckles, while purpuric lesions cover larger areas.
- Scabbed: Lesions that are crusted over.

- Pattern: can be disconnected (discrete) or run together (confluent).
- Location: may include one area of the body, such as the face, or more than one area [US CDC, 2014].

Swollen glands: Enlargements of glands located in the head, neck, or groin, notably of salivary or parotid glands or lymph nodes [US CDC, 2009].

Food safety

Approved/nominated suppliers: A company or a person that supplies the ship with safe foodstuffs (Regulation (EC) 852/2004) which complies with European legislation standards.

Bivalve molluscs: Filter-feeding lamellibranch molluscs [Regulation (EC) 853/2004].

Cross-contamination: The contamination of a food product from another source. There are four main ways that cross-contamination can occur: i) food to food, ii) equipment or work surfaces to food, iii) people to food and iv) pests to food.

Domestic ungulates: Domestic bovine (including Bubalus and Bison species), porcine, ovine and caprine animals, and domestic solipeds (horses) [Regulation (EC) 853/2004].

Eggs: Eggs in shell — other than broken, incubated or cooked eggs — that are produced by farmed birds and are fit for direct human consumption or for the preparation of egg products [Regulation (EC) No 853/2004]. Eggs used in catering are predominantly chicken, although duck, quail and others can be used.

Equipment: An article that is used in the operation of a food business (passenger ship food operation) such as a freezer, grinder, hood, ice maker, meat block, mixer, oven, reach-in refrigerator, scale, sink, slicer, stove, table, temperature measuring device for ambient air, vending machine, or dishwasher. Equipment does not include apparatus used for handling or storing large quantities of packed foods that are received from a supplier in an encased or overwrapped lot, such as hand trucks, forklifts, dollies, pallets, racks, and skids [FDA, 2013].

Fishery products: All sea water or freshwater animals (except for live bivalve molluscs, live echinoderms, live tunicates and live marine gastropods, and all mammals, reptiles and frog) whether wild or farmed and including all edible forms, parts and products of such animals [Regulation (EC) No 853/2004].

Food contact surfaces: Surfaces intended to be in direct contact with food or onto which food may drain, drip or splash.

Food contact material: Materials and articles, including active and intelligent food contact materials and articles, which in their finished state:

- are intended to be brought into contact with food; or
- are already in contact with food and were intended for that purpose; or
- can reasonably be expected to be brought into contact with food or to transfer their constituents to food under normal or foreseeable conditions of use [Regulation (EC) No 1935/2004].

Active materials and articles intended to come into contact with food: materials and articles that are intended to extend the shelf-life or to maintain or improve the condition of packaged food. They are

designed to deliberately incorporate components that would release or absorb substances into or from the packaged food or the environment surrounding the food [Regulation (EC) No 1935/2004].

Intelligent materials and articles intended to come into contact with food: materials and articles which monitor the condition of packaged food or the environment surrounding the food [Regulation (EC) No 1935/2004].

Food handler: Any person, temporary food handlers and contractors, who directly handles packaged or unpackaged food, food equipment and utensils or food contact surfaces and is therefore expected to comply with food hygiene requirements [FAO, 1998].

Food hygiene: The measures and conditions necessary to control hazards and to ensure fitness for human consumption of a foodstuff taking into account its intended use [Regulation (EC) No 852/2004].

Foodstuff (or food): Any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans. It includes drink, chewing gum and any substance, including water, intentionally incorporated into the food during its manufacture, preparation or treatment [Regulation (EC) No 178/2002].

High-risk foods: Foods that may contain and support the growth of microorganisms and are intended for consumption with or without further treatment to destroy microorganisms (e.g. cheese from pasteurised milk and cheese from unpasteurised milk, low acid foods such as mortadella, ground raw meat products such as sausages and hamburgers, raw fresh chilled or frozen meat, including poultry, products) [FAO/WHO, 2004].

Lagomorphs: Rabbits, hares and rodents [Regulation (EC) 853/2004].

Low-risk foods: Foods that are unlikely to contain pathogenic microorganisms or will not support growth of pathogenic microorganisms but due to their processing may support their growth. This category includes carbonated beverages, alcoholic drinks, coffee and tea, dried herbs, grains and grain derivatives (corn flakes), honey, sugar and bakery products [FAO/WHO, 2004].

Mandatory food information: The particulars that are required to be provided to the final consumer by EU provisions. [Regulation (EU) No 1169/2011].

Meat: Edible parts of the animals including blood [Regulation (EC) No 853/2004].

Meat preparations: Fresh meat, including meat that has been reduced to fragments, which has had foodstuffs, seasonings or additives added to it or which has undergone processes insufficient to modify the internal muscle fibre structure of the meat and thus to eliminate the characteristics of fresh meat [Regulation (EC) 853/2004].

Mechanically Separated Meat (MSM): The product obtained by removing meat from flesh-bearing bones after boning or from poultry carcases, using mechanical means resulting in the loss or modification of the muscle fibre structure [Regulation (EC) 853/2004].

Minced meat: Boned meat that has been minced into fragments and contains less than 1 % salt [Regulation (EC) No 853/2004].

Prepacked food items: Any single item for presentation as such to the final consumer, consisting of a food and the packaging into which it was put before being offered for service, whether such packaging encloses the food completely or only partially, but in any event in such a way that the contents cannot be altered without opening or changing the packaging. Prepacked food does not cover foods packed on the ships premises at the consumer's request or prepacked for direct service [Regulation (EU) No 1169/2011]. Prepacked food items are prepared on a licensed premise ashore.

Offal: Fresh meat other than that of the carcase (body of an animal after slaughter and dressing), including viscera (organs of the thoracic, abdominal and pelvic cavities, as well as the trachea and oesophagus and, in birds, the crop) and blood [Regulation (EC) 853/2004].

Poultry: Farmed birds, including birds that are not considered as domestic but which are farmed as domestic animals, with the exception of ratites (flightless birds such as ostrich) [Regulation (EC) No 853/2004].

Products of animal origin: Food of animal origin, including: honey and blood; live bivalve molluscs, live echinoderms, live tunicates and live marine gastropods, intended for human consumption; and other animals destined to be prepared with a view to being supplied live to the final consumer [Regulation (EC) No 853/2004].

Quick-frozen foodstuffs: Foodstuffs which a) have undergone a suitable freezing process known as 'quick-freezing' whereby the zone of maximum crystallization is crossed as rapidly as possible, depending on the type of product, and the resulting temperature of the product (after thermal stabilization) is continuously maintained at a level of – 18 °C (– 0.4 °F) or lower at all points, and b) are marketed in such a way as to indicate that they possess this characteristic. Ice-cream and other edible ices shall not be regarded as quick-frozen foodstuffs [Council Directive 89/108/EEC].

Ready-to-eat food: The status of the food being ready for immediate consumption at the point of service or sale. It could be raw or cooked, hot or chilled, and can be consumed without further heat-treatment including reheating.

Ship food operation (food business): Any undertaking, whether for profit or not and whether public or private, carrying out any of the activities related to any stage of production, processing and distribution of food [Regulation (EC) No 178/2002].

Ship food operator (food business operator): The natural or legal persons responsible for ensuring that the requirements of food law are met within the food business (passenger ship food operation) under their control [Regulation (EC) No 178/2002].

Traceability: The ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution [Regulation (EC) No 178/2002].

Utensils: Any of the instruments or vessels commonly used in a galley such as eating utensils (knives, forks, etc.) and baking utensils (ladle, tongs, etc.).

Wild game: i) Wild ungulates and lagomorphs, as well as other land mammals that are hunted for human consumption and are considered to be wild game under the applicable law in the Member State concerned, including mammals living in enclosed territory under conditions of freedom similar to those of wild game; and ii) wild birds that are hunted for human consumption [Regulation (EC) 853/2004].

Potable water

Air gap: The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood-level rim of the receptacle or receiving fixture. The air gap would typically be at least twice the diameter of the supply pipe or faucet, or at least 2.5 cm (1 in) [WHO, 2011].

Backflow: The undesirable reversal of flow of water or mixtures of water and other liquids, gases or other substances into the distribution pipes of the potable water supply of water from any other source or sources [Foundation for cross connection control and hydraulic research, 1993]. Back-siphonage and back pressure are forms of backflow.

Backflow preventer: An approved backflow prevention plumbing device that must be used on potable water distribution lines where there is a direct connection or a potential cross-connection between the potable water distribution system and other liquids, mixtures, or substances from any source other than the potable water supply. Some devices are designed for use under continuous water pressure, whereas others are non-continuous pressure types [VSP, 2011].

Control measures: Any action or activity that can be used to prevent, eliminate or reduce to an acceptable level any water safety hazard [WHO, 2012].

Corrective action: Any action to be taken when critical limits are exceeded [WHO, 2012].

Cross connection: Any unprotected actual or potential connection or structural arrangement between a public or a consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas, or substance other than the intended potable water with which the system is supplied. Bypass arrangements, jumper connection, removable section, swivel or change-over devices and other temporary or permanent devices which or because of which backflow can occur are considered to be cross connections [WHO, 2011].

Deadleg/blind line: A length of pipe (larger than twice its diameter) closed at one end through which no water passes.

Hazardous event: Any process that introduces hazards to, or fails to remove them from, the water supply [WHO, 2012].

Non-potable water: Water not intended for human consumption according to Council Directive 98/83/EC.

Operational monitoring: The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a control measure is operating within design specifications [WHO, 2012].

Potable water: Water meeting the requirements laid down in Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption. According to the Directive 98/83/EC, "water intended for human consumption" means:

- all water either in its original state or after treatment, intended for drinking, cooking, food preparation or other domestic purposes, regardless of its origin and whether it is supplied from a distribution network, from a tanker, or in containers;
- all water used in any food production undertaking for the manufacture, processing, preservation or marketing of products or substances intended for human consumption unless the competent national authorities are satisfied that the quality of the water cannot affect the wholesomeness of the foodstuff in its finished form [Council Directive 98/83/EC].

Stagnant line: Pipe leading to a fitting through which water only passes when there is draw off from the fitting. This pipe is considered as a stagnant line when water remains stagnant for more than seven days.

Verification: The application of methods, procedures, tests and other evaluations to determine compliance with the WSP. Verification confirms that the water quality targets are being met and maintained and that the system as a whole is operating safely and the WSP is functioning effectively [WHO, 2012].

Water Safety Plan (WSP): A comprehensive risk assessment and risk management approach that encompasses all steps in water supply from source to consumer in order to ensure the safety of potable water [WHO, 2011].

Recreational Water Facilities (RWF)

Alkalinity: A measure of the concentration of alkaline salts dissolved in the water. Total alkalinity is the water's resistance to pH changes [WHO, 2006].

Automatic controllers: A system of at least one chemical probe, a controller, and an auxiliary or integrated component that senses the level of one or more RWF water parameters and provides a signal to other equipment to maintain the parameter(s) within a user-established range.

Backwash: The process of reversing the flow of water through a filter to clean the filter media from matter accumulation and prevent mud ball formations that can hinder filter operation.

Bathing load: The maximum number of people that are allowed to use a RWF (e.g. swimming pool), at one time, for safety and hygiene issues.

Bromine: A halogen chemical element that works as a disinfectant in pool and spa water to kill microorganisms, and oxidises ammonia and nitrogen compounds that can enter the RWF from swimmer body wastes and other sources.

Chlorine: A halogen chemical element that works as a disinfectant in pool and spa water to kill microorganisms, and oxidises ammonia and nitrogen compounds that can enter the RWF from swimmer body wastes and other sources. This is the disinfectant that is most commonly used for disinfection of potable and recreational waters.

Circulation rate: The flow rate of water to and from the pool through all the pipe work and the treatment system, it is related to the turnover period [WHO, 2006].

Coagulation: The process employed to enhance the removal of dissolved, colloidal or suspended material by addition of a chemical coagulants prior to filtration. The dissolved solids are suspended out of solution and clump together forming flocs which are more easily trapped in the filter [WHO, 2006].

Combined halogen (bromine or chlorine): The substance formed when halogen combines with ammonia, other nitrogen containing compounds and organics compounds. They are still disinfectants but 40-60 times less effective than free available halogen.

Filter: A device that separates particulate matter from water by circulation through a porous medium.

Filtration rate: A measurement of the volume of water that passes through a filter per unit of surface area in a given period of time expressed in litres/minute/square meter (gallons/minute/square foot).

Flow meter: A device that measures the flow rate of a substance through a conduit.

Free halogen (bromine or chlorine): Halogen that has not combined with ammonia, nitrogen, or other organic compounds.

Gravity feed tank: Tank that is filled by pool water flowing by gravity only, intended as a separation element between the pool and the suction pumps [EN 13451-3].

Grille: Component to cover any opening, designed to allow the passage of water and/or air (e.g. inlet grille, outlet grille, overflow channel grille, deck level channel grille) [EN 13451-3].

Halogen demand (e.g. chlorine or bromine demand): The halogen consumed by materials in the water such as bacteria, algae, dirt, leaves and swimmers waste. The halogen demand must be satisfied before a halogen residual is available to disinfect the pool water.

Halogen residual (or disinfectant residual): The amount of halogen (chlorine or bromine) remaining in RWF after satisfying the halogen demand. The halogen residual can be expressed as free halogen residual

(e.g. free chlorine), combined halogen residual (combined chlorine); or total halogen residual (that it is the total of free and combined halogen residual).

Hot tub/spa: A body of water designed for sitting or lying in up to the neck, and not for swimming. It is a self-contained body of water that is filtered and chemically disinfected. Usually, a hot tub/spa is not drained, cleaned or refilled after each user but after a number of users or a maximum period of time. Hot tub contains hot water to 30-40 °C (86-104 °F) and has hydrotherapy jet circulation with or without air induction bubbles. Common terms for hot tub are spa pool, hot spa and whirlpool spa. Jacuzzi is the registered trade name of a specific manufacturer and should not be mistaken for a generic name for spa pools or hot tubs. Some hydrotherapy pools/spa may have cold water.

Inlet: A device designed for introducing water/air in the pool [EN 13451-3].

Leisure water pools: Water pools for leisure activities.

mg/L: An abbreviation for milligrams per litre or parts per million (ppm), which is a concentration measurement for disinfectants and other chemical parameters such as alkalinity, chlorine, hardness, etc.

Outlet: A device designed for the extraction of water by gravity or suction [EN 13451-3].

pH: The negative logarithm of the hydrogen ion concentration, which is a measure of the degree of acidity or basicity of a solution, where value seven is neutral, higher values are more alkaline and lower values are more acidic.

Recirculation: The process of pumping water from the pool through the filter system and returning it to the pool.

Recreational Water Facility: A water facility that has been constructed, installed, or modified for the purposes of public swimming or recreational bathing. It includes but it is not limited to swimming pools, hot tubs, leisure water pools, children's pools, etc.

Sump: Vessel between the suction outlet grille and the suction outlet piping, manufactured or field built [EN 13451-3].

Swimming pool: A watertight basin, chamber or tank containing an artificial amount of water suitable for swimming, diving and recreational bathing.

Total halogen (bromine or chlorine): The sum of all active halogen compounds or otherwise the sum of free and combined halogen.

Turbidity: A measure of the cloudiness of water. It quantifies the clarity of the water expressed as Nephelometric Turbidity Units (NTU).

Turnover period: The time taken for a volume of water equivalent to the entire pool water volume to pass through the filters and treatment plant and back to the pool. It is calculated by dividing the volume of the pool by the flow rate.

Pest management

Active surveillance: The planned process of active finding of pests, signs for their presence and conditions favour their access, harbourage and reproduction. This includes but is not limited to visual determination of general hygiene levels, structural discrepancies, and signs of pest accesses/harbourages [Defence Commissary Agency (DeCA), Integrated Pest Management Services Statement of Work].

Harbourage: Any conditions or place where pests can live, nest or seek shelter.

Integrated Pest Management: A documented process/programme of controlling pests consisting of five steps. These include inspection, identification and establishment of threshold levels, employment of control measures and evaluation of effectiveness. To be acceptable, the control measures must be environmentally compatible [NPMA, 2006; WHO, 2007].

Passive surveillance: The passive monitoring for pests, which typically includes the placement of glue traps, glue boards, bait stations, and with respect to rodents, either snap traps or isolation traps [CDC, Health practices on cruise ships: training for Employees Transcript].

Pest: Organisms (rats, insects, etc.) which may cause illness or damage or consume or infest food products and other materials important to humans.

Pesticide: Any chemical substance used for killing pests which complies with the Regulation (EU) No 528/2012. It includes insecticides (products used for the control of arthropods) and rodenticides (products used for the control of mice, rats or other rodents).

Reservoir: An animal, plant or substance in which an infectious agent normally lives and whose presence may constitute a public health risk [IHR, WHO 2008].

Vector: An insect or other animal which normally transports an infectious agent that constitutes a public health risk [IHR, WHO 2008].

Housekeeping

Body fluid spillage: An uncontrolled/uncontained escape of fluids produced by the body such as blood, faeces, vomit, or urine.

Nappy (diaper) changing area: An area appropriate for nappy changing, which is located inside the nursery and play areas.

Nursery and play area: A facility of the ship where children under six years old are cared for by the designated crew.

Ventilation systems: A system which provides sufficient air at an appropriate temperature [IMO, 2002].

Hazardous chemical agents

Biocidal products: (i) Any substance or mixture, in the form in which it is supplied to the user, consisting of, containing or generating one or more active substances, with the intention of destroying, deterring, rendering harmless, preventing the action of, or otherwise exerting a controlling effect on, any harmful organism by any means other than mere physical or mechanical action; (ii) any substance or mixture, generated from substances or mixtures which do not themselves fall under the first indent, to be used with the intention of destroying, deterring, rendering harmless, preventing the action of, or otherwise exerting a controlling effect on, any harmful organism by any means other than mere physical or mechanical action [Regulation (EU) No 528/2012]. An exhaustive list of 22 product types with an indicative set of descriptions within each type is given in Annex V of the Regulation (EU) No 528/2012.

Chemical agent: Any chemical element or compound, on its own or admixed, as it occurs in the natural state or as produced, used or released, including release as waste, by any work activity, whether produced intentionally or not and whether placed on the market or not [Council Directive 98/24/EC].

Hazardous chemical agent: (i) Any chemical agent which meets the criteria for classification as hazardous within any physical and/or health hazard classes laid down in Regulation (EC) No 1272/2008 of the European Parliament and of the Council, whether or not that chemical agent is classified under that Regulation; (ii) any

chemical agent which, whilst not meeting the criteria for classification as hazardous may, because of its physicochemical, chemical or toxicological properties and the way it is used or is present in the workplace, present a risk to the safety and health of workers [Council Directive 98/24/EC].

Mixture: A mixture or solution composed of two or more substances [Regulation (EC) No 1272/2008].

Safety Data Sheet: Provides a mechanism for transmitting appropriate safety information on classified substances and preparations, including information from the relevant Chemical Safety Report(s) down the supply chain to the immediate downstream user(s) [Regulation (EC) No 1907/2006].

Substance: A chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition [Regulation (EC) No 1272/2008].

Packaging: One or more receptacles and any other components or materials necessary for the receptacles to perform their containment and other safety functions [Regulation (EC) No 1272/2008].

Use: Any processing, formulation, consumption, storage, keeping, treatment, filling into containers, transfer from one container to another, mixing, production of an article or any other utilisation [Regulation (EC) No 1907/2006].

Waste management

Black water or sewage:

- Drainage and other wastes from any form of toilets and urinals;
- drainage from medical premises (dispensary, sick bay, etc.) via washbasins, wash tubs and scuppers located in such premises;
- drainage from spaces containing living animals; or
- other waste waters when mixed with the drainage defined above [IMO, MARPOL, ANNEX IV].

Catering waste from means of transport operating internationally (or international catering waste): International catering waste is characterized as High-Risk Category I animal by-product [Regulation (EC) 1774/2002]. Means of transport operating internationally include vessels, which have landed on territory outside of the EU or are operating in non-EU waters. Catering waste includes materials derived from foodstuffs served on board a ship arriving in the European Union from a third country destination (i.e. outside the EU). The food waste may have originated from:

- food prepared on board the ship;
- food brought onto a ship by outside caterers; or by passengers or crew from their own private kitchens, retailers, fast food outlets, etc.

Chemical waste: Discarded solid, liquid, and gaseous chemicals, for example from diagnostic and experimental work and from cleaning, housekeeping, and disinfecting procedures [WHO, 2014].

Cooking oil: Any type of edible oil or animal fat used or intended to be used for the preparation or cooking of food, but does not include the food itself that is prepared using these oils [IMO, MARPOL, ANNEX V].

Emission: Any release of substances subject to control by Annex VI of MARPOL from ships into the atmosphere or sea [IMO, MARPOL, Annex VI].

Food waste: Any spoiled or unspoiled food substances including fruits, vegetables, dairy products, poultry, meat products and food scraps generated aboard, principally in the galley and dining areas [IMO, MARPOL, Annex V].

Garbage: All kinds of food wastes, domestic wastes and operational wastes, all plastics, cargo residues, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically except sewage. Garbage does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities which involve the transport of fish including shellfish for placement in the aquaculture facility and the transport of harvested fish including shellfish from such facilities to shore for processing [IMO, MARPOL, Annex V]. Hazardous and medical wastes are excluded from this definition for the purpose of this document (see below for definitions for medical and hazardous wastes).

Grey water: Drainage from dishwasher, shower, laundry, bath and washbasin drains and where such drainage does not include and is not mixed with drainage from toilets, urinals, hospitals, and animal spaces, as defined in regulation 1(3) of Annex IV, as well as drainage from cargo spaces [IMO, 2012, Guidelines for Implementation of Annex V of MARPOL].

Harmful substance: Any substance which identified as marine pollutants in the IMDG code [IMO, 2012, Guidelines for Implementation of Annex V of MARPOL].

Hazardous waste: A type of waste, which, because of its quantity, concentration or physical or chemical or biological/infectious characteristics, may pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed or otherwise managed. Hazardous waste has the following properties: explosive, oxidising, highly flammable, flammable, irritant, harmful, toxic, carcinogenic, corrosive, infectious, toxic for reproduction, sensitising, teratogenic, mutagenic, ecotoxic and waste capable by any means, after disposal, of yielding another substance, e.g. a leachate, which possesses any of the characteristics listed above [Directive 2008/98/EC].

Infectious medical waste: Substances containing viable microorganisms or other toxins which are known or reliably believed to cause disease in man or other living organisms [Directive 2008/98/EC].

MARPOL: The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 [Directive 2000/59/EC].

Medical waste: Any waste generated during patient diagnosis, treatment or immunisation. Medical waste is distinguished into two categories: infectious and non-infectious [WHO, 2014].

Non-infectious medical waste: Disposable medical supplies and materials that do not fall into the category of infectious medical waste [WHO, 2014].

Pharmaceutical waste: Expired, unused, spilt, and contaminated pharmaceutical products, prescribed and proprietary drugs, vaccines, and sera that are no longer required and due to their chemical or biological nature need to be disposed of carefully. The category also includes discarded items heavily contaminated during the handling of pharmaceuticals, such as bottles, vials and boxes with residues, gloves, masks, connecting tubing [WHO, 2014].

Port reception facilities: Any facility, which is fixed, floating or mobile and capable of receiving ship generated waste or cargo residues [Directive 2000/59/EC].

Sewage holding tank: A tank used for the collection and storage of sewage [IMO, MARPOL, ANNEX IV].

Sharps: Objects or instruments necessary for the exercise of specific healthcare activities, which are able to cut, prick, cause injury and/or infection. Sharps are considered as work equipment within the meaning of Directive 89/655/EEC on work equipment [adapted from Council Directive 2010/32/EU].

Shipboard incineration: The incineration of wastes or other matter on board a ship, if such wastes or other matter were generated during the normal operation of that ship [IMO, MARPOL, Annex VI].

Shipboard incinerator: A shipboard facility designed for the primary purpose of incineration [IMO, MARPOL, Annex VI].

Ballast water

Ballast water: Water with its suspended matter taken on board a ship to control trim, list, draught, stability or stress of the ship [IMO, Ballast Water Management Convention, 2004].

Ballast Water Management: Mechanical, physical, chemical and biological processes, either singularly or in combination, to remove, render harmless, or avoid the uptake or discharge of harmful aquatic organisms and pathogens within ballast water and sediments [IMO, Ballast Water Management Convention, 2004].

Harmful aquatic organisms and pathogens: Aquatic organisms or pathogens which if introduced into the sea, including estuaries or into fresh water courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas [IMO, Ballast Water Management Convention, 2004].

Sediments: Matter settled out of ballast water within a ship [IMO, Ballast Water Management Convention, 2004].

1. MEDICAL FACILITIES

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The specific medical needs of a ship are dependent on variables such as ship size, duration and destination of the voyage, and the number of passengers and crew. The majority of ships are equipped with at least a basic medical infirmary for minor injuries and ailments. It is important for a ship to have a well-equipped examination and treatment room and the ability to provide authoritative medical advice. Medical staff play an important role on board, not only when injuries occur, but also in infectious disease control, outbreak investigation and surveillance.

Legal requirements (LEG)/recommended standard (ST)

Item	Details	LEG/ ST
	Medical staff, medicines, facilities construction and maintenance	
1.1 Medical staff and medicines	• Ships must have medical staff, a medicine chest, medical equipment, and a medical guide in accordance with the Flag State requirements.	LEG[1, 2, 3]
	• Ships flying the flag of EUMS or registered under the jurisdiction of an EUMS must have medicines and medical equipment as described in the Council Directive 92/29/EEC.	LEG[1]
1.1.1 Medical facilities and medical staff recommendations	Recommendations for medical facilities and medical staff on passenger ships on international voyages are given in Annex 5 (page 229).	ST
1.2 Medical facilities	Ships must have medical facilities in accordance with the Flag State legislation.	LEG[1, 2, 3]
1.2.1 Medical facilities description	• Ships should have a minimum of one examination room per ship.	ST
	• Medical facilities should be designed to facilitate private treatment of ill passengers or crew to help prevent the spread of infectious diseases.	ST
	• Medical facilities should be separated from other facilities.	ST
	• Medical rooms should be used solely for the treatment of sick persons and for the isolation of potentially infectious patients.	ST
	• Furnishing and equipment in medical facilities should have smooth, light coloured surfaces that can be cleaned and disinfected.	ST
	• Medical supplies and medicines should be protected, stored and locked in cupboards.	ST

Medical facilities

1.3 Isolation facilities	Ships should have: - an isolation room or the capability to provide isolation of patients; - the capability to provide quarantine.	ST
1.4 Ventilation	Medical rooms should be well ventilated.	ST
1.5 Washing facilities	Medical facilities should have a patient toilet and hand washing facilities, which should be supplied as described in section 7.2.	ST
1.6 Medical waste management – sharps and biomedical waste	Medical facilities must have appropriate sharps and biomedical waste capability.	LEG[4]
1.6.1 Medical waste management - Identification	Medical waste must be clearly identifiable and placed in containers/bags that are appropriately marked as described in items 9.1.3, 9.1.3.1, 9.5.2.1 and 9.5.4.	LEG[5, 6]
1.6.2 Medical waste management	• Contaminated, out of date, damaged or partially used medicines that cannot be reused should be replaced and not used. Pharmaceutical waste should be disposed of as described in item 9.5.6.	ST
	• Waste produced and disposed of by patients in medical facilities should not be re-cycled.	ST
1.7 Temperature measuring devices	Temperature measuring devices (medical thermometer) must be provided and maintained in proper operational condition for patients.	LEG[1]

1.8 Medical procedures	The following procedures are considered to be the minimum required on board:
	- maintenance and calibration (where applicable) for all medical equipment;
	- a medical record system with:
	  ○ well organised, legible and consistent documentation of all medical care,
	  ○ a system of appropriate medical records and communication confidentiality;
	- code team (crash team) trained and updated regularly;
	- manuals for the operation of medical equipment;
	- Medical Operations Manual as required by the International Safety Management Code requirements;
	- Emergency Preparedness Plan as required by the International Safety Management Code.
		LEG[1, 7]

1.9 Hygiene Plan and implementation	• A Hygiene Plan for medical facilities should be implemented.	ST
	• The Hygiene Plan should include disinfection, sterilization (unless single use instruments are used), hand washing, laundry, medical waste management and correct use of PPE.	ST
	• Equipment for hand hygiene of medical staff should be available in the wards separate from the toilet facilities. Equipment can include hand washing facilities (applicable to new ships* only) or hand antiseptics. Hand washing facilities should be supplied as described in section 7.2.	ST
	• The following PPE should be available: single-use (disposable) polyethylene gloves, rubber gloves, sterile gloves, plastic aprons, plastic goggles, surgical face masks, full-face masks, fluid-resistant or impermeable boot and shoe covers, fluid-resistant or impermeable gown.	ST
1.10 Gastroenteritis Outbreak Management Plan	• There should be an agreed Gastroenteritis Outbreak Management Plan, which specifies the duties for all crew members and responsibilities of the outbreak management team (see Part B, Guideline II, page 167).	ST
	• Pre-defined thresholds for outbreak alert reports and control measures should be agreed and included in the Gastroenteritis Outbreak Management Plan.	ST
1.11 Isolation Plan for passengers and crew and implementation	• There should be a written Medical Isolation Plan for passengers and crew suspected or known to be suffering from infectious diseases, which may require isolation. The plan should take into account the normally expected number of the passengers or crew on board (see Part A, Chapter 2 and Part B, Guidelines I and II).	ST
	• The isolation plan should describe the location(s) where cases should be isolated and any necessary communication between departments (medical, housekeeping, laundry, room service, etc.) about the persons in isolation.	ST
	• Medical staff should have knowledge of the isolation plan and should implement it as required.	ST
1.12 Temperature control	• Refrigerators and freezers used to store temperature sensitive medicines should be capable of maintaining the safe temperatures recommended by the manufacturer.	ST
	• Temperatures of these fridges/freezers should be checked and recorded at least daily using internal thermometers or external reading thermometers.	ST

* Ships that the keel is laid after 01/01/2017.

1.13 Sharp injuries prevention

- Appropriate training should be provided to support the implementation of policies and procedures associated with sharps injuries, including: the correct use of medical devices incorporating sharps protection mechanisms, induction for all new and temporary staff, the risk associated with blood and body fluid exposures; preventive measures including standard precautions, safe systems of work, the correct use and disposal procedures, the importance of immunisation, according to the procedures at the workplace, the reporting, response and monitoring procedures and their importance, measures to be taken in case of injuries. LEG[4]
- Risk-assessment procedures should be conducted regarding sharp handling practices and should include an exposure determination and cover all situations where there is injury, blood or other potentially infectious material. LEG[4]

1.13.1 Medical staff vaccination

Medical staff should be offered vaccination and, if necessary, revaccination should be carried out in accordance with Flag State law and/or company practice. ST

Medical facilities

Referenced legislation

1. Council Directive 92/29/EEC on the minimum safety and health requirements for improved medical treatment on board vessels
2. ILO Maritime Labour Convention, 2006
3. Council Directive 2009/13/EC implementing the Agreement concluded by the European Community Shipowners' Associations (ECSA) and the European Transport Workers' Federation (ETF) on the Maritime Labour Convention, 2006, and amending Directive 1999/63/EC
4. Directive 2010/32/EU implementing the Framework Agreement on prevention from sharp injuries in the hospital and healthcare sector concluded by HOSPEEM and EPSU
5. Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues
6. Directive 2008/98/EC on waste
7. Regulation (EC) No 336/2006 on the implementation of the International Safety Management Code within the Community and repealing Council Regulation (EC) No 3051/95

2. COMMUNICABLE DISEASE SURVEILLANCE

2. COMMUNICABLE DISEASE SURVEILLANCE

Surveillance of communicable diseases on board passenger ships is an essential tool for assessing the burden of communicable diseases and to allow the early detection and management of outbreaks.

Maintaining medical logs of communicable diseases and the active monitoring of such illnesses on board will assist ships in identifying outbreaks and other events of public health concern, and allow them to implement control measures rapidly and consistently.

Objectives of surveillance on board ships

- To enable timely application of preventive measures through the early detection of outbreaks and other communicable disease events.
- To inform competent authorities and to assist them in case investigation, management and follow-up.
- To collect baseline information on communicable diseases by season and specific itineraries, in order to determine thresholds for outbreak detection.
- To estimate the burden of communicable diseases.
- To provide data for risk assessment.

Reporting to competent authorities in ports in EUMS

If an infection or death otherwise than as a result of accident has occurred on board a ship on an international voyage, the master is required to inform the next port of call according to the IHR. In the event of an outbreak, the competent authority staff may request to see the ship's surveillance data whilst undertaking a risk assessment. If they consider that there is a risk of transmission of the infection in their country or other MS, they may alert their national surveillance centre and/or National Focal Point. It is important, therefore, that good surveillance logs are maintained by the ship (Annex 6, page 231).

Legal requirements (LEG)/recommended standards (ST)

Item	Details	LEG/ ST
	Records/Log	
2.1 Responsibility	A standardised illness medical log for each voyage must be maintained daily by the designated crew member.	LEG[1]
2.2 Log content	• The illness medical log should list: - the name of the ship, the voyage dates and the voyage identification code;	ST

- all cases of communicable diseases or events or syndromes (see items 2.11 and 2.12);
- all passengers and crew who were dispensed medication by designated crew member.

- The illness medical log entry for each passenger or crew member should contain the following information: ST
  - the date of the first clinic visit or when the illness was reported to a crew member,
  - person's name, age and gender,
  - nationality,
  - designation as either a passenger or crew member,
  - crew member position or job on the ship, if applicable,
  - cabin number,
  - date and time of illness onset,
  - symptoms of their illness,
  - use of medication,
  - presence of any underlying medical conditions or medication side effects or other comments,
  - laboratory result (if available).

2.3 GI and ILI log

- The normal daily illness medical log has additional specific logs for GI and ILI. Model specific logs are included in Annex 7 (page 232) for GI and in Annex 8 (page 233) for ILI. For passenger ships without specific health surveillance systems in place, it is recommended that these formats or similar templates are used and continually maintained. ST
- Data collected by using GI and ILI logs should be collated (aggregated) and reviewed (summarized/analysed, electronically where possible) on a daily basis for each voyage. ST
- For logs, all fields should be filled in. If the information is not known then 'NK' can be inserted. ST

Questionnaires

2.4 GI questionnaire

GI questionnaires (see an example in Annex 9, page 234) detailing activities and all meal locations, whether on or off ship, for the 72 hours before the onset of illness should be available in the ship infirmary and be given to all gastroenteritis cases on presentation. The completed questionnaires should be maintained alongside the GI medical log. ST

Retention

2.5 Retention

- The ship's illness medical log, surveillance forms and questionnaires should be maintained on the ship for at least 12 months. Electronic versions of these records are acceptable as long as the data are complete and can be retrieved during inspections*. ST
- The ships illness medical log, surveillance forms and questionnaires including all completed copies should be available for review by the authorities conducting inspections and outbreak investigations. ST

2.6 Confidentiality

All personal medical information collected by the medical staff must be protected in accordance with EU legislation for personal data protection. LEG[2, 3, 4, 5]

Notification and Maritime Declaration of Health (MDH)

2.7 Notification to the next port

- Officers in command of ships, or their agents, must make known to the port, as early as possible before arrival at the port of destination, any cases of illness indicative of a disease of an infectious nature, irrespective of case numbers, or evidence of a public health risk on board as soon as such illnesses or public health risks are made known to the officer (ships physicians or doctors must always submit information to the master for reporting). LEG[1, 6]
- This information must be immediately relayed to the competent authority for the port. LEG[1, 6]

2.7.1 Notification under urgent circumstances

In urgent circumstances, such information should be communicated directly by the master/officers to the relevant port authority. ST

2.8 Maritime Declaration of Health

- For ships on international voyages, the master of a ship, before arrival at its first port of call in the territory of a State Party, must ascertain the state of health on board, and, except when that State Party does not require it, the master must, on arrival, or in advance of the ship's arrival if the ship is so equipped and the State Party requires such advance delivery, complete and deliver to the competent authority for that port a MDH (Annex 10, page 242) which must be countersigned by the ship's doctor, if one is LEG[1, 6]

* National legislation in Germany requires hard copies of the medical log.

carried.

- The information included will be assessed by the competent authority. LEG[1]
- If a doctor is on board, it is recommended to provide additional information on the case of illness to support the assessment of the competent authority. LEG[1]

2.9 Ships without doctor

In the absence of a doctor, the master should regard the following symptoms as grounds for suspecting the existence of a disease of an infectious nature: ST

- any individual on board (excluding those with symptoms or other indications of a pre-existing chronic medical condition) who displays the following:
  a) fever ≥ 38 °C (≥ 100.4 °F), persisting for several days or accompanied by: (i) prostration, (ii) decreasing level of consciousness, (iii) swollen glands, (iv) jaundice, (v) persistent cough or shortness of breath, (vi) unusual bleeding, or (vii) recent weakness or paralysis;
  b) with or without fever: (i) any acute skin rash or eruption*, (ii) severe vomiting (other than sea sickness), (iii) severe diarrhoea, or (iv) recurrent convulsions.

Specific recommendation for gastroenteritis outbreak reporting

2.10 Outbreak reporting

- For reporting of gastroenteritis outbreak alert, an initial report should be prepared and sent to the competent authority at the next port of call, when the percentage of reportable cases reaches 2 % or more among passengers or 2 % or more among crew. A second update report should be sent when the number of cases reaches 3 % or more among passengers or 3 % or more among crew. ST
- For updates, the report should be sent not less than four hours before the next port of call. ST
- The ship communication form (S2) found in Annex 11 page 238 may be used in addition to the MDH for reporting the details of any reportable case or outbreak alert. ST[7]

* Excluding allergic reactions in persons with history of allergy.

Tools to help with communicable disease surveillance

Case/outbreak recording

2.11 Ship communication form

- The ship communication form found in Annex 11 (page 238) should be used for record keeping of any case/outbreak or event of public health concern, unless the ship uses other forms or has other system in place to record the same information. ST
- This information should be kept on board for at least 12 months and be available for inspection. ST
- The ship communication form may be used in addition to the MDH for the purposes of reporting additional information to the competent authorities. ST

2.12 Case definitions

For recording or reporting purposes the use of EC case definitions is recommended*. ST[8, 9, 10]

Routine record keeping for GI and ILI

2.13 GI or ILI recording form

- The recording form found in Annex 12 (page 243) should be used for recording of any GI or ILI, unless the ship implements other system to record and monitor GI or ILI cases, or unless the cruise/voyage lasts for less than 24 hours. ST
- This form should be completed by the designated crew of the ship at the end of the day, unless the ship implements other system to record and monitor GI or ILI cases, or unless the cruise/voyage lasts for less than 24 hours. ST

2.14 GI or ILI

For GI and ILI routine surveillance data (Annex 12, page 243) (including zero recording) should be collected and reviewed on a daily basis for each voyage and be available for inspections. ST

2.15 Anti-diarrhoeal medication

Anti-diarrhoeal medication should be provided exclusively by designated staff on board. Logs with the names and cabin numbers for all who are provided anti-diarrhoeal medication should be maintained. ST

* http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02002D0253-20120927&qid=1424881298598&from=EN

Referenced legislation

1. International Health Regulation 2005
2. Directive 95/46/EC of the European Parliament and of the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and on the free movement of such data
3. Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications)
4. Directive 2006/24/EC of the European Parliament and of the Council of 15 March 2006 on the retention of data generated or processed in connection with the provision of publicly available electronic communications services or of public communications networks and amending Directive 2002/58/EC
5. Regulation (EC) 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data
6. Directive 2010/65/EU on reporting formalities for ships arriving in and/or departing from ports of the Member States and repealing Directive 2002/6/EC
7. Decision No 1082/2013/EU of the European Parliament and of the Council of 22 October 2013 on serious cross-border threats to health and repealing Decision No 2119/98/EC
8. Commission Decision 2000/57/EC and Commission Decision of 28 April 2008 amending Decision 2000/57/EC as regards events to be reported within the early warning and response system for the prevention and control of communicable diseases
9. Commission Decision 2002/253/EC laying down case definitions for reporting communicable diseases to the Community network under Decision No 2119/98/EC of the European Parliament and of the Council
10. Commission Implementing Decision 2012/506/EU amending Decision 2002/253/EC laying down case definitions for reporting communicable diseases to the Community network under Decision No 2119/98/EC of the European Parliament and of the Council

3. FOOD SAFETY

3. FOOD SAFETY

There are a number of factors which influence the standards of food safety and the likelihood of foodborne illness on passenger ships. On passenger ships, a large number of people commonly eat from the same food supply. The sources of food supplied to ships may vary depending on the previous ports of call of the ship although many ships routinely store provisions from controlled sources in designated ports.

Food handlers on ships come from a variety of countries and their experience and understanding of safe food handling procedures, together with the levels of hygiene training and expertise on the ship, can vary considerably. Extensive menus with many dishes are often offered to passengers, many of whom eat on board for the majority of their voyage. As on land, the preparation of a wide variety of foods at the same time for a large number of people can increase the risks of mishandling or cross-contamination. Most ship companies seek to reduce such risks by good design — in particular the installation of adequately sized, fully equipped food rooms and the separation of 'low risk' and 'high risk' food processes. Other factors that influence the standards of food safety may include: a) the effective implementation and maintenance of food safety management systems including HACCP; b) the standard of food facilities and equipment including durability and ease of cleaning; c) the age of food production facilities; and d) the effective repair, maintenance and condition of food handling facilities and equipment.

3.1 Hazard Analysis and Critical Control Point

HACCP is a documented, structured and systematic food safety management system. It consists of the analysis of potential food hazards within a process, the identification of points in the food production process where action should be taken to prevent these hazards, and the recording, monitoring and, where necessary, the modification of the food process and the procedures for HACCP principles implementation.

Passenger ships need to use a HACCP-based approach to ensure food safety during all stages of food production, from supply and storage through to preparation, cooking and final service.

Legal requirements (LEG)/recommended standards (ST)

Item	Details	LEG/ ST
	HACCP Principles	
3.1.1 HACCP implementation	Passenger shipping operators must be able to show that they are applying the HACCP principles in relation to food production, storage and service as follows.	LEG[1]
3.1.2 Identification	**a. Identifying any hazards (Annex 13, page 246) that must**	LEG[1]

of hazards	**be prevented, eliminated or reduced to acceptable levels.**	
3.1.3 Identification of CCPs	**b. Identifying the Critical Control Points (CCPs) at the step(s) or steps at which control is essential to prevent or eliminate a hazard or to reduce it to acceptable levels.**	LEG[1]
3.1.3.1 Description of CCPs	• A CCP is a point, step or procedure at which controls can be applied and a food safety hazard can be prevented, eliminated or reduced to acceptable levels.	ST
	• A control point may be critical if the lack of any control measure at that stage is likely to cause a health risk when the food is eventually consumed.	ST
	• It is vital that the CCPs are correctly identified as control needs to be exercised at these points to ensure food safety.	ST
	• A simple way to do this is to construct a flow chart for the various processes within the ship's food operations.	ST
3.1.4 Establishment of CLs	**c. Establishing Critical Limits (CLs) at CCPs which separate acceptability from unacceptability for the prevention, elimination or reduction of identified hazards.**	LEG[1]
3.1.4.1 Information on CLs	• A CL is the minimum or maximum value to which a physical, chemical or microbiological hazard should be controlled at a CCP to prevent, eliminate or reduce to an acceptable level a food safety hazard.	ST
	• CLs separate acceptability from unacceptability.	ST
	• When CLs are set they should be realistically achievable, practical and recordable and should effectively reduce or minimise the hazard concerned.	ST
3.1.5 Monitoring procedures	**d. Establishing and implementing effective monitoring procedures at CCPs.**	LEG[1]
3.1.5.1 Information on monitoring procedures	• A HACCP system should ensure that all control measures at CCPs are effectively monitored.	ST
	• Different hazards will require different control measures and different CLs. This means that monitoring methods may vary within a ship food operation.	ST
3.1.6 Corrective actions	**e. Establishing corrective actions when monitoring indicates that a CCP is not under control.**	LEG[1]

3.1.6.1 Information on corrective actions

- Corrective actions should be taken when monitoring indicates a deviation from an established CL. ST
- Corrective actions are intended to ensure that no product injurious to health or otherwise adulterated as a result of such a deviation is used or served. ST
- Corrective actions have two important functions: ST
  - first, to ensure that immediate steps are taken to prevent unsafe food being served to customers by, for example, rendering the food safe by further cooking or by throwing the contaminated food away;
  - second, to prevent a re-occurrence of the same problem by identifying the cause of the failure of the control measure and taking appropriate actions to effectively counteract the problem.

3.1.7 Establishment of procedures

f. Establishing procedures, which must be carried out regularly, to verify that the measures outlined in subparagraphs (a) to (e) are working effectively. LEG[1]

3.1.8 Validation

- Validation is concerned with obtaining evidence that the procedures for HACCP principles implementation will be effective. ST
- Validation should ensure that the information supporting the procedures for HACCP principles implementation is correct. ST

3.1.9 Verification

- Verification is a management task that involves checking that HACCP is working effectively and controlling the hazards identified within a ship's food operations. ST
- Verification actions should be recorded and documented to provide evidence that the HACCP system is working effectively. ST
- Verification procedures may include such activities as review of the procedures for the HACCP principles implementation, CCP records, CLs, etc. ST

3.1.10 Record keeping

g. Establishing documents and records commensurate with the nature and size of the ship food operation to demonstrate the effective application of the measures outlined in subparagraphs (a) to (f). LEG[1]

3.1.10.1 Information on records

- Documentation and record keeping should be appropriate to the nature and size of the operation, the hazards identified and the procedures required for their control. ST
- Documentation and record keeping should be sufficient to help ST

verify that the necessary HACCP controls are in place and being maintained.

- Efficient and accurate record keeping is essential in the application of procedures for HACCP principles implementation. ST
- HACCP records should be kept up to date. ST
- Records should be kept as simple and easy to understand and use as possible. ST
- Records should be kept for at least 12 months and be available for inspection. ST

3.1.11 Modification

When any modification is made to the product, process, or any step, ship food operators must review the procedure and make the necessary changes and updates to it. LEG[1]

3.1.12 Review

A review of the procedures for HACCP principles implementation should be undertaken when there is a change that may affect food safety to ensure that the system continues to be valid for the passenger ship food operator, for example, when: ST

- a new food or menu item is produced or used, or a new catering method of food production process is applied;
- a failure or deficiency is observed in the system;
- a food safety incident occurs.

3.2 Food handlers

Food handlers can avoid creating food safety risks (such as causing contamination of food) provided they are well trained and know how to handle raw foodstuffs (which requires cooking or other process) and ready-to-eat food. It is a legal requirement (Regulation (EC) No 852/2004) that crew involved in a ship food operation are trained and/or supervised as appropriate for their work activity. Responsibility for ensuring that food handlers are supervised, instructed and/or trained lies with the ship food operator. Supervision, instruction and training aim to ensure that food handlers work hygienically.

Food handlers who prepare or handle food while ill with infectious diseases transmissible through food can contaminate food and transmit illness to consumers. Excluding food handlers with infectious diseases from work is necessary to help ensure that food does not facilitate the spread of infection on a ship.

Food may be contaminated when it comes into contact with dirty surfaces or when appropriate hygiene practices are not properly applied. Hygiene practices aim to protect food from the risk of biological, chemical or physical contamination and prevent any organisms growing to an extent that would expose passengers and crew to risk or result in premature decomposition of food.

Training of food handlers

Item	Details	LEG/ ST
	Training plan and record keeping	
3.2.1 Training plan	There should be a training plan which identifies: - the number and the type of food handlers employed; - the training required by each food handler.	ST
3.2.2 Record keeping	Up to date, completed records of each food handler's training should be maintained and be available for inspection.	ST
3.2.3 Food handler training	Ship operators must ensure that food handlers are trained in food hygiene matters commensurate with their work activity.	LEG[1]
3.2.3.1 Food handler training and demonstration of knowledge	• Food handlers should be trained to an appropriate level as determined by the types of food they handle. Examples of appropriate levels and suggested training content and a model training plan are contained in Annex 14 (page 247).	ST
	• Food handlers should demonstrate knowledge in food hygiene matters commensurate with their work activity.	ST
	• If a food handler has several different duties within a ship food operation, he/she should be trained to the highest training level for the food types involved.	ST
	Exemption	
3.2.4 Non-food handlers	Non-food handlers who enter the food preparation areas, such as engineers, pest control crew, outside contractors and any other crew who work in these areas should receive appropriate supervision, instruction and/or training commensurate with their activities. Tools which are needed for works within food preparation areas need to be cleaned and/or disinfected. Alternatively, there should be a separate set of tools which is available for use in food preparation areas.	ST

Food handlers' diseases: reporting and restriction

Item	Details	LEG/ ST
	Health of food handlers	
3.2.5 Diseases	Food handlers who are infected by pathogenic microorganisms * transmissible through food must be excluded from food handling activities.	LEG[1]
3.2.6 Medical permission	• Supervisors should ask the medical staff or other designated crew to issue written release/authorization to return to work, for food handlers to return to their duties after recovery.	ST
	• A record of the written release/authorization to return to work should be maintained for at least 12 months and be available for inspection.	ST
3.2.7 Reporting symptoms	Food handlers must report any symptoms of infectious disease transmissible through food to their supervisor. These usually include: - Vomiting, - fever (≥ 38 °C (100.4 °F)), - abdominal cramps, - diarrhoea, - sore throat with fever, - any discharges from their nose, - persistent coughing and sneezing, - visible sores on their hands, arm or face, - jaundice.	LEG[1]
3.2.8 Covering of wounds	Crew working in food handling areas should cover wounds which have the potential to contaminate food (on hands or other exposed parts of the body) with waterproof dressings.	ST

Hygiene practices and personal hygiene of food handlers

Item	Details	LEG/ ST
	Food handlers' hygiene	
3.2.9 Hygiene	Food handlers must prevent food contamination by working	LEG[1]

* such as *E. coli*, *Salmonella* Typhi, *S.* Paratyphi, *Giardia lamblia*, other parasites, hepatitis A, norovirus, etc.

practices

hygienically.

3.2.10 Personal cleanliness

Crew working in a food handling area must maintain a high degree of personal cleanliness. LEG[1]

Clothing

3.2.11 Clothing

Crew working in a food handling area must wear suitable, clean, clothing. LEG[1]

3.2.11.1 Protective clothing and uniforms

- Protective clothing or uniforms should be changed as soon as they get dirty. ST
- Outdoor clothes and personal effects should not be brought into food preparation, handling or storage areas. ST
- Protective clothing or uniform should be considered as possibly contaminated and handled and washed as described in section 7.6. ST
- Protective clothing or uniform should be light coloured, suitable for the work being carried out and either be disposable or able to be disinfected. ST
- Protective clothing or uniform should completely cover other clothing. ST
- Clean protective clothing or uniform should be available on demand, in case it becomes soiled and needs to be changed. ST
- Food handlers protective clothing or uniform which is soiled or contaminated while they are outside the food areas (e.g. during breaks) must be changed before resuming work. ST

Jewellery

3.2.12 Jewellery wearing

Food handlers should not wear jewellery, pendants, watches, pins or other decorative items except for a flat plain ring. ST

Hair

3.2.13 Hair restraining and covering

- Crew working in food handling areas should cover their head to prevent any hair or sweat from falling into food. ST
- Long hair should be restrained within a hair covering. ST

3.2.14 Facial hair covering

Long facial hair such as moustaches and beards, which are heavy or pronounced, should be covered with a snood. ST

Nails

3.2.15 Nail hygiene

Fingernails should be kept short and clean. ST

3.2.16 Artificial nails and nail varnish

Artificial nails and nail varnishes should not be used. ST

Gloves

3.2.17 Glove wearing

- The use of disposable gloves should not replace effective hand washing. ST
- Disposable gloves should be used properly. Food handlers using disposable gloves should follow the guidelines given below. ST

If food handlers wear gloves, the following recommended standards should be followed.

- Wash and dry hands thoroughly before putting on gloves.
- Change gloves frequently.
- Change gloves after handling raw foods (which requires cooking or other process) and before handling cooked or ready-to-eat foods.
- Discard gloves that are torn, dirty or contaminated (gloves should not be left on the top of work surfaces).
- If stopping preparing food to carry out another non-food handling task, such as answering the telephone or taking money from a customer, always take off gloves and put on a new pair before handling food again.
- Discard gloves when they are taken off for any reason.
- The re-use or sharing of disposable gloves is forbidden.

Hand washing

3.2.18 Triggers for hand washing

- Food handlers should wash their hands as frequently as necessary during the day and always: ST
  - before starting work;
  - before touching any raw meat or high-risk foods;
  - during food preparation as often as may be necessary to keep hands clean;
  - after break periods;
  - after using the toilet;
  - after touching any raw meat or high-risk foods, using cleaning chemicals and materials, discarding waste/rubbish, having dealt with dirty dishes, utensils or other equipment, or coming in contact with any dirty item;
  - after eating or drinking, smoking or using tobacco, coughing or sneezing, touching their hair, face, nose, mouth, wounds or

	sores, or changing any wound dressings/plasters; - when changing from working with raw food which needs to be cooked and any ready-to-eat food. See Annex 15, page 250 for hand washing technique.	
	• Alcohol antiseptics (hand sanitisers) should not be used instead of hand washing in food preparation areas. They may be used after washing and the product should be appropriate for use by food handlers.	ST
	• It is recommended that the wash hand basin taps are turned on and off using the arm, elbow or foot to minimise hand contact*.	ST
	Other contamination sources	
3.2.19 Other contamination sources	Food handlers should not: - cough, sneeze or spit over or around food; - pick, scratch or blow their nose; - taste food with their fingers or an unwashed utensil; - blow into glasses to polish them or bags to open them; - smoke or use tobacco (pipes, cigars, etc.) in food preparation and handling areas, including chef's office if the office is incorporated in the galley area; - drink or eat (food, gum, etc.); - lick their fingers when handling food or wrapping materials.	ST

3.3 General requirements for food handling areas

Food handling areas must be kept clean and maintained in good repair. The layout, design, construction and size of food handling areas must permit adequate cleaning and/or disinfection; protect against the accumulation of dirt and contaminants; permit good hygienic practices including protection against cross-contamination; and provide suitable temperature conditions for hygienic food handling.

Item	Details	LEG/ ST
	Decks	
3.3.1 Materials	The materials used for deck construction in all food rooms must be impervious, durable, non-absorbent, washable and non-toxic.	LEG[1]
3.3.1.1 Suitable materials	Suitable materials may include:	ST

* Where this is not practicable food handlers should turn off taps using disposable tissue or hand drying towels.

- stainless steel,
- ceramic, quarry tiles,
- epoxy resin,
- terrazzo.

3.3.2 Defects	Decks, deckheads and bulkheads should be free from cracks, crevices or pitting.	ST
3.3.3 Easy to clean surfaces	Decks must be easy to clean.	LEG[1]
3.3.3.1 Coved decks	In galleys or other high-risk food areas, it is recommended that decks are coved at bulkheads to facilitate cleaning.	ST
3.3.4 Repairing	Decks, deckheads and bulkheads must be kept in good condition.	LEG[1]
3.3.5 Construction	The construction of decks should prevent the accumulation of dirt and debris and allow for adequate surface drainage.	ST

Bulkhead surfaces

3.3.6 Accumulation of dirt	Bulkhead surfaces and fixtures such as bulkhead electrical sockets must be made of materials that prevent accumulation of dirt and undesirable substances such as mould.	LEG[1]
3.3.6.1 Materials	• The materials used for bulkhead surfaces should be impervious, non-absorbent, cleanable and non-toxic.	ST
	• Suitable materials may include: - stainless steel, - ceramic tiles, - washable painted steel, - PVC, - epoxy resin and similar coatings.	ST
3.3.6.2 Design	Bulkhead surfaces must be smooth.	LEG[1]
3.3.7 Defects	Bulkhead surfaces should be free of obstructions, holes and other obstacles or recesses in which dirt can accumulate.	ST
3.3.8 Cleanable surfaces	Bulkhead surfaces should be cleanable to a height at which they may be soiled with food particles during normal use.	ST

Deckheads

3.3.9 Accumulation of dirt

Deckheads and overhead fixtures (e.g. lights) must be made of materials that prevent the accumulation of dirt and undesirable substances such as mould. LEG[1]

3.3.9.1 Design and materials

- Suitable materials may include among others stainless steel and smooth washable painted steel. ST
- In order to prevent the accumulation of dirt direct fixed deckheads or suspended deckheads should be installed. ST
- Deckhead surfaces should be smooth and cleanable. ST
- Deckhead surfaces should be in good condition. ST

Cleaning and disinfection

3.3.10 Cleaning and disinfection

All decks, deckheads and bulkheads must be maintained in a clean condition and disinfected periodically to remove any mould build up and any other particles or debris that could fall into food. LEG[1]

Windows and other openings

3.3.11 Materials

Windows or portholes must be constructed to allow effective cleaning and to prevent the accumulation of dirt. LEG[1]

3.3.12 Prevention of contamination

Windows should be protected to prevent contamination of foodstuffs and to exclude pests. LEG[1]

3.3.12.1 Protection

Windows should be closed, protected with a screen of hole size of no more than 0.16 cm (0.06 in) or protected by other means. ST

Doors

3.3.13 Cleaning and disinfection

- Doors must be made of materials that can be easily cleaned. LEG[1]
- Doors that require disinfection must be made of a material that can be easily disinfected. LEG[1]

3.3.14 Materials

Suitable materials may include: ST

- gloss painted wood,
- laminated glass,
- stainless steel,
- plastic,
- rubber.

3.3.15 Construction	Doors should be flush fitting to avoid angles and mouldings that accumulate dirt.	ST
3.3.16 Fingerplates and handles	Door fittings likely to come in contact with hands such as fingerplates and handles should also be capable of being disinfected.	ST
3.3.17 Self closing door	Doors should preferably be automatic or self-closing.	ST
	Equipment and food contact surfaces	
3.3.18 Sound condition	Food contact surfaces (including surfaces of equipment) in areas where foods are handled and, in particular, those in contact with food are to be maintained in a sound condition and be easy to clean and, where necessary, to disinfect.	LEG[1]
3.3.19 Materials	The materials used for surfaces must be smooth, impervious, non-absorbent, washable and non-toxic and food grade.	LEG[1]
3.3.19.1 Suitable materials and coating	• Suitable materials may include: - stainless steel, - marble, - ceramics, - food grade plastics.	ST
	• Food contact surfaces constructed of materials not meeting these standards should be coated using materials that meet these standards.	ST
3.3.20 Cleaning	Windows and other openings, doors and other surfaces (including surfaces of equipment) in areas where foods are handled must be kept clean.	LEG[1]
	Lighting in food preparation areas	
3.3.21 Lighting	• Light bulbs should be covered or shatter-resistant in areas where there is exposed food, clean equipment, utensils and linen or unwrapped single service and single use articles.	ST
	• Infrared or heat lamps should be protected against breakage.	ST
	Ventilation in food preparation areas	
3.3.22 Ventilation	There must be sufficient natural or mechanical ventilation in food preparation areas. Mechanical airflow from a contaminated area to a clean area must be avoided. Filters and other removable parts of the	LEG[1]

ventilation system should be easily accessible for cleaning and maintenance.

3.4 General food safety rules

General food safety rules/source/purchasing

Food safety starts with the source of food products. It is important for a ship food operation to select appropriate suppliers. Ship food operators must have systems in place to check delivered foods and must not accept on board, or must remove, any contaminated, defective or spoiled foodstuffs.

Item	Details	LEG/ ST
	General food safety/source	
3.4.1 Safe food	Ship food operators must ensure that food meets safety requirements.	LEG[1]
3.4.1.1 Expired food	Foods which, from a microbiological point of view, are highly perishable (high-risk food), must have a 'use by' date. After the 'use by' date, a food shall be deemed to be unsafe.	LEG[2]
3.4.1.2 Protection from contamination	At all stages of production, processing and distribution, food is to be protected against any contamination likely to render the food unfit for human consumption, injurious to health or contaminated in such a way that it would be unreasonable to expect it to be consumed in that state.	LEG[1]
3.4.1.3 Quarantine and disposal	Any food discovered on board which is suspected of being contaminated, defective or spoiled must be quarantined from sound foodstuffs and disposed of from the ship as soon as practicable.	LEG[1]
3.4.1.4 Release from quarantine	If no evidence is identified that confirms contamination then the suspect food may be released from quarantine, providing there have been no subsequent issues caused by handling, cross-contamination, temperature abuse or shelf life of the suspected item.	ST

3.4.2 Food source	Ship food operators should obtain food from approved and nominated suppliers*.	ST
3.4.3 Contamination during transport	All foodstuffs must be protected from contamination during transport and transfer to the ship†.	LEG[1]
3.4.4 Supplier's list	Passenger shipping companies should inspect the suppliers' establishments or otherwise assess the safety of the operation before they are added to any approved supplier list‡.	ST
3.4.5 Details of list	• An approved list of direct suppliers should be used and should include either the name of the company or person, their address and documentation to prove the suppliers establishments' permit/registration or other food safety approval.	ST
	• The ship food operators and food suppliers should have a specification, detailing a written agreement regarding the safe standards of foodstuffs supplied to the ship.	ST
	• The approved list of direct suppliers can be maintained either on board or ashore. The ship should contact the shore side office to get answers if needed during inspection or other situation.	ST

Purchasing

3.4.6 Purchasing of food materials	Effective controls should be in place to ensure that approved suppliers are used during purchasing.	ST
3.4.7 Checking of foodstuffs	A representative part of each delivery should be checked on arrival at the ship.	ST
3.4.7.1 Defective items	Any defective items, such as dented cans§, expired foodstuffs, improperly packaged foodstuff or food unfit for human consumption must be rejected.	LEG[1]
3.4.7.2 Rejection	High-risk foods must be checked and those which do not meet the required standards (including temperature) rejected.	LEG[1]

Food safety

* EUMS publish lists of establishments handling, preparing or producing products of animal origin that have received approval according to the requirements are laid down in Regulation (EC) 853/2004.

† This is the direct responsibility of the food supplier but the transportation and safe condition of food should be checked on arrival at the ship.

‡ These assessments may be made checking compliance with supplier third party accreditation and approval by an internationally recognised body or standard — for example ISO 22000 regarding food safety.

§ In this section 'dented' means in such a damaged condition that they may cause a food safety risk.

3.4.7.3 Responsibility

It is the responsibility of the ship operator not to supply food non-compliant with the food information law described in items 3.4.13 to 3.4.13.4. LEG[1]

3.4.8 Checking of temperatures

The temperature of quick-frozen foodstuffs must be stable and maintained, at all points in the product, at – 18 °C (– 0.4 °F) or lower, with possibly brief upward fluctuations of no more than 3 °C (5.5 °F) during transport. LEG[3, 4]

Food of animal origin	Temperature of raw meat during transport
Meat of domestic ungulates	- Offal: not more than 3 °C (37.4 °F) - Other meat: not more than 7 °C (44.6 °F)
Fishery products	- Frozen fishery products: not more than – 18 °C (– 0.4 °F) - Fresh fishery products, thawed unprocessed fishery products, and cooked and chilled products from crustaceans and molluscs: at a temperature approaching that of melting ice.

3.4.8.1 Other high-risk foods

Other high-risk chilled foods should be maintained at a temperature of ≤ 5 °C (41 °F) during transport*. ST

3.4.8.2 Temperature recording of quick-frozen foodstuffs

The means of transport of quick-frozen foodstuffs in EUMS must be fitted with suitable recording instruments to monitor, at frequent and regular intervals, the air temperature to which the quick-frozen foodstuffs are subjected. Temperature recording must be dated and stored by the ship food operator for a period of at least one year, or for a longer period taking into account the nature and the shelf life of the quick-frozen foodstuffs. LEG[4]

3.4.9 Record keeping

Records of all deliveries, with delivery details (date and time of delivery, officer in charge, and temperature log during transport (for food purchased in EUMS)) and item details must be kept on board for at least 12 months electronically or in hard copies for traceability. LEG[1, 5]

Storage and food information

The shelf life of stored food depends upon the nature of the food itself, its packaging, temperature and humidity. Foods, such as dairy products, meats and eggs will spoil rapidly if not protected from

* SHIPSAN recommends high-risk food storage temperatures at ≤ 5 °C (41 °F) as best practice however some EU countries require that chilled food is transported in a temperature of < 8 °C (46 °F).

contamination and stored at proper temperatures. Food that is temperature abused will spoil rapidly and this can be identified by changes in odour, flavour, colour, and/or texture. Dry food staples such as flour, seasonings and canned goods should be stored in their original packages or decanted into closed containers.

Item	Details	LEG/ ST
	Storage and food information	
3.4.10 Protection against contamination	Food must be stored so that it is protected against contamination, deterioration and infestation.	LEG[1]
3.4.10.1 Protection against cross-contamination	Different types of foodstuffs (raw and cooked/ready-to-eat, different types of raw foods of animal origin) should be stored separately to avoid any risk of cross-contamination, unless if they will be cooked together in the same recipe.	ST
3.4.11 Storage capacity	Food stores should be sufficient in number and capacity to maintain adequate, safe food storage conditions.	ST
3.4.12 Good storage practices	Food and stored ingredients must be located away from sources of contamination (e.g. from odours or pollution).	LEG[1]
3.4.12.1 Exposed foodstuffs and ingredients capable of being allergenic	• Exposed foodstuffs should be covered, or otherwise protected, to prevent contamination. • All ingredients capable of being allergenic (Table 1, page 66) have to be maintained separate from other foods and to be marked as such.	ST ST
3.4.13 Labelling of foodstuffs	• Ship operators must not supply food, which they know or presume to be non-compliant with the following requirements for the mandatory food information.	LEG[2]

- The following mandatory food information must appear on the prepackaging or on a label attached thereto, or on the commercial documents* referring to the foods and ingredients: LEG[2]
  a) the name of the food;
  b) the list of ingredients (except: in the case of glass bottles intended for reuse which are indelibly marked and which therefore bear no label, ring or collar; in the case of packaging or containers the largest surface of which has an area of less than 10 cm^2 where the information can be provided by other means or upon customer's request; in cases of beverages containing more than 1.2 % by volume of alcohol; and in the case of foods listed in Table 2, page 67);
  c) any ingredient or processing aid listed in Table 1 (page 66) or derived from a substance or product listed in Table 1 (page 66) causing allergies or intolerances used in the manufacture or preparation of a food and still present in the finished product, even if in an altered form;
  d) the quantity of certain ingredients or categories of ingredients (except: in the case of glass bottles intended for reuse which are indelibly marked and which therefore bear no label, ring or collar; and in the case of packaging or containers the largest surface of which has an area of less than 10 cm^2);
  e) the net quantity of the food;
  f) the date of minimum durability or the 'use by' date (see item 3.4.13.2) (Table 3, page 67). Foods that do not require an indication of the date of minimum durability are included in Table 4 (page 68);
  g) any special storage conditions and/or conditions of use (except: in the case of glass bottles intended for reuse which are indelibly marked and which therefore bear no label, ring or collar; and in the case of packaging or containers the largest surface of which has an area of less than 10 cm^2);

* Any official accompanying document that provides the following information could be accepted for prepacked food intended for supply to ship food operators for preparation, processing, splitting or cutting up.
The mandatory food information must appear:
- on the prepackaging, or
- on a label attached thereto, or
- on the commercial documents referring to the foods and ingredients where it can be guaranteed that such documents either accompany the food to which they refer or were sent before or at the same time as delivery.

However, mandatory food information for the name of food, the date of minimum durability or the 'use by' date, any special storage conditions and/or conditions of use and the name or business name and address of the food business operator must appear on the external packaging in which the prepacked foods are presented for marketing. Additionally, the 'use by' date shall be indicated on each individual prepacked portion.

h) the name or business name and address of the food business operator (except: in the case of glass bottles intended for reuse which are indelibly marked and which therefore bear no label, ring or collar; and in the case of packaging or containers the largest surface of which has an area of less than 10 cm^2);
i) the country of origin or place of provenance (except in the case of packaging or containers the largest surface of which has an area of less than 10 cm^2);
j) instructions for use where it would be difficult to make appropriate use of the food in the absence of such instructions (except: in the case of glass bottles intended for reuse which are indelibly marked and which therefore bear no label, ring or collar; and in the case of packaging or containers the largest surface of which has an area of less than 10 cm^2);
k) with respect to beverages containing more than 1.2 % by volume of alcohol, the actual alcoholic strength by volume (except: in the case of glass bottles intended for reuse which are indelibly marked and which therefore bear no label, ring or collar; and in the case of packaging or containers the largest surface of which has an area of less than 10 cm^2);
l) a nutrition declaration (apart: from those foods listed in Table 5, page 69; from the case of glass bottles intended for reuse which are indelibly marked and which therefore bear no label, ring or collar; the case of packaging or containers the largest surface of which has an area of less than 10 cm^2; and the case of beverages containing more than 1.2 % by volume of alcohol).

Additional information presented in Table 6 (page 70) is required for the certain foods.

- Mandatory food information must be available and must be easily accessible, for all foods. LEG[2]

3.4.13.1 Non-prepacked food

Where foods are offered for service or sale to the final consumer without prepackaging or where foods are packed on the ship at the consumer's request or prepacked for direct service or sale: indication of any ingredient or processing aid or derived from a substance or product listed in Table 1 (page 66) is mandatory. LEG[2]

3.4.13.2 'Use by' date

- In the case of foods which, from a microbiological point of view, are highly perishable and are therefore likely after a short period to constitute an immediate danger to human health, they must be labelled with the 'use by' date (see item 3.4.1.1). LEG[2]

Food safety

- The appropriate date must be expressed in accordance with Table 3 (page 67). LEG[2]
- The 'use by' date shall be indicated on each individual prepacked portion. LEG[2]

3.4.13.3 Traceability

All foodstuffs must be traceable. LEG[1, 6]

3.4.13.4 Durability of prepared food

Food prepared on a ship and held refrigerated for more than 24 hours should be clearly marked at the time of preparation to indicate the date or day by which the food should be consumed (7 calendar days or less from the day the food is prepared). The day of preparation is counted as day one (see item 3.4.17.1). ST

Dry storage

3.4.14 Dry stores standards

- Dry stores should be cool, dry and clean. ST
- Foodstuffs should be kept elevated off the decks. ST
- Dry food packages should be handled with care to prevent damage to the packing. ST
- Foodstuffs from cans and jars that are damaged, swollen or leaking should not be used. ST
- When foodstuff packaging has been damaged after delivery then loose dry foodstuffs (flour, rice, etc.) should be decanted and stored in sealed labelled containers. ST
- Humidity should be controlled (for example through sufficient airflow or air changes) because moisture can affect the safety of food products. ST
- Cans and jars may be placed in dry stores but once opened some products (mustard, mayonnaise, etc.) require refrigeration where stated by the manufacturers. ST

3.4.15 Dates of durability

Dates of durability of dry stored products are described in item 3.4.13. LEG[2]

3.4.16 First in — first out

Stored food should be rotated and used on a First In First Out (FIFO) system taking into account the durability date. ST

Cold storage

3.4.17 Cold storage practices

- Cold storage should be used to store high-risk foodstuffs which require temperature control to ensure their safety. This includes foods which may perish more readily at high temperatures (e.g. meat, fish or dairy products). ST
- Temperatures in cold stores should be checked at least daily using internal thermometers or external reading thermometers (see item ST

	3.5.10 for calibration standards). • Cold stores should be checked regularly and products that are spoiled or expired should be removed. Stored food should be rotated and used on a First In First Out (FIFO) system taking into account the durability date and 'use by' date.	ST
3.4.17.1 Retention time of high-risk, ready-to-eat food	High-risk, ready-to-eat food, at cold storage, should be discarded if not consumed within seven days from the date of preparation or opening, or according to the labelling instructions, when stored at ≤ 5 °C (41 °F)*.	ST
3.4.18 Prevention of cross-contamination	Foodstuffs with different risk profiles (e.g. raw and cooked) must be stored separately to avoid any risk of cross-contamination.	LEG[1]
3.4.18.1 Arrangement and labelling	• When it is not possible to separate food with different risk profiles and these are placed in the same refrigerator or upright freezer, they should be arranged as described below: - raw meats, raw fish and shellfish, raw poultry and eggs should be stored at the bottom; - unprocessed vegetables and fruits should be stored in the middle; - ready-to-eat food should be stored on the top shelf.	ST
	• Stored partially-used ingredients should be clearly labelled and stored so that food can be protected against moisture and contamination.	ST
3.4.19 Cold storage of high-risk foods	Ship food operators should ensure that high-risk food storage is at a temperature of ≤ 5 °C (41 °F)†.	ST
3.4.20 Storage of quick-frozen foodstuffs	The temperature of quick-frozen foodstuffs must be stable and maintained, at all points in the product, at – 18 °C (– 0.4 °F) or lower, except where a higher or lower temperature is recommended for specific products by the manufacturer.	LEG[4]
3.4.20.1 Storage of all other frozen foodstuffs	The temperature of foodstuff other than quick-frozen should be maintained at all points in the product, at – 18 °C (– 0.4 °F) or lower,	ST

* SHIPSAN recommends a high-risk food storage temperature of ≤ 5 °C (41 °F) or below as best practice however some EU countries require that chilled food is maintained at a temperature of < 8 °C (46 °F): when high-risk, ready-to-eat food, is stored at a temperature between 5 °C (41 °F) and 8 °C (46 °F), then this food must be discarded if not consumed within 5 days from the date of preparation or opening, or according to the labelling instructions.

† SHIPSAN recommends a high-risk food storage temperature of ≤ 5 °C (41 °F) or below as best practice however some EU countries require that chilled food is maintained at a temperature of < 8 °C (46 °F).

	except where a higher or lower temperature is recommended for specific products by the manufacturer.	
	Storage of unfit foodstuffs	
3.4.21 Unfit foodstuffs	Foodstuffs that are considered not suitable or unfit for human consumption must be marked and kept separately from other foodstuffs until discarded.	LEG[1]

Handling

During food handling, cross-contamination and physical contamination of products can occur. Cross-contamination is a key factor in foodborne illness, and it usually originates from four common sources: food itself, people, food contact equipment and work surfaces and pests.

Good hygiene practices in food service are of crucial importance. For example, one key safety issue in food service is the use of utensils (e.g. tongs and spoons) because their inappropriate use could lead to the contamination of food. Waiting crew and any chefs involved in food service are usually responsible for keeping food safe and preventing cross-contamination.

Item	Details	LEG/ ST
	Handling	
3.4.22 Cross-contamination during handling	• Raw food which requires cooking or any other processing before consumption and ready-to-eat/cooked foods should be kept separate from each other during handling and preparation to avoid cross-contamination.	ST
	• Different types of raw foods of animal origin (e.g. beef, poultry, fish) should be handled separate from each other, unless if they will be cooked together as ingredients of the same recipe.	ST
	• The same utensils and equipment (knives, plates, spoons, cutting boards, meat slicers, etc.) should not be used to handle raw food which requires cooking or other process and ready-to-eat foods without cleaning and disinfection between uses.	ST
	• Separate work surfaces, equipment and utensils should ideally be provided to prevent the risk of cross-contamination between different types of food.	ST
3.4.22.1 Chopping boards	• The same chopping boards must not be used for different types of foodstuffs unless cleaned and disinfected between uses.	LEG[1]

- Chopping boards and cook knives must be cleaned and disinfected before changing from raw food which requires cooking or other process and ready-to-eat foods (and vice versa) and, at least one, time every four hours if used for continuously with a single product. LEG[1]

3.4.22.2 Heavy soiling of vegetables and fruits

Any heavy soiling should ideally be removed from vegetables and fruits, before being transferred to galley areas. ST

3.4.23 Fruits and vegetables

Fruits and vegetables which will not be peeled should be rinsed with potable water and/or disinfectant solutions (where necessary) designed for foodstuffs before food preparation to remove soil, bacteria, insects and chemicals. ST

Service

3.4.24 Protection against contamination

Food in service should be protected against contamination. LEG[1]

3.4.24.1 Cross-contamination during service

- Crew involved in serving food should use clean utensils (e.g. a spoon or ladle) to serve food. ST
- The food contact part of serving utensils (tongs, ladles, spoons, etc.) used for food service should not be in direct contact with hands. ST
- A clean dish should always be used for serving cooked and prepared foods. ST
- Cooked food should never be placed back into the same container it was stored in before cooking or during preparation. ST
- Crew who serve food should wear clean clothing. ST
- Sneeze guards (front and side guards) or suitable protection should be installed to prevent contamination of food on display or in service. ST
- Each food item should have a separate serving utensil. ST
- Food handling staff should encourage passengers serving themselves not to handle food directly (e.g. hands, elbows, etc.), or to touch food with their jewellery (e.g. loose bracelets, chains). ST

3.4.24.2 Information to consumers

Consumers must be informed about the allergens of food in service as described in item 3.4.13.1. LEG[2]

Temperature and time control

To ensure that food remains safe, food handlers are required to make sure that food is kept either cold or hot at an appropriate temperature. It is unsafe for many foods to be kept for a long time at ambient temperature because this can allow the growth of pathogenic bacteria, which may multiply to unsafe numbers, release toxins or allow spores to germinate.
Frozen food should be thawed in a way that prevents it remaining at ambient temperature for a sustained period. If food is thawed too far ahead of when it is actually needed then the core temperature may remain at ambient temperature for long periods.

Item	Details	LEG/ ST
	Temperature control	
3.4.25 Temperature control	Raw materials, ingredients, intermediate products and finished products likely to support the reproduction of pathogenic microorganisms or the formation of toxins must not be kept at temperatures that might result in a risk to health. The cold chain must not be interrupted. However, limited periods outside temperature control are permitted, to accommodate the practicalities of handling during preparation, transport, storage, display and service of food, provided that it does not result in a risk to health.	LEG[1]
3.4.26 Devices and process	All refrigerators, freezers, cold stores, bain-maries, etc. should be capable of maintaining stored foods at the relevant temperatures.	ST
	Cooking	
3.4.27 Cooking temperatures	• The length and temperature of cooking should be sufficient to ensure the destruction of non-spore forming pathogenic microorganisms.	ST
	• For the safe preparation of whole cuts or joints of meat such as beef and pork all parts of them should reach a minimum of 63 °C (145 °F) or above for four minutes, or to equivalent temperature-time combination as described below or a scientific assessment of equivalent safe food cooking temperatures should be made.	ST

Temperature	Time*
54.4 °C (130 °F)	112 minutes
55.0 °C (131 °F)	89 minutes
56.1 °C (133 °F)	56 minutes
57.2 °C (135 °F)	36 minutes
57.8 °C (136 °F)	28 minutes
58.9 °C (138 °F)	18 minutes
60.0 °C (140 °F)	12 minutes

61.1 °C (142 °F)	8 minutes
62.2 °C (144 °F)	5 minutes
62.8 °C (145 °F)	4 minutes
63.9 °C (147 °F)	134 seconds
65.0 °C (149 °F)	85 seconds
66.1 °C (151 °F)	54 seconds
67.2 °C (153 °F)	34 seconds
68.3 °C (155 °F)	22 seconds
69.4 °C (157 °F)	14 seconds
70.0 °C (158 °F)	0 seconds
**Holding time may include post oven heat rise*	

- For minced meat and minced fish, the centre of the food should reach a temperature of at least 68°C (155 °F) for 15 seconds or according to the following table: ST

Temperature	Time*
63 °C (130 °F)	3 minutes
66 °C (131 °F)	1 minutes
70 °C (133 °F)	1 second (instantaneous)

- For poultry, lagomorphs (e.g. rabbit), stuffed fish, stuffed meat, stuffed pasta, stuffed poultry or stuffing containing fish, meat or poultry, all parts of the food should reach a temperature of at least 74 °C (165 °F) for 15 seconds. ST
- For fish and meats including pork, beef, lamb, for which the cooking temperature is not specified above, all parts of the food, should reach a temperature of at least 63 °C (145 °F) for 15 seconds. ST
- Raw eggs that are not prepared for immediate service, should reach a temperature of at least 68 °C (155 °F) or above for 15 seconds or an equivalent temperature-time combination. ST
- Raw shell eggs that are broken and prepared in response to consumers' orders and for immediate service should reach a temperature of at least 63 °C (145 °F) or above for 15 seconds. ST
- Fruits and vegetables cooked for hot holding should be cooked to a temperature of 57 °C (135 °F). ST

3.4.27.1 Live bivalve molluscs

Live bivalve molluscs: immersion in boiling water for the period required to raise the internal temperature of the mollusc flesh to not less than 90 °C (194 °F) and maintenance of this minimum temperature for a period of not less than 90 seconds. LEG[3]

3.4.27.2 Stirring

Heat should be distributed throughout soups/gravies/stews/custard and other liquid based foods by stirring. ST

Food safety

3.4.27.3 Frying oil

- Frying oil should be changed when the content of total polar compounds is more than 25 %. ST
- If a measuring device (cooking oil tester/food oil monitor) is not available, the frying oil should be changed if foaming occurs during heating, if it changes colour (darkens or lightens) or if it has/acquires unusual taste, smell and/or odour. ST

3.4.28 Sushi

The ship food operator must ensure that the fishery products to be consumed raw, have been preserved as frozen fishery products for a sufficiently long period to kill the viable parasites. LEG[3]

3.4.28.1 Documentation

- For fishery products derived from finfish or cephalopod molluscs: (a) fishery products intended to be consumed raw; or (b) marinated, salted and any other treated fishery products, if the treatment is insufficient to kill the viable parasite; the ship food operator must ensure that the raw material or finished product undergo a freezing treatment in order to kill viable parasites that may be a risk to the health of the consumer. These fishery products must be accompanied by a document issued by the food business operator performing the freezing treatment, stating the type of freezing treatment that the products have undergone. LEG[3]
- The ship food operator must ensure that the fishery products intended to be consumed raw, which have undergone other acceptable treatment (other than freezing treatment), are accompanied by documents stating that these fishery products originate from a fishing ground or fish farming which complies with the specific conditions required by legislation. LEG[3]

Cooling

3.4.29 Cooling guidelines

Where foodstuffs are to be held or served at chilled temperatures they are to be cooled as quickly as possible following the heat-processing stage, or final preparation stage if no heat process is applied, to a temperature which does not result in a risk to health. LEG[1]

3.4.29.1 Cooling process

The temperature at the centre of the food product should be reduced from 57 °C (135 °F) to 21 °C (70 °F) in less than two hours; and from 21 °C (70 °F) to 5 °C (41 °F) or less within a further four hours. ST

3.4.30 Cooling methods

The following methods may be used to cool foods rapidly: ST

- placing the food in shallow pans;
- separating the food into smaller or thinner portions;

- using rapid cooling equipment, such as 'blast chillers';
- stirring the food in a container placed in an ice bath;
- placing the food in containers that facilitate the rapid transfer of heat;
- adding ice as an ingredient to the food;
- cooling food containers or food under running cold potable water;
- storing the food in a cool designated area;
- placing the food in pre-frozen or cold containers;
- using a combination of the methods described above.

Ice cream

3.4.31 Temperature of frozen foods

Ice cream may be stored at a higher temperature only when it is about to be served. ST

Thawing

3.4.32 Thawing hazards

High-risk foods must be thawed quickly or using a method that will prevent them being kept for long periods at ambient temperature. LEG[1]

3.4.32.1 Ambient temperatures

Frozen foods should not be thawed at ambient temperatures. ST

3.4.33 Good thawing practices

- Thawing should be carried out by one of the following methods: ST
  - under refrigeration at a temperature of ≤ 5 °C (41 °F)*;
  - by completely submerging food in cold running potable water at a temperature not above 21 °C (70 °F) for a period not exceeding four hours;
  - as part of cooking process (but only when thawing is taken into consideration in determining cooking time and following any directions on the food packaging);
  - by using a microwave (attention is to be given to ensure a proper thawing cycle-controlled time or temperature).
- When using water to thaw food, cold running potable water should be used in a clean unstopped (i.e. no plug inserted) sink. ST
- Thawing should be carried out in a container that is larger than the food which is to be thawed. ST
- Thawed food should not be refrozen except where it is used as an ingredient in a food that is cooked and then frozen. ST
- Food should be covered completely unless it is an item which can be thawed in its original packaging or is otherwise protected. ST

* SHIPSAN recommends a thawing temperature of 5 °C (41 °F) or below as best practice however some EU countries require that frozen foods are thawed in a temperature of < 8 °C (46 °F).

- If food is thawed in a refrigerator which is also used for food storage then it should be placed on the lowest shelves of the unit and below any stored items. ST
- While defrosting food, it should not be kept in contact with other types of food. ST
- All frozen foods should be thawed prior to cooking except foods that have manufacturer's instructions which state otherwise. ST
- Thawed frozen foods should be cooked as soon as possible. ST

3.4.33.1 Run off liquid

The run off liquid must be held and disposed of appropriately to avoid any risk of cross-contamination. LEG[1]

3.4.34 Labelling

When the thawing method requires controlled time or temperature, these should be monitored. ST

3.4.35 Record keeping

When the thawing method requires controlled time or temperature, records of food thawing including core temperatures and thawing times should be maintained for at least 12 months and be available for inspection. ST

Reheating

3.4.36 Reheating temperatures

- Reheating food should be carried out rapidly. The maximum time allowed should not be greater than two hours. The reheating process should be adequate to ensure food reaches a safe core temperature. ST
- The reheating process of high-risk food should be adequate to ensure that the centre of the food reaches a temperature of at least 74 °C (165 °F) for 15 seconds or 82 °C (180 °F) for one second. ST

3.4.37 Reheating restrictions

It is advised that food should not be reheated more than once. ST

Hot holding

3.4.38 Hot holding temperature

High-risk food which is to be held hot should be kept at a temperature of at least 57 °C (135 °F) or above until required (except where time is used as a control as set out in item 3.4.41). ST

3.4.39 Temperature check

Checks should take place on a regular basis to ensure that high-risk foods are held at or above 57 °C (135 °F). ST

	Cold holding	
3.4.40 Cold holding temperatures	If high-risk food is to be held cold, it must be kept at temperatures that are given in item 3.4.19 (storage temperatures), or time must be used as a control set out in item 3.4.41.	ST
	Time as a control	
3.4.41 Time as a control for served food	When time is used as a control for served high-risk food, then: - hot food should be displayed for a maximum of four hours, from the time that the food is removed from hot holding temperatures to the time of consumption; - cold food should be displayed for a maximum of four hours from the time that the food is removed from cold storage to the time of consumption; - food not consumed within four hours should be disposed of.	ST

3.5 Equipment and utensils

Materials used in the design and the construction of equipment and utensils should not affect the safety or quality of food. Equipment and utensils should be designed and constructed with materials that are durable and easy to clean. The materials used should retain their properties when used under normal conditions.

Item	**Details**	**LEG/ ST**
	Characteristics of materials	
3.5.1 Properties of materials	Materials used in the construction of equipment and utensils must be: - food safe, - non-toxic, - suitable for food contact, - easily cleanable, - corrosion-resistant, - smooth, - non-absorbent, - resistant to chipping, scratching, scoring and decomposition, - resistant to the damaging effects of detergents and disinfectants.	LEG[7]

Examples of appropriate materials for equipment and utensils:

- stainless steel,
- food grade plastics and laminates,
- copper and copper alloys (used only where rendered corrosion-resistant or where exposure to food is clearly and specifically limited to non-acidic (pH > 6) food and beverage),
- ceramic and enamelled ware,
- glass.

Migration

3.5.2 Migration of materials to foods

- Food contact materials must be made of substances that may not reasonably migrate or affect the characteristics of food. They must not be made of hazardous materials or impart a colour, taste or odour to food. LEG[1, 7]
- Ship food operators must have in place systems and procedures to allow identification of the businesses from which and to which, materials or articles intended to come into contact with food, used in their manufacture, are supplied. LEG[1, 7]

Utensils

3.5.3 Characteristics of utensils

- Rims, bases, handles and any other ledges or crevices of pots and pans should be easily cleanable and kept in sound condition. ST
- Containers and similar receptacles for unpackaged moist foods should be: ST
  - readily removable;
  - easily cleanable and be capable of being drained.

Design and construction

3.5.4 Design of equipment

- Equipment and utensils must be designed and constructed to facilitate cleaning. LEG[1]
- Equipment must be designed and constructed to prevent accumulation of dirt and debris. LEG[1]

3.5.4.1 Easy access

Equipment, control systems and services connected to the equipment should be designed so as to allow easy access for maintenance and cleaning. ST

3.5.5 Maintenance

There should be a suitable maintenance and cleaning programme or system in place for equipment. ST

3.5.5.1 Condition of equipment	Equipment should be kept in good order, repair and condition.	LEG[1]
3.5.5.2 Out of order equipment	Out of order devices should have sings or labels that clearly state that the devices are out of order and that they are not to be used.	ST
3.5.6 Good condition	All articles, fittings and equipment with which food comes into contact must be so constructed, be of such materials and be kept in such good order, repair and condition as to minimise any risk of contamination.	LEG[1]
3.5.7 Placing of equipment	There must be sufficient height between the equipment and the deck to allow adequate access for inspection, cleaning and maintenance of the equipment and to allow deck cleaning.	LEG[1]
3.5.8 Drainage	Drainage facilities must be designed and constructed to avoid the risk of contamination of foodstuffs.	LEG[1]
3.5.8.1 Base plates	Base plates used to support and fix equipment should have smooth, continuous and sloping surfaces to aid drainage.	ST
3.5.9 Temperature control	Where necessary, suitable temperature-controlled handling and storage conditions of sufficient capacity must be provided for maintaining foodstuffs at appropriate temperatures and designed to allow those temperatures to be monitored and, where necessary, recorded.	LEG[1]
3.5.9.1 Temperature measuring devices	• Equipment such as refrigerators, freezers, ovens, bain-maries and dishwashers should have working temperature measuring devices installed to help ensure that appropriate temperatures are achieved and allow effective monitoring. • Temperature measuring devices or thermometers on equipment should be periodically checked with a calibrated manual thermometer. This should be recorded and maintained on board for at least 12 months.	ST ST
3.5.10 Calibration	Food temperature measuring devices should be accurate and where necessary calibrated in accordance with the manufacturer's instructions.	ST
3.5.11 Location of temperature measuring devices	• Hot and cold food holding equipment should be equipped with at least one temperature measuring device that is positioned to allow easy observation of the device's temperature display, where temperature control is needed.	ST

	• In a mechanical refrigerated or hot storage unit, the sensor of the thermometer should be located to measure the air temperature in the warmest part of a mechanically refrigerated unit and in the coolest part of a hot storage unit.	ST
3.5.12 Capacity of equipment	• Equipment for food should be sufficient in number and capacity to maintain safe food storage, processing and service. • Equipment used for food storage/holding should have a data plate that specifies the maximum capacity of the unit.	ST ST
3.5.13 Transport equipment	The exposed surfaces and food contact space of food transport equipment should be easy to clean, disinfect and be kept in good repair.	ST
	Dish/pot/glass washing machines	
3.5.14 Characteristics of washing machine	Exposed surfaces of dish, glass and pot washing equipment should be corrosion-resistant, smooth and easily cleanable.	ST
3.5.15 Coating	Coatings used on temperature measuring devices should be resistant to cracking.	ST
3.5.16 Temperature thermostat	Wash tanks and pumped rinse tanks designed to heat water should be equipped with a temperature thermostat for maintaining the proper water temperature in the tank.	ST
	Freezers and refrigerators	
3.5.17 Types of freezers and refrigerators	All types of refrigerators and freezers should have controls capable of maintaining safe temperatures.	ST
3.5.18 Cleaning and maintenance	Refrigeration components should be accessible for necessary cleaning and maintenance.	ST
	Hot holding equipment	
3.5.19 Temperature measuring devices	Temperature measuring devices should be accurate to ± 1 °C (± 2 °F) in the intended range of use.	ST
	Ice cube making machine	
3.5.20 Protection of ice pans and bins	• The lids and doors on ice cube making machines should be kept closed when not in use. • When top openings into ice pans and bins are subject to potential	ST ST

	overhead contamination from drink dispensers or water stations, they should be protected during use and holding.	
	• Ice scoops should be stored in a hygienic manner so as not to contaminate the ice. The hand contact parts of the ice scoop should not be allowed to come into contact with ice.	ST
	• Ice cubes should normally be stored inside the machines. They may be transferred to a clean lidded ice bin/container for transport or service when required.	ST
3.5.21 Use of potable water	Potable water must be used for making ice cubes.	LEG[1]
	Sinks	
3.5.22 Resistance to corrosion	Food and equipment washing sinks must be made of a durable material and corrosion-resistant particularly if they come into contact with chemicals.	LEG[1, 7]
3.5.23 Materials	Sinks should be constructed from stainless steel or ceramics.	ST
3.5.24 Drainage	Utensil washing sinks should be equipped with a draining board and splash back.	ST
3.5.25 Design	Utensil washing sinks with three compartments (triple bowl) are preferred to single bowl or double sinks to allow an effective wash, rinse and disinfection operation.	ST
3.5.26 Taps	• Every sink should have a supply of potable water at cold and hot temperatures (e.g. mixer taps or separate hot and cold taps).	ST
	• Sink taps should preferably open and close with non-hand operated (elbow, knee, or foot) activation.	ST
3.5.27 Separate sinks	Separate sinks should be provided for food, utensil and hand washing.	ST
3.5.28 Hand washing facilities	Hand washing facilities must be supplied as described in section 7.2.	LEG[1]
3.5.29 Drain	The drain of food and equipment washing sinks should be designed as described in item 9.3.3.	ST

3.6 Cleaning, disinfection and storage of working utensils and equipment

Cleaning is the removal of food residues, dirt, grease and other undesirable soiling and debris. The risk of contamination of food by pathogenic microorganisms is reduced when utensils and equipment are kept clean. It is a legal requirement (Regulation (EC) No 852/2004) to keep premises, equipment, utensils and materials clean to help to ensure the safety of food. Disinfection is used in order to reduce the number of pathogenic and other microorganisms to safe levels by using physical or chemical means. Applying appropriate methods of cleaning and disinfection to work surfaces and utensils can control the number of pathogenic microorganisms present. Therefore, cleaning and disinfection are an essential and integral part of a ship food operators safe functioning.

Item	Details	LEG/ ST
	Cleaning and disinfection	
3.6.1 Cleaning of utensils and equipment	All utensils and equipment that may come into contact with food must be kept clean (see item 3.6.4).	LEG[1]
3.6.1.1 Disinfection of utensils	All utensils and equipment that may come into contact with high-risk food should be disinfected after cleaning (see item 3.6.6).	ST
3.6.2 Cleaning Schedule/Plan	• In a ship food operation, a suitable Cleaning Schedule or Plan should always be in place. • Cleaning Schedule/Plan records should be maintained and be available for inspection.	ST ST

Cleaning Schedule/Plan

This should include:

- the areas, surfaces or items to be cleaned;
- the types of cleaning materials to be used;
- the methods of cleaning and disinfection;
- the frequency of cleaning (before/after use, daily, weekly, monthly);
- any safety precautions for crew required;
- the function and station of the crew member doing the cleaning
- a signature of the person responsible for cleaning and disinfection;
- a signature of the supervisor/manager responsible for ensuring and checking the standards of cleaning.

3.6.3 Cleaning frequency	• Utensils and equipment should be cleaned both between tasks and during any food handling when cross-contamination could occur, such as after contact with high-risk foods.	ST

- Food temperature measuring devices (e.g. temperature probes) should be cleaned and disinfected before and after use. ST

Methods of cleaning utensils

3.6.4 Manual washing method

- A sink with at least three compartments should be used for manual utensil washing. ST
- In any operations where this is not possible, the sink should be cleaned and disinfected between uses to ensure that effective washing, rinsing and disinfection can be maintained. ST
- Manual washing should include the five stages listed below. ST
  - **Pre-cleaning**: removal of food waste by scraping, sweeping, wiping or pre-rinsing. Pre-soaking may also be used to help effective cleaning.
  - **Main cleaning** (first sink): loosening of surface waste and grease using hot water, detergent and brushes.
  - **Rinsing** (second sink): removal of any detergent traces using clean water.
  - **Disinfection** (third sink): killing of microorganisms to a safe level as described in item 3.6.6.
  - **Drying**: using suitable techniques (e.g. air drying).

3.6.5 Dish/pot/glass washing machine

Machine dish/pot/glass washing should follow the five stages listed below. ST

- **Pre-cleaning**: removal of food waste manually before loading the machine.
- **Main cleaning**: with clean hot water and detergent.
- **Rinsing**: removal of detergent using clean water. Normally known as 'intermediate rinse' in many conveyor and 'flight' type machines.
- **Disinfection**: killing microorganisms as described in point 3.6.6. Normally known as the 'final rinse' in many conveyor and 'flight' type machines.
- **Drying**: air drying. This may be achieved by blown warm air on some machines.

Disinfection

3.6.6 Methods of disinfection

- Utensils and equipment that come into contact with food should be disinfected using one or more of the following. ST
  - Hot water at a minimum temperature of 77 °C (171 °F) or above for at least 30 seconds (manual washing) or 82 °C (179.6 °F) (this is dish washing machine water temperature at

the manifold). The maximum temperature at the surface of the utensil in the dishwashing machine should not be less than 71 °C (160 °F).
  - Steam (steam can be unsuitable for machines and systems containing plastic materials which are destroyed by high temperatures).
  - A chemical disinfectant in accordance with manufacturer's instructions.
- Personal Protective Equipment (PPE) should be used where necessary in order to avoid scalding. ST

Cleaning equipment

3.6.7 Maintenance

Cleaning equipment should be kept clean and well maintained. ST

Use of cleaning equipment

3.6.8 Safety of cleaning chemicals

Cleaning and disinfection chemicals used in food areas must be food safe and designed for use on food contact surfaces. LEG[8]

3.6.9 Correct use of cleaning chemicals

- Cleaning chemicals should be used in accordance with the manufacturer's instructions (e.g. contact time, concentration, doses, etc.). ST
- Manual mixing instructions should be available to be used when automatic dosing systems are out of order. ST
- Surfaces to which cleaning chemicals have been applied should be rinsed with clean water. Some cleaning chemicals can be left on surfaces when this is indicated in the manufacturer's instructions. ST
- Disinfectants do not have cleaning properties and they should not be used as detergents. However, some cleaning chemicals such as detergent-sanitisers may do both tasks and this will be indicated in the manufacturer's instructions. ST

Storage of utensils and equipment

3.6.10 Storage

Only utensils and equipment for food preparation and service should be stored in food handling and preparation areas. ST

3.6.11 Protection

- Loose and portable equipment should not be stored in direct contact with the deck. ST
- The utensils and equipment stored should be kept clean and dry. ST
- Utensils and equipment should be kept covered or otherwise protected from dirt and condensation. ST
- Equipment should be protected against contamination. ST

Frequency of cleaning and disinfection of equipment

3.6.12 Cleaning frequency of equipment

Cleaning equipment should be cleaned: ST

- after each use;
- throughout the day at a frequency to help reduce any risk of contamination.

Storage of cleaning equipment

3.6.13 Storage of cleaning equipment

- Cleaning equipment should be stored in a separate area, cupboard or locker away from food or food contact surfaces. ST
- Storage rooms should be dry, clean and well ventilated. ST

3.6.14 Storage of cleaning chemicals

- Cleaning agents and disinfectants are not to be stored in areas where food is handled. LEG[1]
- Cleaning chemicals should be stored in a cupboard or locker and away from food or food contact surfaces (see Chapter 8). LEG[1]

Referenced legislation

1. Regulation (EC) No 852/2004 on the hygiene of foodstuffs
2. Regulation (EC) No 1169/2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives 2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004
3. Regulation (EC) No 853/2004 laying down specific hygiene rules for food of animal origin
4. Council Directive No 89/108/EEC on the approximation of the laws of the Member States relating to quick-frozen foodstuffs for human consumption
5. Commission Regulation (EC) No 37/2005 on the monitoring of temperatures in the means of transport, warehousing and storage of quick-frozen foodstuffs intended for human consumption
6. Regulation (EC) No 178/2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety
7. Regulation (EC) No 1935/2004 on materials and articles intended to come into contact with food
8. Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products

Table 1: Substances or products causing allergies or intolerance

1. Cereals containing gluten, namely: wheat (such as spelt and khorasan wheat), rye, barley, oats or their hybridised strains, and products thereof, except:
   - wheat based glucose syrups including dextrose*;
   - wheat based maltodextrins*;
   - glucose syrups based on barley;
   - cereals used for making alcoholic distillates including ethyl alcohol of agricultural origin;
2. Crustaceans and products thereof;
3. Eggs and products thereof;

* And the products thereof, in so far as the process that they have undergone is not likely to increase the level of allergenicity assessed by the Authority for the relevant product from which they originated.

4. Fish and products thereof, except:
   - fish gelatine used as carrier for vitamin or carotenoid preparations;
   - fish gelatine or Isinglass used as fining agent in beer and wine;
5. Peanuts and products thereof;
6. Soybeans and products thereof, except:
   - fully refined soybean oil and fat*;
   - natural mixed tocopherols (E306), natural D-alpha tocopherol, natural D-alpha tocopherol acetate, and natural D-alpha tocopherol succinate from soybean sources;
   - vegetable oils derived phytosterols and phytosterol esters from soybean sources;
   - plant stanol ester produced from vegetable oil sterols from soybean sources;
7. Milk and products thereof (including lactose), except:
   - whey used for making alcoholic distillates including ethyl alcohol of agricultural origin;
   - lactitol;
8. Nuts, namely: almonds (Amygdalus communis L.), hazelnuts (Corylus avellana), walnuts (Juglans regia), cashews (Anacardium occidentale), pecan nuts (Carya illinoinensis (Wangenh.) K. Koch), Brazil nuts (Bertholletia excelsa), pistachio nuts (Pistacia vera), macadamia or Queensland nuts (Macadamia ternifolia), and products thereof, except for nuts used for making alcoholic distillates including ethyl alcohol of agricultural origin;
9. Celery and products thereof;
10. Mustard and products thereof;
11. Sesame seeds and products thereof;
12. Sulphur dioxide and sulphites at concentrations of more than 10 mg/kg or 10 mg/L in terms of the total SO2 which are to be calculated for products as proposed ready for consumption or as reconstituted according to the instructions of the manufacturers;
13. Lupin and products thereof;
14. Molluscs and products thereof.

Table 2: Omission of the list of ingredients

The following foods shall not be required to bear a list of ingredients:

- fresh fruit and vegetables, including potatoes, which have not been peeled, cut or similarly treated;
- carbonated water, the description of which indicates that it has been carbonated;
- fermentation vinegars derived exclusively from a single basic product, provided that no other ingredient has been added;
- cheese, butter, fermented milk and cream, to which no ingredient has been added other than lactic products, food enzymes and micro-organism cultures essential to manufacture, or in the case of cheese other than fresh cheese and processed cheese the salt needed for its manufacture;
- foods consisting of a single ingredient, where:
  - the name of the food is identical to the ingredient name; or
  - the name of the food enables the nature of the ingredient to be clearly identified.

Table 3: Date of minimum durability, 'Use by' date and date of freezing

1. The date of minimum durability shall be indicated as follows:
   a) the date shall be preceded by the words:
      - 'Best before …' when the date includes an indication of the day,
      - 'Best before end …' in other cases,
   b) the words referred to in point (a) shall be accompanied by:

- either the date itself, or,
- a reference to where the date is given on the labelling,

If need be, these particulars shall be followed by a description of the storage conditions which must be observed if the product is to keep for the specified period;

c) the date shall consist of the day, the month and possibly, the year, in that order and in uncoded form.

However, in the case of foods:

- which will not keep for more than three months, an indication of the day and the month shall be sufficient,
- which will keep for more than three months but not more than 18 months, an indication of the month and year shall be sufficient,
- which will keep for more than 18 months, an indication of the year shall be sufficient,

d) subject to Union provisions imposing other types of date indication, an indication of the date of minimum durability shall not be required for foodstuff listed in Table 4

2. The 'use by' date shall be indicated as follows:

a) it shall be preceded by the words 'use by …';

b) the words in point (a) shall be accompanied by:

- either the date itself, or,
- a reference to where the date is given on the labelling,

Those particulars shall be followed by a description of the storage conditions which must be observed;

c) the date shall consist of the day, the month and, possibly, the year, in that order and in uncoded form;

d) the 'use by' date shall be indicated on each individual prepacked portion.

3. The date of freezing or the date of first freezing for frozen meat, frozen meat preparations and frozen unprocessed fishery products shall be indicated as follows:

a) it shall be preceded by the words 'Frozen on …';

b) the words referred to in point (a) shall be accompanied by:

- the date itself, or,
- a reference to where the date is given on the labelling,

c) the date shall consist of the day, the month and the year, in that order and in uncoded form.

Table 4: Foods that an indication of the date of minimum durability shall not be required

- Fresh fruit and vegetables, including potatoes, which have not been peeled, cut or similarly treated; this derogation shall not apply to sprouting seeds and similar products such as legume sprouts.
- Wines, liqueur wines, sparkling wines, aromatised wines, and similar products obtained from fruit other than grapes, and beverages falling within CN code 2206 00 obtained from grapes or grape musts.
- Beverages containing 10 % or more by volume of alcohol.
- Bakers' or pastry cooks' wares which, given the nature of their content, are normally consumed within 24 hours of their manufacture.
- Vinegar.
- Cooking salt.
- Solid sugar.

- Confectionery products consisting almost solely of flavoured and/or coloured sugars.
- Chewing gums and similar chewing products.

Table 5: Foods which are exempted from the requirement of the mandatory nutrition declaration

1. Unprocessed products that comprise a single ingredient or category of ingredients;
2. Processed products which the only processing they have been subjected to is maturing and that comprise a single ingredient or category of ingredients;
3. Waters intended for human consumption, including those where the only added ingredients are carbon dioxide and/or flavourings;
4. A herb, a spice or mixtures thereof;
5. Salt and salt substitutes;
6. Table top sweeteners;
7. Products covered by Directive 1999/4/EC of the European Parliament and of the Council of 22 February 1999 relating to coffee extracts and chicory extracts, whole or milled coffee beans and whole or milled decaffeinated coffee beans;
8. Herbal and fruit infusions, tea, decaffeinated tea, instant or soluble tea or tea extract, decaffeinated instant or soluble tea or tea extract, which do not contain other added ingredients than flavourings which do not modify the nutritional value of the tea;
9. Fermented vinegars and substitutes for vinegar, including those where the only added ingredients are flavourings;
10. Flavourings;
11. Food additives;
12. Processing aids;
13. Food enzymes;
14. Gelatine;
15. Jam setting compounds;
16. Yeast;
17. Chewing-gums;
18. Food in packaging or containers the largest surface of which has an area of less than 25 cm^2 (3.875 in^2);
19. Food, including handcrafted food, directly supplied by the manufacturer of small quantities of products to the final consumer or to local retail establishments directly supplying the final consumer.

Table 6: Foods which the labelling must include additional particulars

Category of food	Type of food	Particulars
Foods packaged in certain gases	Foods whose durability has been extended by means of packaging gases authorised pursuant to Regulation (EC) No 1333/2008 on food additives.	"packaged in a protective atmosphere"
Foods containing sweeteners	Foods containing a sweetener or sweeteners authorised pursuant to Regulation (EC) No 1333/2008 on food additives.	"with sweetener(s)" this statement shall accompany the name of the food
	Foods containing both an added sugar or sugars and a sweetener or sweeteners authorised pursuant to Regulation (EC) No 1333/2008 on food additives.	"with sugar(s) and sweetener(s)" this statement shall accompany the name of the food.
	Foods containing aspartame/aspartame-acesulfame salt authorised pursuant to Regulation EC) No 1333/2008 on food additives.	"contains aspartame (a source of phenylalanine)" shall appear on the label in cases where aspartame/aspartame-acesulfame salt is designated in the list of ingredients only by reference to the E number. "contains a source of phenylalanine" shall appear on the label in cases where aspartame/aspartame-acesulfame salt is designated in the list of ingredients by its specific name.
	Foods containing more than 10 % added polyols authorised pursuant to Regulation (EC) No 1333/2008 on food additives.	"excessive consumption may produce laxative effects".
Foods containing glycyrrhizinic acid or its ammonium salt	Confectionery or beverages containing glycyrrhizinic acid or its ammonium salt due to the addition of the substance(s) as such or the liquorice plant Glycyrrhiza glabra, at concentration of 100 mg/kg or 10 mg/L or above.	"contains liquorice" shall be added immediately after the list of ingredients, unless the term "liquorice" is already included in the list of ingredients or in the name of the food. In the absence of a list of ingredients, the statement shall accompany the name of the food.
	Confectionary containing glycyrrhizinic acid or its	"contains liquorice – people suffering from hypertension should

	ammonium salt due to the addition of the substance(s) as such or the liquorice plant Glycyrrhiza glabra at concentrations of 4 g/kg or above.	avoid excessive consumption" shall be added immediately after the list of ingredients. In the absence of a list of ingredients, the statement shall accompany the name of the food.
	Beverages containing glycyrrhizinic acid or its ammonium salt due to the addition of the substance(s) as such or the liquorice plant Glycyrrhiza glabra at concentrations of 50 mg/L or above, or of 300 mg/L or above in the case of beverages containing more than 1.2 % by volume of alcohol*.	"contains liquorice – people suffering from hypertension should avoid excessive consumption" shall be added immediately after the list of ingredients. In the absence of a list of ingredients, the statement shall accompany the name of the food.
Beverages with high caffeine content or foods with added caffeine	Beverages, with the exception of those based on coffee, tea or coffee or tea extract where the name of the food includes the term 'coffee' or 'tea', which: • are intended for consumption without modification and contain caffeine, from whatever source, in a proportion in excess of 150 mg/L, or, • are in concentrated or dried form and after reconstitution contain caffeine, from whatever source, in a proportion in excess of 150 mg/L.	"High caffeine content. Not recommended for children or pregnant or breast-feeding women" in the same field of vision as the name of the beverage, followed by a reference in brackets and in accordance with this Regulation to the caffeine content expressed in mg per 100 mL.
	Foods other than beverages, where caffeine is added with a physiological purpose.	"Contains caffeine. Not recommended for children or pregnant women" in the same field of vision as the name of the food, followed by a reference in brackets and in accordance with this Regulation to the caffeine content expressed in mg per 100 g/mL. In the case of food supplements, the caffeine content shall be expressed per portion as recommended for daily consumption on the labelling.

* The level shall apply to the products as proposed ready for consumption or as reconstituted according to the instructions of the manufacturers.

4. POTABLE WATER SAFETY

4. POTABLE WATER SAFETY

Ships must provide an adequate supply of safe water for drinking, washing, preparing food, supplying recreational water facilities such as swimming pools and spas, fire control, steam production, dishwashers, laundry, air conditioning, boilers, deck washing, toilets, hair/beauty treatments and refrigeration. Drinking water (potable water) consumed by passengers or crew must be provided under good hygienic conditions. It should be of an appropriate quantity and of a quality that it will not cause immediate or long-term harm to people drinking it. In particular, it must be free from any microorganisms, parasites, chemicals or other substances which, in the numbers or concentrations present, constitute a risk to human health. Waterborne disease outbreaks may occur on passenger ships due to failures in water safety systems.

Water is usually sourced from potable supplies on shore or generated at sea from sea water. Ensuring safe bunkering of water is essential to reducing potential risks for passengers and crew. For water supplied from a recognised water utility, the microbiological and chemical quality is the responsibility of the producer. However, ships must ensure that bunkered water is of potable quality, as well as ensure that the actual process of bunkering distribution and storage of water within the ship is safe and prevents chemical or microbial contamination. In line with the WHO and International Water Association (IWA) guidance, the systems and controls for the provision of safe water on passenger ships should be included within an overall Water Safety Plan (World Health Organization, 2008).

Guidance on production and use of Water Safety Plans (WSP) is included in Annex 16 (page 251). This suggests a systematic risk assessment based approach to water safety management similar to that used in HACCP systems in food operations.

4.1 Water Safety Plan

The management of potable water on ships should cover design, construction, commissioning, operation, monitoring and maintenance, in order to ensure that there are hygienic safeguards for the whole water supply process. The WHO has developed a HACCP-like system for drinking water called a WSP and EU SHIPSAN has adopted this approach for managing potable water quality on passenger ships.

Legal requirements (LEG)/recommended standards (ST)

Item	Details	LEG/ ST
	Water Safety Plan (WSP)	
4.1 WSP	• Passenger shipping operators should apply hazard analysis principles and implement a WSP in order to ensure the safety and quality of potable water that is provided to consumers.	ST

	• The WSP steps include: a) system assessment, b) operational monitoring, c) management plan, and are described in Annex 16 (page 251).	ST
	Team establishment	
4.2 WSP team	A WSP team should be designated, consisting of a team leader and crew or other trained personnel responsible for the WSP implementation such as managers, engineers, water quality controllers, medical staff, facilities managers and technical crew.	ST
4.3 Training	Crew or other personnel responsible for the application of the WSP should be trained and have adequate knowledge of the management of potable water systems, monitoring procedures, control measures, operational limits and corrective actions. A competency framework for crew responsible to implement the WSP is given in Annex 17 (page 259).	ST

4.2 System assessment

A system assessment should be conducted for the whole potable water supply system from supply to consumer including the sources of water, water bunkering and production, treatment, storage and distribution.

Item	Details	LEG/ ST
	System description	
4.4 System description	• The system description should include all processes and components of the water systems from the source of water to the consumer.	ST
	• The water processes and components that may result in direct human exposure (ingestion, contact, and inhalation) should be identified and described.	ST
	• The description may include a diagram or schematic which identifies all the key steps and processes within all the identified water systems (e.g. potable water, technical water, etc.).	ST
	Identification of possible hazards	
4.5 Possible hazards	During the system assessment, possible hazards should always include at a minimum:	ST

- faecal microorganisms such as *E. coli, Enterococci*, *Cryptosporidium* spp. and enteric viruses;
- *Legionella* spp. and *Mycobacterium* spp.;
- contamination by chemical agents caused by exposure to heavy metals, disinfection residual, disinfection by-products, pesticides, toxic Volatile Organic Compounds (VOC);
- physical agents: sediments and particulates, pipe materials, pipe and tank liner materials, sloughed biofilms or iron and manganese films.

Identification of potentially hazardous events

All potential events or situations that could lead to the presence of a hazard must be identified and listed. Potentially hazardous events should be indicated in the flow diagram/table (Annex 16, page 251).

Item	Details	LEG/ ST
	Identification of potentially hazardous events Possible hazardous events should include at a minimum:	
4.6 Contaminated source water	Contaminated water sources from: - bunkered water from a potable supply; - sea water used to produce potable water on board.	ST
4.7 Contamination during bunkering, production and treatment	• Water contaminated during bunkering by the filling hose, filling line, or shore side/barge or truck connections.	ST
	• Water contaminated with sea water due to a missing or malfunctioning conductivity meter or automatic dumping valve.	ST
	• Water pollution caused by chemicals used before and during the water production.	ST
	• Corrosive water due to failure of mineralization.	ST
4.8 Contamination during storage	• Contamination of or bacterial growth in potable water during storage caused by: - ingress of foreign materials or other substances caused by improper design and construction of storage tanks; - sediment in storage tanks; - incorrect cleaning of tanks; - biofilm growth in storage tanks pipe work and fittings contributing to contamination with *Legionella*, *Pseudomonas aeruginosa*, *Mycobacterium* spp. and amoebae; - damaged or defective storage tanks or their linings;	ST

- ingress of foreign materials or other substances during maintenance or repair of storage tanks;
- backflow (backpressure or backsiphonage);
- cross connection with technical, black or grey water systems;
- poor temperature control or inadequate disinfection;
- presence of stagnant water for more than seven days;
- poor hygiene in repair works allowing potential microbial contamination to enter the system;
- deliberate attempts to contaminate water supplies.

4.9 Contamination through distribution system

- Contamination of potable water or microorganism growth in the distribution system, in particular due to: ST
  - backflow;
  - poor design and construction of piping system components;
  - existence of deadlegs/blind lines in the distribution system;
  - damaged pipes;
  - chemical contamination through the use of the wrong distribution construction materials;
  - contamination during maintenance or the repair of piping system;
  - biofilm growth in pipe work and fittings contributing to contamination with *Legionella*, *Pseudomonas aeruginosa*, *Mycobacterium* spp. or amoebae;
  - contamination due to stagnant water for example in infrequently used outlets (stagnant lines) or other part of the water system where water remains stagnant for more than seven days;
  - poor hygiene in repair works allowing microbial contamination to enter the system;
  - deliberate attempts to contaminate water;
  - corrosion in the distribution system.

Control measures

4.10 Control measures

Suitable control measures should be identified for each potential hazardous event. ST

Control measures — bunkered water source

4.11 Supplier water quality reports

Where available and supplied to the ship any supplier water quality/safety reports should be checked for compliance with the Directive 98/83/EC requirements, before loading potable water (Annex 18, page 260). If this report is not available, then, the tests described in item 4.12 should be performed. ST

4.12 Water quality tests

If the report mentioned in item 4.11 is not available, routine basic water quality tests of the supplied potable water (pH, free halogen, *E. coli* test) should be performed before bunkering. ST
It is recommended that bunkered water should only be consumed after the result of *E. coli* test is confirmed as negative.

Control measures — water production (potable water)

4.13 Filtration of sea water

Sea water should be filtered to remove particulate matter before it is processed. ST

4.14 Risk assessment

When taking sea water for potable water production, every effort should be made to avoid the uptake of potentially contaminated water. A risk assessment should be performed to ensure that the water loaded for production is of appropriate quality. The uptake of sea water should be avoided in areas identified as polluted, in coastal waters, in very shallow water, and during the discharge of any type of waste (for example sewage and grey water). ST

4.15 Equipment

A water production (evaporator, reverse osmosis unit) should be fitted with a double step conductivity sensor with alarm function and an automatic switch-off or discharge. Conductivity levels should be measured continuously through an automatic system. ST

4.16 Treatment

- Produced water intended to supply the potable water system, prior to disinfection should be conditioned (e.g. remineralised) to reduce the aggressive nature of the water. ST
- Conditioned water should be disinfected by passing through an automatic halogenation unit. The halogen residual disinfectant concentration should be at least 2.0 mg/L. Alternative disinfection methods with residual effect can be acceptable provided a scientific assessment is conducted to ensure its efficacy is established. ST
- During chlorination of the conditioned water, the amount of halogen injected should be controlled by a flow meter or a free halogen analyser. ST

4.17 Maintenance and cleaning

Regular maintenance and a cleaning schedule should be implemented for the components of water production. ST

Control measures — bunkering

4.18 Equipment	All equipment used to bunker water should be used exclusively for this purpose, including the equipment on water boats, barges or trucks (tanks, hoses, pipe system and pumps).	ST
4.19 Hoses	• Ships should be equipped with hoses that are exclusively used for potable water loading and which are marked with "POTABLE WATER HOSE ONLY" (or a similar phrase).	ST
	• Equipment used to bunker or discharge any non-potable water should have incompatible fittings, which cannot be used for the potable water supply system.	ST
	• Equipment used to bunker water should be kept clean and in good condition.	ST
4.20 Flushing	Hoses should be flushed with potable water at full bunkering speed before use. Filling line connections and hose connections should be disinfected before each use.	ST
4.21 Drainage and caps	Hoses should be kept clean, drained and capped at both ends or otherwise protected after use.	ST
4.22 Avoidance of contamination	Hoses should be handled with caution to avoid water contamination from the ground, pier or deck surfaces or from the harbour water.	ST
4.23 Storage in lockers	• Hoses should be stored in lockers used exclusively for this purpose. The lockers should be marked with "POTABLE WATER HOSE ONLY" (or a similar phrase) with letters at least 1.3 cm (0.5 in) high.	ST
	• Lockers should be placed at least 45 cm (18 in) above the deck and should be made of non-toxic, non-corrosive material.	ST
4.24 Disinfection	Hoses should be disinfected at least every six months (e.g. superchlorinated with water at 100 mg/L with a contact time of one hour), or whenever contamination has occurred.	ST
4.25 Caution on cross connection	There should be no cross connection between the potable water filling line and any non-potable piping system. The potable water filling line should not pass through any non-potable water piping system or through a non-potable liquid.	ST

4.26 Filling line

- The filling line should be marked with "POTABLE WATER FILLING" (or a similar phrase) in letters at least 1.3 cm (0.5 in) high stamped on a non-corrosive material. ST
- The filling line should be capped when not in use. Filling line caps should be connected using suitable chains so that they cannot come in contact with the deck. The internal parts of the filling line and the caps should be protected from contamination. ST

4.27 Colour of filling line

The filling line should be painted as per ISO 14726 or according to the colour coding used by the ship. ST

4.28 Disinfection during bunkering

Potable water should be disinfected by passing through an automatic halogenation unit during bunkering. The halogen residual disinfectant concentration should be at least 2.0 mg/L at the time of bunkering. Alternative disinfection methods can be acceptable provided a scientific assessment is conducted to ensure its efficacy is established. During bunkering, the amount of halogen injected should be controlled by a flow meter or a free halogen analyser. ST

Control measures — storage

4.29 Storage tank construction

Every potable water storage tank should be provided with a vent located and constructed so as to prevent the entrance of any contaminating substances. The vent or combined vent and overflow should terminate with the open end pointing downward and should be suitably protected (for example screened with a corrosion-resistant and vermin-proof mesh screen). ST

4.30 Coating materials

- The coating materials of storage tanks should not be toxic or allow any contamination of potable water by toxic substances. ST
- Only trained operatives should apply tank coatings. Coatings should be applied correctly including the surface pre-treatment, pre-washing, coating method, film thickness, curing time, curing temperature, humidity, number of layers, after-washing, etc. and all procedures should be documented. ST

4.31 Caution on cross connection

No cross connections should exist between storage tanks and the non-potable water systems. ST

4.32 Ease of cleaning and maintenance

Potable water storage tanks should be accessible for cleaning and maintenance. ST

4.33 Non-potable piping systems and potable water tanks

Piping systems carrying sewage or other non-potable liquids should not pass through potable water tanks. ST

4.34 Labelling of potable water tanks

Potable water tanks should be identified with the words "POTABLE WATER" (or similar phrase) in letters at least 1.3 cm (0.5 in) high. ST

4.35 Ventilation and cleaning

Water storage tanks should be opened up, emptied, ventilated and cleaned at a suitable frequency based on the findings of operational monitoring and inspections. ST

4.36 Hygienic codes of practice

- Hygienic practices and procedures for cleaning and maintenance should be used and records kept available for inspection. ST
- During cleaning maintenance or repair the workers should have written procedures for physical cleaning and disinfection of potable water tanks. ST

4.37 Post-repair disinfection

Post repair tank cleaning and disinfection should always be carried out. ST

4.38 Separation of potable and non-potable water tanks

- Potable water tanks should not have any common partition with a tank holding non-potable water or other liquids. ST
- Any ship with tanks which are not independent of the shell of the ship (skin tanks) must have suitable protection and safety measures in place to prevent any potential contamination of the stored potable water. ST

Control measures — distribution system

4.39 Colour of potable water piping

Potable water piping should be painted blue or striped in accordance with ISO 14726, at five-metre (15 feet) intervals, or according to the colour coding used by the ship. It is advised to show the direction of flow of the potable water with an arrow. ST

4.40 Avoidance of sewage or tanks holding non-potable liquids

Potable water piping should not pass under or through sewage or tanks holding non-potable liquids. ST

4.41 Protection against backflow

- Appropriate backflow prevention assemblies should be installed where contamination from backflow can occur. ST
- The system should be protected against backflow by either backflow preventers (e.g. reduced pressure, vacuum breakers) or air gaps. ST
- Backflow prevention assemblies (backflow preventers and air gaps) should be maintained in good condition. ST
- Backflow prevention assemblies (backflow preventers and air gaps) should be periodically inspected and any failed units should be replaced or repaired depending on the type of the assembly. ST

	• Testable backflow preventers should be tested after installation and at least every 12 months or in accordance with the manufacturer's instructions.	ST
4.42 Disinfectant halogen residual	• The disinfectant halogen residual should be maintained at a minimum of 0.2 mg/L and not more than 5.0 mg/L of free chlorine in all sites of the distribution system (see also item 4.45). Alternative means of disinfection with a residual effect can be acceptable provided a scientific assessment is conducted to ensure its efficacy is established.	ST
	• An automatic halogenation unit should be used for water disinfection. The automatic halogenation unit should be fitted with a warning alarm and backup halogenation pump that switches over automatically when the primary pump fails. The amount of halogen injected should be controlled by a free halogen analyser.	ST
4.43 Coating materials	Coating materials used in the piping system should not introduce toxic substances into the potable water.	ST
4.44 Maintenance	Hygienic practices and procedures for maintenance and repair work should be used. During maintenance or repair, the workers should have written procedures for maintenance of piping systems. The relevant section of the system needs to be disinfected following any repair works.	ST
4.45 Maintenance of temperature in cold water distribution system	In cold water distribution systems, water temperatures should ideally be maintained at less than 25 °C (77 °F) throughout the system to provide effective *Legionella* control. However, this may not be achievable in all systems, particularly those in hot climates. Maintaining residual disinfection at > 0.5 mg/L free chlorine, or alternative disinfection methods and technology, will contribute to the effective control of *Legionella* in such circumstances.	ST
4.46 Hot water distribution system temperature	Throughout the hot water distribution systems, water temperatures should be ≥ 50 °C (122 °F).	ST
4.47 Insulation of pipes and storage tanks	All pipes and storage tanks should be insulated, when necessary, to help ensure that water is maintained, as far as possible, outside the temperature range of 25-50 °C (77-122 °F) to minimise the risk of *Legionella* growth.	ST
4.48 Heating and	• Heaters/calorifiers should be set up so as to ensure hot water is	ST

refrigeration	delivered to all hot water taps at ≥ 50 °C (122 °F) and that the water temperature on return to the heater/calorifier is ≥ 50 °C (122 °F). • Where cold water is regularly held and distributed at ≥ 25 °C (77 °F) then refrigeration may be considered or the disinfection residual levels may be increased (see item 4.45).	ST
4.49 Prevention of scalding	• To prevent scalding, hot water signs may be displayed to warn users about the risk. • In nursery and play areas temperature limiting valves or alternative safety measures may be used for taps in children facilities to avoid scalding. A maximum water temperature of 43 °C (109 °F) is recommended.	ST ST
4.49.1 Thermostatic Mixing Valves	Thermostatic Mixing Valves (TMVs) should be fitted as close to the outlet as possible and ideally less than two meters (6.5 feet). The thermostatic mixing valves should ideally provide an over-ride mechanism for hot water flushing. If not, then regular cleaning descaling and disinfection of the thermostatic mixing valves and downstream piping should be performed.	ST

4.3 Operational monitoring

Control measures should be monitored in order to spot any deviations from the operational limits. Operational monitoring should include measurement of selected water parameters, and the equipment and construction inspection procedures. Operational monitoring should provide early warning of failure of halogenation or any other operational limit violations to enable effective water system management. In most cases, operational monitoring involves basic water quality tests (pH, halogen residuals) and routine hygienic inspections.

An operational monitoring plan should be put in place and include the following basic elements:

- define the sampling points and frequency of sampling;
- list the equipment required for monitoring water systems;
- establish the monitoring equipment standards (calibration, certification);
- ensure compliance with standard methods for water quality monitoring;
- define the locations to be inspected and the frequency of inspections;
- define the required qualifications of crew carrying out the monitoring.

Item	**Details**	**LEG/ ST**
	Operational limits	
4.50 Parameters	The following parameters should always be monitored.	ST

Operational monitoring parameters

4.51 Monitoring of free halogen at far point

Free halogen residual at a far point of the distribution system should be measured continuously, with the use of a halogen analyser chart recorder or electronic data logger. ST

Operational limit: free halogen residual more than 0.2 mg/L and less than 5.0 mg/L.

4.52 Monitoring of free halogen and pH during bunkering and production

During bunkering and during production the free halogen residual and pH should be measured hourly. This can be checked manually using a test kit or spectrophotometer, or automatically by using probes and data logging equipment. ST

Operational limits: free halogen residual more than 2.0 mg/L and less than 5.0 mg/L. pH within the range of 6.8 to 7.8.

4.53 Measurement of pH before bunkering

Before bunkering chlorine and pH should be measured in order to adjust the halogen and pH dosages. ST

Operational limit: pH within the range of 6.8 to 7.8.

4.54 Monitoring of pH of water in the distribution system

The pH of water in the distribution system should be measured at least daily in order to evaluate the effectiveness of the halogenation process. ST

Operational limit: pH within the range of 6.8 to 7.8.

4.55 Bunkered water quality verification

A water sample for *E. coli* testing should be taken from the supplied water before bunkering. Alternatively, a copy of the most recent microbiological report from each supplier should be obtained and held on board for a minimum of 12 months. ST

Operational limit: negative test result before the water is used or a negative supplier report for *E. coli*.

4.56 Monitoring of temperature

For recirculation hot water systems, the temperature of the water leaving and returning to the heater should be measured daily. ST

Operational limit: temperature of water less than 25 °C (77 °F) or more than 50 °C (122 °F) at any point, in the recirculation hot water system. If the acceptable operational limit cannot be achieved, additional operational limits should be established and implemented as described in items 4.45 and 4.48.

4.57 Inspection of bunkering procedures and equipment

Bunkering procedures should be supervised and all potable water equipment inspected at least monthly in order to ensure that the standards are met. ST

Operational limit: appropriate handling of hose, incompatible fittings system of the filling hose or line with any non-potable water, appropriate storage of the filling hoses, adequate labelling, appropriate construction materials, cross connections not found, the hoses are not making contact with the ground or sea water.

4.58 Inspection of potable water tanks

Potable water tanks should be inspected after installation and during and after maintenance or when conditions indicate that there is a problem and at least once every 24 months in order to identify potential defects or inadequate functioning. ST

Operational limit: absence of dirt inside the tank; water does not appear turbid; inspection covers are not damaged and are in place; absence of cracks and corrosion in tank structure; tank lining is in good condition; cross connections not found.

4.59 Cleaning and disinfection of storage tanks

Potable water storage tanks should be cleaned and disinfected at least every 24 months or as needed considering the inspection findings. ST

Operational limit: proper cleaning and disinfection procedures observed.

4.60 Testing of backflow prevention

Backflow prevention assemblies should be periodically inspected at least every 12 months. Testable backflow prevention assemblies should be tested after each installation and at least every 12 months or in accordance with the manufacturer's instructions. ST

Operational limit: no defects in the backflow prevention assemblies spotted during inspection or testing.

4.61 Inspection of the piping system

Visual inspections of the potable water distribution system (pipes, connections, stagnant water) should be conducted routinely — ideally every 12 months where practicable, during routine maintenance or as recommended by manufacturers. ST

Operational limit: absence of leakage, corrosion or cross connections, no presence of stagnant lines or blind lines and documented results of inspections conducted every 12 months

4.62 Repair and maintenance of piping system

The maintenance and repair procedures should be supervised. ST

Operational limit: proper maintenance and repair procedures observed.

4.63 Avoid stagnant water

A monitoring programme should be implemented to ensure that stagnant water does not exist in the water distribution system (Annex 19, page 263). ST

Operational limit: water does not remain stagnant in any part of the water distribution system for more than 7 days.

4.4 Management Plan

Item	Details	LEG/ ST
	Corrective actions	
4.64 Corrective actions	When operational monitoring shows that the existing control measures are not operating effectively, corrective actions should be taken to ensure the system is functioning safely again as soon as possible.	ST
	Verification monitoring	
4.65 Microbiological indicator parameters	• The microbiological quality of the water supplied for human consumption on passenger ships must be verified on a regular basis.	LEG[1]
	• The following indicator parameter must be measured regularly: - *E. coli* (the presence of *E. coli* in the water distribution system must be checked by taking at least four random potable water samples at least monthly for testing) (Annex 18, page 260).	LEG[1]
4.65.1 Legionella and additional indicator parameter	• It is recommended that water samples are checked for *Legionella* spp. This microbiological examination should be conducted every six months or more frequently according to the findings of the risk assessment of the WSP. More information can be found in Guideline III of Part B (page 179).	ST
	• Additional indicator parameters should be measured regularly depending on any specific water risks which are identified by the ship. These parameters may include Enterococci (e.g. monthly).	ST
4.66 Chemical indicator parameters	The chemical quality of water supplied for human consumption must be verified on a regular basis. The parameters to be checked depend on any specific water risks which are identified by the ship and after considering the chemical parameters and indicator parameters provided in Annex 18 (page 260).	LEG[1, 2]
4.67 Halogen/pH analysers and test kits	• Halogen and pH analyser chart recorders or electronic data loggers should be checked and calibrated when necessary and maintained according to the manufacturer's instructions.	ST
	• A manual comparison test should be conducted at least daily to verify if the calibration is correct.	ST

- The free residual halogen measured by the halogen analyser should be within ± 0.2 mg/L of the free residual halogen or ± 0.2 of the pH measured by the manual test. The halogen and pH analyser/s should be recalibrated if there is more than a 0.2 difference between the two readings. ST
- The daily, manual comparison test or calibration should be recorded either on the recorder analyser chart or in a suitable log. ST
- The sample used for the calibration of the analysers should be taken as close as possible to the position of the analyser (probe). ST
- The test kit used to perform the manual tests and to calibrate the halogen and pH analysers should be graduated in increments no greater than 0.2 in the range of free residual halogen and pH normally maintained in the potable water. ST
- The test kits used on the ship should be calibrated, checked for accuracy and appropriately operated by following the manufacturer's instructions. ST
- Test of accuracy should be conducted using manual tests carried out at least weekly and using methods recommended by the manufacturers. ST
- The standard solutions where applicable should be accompanied by a certificate and should be maintained according to the manufacturer. ST
- The instructions for every type of measurement should always be followed. ST
- The test kit should be equipped and operated only with reagents that have not expired and are compatible with the specific test kit according to the manufacturer instructions. ST
- The vials and other equipment accompanying the test kit should be clean and in good condition. ST

Record keeping

4.68 Record keeping

The WSP should always include record keeping procedures including the following: ST

- water safety parameters monitored on the ship;
- the outcome of routine inspections and any incident investigations on the ship;
- details of training programmes and courses for crew or other personnel;
- details of any water safety certifications (for materials, equipment, chemicals, etc.) kept on the ship;
- the monitoring programme for the ship (as recommended in items 4.50-4.63);

- a list of water treatment methods used on the ship (disinfection, filtration, mineralization, etc.);
- calibration records of equipment used to monitor the main control measures and the operational equipment used at the control measures;
- operational and maintenance procedures.

4.69 Duration of water record keeping	Potable water safety records should be kept for at least 12 months on board and be available for inspection.	ST

Referenced legislation

1. Council Directive 98/83/EC on the quality of water intended for human consumption
2. Council Directive 2013/51/EURATOM laying down requirements for the protection of the health of the general public with regard to radioactive substances in water intended for human consumption

5. RECREATIONAL WATER SAFETY

5. RECREATIONAL WATER SAFETY

Recreational Water Facilities (RWFs) on board passenger ships include outdoor and indoor swimming pools, hot tubs and spas, and wading and splash pools which are normally associated with children's activities. A number of infectious diseases can be acquired in RWFs that can cause diarrhoea, or skin, ear, eye or upper respiratory tract infections. Enteric pathogens such as *Cryptosporidium parvum* have commonly been associated with RWFs, but other pathogens can be involved including *Legionella* spp. and *Pseudomonas aeruginosa*. Pathogens can enter the pools from bathers, from the sea in salt water pools, through the use of contaminated potable water in potable water pools, or through sewage contamination. A comprehensive set of guidelines is available that provides best practice for operating swimming pools (Pool Water Treatment Advisory Group, 2015).

Special care and management of RWFs is needed in order to provide a safe and hygienic environment that does not facilitate communicable diseases transmission. Appropriate management includes treatment (including disinfection and filtration), regular cleaning, daily inspections and a maintenance plan.

Legal requirements (LEG)/recommended standards (ST)

Item	Details	LEG/ ST
	Management	
5.1 Documentation of Management Plan	Each ship should have a documented Management Plan or written procedures for all RWFs on board. These should consist of at least the following.	ST
5.2 Treatment Plan	• A Treatment Plan or procedures containing at least the description and documentation of: - treatment processes (disinfection, filtration, etc.), - disinfectant residual used, - filter type and filter rate, - backwash procedure and frequency, - turnover period, - maximum bather load, - draining frequency.	ST
	• It should be consistent with recommended standards given in items 5.9-5.23, 5.38, 5.44 and 5.46-5.50.	ST
5.3 Monitoring Plan	A Monitoring Plan or procedures containing at least a description and documentation of:	ST

- operational limits and monitoring results,
- sampling and testing procedures (test kits, etc.),
- frequency of sampling and recording,
- corrective actions in case of adverse results.

Recommended standards for monitoring are given in items 5.24-5.31, 5.43 and 5.45.

5.4 Cleaning Plan

A Cleaning Plan or procedures containing a cleaning programme for each RWF (see items 5.32-5.33 and 5.41-5.42). ST

5.5 Maintenance Plan

A Maintenance Plan or procedures containing a maintenance programme for each RWF (see items 5.34-5.37). ST

5.6 Emergency Plan

An Emergency Plan or procedures containing the response plan for emergencies such as accidental injuries (first aid kit and auxiliary equipment). ST

5.7 Accidental Faecal/Vomit Release Plan

There should be a plan or procedures for dealing with vomit or faecal accidents (e.g. based on the model version in Annex 20, page 264). ST

5.7.1 Training

Crew or other personnel responsible for the Management Plan and procedures of the RWF should be trained and have adequate knowledge of the management of all RWFs on board. ST

5.8 Record keeping

RWF records should be kept on board and be available to inspectors for at least 12 months, except for the hot tubs/spas that records should be kept on board for at least 24 months. A complete list for record keeping is given in Table 7 (page 102). ST

Operational Mode of RWFs

5.9 Water source

The water source for recreational water facilities should be either sea water or potable water. ST

5.10 Potable water pools and sea water recirculating pools

When either potable water or recirculated sea water is used the water should be circulated through an appropriate treatment system that contains at least filtration coagulation (when necessary) and halogenation or alternative means of disinfection with residual effect and pH control. ST

5.11 Turnover period

For RWFs in recirculating mode, the circulation rate of water should be such that the turnover period does not exceed the values given below. ST

Recreational water facility	Maximum turnover period*
Swimming pools	6 hours
Hot tubs/spas	1 hour
Leisure waters up to 0.5 m (1.6 ft) deep	45 minutes
Leisure waters 0.5-1 m (1.6-3.3 ft) deep	1.25 hours
Leisure waters 1-1.5 m (3.3-5 ft) deep	2 hours
Leisure waters over 1.5 m (5 ft) deep	2.5 hours

*For hot tubs/spas the turnover period could be lower than the values above in order to achieve 20 L/min (5 gal/min) of recirculation per bather for the maximum bather load that has been calculated according to item 5.59.

5.12 Salt water pools: flow-through pools

- Some ships operate in a flow-through mode, but flow-through sea water supply systems for swimming pools that do not have recirculation should only be used while the ship is moving at sea. ST
- When a ship is operating a flow-through pool, every effort should be made to avoid the uptake of potentially contaminated water. An assessment should be performed to ensure that the water is of appropriate quality. The uptake of sea water should be avoided in areas identified as polluted, in coastal waters, in very shallow water and during the discharge of any type of waste (for example sewage and greywater). ST
- If a ship is operating a flow-through pool, the pool water supply should be shut off or closed 20 kilometres (10.8 nautical miles) from land and then either changed to recirculation mode or drained. ST
- Flow-through pools should remain empty while in port and not refilled until the ship is 20 kilometres (10.8 nautical miles) from land. ST
- For continual use while in port RWFs should be switched to a recirculation mode that includes a filtration and halogenation system or alternative disinfection system. ST
- Prior to opening the RWF to the public, the required free residual halogen and pH levels should be achieved. ST

Water treatment

The treatment system for RWFs should include the following.

a. Filtration

5.13 Backwashing and cleaning

- All sand filters should be backwashed at least as recommended by the filter manufacturer/supplier, when the allowable turbidity value has been exceeded, when a certain length of time, as defined by risk assessment and manufacturers guidelines, without backwashing has passed or when a pressure differential is observed. Backwashing should take place when the pool is not in use at the end of the day. ST
- Additional standards for frequency of backwashing in hot tubs/spas can be found in item 5.44. ST
- Cartridges should be cleaned at least as recommended by the filter manufacturer/supplier, when the allowable turbidity value has been exceeded, when a certain length of time, as defined by risk assessment and manufacturers guidelines, without cleaning has passed. Cleaning of cartridges should take place when the pool is not in use at the end of the day. ST

5.14 Backwash water

The backwash water is regarded as waste and should be discarded to the waste system. ST

5.15 Filter

- The filters should be examined regularly and the media (sand or cartridges) changed as recommended by the manufacturer/supplier. ST
- When cartridge filters are used, at least one spare part should be available. ST
- Additional standards for filter inspection of hot tubs/spas can be found in item 5.43. ST

b. Disinfection

5.16 Disinfectant choice

Halogenation with chlorine or bromine should be used. Alternative means of disinfection with residual effect may also be used. ST

5.17 Automatic dosing

- Disinfection should be automatically controlled. ST
- Halogenating systems should be operated and well maintained. ST

5.18 Residual disinfectant

- Automatic dosing of halogen disinfectant should be such that a residual is maintained in the water of the pool at all times between the acceptable limits given in Table 8 (page 104) and Table 9 (page 105). ST

5.18.1 Monitoring of residual disinfectant

- The halogen levels in RWFs' water should be tested manually at a frequency described in items 5.18.2 and 5.45. ST
- Halogen analyser-chart recorders can be used instead of manual tests. ST

5.18.2 Monitoring in swimming pools

- When the residual halogen levels are tested manually, halogen logs should be maintained with residuals measured and recorded at least every four hours during operation of swimming pools and at least every one hour during operation of hot tubs/spa pools, unless an automatic halogen analyser and monitoring system with alarms used to alert when out of parameter, are in place. ST
- In case automatic recording is taking place the sample water for the analyser (probe) should be taken from a line before the balance tank. ST
- Additional standards for monitoring of disinfectant levels in hot tubs/spas can be found in item 5.45. ST

5.19 Alternative methods

Alternative methods of disinfection can be employed (e.g. UV radiation or ozonation) but they should be combined with halogenation in order for a residual to be maintained and a scientific assessment to ensure its efficacy should be provided. ST

5.20 Ozonation

When ozonation is applied caution should be taken for the ozone release. Activated carbon should be used for deozonation of water. For indoor pools, ozone should not exceed 0.1 mg/m^3 in the atmosphere above the pool. A scientific assessment to ensure its efficacy and safety should be provided. ST

c. Coagulation

5.21 Coagulation as an option

Coagulation (the addition of chemicals known as coagulants) should be available for use where necessary in the treatment process to increase filtration efficiency. ST

d. pH adjustment

5.22 Automatic pH adjustment

- The pH value of RWFs' water should be maintained within the recommended range (Table 8 (page 104) and Table 9 (page 105)) to ensure optimal treatment. ST
- pH adjusting systems should be operated and well maintained. ST

5.22.1 pH monitoring

- There should be a routine pH measurement and an automatic pH adjustment. ST

- pH logs should be maintained with levels measured and recorded at least every four hours during operation of swimming pools and at least every one hour during operation of hot tubs when automatic recording is not taking place. ST
- In case automatic recording is taking place the sample water of the analyser (probe) should be from a line before the balance tank and preferably directly from the pool. ST

e. Addition of fresh water

5.23 Addition of fresh water (dilution of pollutants)

The treatment process should also include the addition of fresh water at frequent intervals. The recommended rate is at least 30 L per bather per day. ST

Monitoring

5.24 Water quality parameters

The water quality parameters which are listed in Table 8 (page 104) and Table 9 (page 105) should be monitored according to the given frequency and should be within the acceptable ranges in all parts of the pool. ST

5.25 Test kits

- Test kits for measuring free halogen residual, pH and total halogen should be available (a cyanuric acid test kit is also required when using a cyanurate for disinfectant stabilisation). The test kits should be cared for and used by trained individuals. ST
- The test kit used to perform the manual tests and to calibrate the halogen and pH analysers should be graduated in increments no greater than 0.2 in the range of free residual halogen and pH normally maintained in the RWF. ST
- The test kits used on the ship should be calibrated, checked for accuracy and appropriately operated by following the manufacturer's instructions. ST
- Test of accuracy should be conducted using manual tests carried out at least weekly and using methods recommended by the manufacturers. ST
- The standard solutions where applicable should be accompanied by a certificate and should be maintained according to the manufacturer. ST
- The instructions for every type of measurement should always be followed. ST
- The test kit should be equipped and operated only with reagents that have not expired and are compatible with the specific test kit according to the manufacturer instructions. ST

- The vials and other equipment accompanying the test kit should be clean and in good condition. ST
- Calibration should be accomplished according to the manufacturer's instructions and documented. ST

5.26 Sampling procedures

It is recommended that the sampling procedures given in Annex 21 (page 265) are used. ST

5.27 Record keeping of tests

All chemical and microbiological tests conducted should be documented and made available during inspections (Table 7, page 102). ST

5.28 Verification

Periodic checks for the physical, chemical and microbiological parameters according to Table 8 (page 104) and Table 9 (page 105) should be conducted. ST

5.29 Calibrations

- Calibrations of automatic controllers/analysers should be regularly conducted as per the manufacture's/supplier's instructions, or whenever there is a significant difference between electronic readings and chemical tests. ST
- Halogen and pH analyser-chart recorders should be checked at least daily and where necessary calibrated and the calibration recorded on the chart or in a log book. ST
- A manual comparison test should be conducted at least daily to verify calibration. Calibration should be made whenever the manual test value is > 0.2 higher or lower than the analyser reading. ST
- The daily, manual comparison test or calibration should be recorded either on the recorder chart or in a log book. ST
- The sample used for the calibration of the analysers should be taken as close as possible to the position of the analyser (probe). ST

5.30 Halogen and pH analyser records

- Electronic readouts of halogen residual and pH should be recorded and should be available during inspections. ST
- Logs and charts should contain records of any unusual water events with the RWF operation and any corrective actions taken. ST
- Logs and charts should be kept for at least 12 months for review during inspections. ST
- Electronic data loggers with certified data security features are acceptable as an alternative record. ST

Corrective actions

5.31 Corrective actions

- When water parameters are out of acceptable limits bathers must leave the pool and the RWF must be closed. ST
- An investigation should be conducted and corrective action taken and recorded. Records should be kept for the remedial actions taken. Suggestions for an investigation and remediation plan are given in Annex 22 (page 266). ST

Cleaning

5.32 Cleaning of RWFs

- RWFs should be kept clean, in a good order and sound condition. ST
- Regular cleaning of RWFs is required and should include draining of the pools, scrubbing tub walls, cleaning of skimmers, strainers, balance tanks and all other removable parts. ST
- Additional standards for cleaning of hot tubs/spas can be found in items 5.41 and 5.42. ST

5.33 Cleaning materials

Cleaning materials should be compatible with pool materials and water treatment chemicals. ST

Equipment maintenance

5.34 Pool hydraulics

Pool hydraulics and equipment should be checked regularly in order to ensure their good operational state. ST

Periodic checks of equipment

5.35 Equipment requiring periodic checks

Periodic checks and maintenance should be carried out for:

- filter equipment including pressure gauges and flow meters; ST
- water pumps; ST
- chemical feeders and controllers; ST
- overflow system; ST
- gates (inlets and outlets): gates should be securely maintained over outlet drains and other suction outlets to prevent bather entrapment; ST
- air ventilation system (for indoor pools): adequate ventilation should be provided in closed environments for the exhaust of volatile chemicals (at least 10 L of fresh air/m^2/s (28.4 gal/ft^2/s) of water surface). ST

5.36 Operability of components

All mechanical components should work as per manufacturer's/supplier's instructions. ST

5.37 Operating manuals on board	Operating manuals for all RWFs should be maintained in a location that is known and accessible.	ST
	Special and additional standards for hot tubs/spas	
	For spa pools and hot tubs the following additional standards should be applied.	
5.38 Thermometers — automatic control	• Thermometers and automatic mechanisms that control the temperature to below 40 °C (104 °F) should be installed.	ST
	• The sensors of thermometers should be checked for accuracy periodically.	ST
	• The hot tubs/spas should not exceed a water temperature of 40 °C (104 °F).	ST
5.39 Spa timer	Use of a spa timer is recommended (maximum recommended time 15 minutes).	ST
5.40 Anti-entrapment measures	Anti-entrapment measures in hot tubs/spas should be documented and be according to item 5.54.	ST
5.41 Weekly thorough cleaning	Routine cleaning of hot tubs, spa pools and associated equipment (flexible hoses, balance tanks, water lines, etc.) should be carried out, at least weekly or when the pools are drained (see item 5.49).	ST
5.42 Monthly cleaning of jets	Where present the air jets or water jets nozzles should be removed, inspected and cleaned once a month.	ST
5.43 Daily filter inspection	Filters should be checked on a daily basis or according to the manufacturer's instructions (e.g. visual inspection of media or cartridge or sedimentation test, etc.).	ST
5.44 Filter backwashing or cleaning	Sand filters of hot tubs and spas should be backwashed whenever they are drained, or earlier as needed (see item 5.13). Cartridges of hot tubs and spas should be cleaned as per manufacturer's instructions whenever they are drained, or earlier as needed (see item 5.13).	ST
5.45 Hourly disinfectant monitoring	Disinfectant levels should be monitored at least hourly when the hot tub/spa pool is operating, unless if an automatic halogen analyser and monitoring system with alarms used to alert when out of parameter are in place.	ST
5.46 Spa connected	If a hot tub/spa pool is connected with a swimming pool and uses the	ST

to swimming pool

same operational equipment, then the rules for turnover periods and disinfectant levels of spas should supersede those of the swimming pool.

5.47 Superhalogenation

A shock treatment (superhalogenation) should take place every day before draining (or according to the draining frequency) by increasing the disinfectant level to at least 10 mg/L for one hour or an equivalent combination of time and concentration (the concentration of disinfectant should be maintained at the required levels at all points and for the required time). ST

5.48 Heating to 70 °C (158 °F)

Alternatively, the spa water may be heated to at least 70 °C (158 °F) on a daily basis when the unit is closed. ST

5.49 Draining

- A complete draining, cleaning and renewal of water should be done at least on a daily basis. ST
- When daily complete draining is not practical or feasible (for example due to environmental law restrictions for discarding treated water to the sea), then complete draining should take place at least every 72 hours in small spa pools and hot tubs. Larger spa/hydrotherapy pools (with depth of more than one meter (3 feet) and tub volume of more than six m^3 (1600 gallons) of water) should be drained and cleaned at least every 30 days. ST

Swimmers safety and hygiene in RWF

5.50 Safety

- The water circulation and treatment system should be operated when the RWFs are open to the public. ST
- Use of the RWF should be allowed when parameters are within the acceptable limits described in Table 8 (page 104) and Table 9 (page 105). ST

5.51 No glass on the sides

Areas adjacent to RWF should be free from any glass objects and items that can cause injuries. ST

5.52 No water accumulation

There should be no water accumulation on the sides of the pool when accidents may occur from slippery deck. ST

5.53 Anti-entrapment — drains, inlet and outlet design

- Inlets, outlets, grilles and covers should be designed according to EN 13451-3. For ships not complying with the European Standards EN 13451-3, the anti-entrapment/anti-entanglement requirements as described in the latest version of the VSP Operations Manual are also acceptable (Table 10, page 106). ST

- Grilles should have gaps less than 0.8 cm (0.31 in) and be designed according to EN 13451-1. For ships not complying with the European Standards EN 13451-3, the anti-entrapment/anti-entanglement requirements as described in the latest version of the VSP Operations Manual are also acceptable (Table 10, page 106). ST
- Anti-entrapment devices should be certified by an accredited institute. ST
- RWFs should not be used if any of the inlets and outlets, are uncovered, or obstructed or if covers are not correctly in place, unsecured or damaged or if there are exposed pools spouts. ST

5.54 Anti-entrapment

In addition to the standards described in item 5.53, entrapment should be prevented as described in the following A or B options. ST

A.

The maximum allowable water flow rate indicated by the manufacturer of each outlet must be followed. This should be in accordance with EN 113451-3. At least one of the either (a), (b), or (c) should be satisfied (this is not applicable to skimmers):

a) multiple suction outlet system designed in such a way that:
- a minimum of two functioning suction outlets per pump are installed;
- the distance between the nearest points of the perimeters of the devices is ≥ 2 m (6.5 ft); and
- if any one of the suction outlets becomes blocked, the flow through the remaining suction outlets should accommodate 100 % of the flow rate;

b) in case of suction outlet systems with only one grille, the grille should be designed in such a way that either:
- one bather cannot cover more than 50 % of the opening; or
- raised grilles domed opposite to the flow direction, with prevalent peripheric suction. The height of the dome should be at least 10 % of the main direction; or
- single grilles with a surface of the area circumscribed to the suction openings ≥ 1 m^2 (10.8 ft^2);

c) there is a gravity feed tank.

Ships not complying with the European Standards EN 13451-3, the anti-entrapment/anti-entanglement requirements as described in the latest version of the VSP Operations Manual are also acceptable.

B. VSP Operations Manual requirements

Anti-entrapment/anti-entanglement requirements for drain covers and suction fittings in RWFs are shown in Table 10 (page 106). This does not apply to facilities with zero depth where the drains are not under direct suction.

Testing of manufactured drain covers should be by a nationally or internationally recognized testing laboratory.

The information below should be stamped on each manufactured antientrapment drain cover:

- certification standard and year;
- type of drain use (single or multiple);
- maximum flow rate (in gallons or litres per minute);
- type of fitting (suction outlet);
- life expectancy of cover;
- mounting orientation (wall, floor, or both);
- manufacturer's name or trademark;
- model designation.

The design of custom/shipyard constructed (field fabricated) drain covers and suction fittings should be fully specified by a registered design professional in accordance with ASME A112.19.8-2007. The specifications should fully address cover/grate loadings, durability, hair, finger and limb entrapment issues, cover/grate secondary layer of protection, related sump design, and features specific to the RWF.

A letter from the shipyard should accompany each custom/shipyard constructed (field fabricated) drain cover fitting. At a minimum the letter should specify the shipyard, name of the ship, specifications and dimensions of the drain cover, as detailed above, as well as the exact location of the RWF for which it was designed. The name of and contact information for the registered design professional and signature should be on the letter.

5.55 Lifesaving equipment	Lifesaving equipment (at least a shepherds hook of appropriate size and floatation devices) should be mounted in a conspicuous location and be plainly marked "For emergency use only".	ST
5.56 Marks for depth	Marks should notify the depth where it exceeds 1 m (3 ft).	ST
5.57 "No Lifeguard on duty" signs	Lifeguards should be present; otherwise, a warning sign informing passengers that no lifeguard is on duty should be posted in plain view in clear legible letters (Annex 23, page 267).	ST

5.58 "No diving" signs

Warning signs prohibiting diving should be placed in pools or areas of pools less than 1.8 m (6 ft) deep (Annex 23, page 267). ST

5.59 Bather load

- The allowable number of bathers should be posted in plain view. ST
- For calculating the maximum number of bathers that can use a swimming pool at a time, the following table should be used: ST

Water depth	Maximum bathing load
< 1.0 m (3.3 ft)	One bather per 2.2 m^2 (23.7 ft^2)
1.0-1.5 m (3.3-4.9 ft)	One bather per 2.7 m^2 (29 ft^2)
> 1.5 m (4.9 ft)	One bather per 4.0 m^2 (43 ft^2)

- For calculating the maximum bather load in hot tubs/spas, the following factor should be used: ST
  - One person per 20 L (5 gal) per minute (1.2 m^3/h (300 gal/h)) of recirculation flow.
- When bathers do not comply with the maximum bather load, instructions should be given to bathers to respect the maximum bather load. ST

5.60 Bather hygiene

Signs for hygiene of bathers should be placed in plain view in the pool area and in the dressing rooms. Signs should request bathers not to swim when they have health problems and to take a shower before using the pool. ST

5.61 Other warning signs

Other signs that prohibit or discourage unsafe behaviour, warn susceptible people, prohibit the use of the pool when experiencing diarrhoea, vomiting or fever or when persons are in nappies and encourage safe practices should be posted in plain view in the pool and in the dressing rooms (where available). ST

5.62 Other safety issues

Other safety issues of RWFs are covered by SOLAS conventions and EN standards 15288-1 and 15288-2. ST

Decorative fountains

5.63 Decorative fountain water

Potable water should be used as a source for decorative fountains. ST

5.64 Disinfection

Water should be disinfected with a halogen or with another chemical disinfectant which provides a residual effect. Where chlorine is used the free residual level should be at least 1 mg/L. Other secondary physical methods of disinfection (e.g. UV radiation) can be used in addition to chemicals. ST

5.65 Maintenance	All parts of the decorative fountains (pool, buffer tank, and piping) should be maintained in good condition, clean and free from algae, sediment and salts.	ST
5.66 Microbiological testing	Water samples should be collected at least every six months and tested for the presence of *Legionella* spp. Acceptable limits are shown in Table 11 (page 107).	ST

Table 7: Recommended standards for record keeping for RWF

Section	Record keeping	Details	Minimum frequency
Treatment	Water quality parameters (see Table 8 and Table 9)	Date, time, test value of parameters	As stated in Table 8 and Table 9 and Table 11
	Backwash	Date and time	Whenever needed and applied (see items 5.13 and 5.44).
Equipment	Filter inspection	Date, time, condition	Daily (see items 5.15 and 5.43).
	Filter media or cartridge change	Date, time	Whenever a filter media or cartridge needs to be changed.
	Shock treatment	Date, time	As applicable (see item 5.47 and 5.48)
	Draining of pools	Date, time	As applicable (see item 5.49)
	Maintenance work	Date, time, process, type of equipment	Whenever it is carried out — as manufacture's/supplier's advice. *This can be recorded in the engineering or other logs*
	Repair work	Date, time, description of problem and repair job	Whenever it occurs. *This can be recorded in the engineering or other logs*
	Calibration of analysers	Date, time, result of manual and electronic measurements	Daily
Cleaning	Cleaning	Date	As applicable (e.g. weekly)
Emergencies	Accidental faecal or vomit releases	Date, time of closure, corrective actions taken, time of opening	Whenever it occurs.

	Water quality parameters out of limits	Date, time, parameter values, corrective actions taken	Whenever it occurs.
	Injuries/deaths. *This can be recorded in the medical log or other incident reports.*	Date, time, description of event and its reasons	Whenever it occurs.
Other	Operation of flow-through mode	Date, time of operation	Whenever it occurs.
	Training	Date, time, name, position, trainer, training hours	Before starting work for the first time and thereafter as necessary.

Table 8: Physical, chemical and microbiological parameters tested in swimming pools and leisure water pools (excluding sea water flow-through RWF) their acceptable limits and frequency of testing

Parameters	Acceptable Limits	Minimum testing frequency
Physical		
Temperature*	Recommended temperature: 25-28 °C (77-82 °F) Maximum temperature: 30 °C (86 °F)	Every day
Chemical		
Free disinfectant residual	1-5 mg/L 0.5-5 mg/L (if ozonation is applied)	Every four hours†
pH	7.0-7.8 for chlorine disinfection 7.0-8.0 for bromine disinfection	Every four hours†
Turbidity*	< 0.5 NTU	Every day
Alkalinity*	80-120 mg/L ($CaCO_3$)	Every day for fresh water pools Every week for other pools
Combined chlorine*	No more than half the free halogen concentration	Every day
Cyanuric acid (in case of chlorinated isocyanurates used)	50-100 mg/L	Every day
Microbiological		
Heterotrophic Plate Count	< 200 cfu/mL	Every two months
E. coli, *Pseudomonas aeruginosa*	< 1/100 mL	Every two months
Other microbiological parameters	Decision on case by case basis considering the operational monitoring results and the risk assessment findings, or whenever there is outbreak public health event	

* Parameters tested optionally.

† Unless electronic halogenation system with automatic monitoring and alarm system is in place.

Table 9: Physical, chemical and microbiological parameters tested in hot tubs/spas their acceptable limits and frequency of testing

Parameters	Acceptable Limits	Minimum testing frequency
Physical		
Temperature	≤ 40 °C (≤ 104 °F)	Every four hours
Chemical		
Free disinfectant residual	3-10 mg/L for chlorine disinfection 4-10 mg/L bromine disinfection	Every one hour*
pH	7.0-7.8 for chlorine disinfection	Every one hour†
	7.0-8.0 for bromine disinfection	
Turbidity†	< 0.5 NTU	Every day
Alkalinity*	80-120 mg/L ($CaCO_3$)	Every week
Combined chlorine*	No more than half the free halogen concentration	Every day
Cyanuric acid (in case of chlorinated isocyanurates used)	50-100 mg/L	Every day
Microbiological		
E. coli, *Pseudomonas aeruginosa*	< 1/100 mL	Every two months
Legionella spp.	< 1/100 mL	Every three months‡
Other microbiological parameters	Decision on case-by-case basis considering the operational monitoring results and the risk assessment findings, or whenever there is outbreak public health event	

* Unless electronic halogenation system with automatic monitoring and alarm system is in place.

† Parameters tested optionally.

‡ Legionella testing can take place every 6 months when for the 24 previous consecutive months: a) Legionella test results were negative for the hot tub/spa, and b) no legionellosis case has been linked with the ship and c) the operational monitoring is implemented continuously according to the plan and the results are satisfactory for the hot tub/spa.

Table 10: Antientrapment Requirements for Recreational Water Facilities in the Vessel Sanitation Program 2011 Operations Manual

Option*	Drainage/Recirculation System	Cover Design	Secondary Antientrapment Requirement**
Gravity only			
1	Multiple drains (2 or more drains greater than 3 feet apart)	Standard design (not compliant with ASME A112.19.8)	Alarm
2	Multiple drains (2 or more drains greater than 3 feet apart)	ASME A112.19.8 compliant cover	None
3	Single unblockable drain (per ASME A112.19.8)	Standard design (not compliant with ASME A112.19.8)	Alarm
4	Single unblockable drain (per ASME A112.19.8)	ASME A112.19.8 compliant cover	None
5	Single blockable drain or multiple drains (less than 3 feet apart)	ASME A112.19.8 compliant cover	GDS
Suction fitting			
6	Multiple drains (2 or more drains per pump with drains greater than 3 feet apart)	ASME A112.19.8 compliant cover	None
7	Single unblockable drain (per ASME A112.19.8-2007	ASME A112.19.8 compliant cover	SVRS or APS
8	Single BLOCKABLE drain or multiple drains (less than 3 feet apart)	ASME A112.19.8 compliant cover	SVRS or APS

* Options 1 through 5 are for fittings that are not under direct suction. These include both fittings to drain the RWF and fittings used to recirculate the water. Options 6 through 8 are for fittings that are under direct suctions. These include fittings to drain the RWF and fittings used to recirculate the water.

**Definitions:

- Alarm = the audible alarm must sound in a continuously manned space AND at the RWF. This alarm is for all draining: accidental, routine, and emergency.
- GDS (Gravity Drainage System) = a drainage system that uses a collector tank from which the pump draws water. Water moves from the RWF to the collector tank due to atmospheric pressure, gravity, and the displacement of water by bathers. There is no direct suction at the RWF.
- SVRS (Safety Vacuum Release System) = a system which stops the operation of the pump, reverses the circulation flow, or otherwise provides a vacuum release at a suction outlet when a blockage is detected. System must be tested by an independent third party and found to conform with ASME/ANSI A112.19.17 or ASTM standard F2387.
- APS (Automatic Pump Shut-off system) = a device that detects a blockage and shuts off the pump system. A manual shut-off near the RWF does not qualify as an APS.

Table 11: Chemical and microbiological parameters tested in decorative fountains, their acceptable limits and frequency of testing

Parameters	Acceptable Limits	Minimum testing frequency
Chemical		
Free disinfectant residual	> 1 mg/L Cl > 1 mg/L Br	Every four hours
Microbiological		
Legionella spp.	< 1/100 mL	Every six months
Other microbiological parameters*	Whenever there is an outbreak	

* Parameters tested optionally

6. PEST MANAGEMENT

6. PEST MANAGEMENT

Passenger ships may provide conditions suitable for the survival and growth of pest populations. Insects, rodents and other pests can gain access directly from the ships' open and technical spaces, can be carried in shiploads, or can be found on humans or animals as ectoparasites. Pests on board ships may contaminate stored foods, transmit illness on board, or introduce diseases to different areas of the world. Early identification of their presence through use of an integrated pest management (IPM) system is important to avoid large infestations.

Legal requirements (LEG)/recommended standards (ST)

Item	Details	LEG/ ST
	Integrated Pest Management Plan	
6.1 Pests	Ship companies must ensure that pest infestation is eliminated on ships for which they are responsible. Any introduction of pests onto the ship must be acted upon immediately.	LEG[1]
6.2 IPM management team	• A designated pest management team should be established and trained so as to recognise common shipboard insects and rodents at every stage of their life cycle and know pests' behaviour.	ST
	• The team should have specific knowledge of pest surveillance methods and appropriate knowledge of housekeeping, effective hygiene, maintenance and safe use of pesticide application.	ST
6.3 IPM Plan content	An IPM Plan should be established and implemented as described in the following paragraphs.	ST
6.4 Responsibilities	Crew positions and responsibilities of the designated pest management team should be written in the IPM Plan.	ST
6.5 Inclusiveness	All common shipboard insects and rodents should be taken into consideration in the IPM Plan. These include, but are not limited to cockroaches, flies, mosquitoes, bedbugs, fleas, bees, mites, ants, beetles, pests of stored products, fruit flies and rodents.	ST
6.6 Monitoring	• Passive and active surveillance, including surveillance at night, should be conducted for evidence of pests. All potential risk areas should be included (food preparation, storage and service areas, garbage rooms, cabins, technical spaces, open decks, etc.).	ST

- The location of suitable monitoring traps or other passive monitoring devices should be included in the IPM plan.

6.7 Inspections

For active surveillance periodical scheduled visual inspections should be conducted. During inspections, the following should be checked: ST

- the presence of pests or other evidence such as droppings/faeces, cast skins or urine, gnawing, signs, traces, footprints, smells;
- leaking water supplies and waste water drain lines, damp and wet areas;
- harbourage and cover areas including warm spaces such as equipment/machine rooms;
- access to points of entry and luggage/supplies;
- unsanitary conditions and access to food and water;
- areas with standing water (lifeboat covers, bilges, scuppers, awnings, gutters, air treatment plants, etc.).

6.8 Trap placement

- Passive surveillance should be conducted by placement of suitable traps, which should be checked and replaced according to the IPM Plan. ST
- If active surveillance has revealed evidence of the presence of pests such as rodents, then further monitoring should be carried out. ST

6.9 Control measures

When pests or evidence of pests (e.g. casts) are found, control measures should be applied. A follow-up inspection should be conducted to ensure that the pests have been controlled. ST

6.10 Record keeping

- Active and passive surveillance should be recorded, including the locations inspected, dates, time, the names of crew involved, the number, the species and the life stage (where applicable) of pests or other evidence of pest infestation found, and the control measures applied. ST
- Records and training documents should be kept for at least 12 months and be available during inspections. ST

6.11 Pesticides

A list of the pesticides carried on board should be maintained and be available during inspections. ST

6.12 IPM Evaluation

The IPM Plan should be evaluated for effectiveness periodically. It should be revised whenever needed — for example when there is a significant change in the ship structure or after a significant refit. The evaluation should be undertaken more frequently where a pest infestation exists but cannot be controlled. ST

6.13 Availability of IPM	The IPM Plan should be available during the inspection.	ST
6.14 Supplies	Pesticides and traps (for insects and rodents) should be available on board and during the inspection.	ST
	Specific pest control preventive measures	
6.15 Exclusion of pests	All entry points where pests may enter the food preparation, service areas and cabins must be protected from the entry of pests.	LEG[2]
6.15.1 Food supplies and preventive measures	• Incoming food and supplies should be routinely inspected for evidence of pests.	ST
	• Air curtains should be placed in areas to prevent fly entrance at the indoor food and garbage areas and buffet self-service areas. Alternatively automatic doors, rotating doors or other effective controls should be installed.	ST
6.16 Rat guards	• Rat guards or other appropriate rodent prevention measures should be fitted when the ship is in port.	ST
	• Lines or group of lines should closely match the diameter of the rat guard. Rat guards should be placed at a point on the line at least two meters (six feet) from the pier, with the point at least 0.60 metres (two feet) from the ship. The point of the rat guard cone (where applicable) should face the ship. Two or more closely placed lines should be grouped to pass through one rat guard or the rat guard should be placed side-by-side. Any gap between the sleeve and the line should be blocked with material which cannot be easily removed or destroyed. The position of the rat guards should be checked regularly.	ST
6.17 Harbourage	Precautions should be taken to prevent harbourage in food areas as described in Chapter 3 of the manual (cleaning of all food preparation areas, hygienic waste management, etc.).	ST
6.18 Cleaning	Traps and insect control devices should be cleaned or replaced at regular intervals, in order to maintain hygienic conditions.	ST
	Pesticide application	
6.19 Trained crew	Pesticides must be applied only by persons who are trained in the application methods and use of the pesticide being applied.	LEG[3]

6.20 Health and safety	Health and safety procedures must be implemented to protect the passengers and crew before and after the pesticide application.	LEG[4]
6.21 Storage and handling of pesticides	Pesticides must be stored and handled in accordance with the provisions described in Chapter 8 of the manual.	LEG[4]

Referenced legislation

1. International Health Regulations 2005
2. Regulation (EC) No 852/2004 on the hygiene of foodstuffs
3. Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work
4. Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products

7. HOUSEKEEPING AND FACILITIES

7. HOUSEKEEPING AND FACILITIES

Housekeeping plays an important role in maintaining a ship in a condition that is not harmful to health and, therefore, contributes to public health protection. It is necessary that all accommodation spaces are maintained to a hygienic standard.

7.1 Accommodation and public spaces

Accommodation facilities for both passengers and crew, and public spaces such as corridors, lounges, bars and restaurants, should achieve hygienic standards in terms of design, construction and cleaning. Accommodation spaces should have suitable and sufficient means of natural or mechanical ventilation, and have adequate natural and/or artificial lighting. Cleaning and disinfection is a key component of housekeeping. An effective cleaning and disinfection protocol for all areas of the ship not only makes the ship more visibly appealing but, more importantly, reduces the risk of infection transmitted through environmental sources.

Legal requirements (LEG)/recommended standards (ST)

Item	Details	LEG/ ST
	Construction and maintenance	
7.1.1 Free from sources of infection or contamination	Ship operators must permanently keep conveyances for which they are responsible free of sources of infection or contamination.	LEG[1, 2]
7.1.1.1 Maintenance	Accommodation and public spaces should be maintained in good repair.	ST
7.1.2 Materials and construction	• The construction of decks, deckheads and bulkheads in accommodation and public spaces should allow effective cleaning. Materials should be suitable to allow the type of cleaning appropriate to the area.	ST
	• Joints between decks and bulkheads should be constructed so as to avoid gaps and crevices.	ST
	Cleaning, disinfection and body fluid spillage policy	
7.1.3 Cleaning and disinfection of surfaces	• Decks, bulkheads, deckheads, surfaces of furniture and other surfaces should be kept clean and in good condition. Other surfaces include, but are not limited to door handles, hand rails, elevator buttons, telephones, keyboards and tabletops.	ST

	• High-risk areas may require additional cleaning and disinfection. Disinfectants should be applied as described in item 8.11. Disinfectants applied as part of the general housekeeping in cabins, public and other areas should be effective against Norovirus. Disinfectants applied in certain areas and equipment in the medical facilities, the beauty salon and after blood spillages should be effective against blood borne pathogens.	ST
7.1.4 Carpeting and other deck coverings	• Carpeting and deck surfaces should be kept clean. • During GI outbreaks vacuum cleaning of carpets and floors has the potential to recirculate pathogenic microorganisms and should not be performed when the infectious agent is suspected of being transmitted through environmental surfaces.	ST ST
7.1.5 Cleaning and disinfection Plan/Schedule	• A Cleaning Plan/Schedule should be in place in all accommodation and public spaces. • The Cleaning Plan/Schedule should at least include: - areas, surfaces or items to be cleaned, - type of cleaning materials to be used, - method of cleaning and disinfection, - frequency of cleaning (before/after use, daily, weekly, monthly), - any safety precautions for crew.	ST ST
7.1.6 Frequency	Decks, bulkheads, deckheads, surfaces or furniture should be cleaned throughout the day at a frequency to help reduce any risk of contamination.	ST
7.1.7 Avoid cross-contamination	• Cleaning and disinfection are two different steps and procedures and should take place so as to avoid cross-contamination. • Cleaning and maintenance equipment including mops, brooms, rags should be: - cleaned, disinfected and dried after use and in such a manner to avoid cross-contamination; - stored in designated and labelled areas, so that they do not contaminate food or other equipment or surfaces; - maintained in good condition.	ST ST
7.1.8 Body fluid spillage policy	• A procedure for dealing with body fluid spillages (blood, vomiting and diarrhoea) should be in place. • In the event of an incident such as body fluid spillage (e.g. faeces, vomit), appropriate disinfectants should be used.	ST ST

- There should be trained crew who carry out the cleaning and disinfection of the area. ST
- The trained crew should use protective clothing (e.g. gloves and aprons), which should be disposable, where possible. ST
- The cleaning materials and disposable protective clothes should be placed in sealed bags which should be incinerated or carefully disposed of to avoid any contamination. Cleaning equipment should be decontaminated and non-disposable clothing laundered. ST
- Given the risk of infection associated with body fluid, passengers and crew should not be allowed into an area where there has been a spillage until the area is cleaned. ST
- If linen is soiled with body fluids, it should be washed separately (see item 7.6.4 and 7.6.5). ST
- All soiled linen should be washed as soon as possible. ST
- Damaged or heavily soiled linen which cannot be effectively laundered should be disposed of in a sealed bag and incinerated. ST

Uniform policy

7.1.9 Uniform policy

- All crew working in facilities on board (e.g. nurseries and play areas, hairdressers and beauty salons, gym) should maintain a high degree of personal cleanliness. ST
- Crew should wear suitable clean protective clothing (e.g. uniforms, aprons). ST
- Protective clothing or uniform should completely cover other clothing. ST
- Protective clothing or uniform should be changed regularly or as soon as they get dirty. ST

Ventilation

7.1.10 Ventilation

- All spaces should be well ventilated. ST
- There should be suitable and sufficient means of natural or mechanical ventilation to all accommodation spaces. ST
- Ventilation systems should be constructed so that filters and other parts requiring cleaning or replacement are readily accessible. ST
- Drains in air handling units should be regularly inspected in order to ensure that are properly working. ST
- Condensate trays and sumps should be kept clean and regularly disinfected. ST
- Filters of air handling unit, ducts and all parts of the ventilation system should be kept clean. ST
- Potable water should be used to clean ventilation systems. ST

7.1.11 Ventilation systems	The ventilation system for cabins should be controlled so as to: - maintain the air in a satisfactory condition; - ensure adequate air movement in all weather conditions.	ST
7.1.12 Isolated air points	• Air intake points should be located away from air exhaust points to allow for proper air circulation.	ST
	• Air intake and exhaust points should be screened to prevent the entry of pests.	ST
	Lighting	
7.1.13 Lighting	Accommodation and public spaces should have adequate natural and/or artificial lighting.	ST
7.1.14 Intensity of lighting in different spaces	In high-risk areas such as toilets and hand washing facilities, lighting levels should be increased so as to allow effective cleaning and the monitoring of cleaning standards.	ST
	Training	
7.1.15 Knowledge	Crew members who are responsible for supervising cleaning and disinfection and performing housekeeping procedures should be fully trained and aware of their tasks prior to starting work in their area of responsibility.	ST

Referenced legislation
1. International Health Regulations, 2005
2. ILO Maritime Labour Convention, 2006

7.2 Toilets and hand washing facilities

Hand washing is an important hygiene practice for passengers and crew, reducing the likelihood of pathogenic contamination of food, water and environment and reducing the risk of disease transmission. Hand washing should take place after activities such as using the toilet, smoking, sneezing, coughing, and changing nappies.

Item	**Details**	**LEG/ ST**
	Construction and maintenance	
7.2.1 Location	• Flush toilets are to be available and connected to an effective drainage system.	LEG[1]

	• Toilets are not to open directly into spaces in which food is handled.	LEG[1]
7.2.1.1 Ventilated space	There should be a ventilated space between the toilets and the food areas.	ST
7.2.2 Drainage	Decks in the toilet facilities should be designed to ensure that there is no accumulation of pooled water under normal operation conditions.	ST
7.2.3 Handwashing	Hand washing facilities should be provided within, or adjacent to, toilets.	ST
7.2.4 Equipment of hand washing facilities and toilets	• Hand washing facilities should include hot and cold running water preferably from a single mixing outlet, single-service paper or cloth towel dispenser or drying device, suitable liquid soap in dispenser or detergent and waste bin.	ST
	• Toilets should be supplied with toilet paper and a waste bin.	ST
7.2.5 Signs	Signs should be posted in the toilet/sanitary accommodation requesting that passengers wash their hands after using the toilet and crew wash their hands often. Hand wash signs should always be posted in crew hand washing facilities adjacent to all food handling areas including the galley. The hand washing method is given in Annex 15 (page 250).	ST
7.2.6 General cleaning procedures	Surfaces such as toilet seats, flush handles or pulls, door handles should be cleaned and disinfected frequently throughout the day.	ST

Referenced legislation
1. Regulation (EC) No 852/2004 on the hygiene of foodstuffs

7.3 Nursery and play areas

In general, the three most important ways of preventing the spread of infectious disease in nursery and play areas are: 1) effective hand washing, 2) exclusion of sick children and crew, and 3) immunisation of children and crew. To promote and enable effective hand washing, sinks and other hand washing facilities need to be readily accessible and appropriately located.

Item	**Details**	**LEG/ ST**
	Hand washing	
7.3.1 Hand washing	• Hand washing facilities should be located within or close to the	ST

facilities	nursery and play areas. • Hand washing facilities should be positioned at an appropriate height for crew and children. • Hand washing liquid soap provided in the hand washing facilities used by children should be suitable for use by children.	ST ST
7.3.2 Supervision of children's hand washing	Crew should supervise and observe children so that they wash their hands at appropriate times using the correct method. The method of hand washing is given in Annex 15 (page 250).	ST
	Nappy (diaper) changing area	
7.3.3 Location of nappy changing area	• An area specifically set aside for changing nappies should be provided. • The nappy changing area should be located inside the nursery and play areas.	ST ST
7.3.4 Hand washing facility	The nappy changing area should include a hand washing facility.	ST
7.3.5 Nappy changing table	Nappy changing tables should be constructed of impervious, non-absorbent, non-toxic, smooth, durable and easily cleanable material. They should be equipped with single-use paper towels or other material to put on the table or pillow and discarded after use.	ST
7.3.6 Equipment	• The area should be equipped with cleaning wipes, soiled nappy bin, detergent and disinfectant. An emergency supply of disposable nappies is recommended. • Gloves and aprons should be available in the nursery and play areas.	ST ST
7.3.7 Signs	Signs should be posted in the nappy changing area requiring crew to wash their hands after each nappy change.	ST
7.3.8 Protective measures for nappy changing	The nappy changing area (table or mat) should be thoroughly cleaned after each nappy change with detergent and warm water and disinfected if necessary.	ST
	Toilets	
7.3.9 Separate toilet facilities	Separate toilet facilities should be provided for the children in the nursery and play area.	ST
7.3.10 Signs in toilets	Signs should be posted in the toilets requiring crew to wash their	ST

hands and the children's hands after toilet use.

Cleaning and disinfection

7.3.11 General cleaning procedures

Surfaces that children touch should be cleaned and disinfected frequently throughout the day. Tables or high chair trays should be cleaned before and after they are used for eating. ST

7.3.12 Body fluid spillages

When body fluid spillages occur, proper cleaning procedures should be followed (refer to the ship's body fluid spillage policy). ST

Waste disposal

7.3.13 Waste disposal

Waste materials should be handled and removed from nursery and play areas according to Chapter 9 — Waste management. ST

Toys

7.3.14 Materials of toys

- Toys must be designed and manufactured in such a way as to meet hygiene and cleanliness requirements in order to avoid any risk of infection, sickness or contamination or injury to children. LEG[1]
- Damaged or broken toys that can cause injury to children or that cannot be cleaned effectively should be removed.

7.3.15 Cleaning of toys

- Toys, especially those in rooms with younger children, should be cleaned at the end of each day by washing in warm water and detergent, rinsing and drying them. ST
- Toys which become dirty or which have been used by a child known to be ill should be immediately removed from the play area. Such toys should be cleaned/disinfected immediately if the toy is to be used again that day, or put aside for cleaning/disinfection at the end of the day. ST
- Toys should be washed in warm water and detergent, well rinsed and dried. ST
- Many toys can be cleaned in dishwashers. Balls used in ball pits/pens should be cleaned at least once per week; if balls are known to have been contaminated they should be washed before they are used again. ST

Infection surveillance

7.3.16 Guidance on childhood infections

Written guidance on the symptoms of common childhood infectious illnesses should be provided for passengers and nursery and play area crew. ST

7.3.17 Reporting of ill children

- Parents should be encouraged to tell crew working in these areas when any children are ill. ST
- Crew working in this area should be aware of the symptoms of common childhood infectious illnesses and evidence of training are to be made available during the inspection. ST
- If a child seems unwell, the child should be separated from other children and medical advice sought. ST
- Parents should be informed that the child needs to be picked up as soon as practicable. ST

7.3.18 Exclusion policies

- Nursery and play areas should have an exclusion policy. Crew working in these areas should have knowledge of the policy and records of training are to be made available during the inspection. ST
- Medical advice should be sought from medical staff or other designated crew prior to exclusion from nursery and play areas. ST
- Advice should be sought prior to an excluded child re-entering the nursery or play area. ST

Referenced legislation

1. Directive 2009/48/EC on the safety of toys

7.4 Hairdresser's, beauty salons and gyms

Hairdressing and cosmetic services are not considered high-risk for transmission of any serious infections. However, some common infections have been associated with hairdresser/beauty salons, including bacterial infections such as impetigo and furuncles (boils), viral infections such as herpes simplex and verrucae (warts) and fungal infections such as tinea capitis and tinea corporis (ringworm infections). Infestations such as head lice are also common. Treatments such as depilatory waxes and lotions, as well as make-up and other lotions and gels, can also act as sources for disease transmission if they are incorrectly handled. To prevent the spread of microbial infections or infestations of head lice, crew should maintain the premises and equipment in a hygienic condition, and undertake procedures in a safe and appropriate manner.

Crew in hairdresser's, beauty salons and gyms should receive training according to their duties. Training should include issues such as the spread of pathogenic microorganisms, cross-contamination, personal health and hygiene, hand washing and cleaning and disinfection techniques. The EU legislation requires that gym operators take care of the structural safety and adequate maintenance of gym equipment.

Item	Details	LEG/ ST
	Training	
7.4.1 Training	Crew working in hairdresser's and beauty salons should demonstrate knowledge about the risk of transmission of infectious diseases and hygienic practices, according to their duties.	ST
	Hand washing	
7.4.1.1 Hand washing	The recommended hand washing method is set out in Annex 15 (page 250).	ST
	Services	
7.4.2 Use of razors	New, single-use, disposable razor blades should be used for each customer.	ST
7.4.3 Use of cosmetics	• A new batch of depilatory waxes and lotions should be made for each customer.	ST
	• Makeup, lotions, waxes and gels should not be reused and should be administered with either a disposable, or clean and disinfected, applicator.	ST
	Treatment of wounds	
7.4.4 Wounds treatment	Minor wounds should be treated according to the company policy. In the case of more serious wounds, medical advice should be sought.	ST
	Cleaning and disinfection	
7.4.5 Cleaning of equipment	All items such as combs, brushes, scissors, clippers, manicuring and pedicure instruments and make-up equipment should be cleaned and disinfected or sterilised when necessary and between each customer.	ST
	Waste disposal	
7.4.6 Sharps disposal	Waste materials, including any sharps, must be removed from hairdresser and beauty salon areas according to Chapter 9 — Waste Management, section 9.5.	LEG[1, 2]
	Gym	
7.4.7 Characteristics of gym equipment	• Gym equipment should be kept clean.	ST
	• Disposable disinfecting sprays, swabs/paper towels, or sanitary wipes/washable rags should be made available for use by	ST

customers.

Referenced legislation

1. Directive 2008/98/EC on waste
2. Council Directive 2010/32/EU implementing the Framework Agreement on prevention from sharp injuries in the hospital and healthcare sector concluded by HOSPEEM and EPSU

7.5 Pet/animal housing areas

Where kennels for pets are provided they must be kept in a clean and hygienic condition. Crew should be trained according to their duties.

Item	Details	LEG/ ST
	Construction	
7.5.1 Facilities designed to be cleanable	Animal housing areas should be constructed and equipped with materials that can be easily cleaned and disinfected. All decks, surfaces and fittings should be constructed of smooth, impervious, durable and preferably light coloured material.	ST
7.5.2 Air circulation	Kennels should be designed and constructed so as to provide animals with adequate space for effective air circulation.	ST
7.5.3 Deck design	Decks should be designed, constructed and maintained to minimise leakage of urine and faeces.	ST
	Cleaning and disinfection	
7.5.4 Faeces and soiled bedding	Faeces, urine, other body fluid and soiled bedding should be removed promptly.	ST
7.5.5 Cleaning of surfaces	All surfaces should be cleaned thoroughly to remove organic matter before disinfection.	ST
	Waste disposal	
7.5.6 Storage of waste	Animal waste should be managed as infectious medical waste (Chapter 9 — Waste management, section 9.5).	ST
	Monitoring of infections	
7.5.7 Common infections	Written guidance on symptoms of common animal infectious illnesses should be provided for crew.	ST

7.5.8 Daily monitoring for illness	Animals should be monitored at least daily for signs of illness, and receive appropriate care by the owners.	ST
7.5.9 Isolation of infected animals	Animals suspected or known to be infected with a pathogen should be isolated from passengers and from other animals.	ST

7.6 Laundry

Soiled clothing and linen may be a source of contamination from pathogenic microorganisms, especially when they are from ill persons (e.g. cases of gastroenteritis). Transmission of skin infections can be prevented by thorough washing of linen and clothing. Washing of clothing and linen at appropriate water temperature with soap or detergent is an effective means of destroying and diluting microorganisms. Proper handling including transport and storage of linen and clothing is important during laundry procedures in order to avoid cross-contamination and to protect crew.

Item	**Details**	**LEG/ ST**
	Construction and maintenance	
7.6.1 Availability of laundry facilities	• Appropriately situated and equipped laundry facilities should be available.	ST
	• Adequate space should be available for storing soiled and clean linen and clothes and avoiding cross-contamination.	ST
	• The water supplied to the laundry machines should have appropriate quality and any health risks associated with the water should be identified and controlled.	ST
7.6.2 Equipment of laundry facilities and record keeping	• The laundry facilities provided for use should include: - washing machines; - drying machines or adequately heated and ventilated drying rooms.	ST
	• All washing machines should be fitted with accurate thermometers to which sensing elements are correctly placed to register the actual wash temperature, i.e. the temperature of the wash water in contact with the load. Temperatures and thermometers should be checked routinely and the results be recorded.	ST
	• Washing machine surfaces and buttons should be cleaned and disinfected regularly.	ST

- Finishing equipment * like tumble dryers, flatwork ironers and presses should be able to dry linen and clothes in full, to avoid any mould growth during storing. ST

7.6.3 Soiled linen and clothes

- Soiled and clean linen and clothes should be handled appropriately so as to avoid cross-contamination. ST
- All soiled linen and clothes should be bagged or placed in containers at the site of collection unless a laundry chute is used. ST
- Soiled linen should be sorted out into categories according to the soil level and can be classified into three categories: ST
  a) high grade contaminated (e.g. linen from medical facilities, from isolation cabins or cabin linen from cases of communicable diseases transmitted through contaminated linen and linen soiled with body substances); however, heavily soiled linen and clothes should be disposed of as infectious medical waste in a sealed bag.
  b) possibly contaminated or contaminated (e.g. clothes of food/beverage crew, restaurant linen and uniforms, uniforms of housekeeping crew, cabin linen; toilet rags, housekeeping rags and mops);
  c) all other.
- Soiled linen and clothes of each of the three categories should be handled and washed separately in order to avoid cross-contamination. Washing is also done by the type of item (e.g. bedspreads, sheets, etc. are washed separately). ST
- During the transfer of laundry bags, there should be no risk of cross-contamination en route. ST
- All soiled linen should be washed as promptly as possible. ST

7.6.4 High grade contaminated linen and clothes

- High grade contaminated laundry items should be placed separately in clearly marked water soluble bags before transfer to the laundry. Temperatures above 30 °C (86 °F) during transport should be avoided in order to maintain the stability of water soluble transport bags if linen and clothes are wet. ST
- If linen is soiled with body substances (e.g. faeces), it should be washed separately without opening the bags, with a pre-wash sluice cycle. ST
- Crew should wear PPE, such as gloves and apron, when dealing with laundry of this category. ST

* The finishing equipment is not a part of the disinfection process and not adequate for destroying or reducing microorganism.

- Used PPE of crew should be disposed of as infectious medical waste in a sealed bag. ST

7.6.5 Washing of linen and clothes

- Each category of soiled linen and clothes should be washed in a washing cycle that is effective to achieve the required level of cleanliness and where necessary disinfection. ST
- Linen of category (a) and (b) should be washed with an adequate amount of detergent at a minimum temperature of 65 °C (149 °F) for a minimum of 10 minutes or at a minimum temperature of 71 °C (160 °F) for a minimum of three minutes. ST
- Where temperatures below 65 °C (149 °F) are used, the correct amount of detergent and disinfectant should be used for the required effective contact time (e.g. sodium hypochlorite to the penultimate rinse with contact time at least five minutes at a concentration of 150 mg/L). ST

7.6.6 Linen and clothes carts

- Linen and clothes should be stored as per their classification to avoid any cross-contamination with other linen and clothes. Additionally clean linen and clothes should be stored separately from soiled linen and clothes to avoid cross-contamination. ST
- Separate trolleys/carts should be used for soiled and clean linen and clothes. ST
- Trolleys/carts used to transport soiled linen and clothes should be cleaned and disinfected after each period of use. ST

7.6.7 Personal Hygiene

- A hand washing facility should be located close to the soiled laundry areas. The hand washing facility should be supplied as described in section 7.2. ST
- Crew should wash their hands on entering the laundry and before starting work. ST
- Crew should wash their hands before moving from soiled to clean areas, before handling clean linen and clothes and before exiting the laundry. ST
- Crew working in the dirty area of a laundry shouldn't then work in clean areas, without prior changing their working clothes. ST

8. HAZARDOUS CHEMICAL AGENTS

8. HAZARDOUS CHEMICAL AGENTS

Hazardous chemical agents are used on board ships during operations such as dry cleaning, photo processing, printing, housekeeping and maintenance. Chemical agents used in a food operation area can be categorised into three basic categories: a) maintenance, b) cleaning and disinfection, and c) pest control chemicals. Appropriate handling of hazardous chemical agents that are used on board can prevent potential health risks. The high risk posed to both human health and the environment has led the EU to set a strict legislative framework setting requirements regarding the labelling, storage, safe handling and disposal of hazardous chemical agents.

Legal requirements (LEG)/recommended standards (ST)

Item	Details	LEG/ ST
	Management	
8.1 Risk assessment	Hazardous chemical agents used in the accommodation/public spaces must be identified and their risk must be assessed (Annex 24, page 268).	LEG[1]
8.2 Biocidal products	Biocidal products used on board the ship must comply with the terms and conditions of the authorisation stipulated in accordance with Article 22(1) and the labelling and packaging requirements laid down in Article 69 of Regulation (EU) No 528/2012.	LEG[2]
	Labelling	
8.3 Original manufactures containers labelling	• All hazardous chemical agents in their original containers must carry a legible manufacturer's label. • The labels must be written in a language that the crew can read and understand.	LEG[3, 4] LEG[3, 4]
8.4 Working containers	Working containers of hazardous chemical agents, when filled from bulk containers, must be clearly identifiable. The manufacturer's name, the product name and the relevant safety and environmental details listed on the manufacturer's label must be included.	LEG[1, 3]
8.4.1 Labelling information	If it is not possible to provide in the working container all the relevant safety and environmental details that are listed on the manufacturer's label, then: - the working containers, together with the nature of those contents and any associated hazards, should be clearly	ST

identifiable;
- all other information should be readily available in the safety data sheets at the place where working containers are stored;
- products decanted for use over more than one day should be labelled with an expiry date.

8.5 Unlabelled containers

Unlabelled hazardous chemical containers must never be used in food areas. LEG[3, 4]

Packaging

8.6 Packaging design and material

Packaging containing hazardous chemical agents must be easily identifiable and must comply with the following requirements: LEG[3]
- the packaging must be designed and constructed so that the contents cannot escape, except in cases where other more specific safety devices are prescribed;
- the materials constituting the packaging and fastenings must not be susceptible to damage, or liable to produce hazardous compounds when in contact with the contents;
- the packaging and fastenings must be strong and solid throughout to ensure that they will not loosen and will safely meet the normal stresses and strains of handling;
- packaging fitted with replaceable fastening devices must be designed so that it can be refastened repeatedly without the contents escaping.

Storage

8.7 Storage area specifications

All storage areas for hazardous chemical agents should be clearly labelled to indicate the types of materials stored within. These areas should be locked when not in use to prevent unauthorised access that might initiate spills or leaks that could contaminate food, packaging materials, utensils or equipment. ST

8.8 Chemical agents storage

- Cleaning and disinfection chemical agents must not be stored in food preparation areas. LEG[4]
- If stored near to food preparation or serving areas the chemical agents should be suitably secured to prevent contamination. LEG[4]

8.8.1 Secondary containment

Where it is necessary to store chemicals, which are known to produce a dangerous reaction when mixed, in close proximity to each other, the chemicals in use should be stored in a secondary watertight, ST

corrosion resistant container or bund of a size that will contain 110 % of the maximum content of the primary container. This storage practice should be applied in any area where such chemicals are required to be placed in close proximity e.g. automatic halogenation and pH adjustment units.

8.9 Containers

Containers previously used to store hazardous chemical agents should not be used to store or transport food. ST

Safety Data Sheets

8.10 Safety Data Sheets

The designated crew member must ensure that the Safety Data Sheet is obtained by the supplier before the hazardous chemical agent is first supplied to the workplace. These must be stored, as an electronic or a hard copy documents, but must be readily available and accessible to crew and medical staff at all times. LEG[5]

Safety Data Sheets must be available where chemical agents are stored and where working containers are filled from bulk containers.

Application

8.11 Handling and disposal

- Hazardous chemical agents must be handled and disposed of in accordance with procedures which take into consideration how the chemical agent is used, how it is chemically altered during use, requirements specific to the ship, and the information contained on the Safety Data Sheets. LEG[2, 4]
- Biocidal products (e.g. disinfectants, pesticides) must be used in compliance with the following terms and conditions as specified in the labelling and manufacturer instructions: LEG[2, 4]
  - the uses for which the biocidal product is authorized;
  - directions for use, frequency of application and dose rate;
  - the expiry date relevant to normal conditions of storage;
  - the period of time needed for the biocidal effect;
  - the interval to be observed between applications of the biocidal product or between application and the next use of the product treated, or the next access by humans or animals to the area where the biocidal product has been used.
- Proper use must involve the rational application of a combination of physical, biological, chemical or other measures as appropriate, whereby the use of biocidal products is limited to the minimum necessary and appropriate precautionary steps are taken. LEG[2]

8.12 Training	Appropriate training and information must be given to those crew exposed to hazardous chemical agents in relation to health hazards and safe use and handling of hazardous chemical agents.	LEG[1]
8.13 Hand washing facilities	A hand washing facility should be located at the place where working containers are filled from bulk containers of hazardous substances, or mixture preparation is taking place. The hand washing facility should comply with the standards set out in section 7.2.	ST
8.14 PPE	Appropriate PPE must be provided to and used by the handlers of hazardous chemical agents, in accordance with the ships health and safety policy and as per the Safety Data Sheet instructions.	LEG[6]

Referenced legislation

1. Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work
2. Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products
3. Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006
4. Regulation (EC) No 852/2004 on the hygiene of food stuffs
5. Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency
6. Council Directive 89/656/EEC on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace

9. WASTE MANAGEMENT

9. WASTE MANAGEMENT

The daily operations on board ships generate significant amounts of waste. Appropriate control and effective management are needed in order to avoid health and environmental risks. The waste streams from ships include food waste, garbage, sewage and grey water, oil, fumes, hazardous waste and infectious and non-infectious medical waste. These types of wastes, if not properly treated and disposed of, can be a significant source of pathogens with the potential to threaten human health. Adopting control measures such as appropriate storage of waste and safe handling procedures will help to safeguard public health on board ships. In response to the particular concerns arising from the impacts of ships discharges, a strict international legislative regime was developed by the IMO with the International Convention for the Prevention of Pollution from Ships (MARPOL). The EU has enacted legislative requirements for the control, safe handling, storage and disposal of waste.

9.1 All types of wastes

Legal requirements (LEG)/recommended standards (ST)

Item	Details	LEG/ ST
	General requirements/recommended standards	
9.1.1 Written procedures	Written procedures must be in place for the storage, handling, and discharge of sewage, grey waters, oily bilge, and for the disposal of garbage, hazardous and medical waste. These procedures must outline waste control measures and corrective actions in emergency situations (in case of accidental discharge, spillage or cross-contamination).	LEG[1]
9.1.2 Certificates and records	The following certificates and records must be available during inspection: - Garbage Management Plan; - Garbage Record Book, where each discharge operation or completed incineration and any accidental loss must be reported; - the Waste Declaration Document must be kept on board at least until the next port of call and must, upon request, be made available to the competent authority; - waste delivery receipts from the port of discharge recording the date and quantity of discharge; - Sewage Discharge Record Book/ Log; - International Sewage Pollution Prevention Certificate (valid for	LEG[1, 2]

five years maximum);
- International Oil Pollution Prevention Certificate (valid for five years but with annual revalidation);
- oil record books detailing bunkering, transfer, usage and means of disposal;
- International Air Pollution Prevention Certificate (valid for five years but with annual revalidation).

Voluntary IMO forms:
- Standard format of the advance notification form for waste delivery to port reception facilities (MEPC.1/Circ.644/Rev.1) (in place of the waste Declaration Document as per Commission Directive 2007/71/EC).
- Waste Delivery Receipt (MEPC.1/Circ.645/Rev.1).

9.1.3 Separate containers

Separate receptacles or containers must be used for the segregation of food waste, cooking oil, international catering waste originating from means of transport operating internationally, hazardous waste, medical waste and recyclables. LEG[2, 3]

9.1.3.1 Labelling

Receptacles/containers should be clearly labelled and distinguishable by colour, graphics, shape, size and/or location. The ISO 21070:2011 could be used. ST

9.1.4 Knowledge of crew

- Crew should have knowledge of the health risks involved with waste accumulation and spoilage, and of the correct use of PPE. ST
- Consumption of food and beverages should be prohibited in the waste handling areas. ST

9.1.5 Use of PPE

Appropriate PPE must be used when collecting, transferring and handling waste to mitigate the risks present. LEG[4, 5]

9.1.5.1 Availability of PPE

The following should be made available to all crew who collect or handle waste: ST
- helmets, with or without visors — depending on the operation,
- face masks — depending on the operation,
- ear protection — depending on the operation,
- eye protectors (safety goggles) — depending on the operation,
- overalls (coveralls),
- leg protectors and/or industrial boots,
- disposable gloves or heavy-duty gloves (waste workers).

9.1.6 Disposal of waste/notification procedures

Discharge of all types of waste must be in accordance with MARPOL Annex IV (restricted discharge in ports, and protected areas). Delivery of waste to port reception facilities must be carried out in accordance with the Directive 2000/59/EC. LEG[1, 2]

> The master of a ship calling at a European port, before leaving the port, must deliver all waste to a port reception facility. A ship may proceed to the next port of call without delivering the ship generated waste if it can be demonstrated that there is sufficient dedicated storage capacity for all ship-generated waste that has already been and will be accumulated during the intended voyage of the ship until the port of delivery.

9.1.7 Incinerators

- Incinerators must comply with MARPOL 73/78, Annex VI, and must not be operated until the correct temperature has been reached. LEG[1]
- The operating times of incinerators, garbage type, volumes incinerated and ships position must be recorded in the Garbage Record Book. LEG[1]

9.1.7.1 Emissions

Arrangements should be in place to monitor emissions from final exhaust, i.e. by CCTV. ST

9.2 Garbage

Item	Details	LEG/ ST
	Receptacles and containers	
9.2.1 Hygienic Waste Management	Garbage must be collected, handled and disposed of in a hygienic manner and at a frequency so that garbage does not accumulate, except in designated garbage storage areas.	LEG[3]
9.2.2 Capacity of receptacles	There must be an adequate number of appropriate receptacles or containers for food waste, international catering waste and recyclables in every area of the ship where garbage is expected to be generated or discarded.	LEG[3]
9.2.3 Tightly covered receptacles	Food waste must be deposited in tightly covered receptacles, or in closed compartments, unless ship food operators can demonstrate to the competent authority that other types of containers or waste evacuation systems used are appropriate.	LEG[3]

9.2.4 Receptacle construction specifications

Garbage receptacles or containers must be of an appropriate material and design, be kept in sound condition, be non-absorbent, durable, leak-proof, be easy to clean and, where necessary, to disinfect. They must not attract pests. LEG[3]

9.2.5 Cleaning procedures

Soiled food waste bins and recyclables receptacles should be cleaned (when empty) in specific areas designated only for this purpose away from food areas. These areas should have access to water, detergent, and suitable drainage. ST

Garbage handling in galleys

9.2.6 Avoiding contamination

Garbage must not be a direct or indirect source of contamination (e.g. through contact with surfaces that food is prepared on, or by attracting pests). LEG[3]

9.2.7 Garbage accumulation

Garbage must not be allowed to remain in food preparation or serving areas beyond the end of any work shift, to avoid contamination of food or the creation of conditions favourable for pest infestations. LEG[3]

9.2.8 Transportation

- Interiors of garbage lifts, garbage chutes, sorting tables or any other surfaces in the galley coming into contact with garbage should be made of easily cleanable, corrosion-resistant, non-absorbent and durable materials. ST
- Drains should be installed at the bottom of all garbage lift shafts including provision platform lifts and dumbwaiters. ST

Garbage waste storage room

9.2.9 Garbage room location

Garbage waste, international catering waste bins and recyclables receptacles should be stored in a designated garbage storage room separate from food handling operations. Garbage room should: ST

- have restricted access for non-authorised crew;
- be as close to the waste lift/elevator and the changing room used by the waste handlers;
- have access which is free from obstructions, as far as practicable.

9.2.10 Garbage room size

Each ship must have a garbage storage space of adequate size to accommodate the maximum quantity of waste produced between the most distant unloading periods, or when unloading is prohibited. LEG[3]

9.2.11 Garbage room specification

The garbage room should: ST

- be constructed and maintained so as to be pest-proof;

- be easily cleaned and disinfected;
- be ventilated and illuminated;
- have a constructed system which will prevent pooling of water;
- have a refrigerated space for the storage of wet garbage;
- have a hand washing facility with potable hot and cold water and equipped as described in item 7.2.4, a hose connection and a deck drain;
- is provided with suitable absorbent material for dealing with any spillages of oil-containing waste;
- have a first aid kit, which includes eye wash solution.

9.2.12 Cleaning procedures

- The garbage room should be cleaned regularly and maintained at appropriate cleaning status so that odours are minimised as much as possible. ST
- Schedules and procedures for cleaning and disinfection should be established for the garbage room and the equipment used. ST

Garbage waste treatment and disposal

9.2.13 Garbage waste treatment

- Food refuse grinders or disposal units located in sculleries or other food handling area should be operated with potable water only. ST
- Processes and techniques to compact, or to comminute garbage should be adopted. ST
- Compactors should be installed in a suitable location with adequate room to allow the safe operation and for storage of processed waste. ST

9.2.14 International catering waste disposal

International catering waste must be disposed of to the port reception facilities for incineration or disposal to approved landfill sites. LEG[6]

Changing room for crew members

9.2.15 Changing room

- New ships* should provide changing facilities for crew working in the garbage handling area/room. ST
- The changing facility should: ST
  - be easily accessible;
  - include suitable storage facilities for clothes;
  - located as near as possible to the garbage room;
  - have access to a hand washing facility.

***** Ships that the keel is laid after 01/01/2017.

9.3 Sewage and grey water

Item	Details	LEG/ ST
	Drain lines	
9.3.1 Drainage system	Separate, leak-proof, isolated drainage systems must exist for sewage and grey water.	LEG[1]
9.3.1.1 Operation and labelling	• Drainage system should operate effectively to prevent the overflow of toilets or shower stalls in passenger and crew cabins. • Drain lines carrying sewage and grey water should be easily identified by labelling or other signs e.g. coloured stripes on all waste system components (black colour for waste media according to ISO 14726).	ST ST
9.3.2 Passage of drain lines carrying sewage	Drain lines carrying sewage and grey water should not be allowed to pass through ice machines, ice storage bins, or potable water tanks, or directly over: - food preparation areas, - food serving areas, - food storage areas, - bars, galleys or buffets, - wash areas for food equipment or utensils, - cabins, - potable water treatment equipment.	ST
9.3.3 Backflow prevention	Drains from equipment used for the preparation/processing/storage/handling of food including fixtures, sinks, appliances, compartments, refrigerators should not be directly piped to the ship's wastewater system but drain through an air-break to a drain or air gap.	ST
	Holding tanks and treatment system	
9.3.4 Ventilation	Ventilation of sewage-holding tanks should be adequate and emissions should be driven outside of the ship and away from any air intakes.	ST
	Discharge of sewage and grey water	
9.3.5 Overflow	Sewage and grey water should not be routinely overflowing into the bilge.	ST

9.3.6 Discharge	No discharge of any type of sewage, sewage residuals or grey water must be allowed within an area from which water for a water supply is drawn or in any area restricted for the discharge of waste by any national or local authority.	LEG[1]
9.3.7 Hose and connections	• For discharge to port reception facilities, a dedicated hose and connections large enough to allow rapid discharge of waste should be used. This hose should be durable, impervious, and of a smooth interior surface, its couplings should be designed not to allow connection to any other bunker or discharge pipe.	ST
	• All waste hoses should be provided by the port reception facility.	ST
	• If the hose is supplied by the ship: - it should be labelled "FOR WASTE DISCHARGE ONLY"; - after use and if the hose is stored on board, it should be thoroughly flushed with clean water, and stored in a convenient place, labelled "WASTE DISCHARGE HOSE". The method of flushing should not present any risk of contamination to the potable water supply.	ST
9.3.7.1 Discharge lines	Discharge lines must be fitted with a standard discharge connection in accordance with IMO MARPOL Annex IV Regulation 10 and must be capable of being capped or blanked. Addition of an end cap or blank to both hose ends, when stored, may be substituted for flushing.	LEG[1]
9.3.8 Cleanable Surfaces and disinfection	• Areas subject to routine splashes or spillages of waste should have cleanable features.	ST
	• Areas should be thoroughly cleaned and disinfected after splashing from sewage and grey water.	ST

9.4 Hazardous waste

Item	**Details**	**LEG/ ST**
	Hazardous waste storage and handling	
9.4.1 Storage and handling	Hazardous waste is not to be mixed, either with other categories of hazardous waste or with other waste, substances or materials. Mixing includes the dilution of hazardous chemical agents with water.	LEG[4]
9.4.1.1 Storage	• Hazardous waste should be stored in a designated locked area. The storage room should be separate from other types of waste storage, be of sufficient size, and kept clean and well ventilated, emissions should be driven outside of the ship and away from any	ST

air intakes.

- Hazardous chemical waste of different composition should be stored separately if they could cause unwanted chemical reactions. ST
- Oily rags are capable of spontaneous combustion and should be stored in metal containers with tightly fitting lids. Oily rags should not be allowed to accumulate. ST

Source/types of hazardous waste

1. Dry cleaning (spent solvent that is chlorinated solvent)
2. Photo processing waste (spent fixer, spent cartridges, expired film, silver flake)
3. Print shop waste (printing solvents, inks)
4. Photocopying and laser printer cartridges (spent or discarded cartridges, inks and toner material)
5. Used cleaners, solvents, paints, thinners
6. Incinerator ash
7. Fluorescent/mercury vapour bulbs
8. Batteries
9. Used and expired explosives
10. Discarded chemicals (solid, liquid or gaseous) that are generated during disinfecting procedures or cleaning processes.
11. Aerosol cans
12. Oily rags
13. Medical waste

Hazardous waste disposal

9.4.2 Hazardous waste disposal

- Hazardous waste (both solid and liquid) must be disposed of by approved contracted firms or agencies specifically authorised to manage hazardous waste according to national legislation. Where the port or other agent selects the waste contractor and not the ship, this standard applies to the port or other agent making that selection. LEG[4]
- If the ship has to arrange disposal of extra waste that cannot be accommodated by port reception facilities, discharge should be done through an approved hazardous waste contractor. LEG[4]

9.4.3 Oily bilge and sludge

- Oily bilge and sludge must be treated and disposed of in accordance with the provisions of IMO, MARPOL 73/78, Annex I. LEG[1]
- The Oil Record Book Part I must be completed on each occasion, on a tank-to-tank basis if appropriate, whenever any machinery space operations take place in the ship as these are specified by the IMO, MARPOL 73/78, Annex I. LEG[1]

9.4.4 Oil separators and 15 – 5 ppm Oil Content Meters

The 15 – 5 ppm oil content meter must be tested periodically and before operations are commenced. LEG[1]

9.4.5 Overboard valves	Overboard valves must be sealed when not in use and the seal number recorded in the oil record book unless the valve is otherwise rendered inoperable i.e. white box.	LEG[1]

9.5 Medical waste

Item	Details	LEG/ ST
	Medical waste storage and handling	
9.5.1 Knowledge of crew	Medical waste should be handled by crew with proper training.	ST
9.5.2 Medical Waste Storage	A specific storage location for medical waste must be designated.	LEG[4]
9.5.2.1 Location	This area should be located inside the medical facilities or the garbage room.	ST
9.5.2.2 Medical waste container scheme	A recommended scheme for medical waste is given in the table below.	ST

Recommended scheme for medical waste (§ 7.1 WHO, 2014)

Type of Waste	Container marking	Type of container
Highly infectious waste	"HIGHLY INFECTIOUS" with biohazard symbol	Strong, leak-proof plastic bag, or container capable of being autoclaved
Other infectious waste, pathological and anatomical waste	Biohazard symbol	Leak-proof plastic bag or container
Sharps	"SHARPS" with biohazard symbol	Puncture-proof container
Chemical and pharmaceutical waste	Labelled with appropriate hazard symbol	Plastic bag or rigid container

9.5.3 Infectious waste handling	Infectious waste must be handled with care and PPE must be used.	LEG[4]
9.5.4 Infectious waste storage	• Infectious waste must be stored in a clearly marked space identified for this purpose only, or disinfected (e.g. by steam).	LEG[4]

- Bags and containers for infectious waste must be marked with the international infectious substances symbol (see picture below). LEG[4]

International infectious substances symbol

Infectious waste
Infectious waste is suspected to contain pathogens (bacteria, viruses, parasites, or fungi) in sufficient concentration or quantity to cause disease in susceptible hosts. This category includes:
- cultures and stocks of infectious agents from laboratory work;
- waste from surgery and autopsies on patients with infectious diseases (e.g. tissues, and materials or equipment that have been in contact with blood or other body fluids);
- waste from infected patients in isolation wards (e.g. excreta, dressings from infected or surgical wounds, clothes heavily soiled with human blood or other body fluids);
- waste that has been in contact with infected patients undergoing haemodialysis (e.g. dialysis equipment such as tubing and filters, disposable towels, gowns, aprons, gloves, and laboratory coats);
- any other instruments or materials that have been in contact with infected persons or animals (WHO, 2014, Safe management of wastes from health care activities).

9.5.5 Sharps storage and handling

- Used or opened sharps must all be collected together regardless of whether or not they are contaminated. LEG[7]
- Sharps must be collected in clearly marked and technically safe UN containers and retained on board for final disposal ashore. LEG[7]
- Containers must be puncture-proof and impermeable with tight fitting covers that are difficult to break open after closure. LEG[7]
- Containers must be equipped with an interim (if applicable) and a permanent closure feature. LEG[7]
- Sharp disposal containers must be placed as close as possible to the assessed areas where sharps are being used or are to be found. LEG[7]

9.5.6 Pharmaceutical and chemical waste

Chemical and pharmaceutical waste must be segregated to be incinerated on board or ashore. LEG[4]

Medical waste disposal

9.5.7 Infectious waste disposal

- Infectious medical waste must be disposed of without endangering human health and without using processes or methods which could harm the environment. LEG[4]

	• When infectious medical waste is incinerated, it must be placed straight in to the furnace, without first being mixed with other categories of waste and without direct handling.	LEG[8]
9.5.7.1 Disinfected infectious waste	If infectious waste has been disinfected, it can join the garbage collection and disposal mechanism.	ST
9.5.8 Sharps disposal	Sharps (unused, contaminated or opened) must be disposed of in sharps containers ashore or incinerated as infectious medical waste.	LEG[4, 7]
9.5.9 Liquid medical waste disposal	Liquid medical waste, with the exception of chemical and pharmaceutical waste or any waste that can affect the operation of the sewage system, may be disposed of by discharging them into the sewage system.	LEG[4]
9.5.10 Non-infectious, non-hazardous	Non-infectious, non-hazardous waste can be handled and stored as garbage not requiring steam disinfection or special handling.	ST
9.5.11 Expired medicines	• Expired medicines should have the type and quantities of each type logged by medical staff prior to disposal.	ST
	• Disposal should be ashore via a pharmacy or by incineration. Where controlled medicines are to be disposed of on board by incineration the incineration should be witnessed by senior officers and a signed record kept.	ST

Referenced legislation

1. The International Convention for the Prevention of Pollution from Ships (MARPOL)
2. Directive 2000/59/EC on port reception facilities for ship generated waste and cargo residues
3. Regulation (EC) No 852/2004 on the hygiene of food stuffs
4. Directive 2008/98/EC on waste
5. Council Directive 89/656/EEC on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace.
6. Regulation (EC) No 1069/2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation)
7. Council Directive 2010/32/EU implementing the Framework Agreement on prevention from sharp injuries in the hospital and healthcare sector concluded by HOSPEEM and EPSU
8. Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control)

10. BALLAST WATER MANAGEMENT

10. BALLAST WATER MANAGEMENT

Ballast water and hull fouling are primary means for transporting aquatic species between ports. Many species of bacteria, plants, and animals can survive in a viable form in the ballast water and sediment carried in ships, even after journeys of several months duration. Organisms transported in ballast water and sediments in ballast tanks are a potential threat to human health. Subsequent discharge of ballast water or sediment into the waters of port states may result in the establishment of harmful aquatic organisms thereby posing threats to indigenous human, animal and plant life, and the marine environment.

Legal requirements (LEG)/recommended standards (ST)*

Item	Details	LEG/ ST
	Management	
10.1 Ballast Water Management Plan and Ballast Water Record Book	The following records should be available during inspection: - Ballast Water Management Plan, - Construction drawings, - Ballast Water Record Book (to be maintained on board for a minimum of two years after the last entry has been made and thereafter in the company's control for a minimum of three years), - International Ballast Water Management Certificate (applicable after the Convention enters into force), - Ballast Water Reporting Form(s), - Type Approval Certificate of Ballast Water Treatment Systems.	ST[1]
	Discharge	
10.2 Discharge of ballast water	No discharge of untreated or unexchanged ballast water has been or is taking place in the port basin, the river or another protected area, unless if an exemption has been granted to the ship according to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, Regulation A-4.	ST[1]

* The Ballast Water Management Convention has not yet entered into force and is implemented on a voluntary basis. The Convention will enter into force 12 months after ratification by 30 States, representing 35 per cent of world merchant shipping tonnage. As of July 2015, 44 States have ratified the Convention, representing 32.89 % of world merchant shipping tonnage.

10.3 Sediment disposal	Sediments from spaces designated to carry ballast water should be removed and disposed of in accordance with the Ballast Water Management Plan.	ST[1]
10.4 Monitoring water quality	The microbiological water quality should be monitored for compliance with the proposed parameters.	ST[1]

Referenced legislation

1. International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the "Ballast Water Management Convention")

Reference list — Part A

Aarnisalo K., Tallavaara K., Wirtanen G., Maijala R. and Raaska L. (2006). The hygienic working practices of maintenance personnel and equipment hygiene in the Finnish food industry. Food Control 17(12): 1001-1011.

Addiss D.G., Yashuk J.C., Clapp D.E. and Blake P.A. (1989). Outbreaks of diarrhoeal illness on passenger cruise ships, 1975-85. Epidemiol Infect 103: 63-72.

ALBERTA Association of Recreation Facility Personnel. (2006). Pool Standards, 2006 for the swimming pool, wading pool and water spray park regulation.

American Bureau of Shipping. (2005). ABS Garbage Management Manual, Regulations for the Prevention of Pollution by Garbage from Ships – Annex V of MARPOL 73/78.

American College of Emergency Physicians. (2014). Health Care Guidelines for cruise ship medical facilities.

Andersen E. and Løfsgaard B.E. (2013). Safe, Sufficient and Good Potable Water Offshore - A guideline to design and operation of offshore potable water systems. 3rd edition. Norwegian Institute of Public Health.

Anon. (2003). US Navy shipboard pest control manual. USA Department of the Navy and Navy Disease Vector Ecology and control Center (Bancor, Washington) reviewed by J.A. Corneil, Washington.

Association Port Health Authorities. Ship Sanitation Inspection Guide, Draft No 2 for Consultation, Ship Sanitation Working Group.

Association Port Health Authorities. (2002a). Good Practice Guides, Environmental Protection, Issue 1 / Sheet 1.

Association Port Health Authorities. (2002b). Good Practice Guides Ship Inspections, Issue 1/ Sheet 1.

Benkel D.H., McClure E.M., Woolard D., Rullan J.V., Miller G.B.Jr, Jenkins S.R., Hershey J.H., Benson R.F., Pruckler J.M., Brown E.W., Kolczak M.S., Hackler R.L., Rouse B.S. and Breiman R.F. (2000). Outbreak of Legionnaires' disease associated with a display whirlpool spa. International Journal of Epidemiology 29(6): 1092-1098.

Bolton D.J., Meally A., Blair I.S., McDowell D.A. and Cowan C. (2008). Food safety knowledge of head chefs and catering managers in Ireland. Food Control 19(3): 291-300.

Bonnefoy X., Kampen H. and Sweeney K. (2008). Public health significance of urban pests. WHO Regional Office for Europe, Denmark.

BRC Global Standards. (2012). Understanding High Risk and High Care. BRC Global Standard for Food Safety Issue 6.

Capunzo M., Cavallo P., Boccia G., Brunetti L., Buonomo R. and Mazza G. (2005). Food hygiene on merchant ships: the importance of food handlers' training. Food Control 16: 183-188.

Centers for Disease Control and Prevention. (2014). Model Aquatic Health Code. 1st Edition.

Centers for Disease Control and Prevention. (2011). Vessel Sanitation Program - 2011 Operations Manual. U.S. Public Health Service, Centers for Disease Control and Prevention/ National Center for Environmental Health.

Centers for Disease Control and Prevention. (2011). Vessel Sanitation Program - 2011 Construction Guidelines. U.S. Public Health Service, Centers for Disease Control and Prevention/ National Center for Environmental Health.

Centers for Disease Control and Prevention. (2009). Maritime Illness and Death Reporting System: Reporting Instructions.

Centers for Disease Control and Prevention. (2010). Fecal Incident Response: Recommendation for pool staff.

Chadwick House Group Ltd. (2010). Industry Guide to Good Hygiene Practice: Catering Guide – Ships, Industry Guides to Good Hygiene Practice. London, UK.

City of Bradford Metropolitan District Council. Cleaning schedule. Department of Environment and Neighbourhoods, Environmental Health, Health Protection, West Yorkshire, UK.

Cruise Lines International Association. (2006). CLIA Industry Standard: Cruise industry waste management practices and procedures.

Cliver D. (2009). Control of Viral Contamination of Food and Environment. Food and Environmental Virology 1: 3-9.

Codex Alimentarius Commission. (1993). CAC/RCP 39-1993: Code of hygienic practice for precooked and cooked foods in mass catering. Food and Agriculture Organization/ World Health Organization Food Standards.

Codex Alimentarius Commission. (2001). Food Hygiene – Basic Texts – 2nd edition. Food and Agriculture Organization/ World Health Organization Food Standards Programme, Rome.

Colorado Department of Public Health and Environment. (2002). Infectious diseases in child care settings. Guidelines for child care providers. Communicable Disease Epidemiology Program.

Council of Europe. (2002). Policy statement concerning metals and alloys. Technical document – Guidelines on metals and alloys used as food contact materials. Council of Europe's policy statements concerning materials and articles intended to come into contact with foodstuffs. Strasbourg.

Cyngor Sir County Council. (2007). Food hygiene supervision and training. Environmental Health Department.

D'Agnese J.J. (2001). Integrated pest management system guide for cruise ships.

D'Agnese J.J. (1988). An integrated pest management system works for cruise ships. Pest Control 50: 220-224.

David M., Gollasch S., Cabrini M., Perkovic M., Bosnjak D. and Virgilio D. (2007). Results from the first ballast water sampling study in the Mediterranean Sea - the Port of Koper study. Marine Pollution Bulletin 54: 53-65.

Dejong B. (2002). Outbreak of salmonellosis on a ferry between Sweden and Poland. Eurosurveillance 19.

Department of Health and Community Services. (1998). Standards for commercial skin penetration, hairdressing, and beauty and natural therapy. Environmental Health Program.

Department of Public Health. (2007). The food safety legislation explained – Document for consultation.

Department of Public Health NSW. (1996). Public swimming pool and spa guidelines. Department of the Navy. (2001). Bumed instruction 6250.14A – Procurement of deratting/deratting exemption certificates. Bureau of Medicine and Surgery. Washington DC.

Environmental Protection Agency. (2008). Cruise Discharge Assessment Report – United States EPA842-R-07-005.

Epping Forest District Council. (2006) Food Safety. Food safety information. Sinks and washing up. Environmental Health Services. Essex, UK.

Epping Forest District Council. (2006) Food Safety. Food safety information. Training for food handlers. Environmental Health Services. Essex, UK.

Epping Forest District Council. (2006). Food Safety. Food safety information. General requirements for kitchen. Environmental Health Services. Essex, UK.

European Centre for Disease Prevention and Control. (2013). Prevention of norovirus infection in schools and childcare facilities. Stockholm: ECDC; 2013

European Hygienic Engineering and Design Group. (2004). Document 8 – Hygienic equipment design criteria second edition. UK.

European Hygienic Engineering and Design Group. (2007). Materials of construction for equipment in contact with food. Trends in Food Science and Technology 18(S1): S40-S50.

Eurostat. (2015). Number of seaborne passengers embarked and disembarked in all ports, 1997-2012 (in 1000).

Executive Council of New Zealand. (2007). Health (Hairdressers) Regulations 1980. SR 1980/143. Department of Health.

Favero M.S. (1984). Whirlpool spa associated infections: Are we really in hot water? American Journal of Public Health 74(7): 653-655.

Fields B.S., Haupt T., Davis J.P., Arduino M.J., Miller P.H. and Butler J.C. (2001). Pontiac fever due to *Legionella micdadei* from a whirlpool spa: possible role of bacterial endotoxin. The Journal of Infectious Diseases 184(10): 1289-1292.

Fijan S., Sostar-Turk S. and Cencic A. (2005). Implementing hygiene monitoring systems in hospital laundries in order to reduce microbial contamination of hospital textile. Journal of Hospital Infection 61: 30-38.

Finnish Consumer Agency. (2003). Consumer agency's guidelines for the promotion of safety at swimming pools and family spas. Publication series 2/2003.

Food and Agriculture Organization. (1998). Food Quality and Safety Systems – A training manual on Food Hygiene and the Hazard Analysis and Critical Control Point (HACCP) System. Publishing Management Group, Rome.

Food Standards Agency. (2006). Food Hygiene – A Guide for businesses. Food Safety Agency Publications, UK.

Food and Drink Federation. Hygiene Fact File 2, Food storage Fact File 3 and Food Preparation Fact File 4. Foodlink. London, UK.

Forest of Dean District Council, Tewkesbury Borough Council, Cheltenham Borough Council, Gloucester City Council, Costwold District Council, Stroud District Council. A Guide to Hazard Analysis for caterers. UK.

Gloucester City Council. (2001). Environmental Health Factsheet. Cleaning and Disinfection. Gloucester, UK.

GP Wild (International), Business Research and Economic Advisors (BREA). (2015). The cruise industry - Contribution of Cruise Tourism to the Economies of Europe. 2015 Edition.

Halton Borough Council. (2009) Training for food handlers. The food and health and safety unit. Runcorn, Widnes, UK.

Hartlepool Borough Council. Construction of Food Preparation Rooms. Hartlepool, UK.

Health Protection Agency. (2003). Guidelines for water quality on board merchant ships including passengers vessels. London, UK.

Health Protection Agency. (2006). Management of Spa Pools - Controlling the Risks of Infection. London, UK.

Herwaldt B.L., Lew J.F., Moe C.L., Lewis D.C., Humphrey C.D., Monroe S.S., Pon E.W. and Glass R.I. (1994). Characterization of a variant strain of Norwalk virus from a food-borne outbreak of gastroenteritis on a cruise ship in Hawaii. J Clin Microbiol 32(4): 861-866.

London Borough of Hillingdon. (2007). Your Guide to Food Safety. UK.

Ho M.S., Glass R.I., Monroe S.S., Madore H.P., Stine S., Pinsky P.F., Cubitt D., Ashley C. and Caul E.O. (1989). Viral gastroenteritis aboard a cruise ship. Lancet 2: 961-965.

International Association for Food Protection. (2003). Food Safety at temporary events.

International Committee on Seafarers' Welfare. (2005). Guidelines for Food Safety on Merchant Ships. Watford – Hertfordshire, UK.

International Council of Marine Industry Associations. (2007). The ICOMIA Guide to On board Treatment of Grey Water.

International Labour Organization. (2014). Maritime Labour Convention, 2006.

International Maritime Organization. International Convention for the Control and Management of Ships' Ballast Water and Sediments.

International Maritime Organization. Guidelines for ballast water management and development of ballast water management plans (G4) (resolution MEPC.127(53)).

International Maritime Organization. Guidelines for ballast water management equivalent compliance (G3) (resolution MEPC.123(53)).

International Maritime Organization. Guidelines for risk assessment under regulation A-4 of the BWM Convention (G7) (resolution MEPC.162(56)).

International Maritime Organization. (1996). Recommendations on the safe use of pesticides in ships. London.

International Maritime Organization. (2002). Guidelines for ships operating in artic ice-covered waters.

International Maritime Organization. (2004). Large passenger ship safety, Medical facilities.

International Maritime Organization. (2006). Guidelines for the Implementation of Annex V of MARPOL.

International Maritime Organization. (2006). MARPOL.

Jolliffe L. (2008). Cruise ship tourism. Tourism Management 29: 604-605.

International Maritime Organization. (2011). Amendments to the Annex of the protocol of 1978 relating to the international convention for the prevention of pollution from ships, 1973 (resolution MEPC.201(62)).

International Maritime Organization. (2012). Guidelines for the implementation of MARPOL Annex V (resolution MEPC.219(63)).

International Maritime Organization. (2013). Standard format for the advance notification form waste delivery to port reception facilities. MEPC.1/Circ.644/Rev.1.

International Maritime Organization. (2013). Standard format for the waste delivery receipt following a ship's use of port reception facilities. MEPC.1/Circ.645/Rev.1.

Jones F. and Bartlett C.L.R. (1985). Infections associated with whirlpools and spas. Journal of Applied Bacteriology Symposium Supplement: 61S-66S.

Kababjian R. (2010). Disinfection of public pools and management of fecal accidents. Journal of Environmental Health 58: 8-12.

Kansas Department of Health and Environment. (2008). Prevention of infectious disease transmission associated with public swimming and bathing facilities (swimming pools, spas, whirlpools, hot tubs, interactive fountains, and water parks). Technical Guidance Tool for Local Health Departments and Environmental Health Staff.

Koo D., Maloney K. and Tauxe R. (1996). Epidemiology of diarrheal disease outbreaks on cruise ships, 1986 through 1993. JAMA 275: 545-547.

Kura F., memura-Maekawa J., Yagita K., Endo T., Ikeno M., Tsuji H., Taguchi M., Kobayashi K., Ishii E. and Watanabe H. (2006). Outbreak of Legionnaires' disease on a cruise ship linked to spa-bath filter stones contaminated with Legionella pneumophila serogroup 5. Epidemiol Infect 134: 385-391.

Lee J., Cartwright R., Grueser T., and Pascall M.A. (2007). Efficiency of manual dishwashing conditions on bacterial survival on eating utensils. Journal of Food Engineering 80: 885-891.

Lew J.F., Swerdlow D.L., Dance M.E., Griffin P.M., Bopp C.A., Gillenwater M.J. Mercatente T.M. and Glass R.I. (1991). An outbreak of shigellosis aboard a cruise ship caused by a multiple-antibiotic-resistant strain of *Shigella flexneri*. Am J Epidemiol 134(4): 413-420.

Loehr L.C., Beegle-Krause C.J., George K., McGee C.D., Mearns A.J. and Atkinson M.J. (2006). The significance of dilution in evaluating possible impacts of wastewater discharges from large cruise ships. Marine Pollution Bulletin 52: 681-688.

Lois P., Wang J., Wall A. and Ruxton T. (2010). Formal safety assessment of cruise ships. Tourism Management 25: 93-109.

Montville R., Chen Y. and Schaffner D.W. (2002). Risk assessment of hand washing efficacy using literature and experimental data. International Journal of Food Microbiology 73: 305-313.

Mouchtouri V.A., Anagnostopoulou R., Samanidou-Voyadjoglou A., Theodoridou K., Hatzoglou C., Kremastinou J. and Hadjichristodoulou C. (2008). Surveillance study of vector species on board passenger ships, risk factors related to infestations. BMC Public Health 8: 100.

National Association of State Public Health Veterinarians. (2007). Compendium of measures to prevent disease associated with animals in public settings.

National Health and Medical Research Council. (2005). Staying healthy in child care. Preventing infectious diseases in child care, 4th edition. Australian Government.

National Standards Authority of Ireland. (2007). Hygiene in the catering sector. Irish Standard I.S. 340:2007.

Nebraska Department of Health and Human Services. (2009). Swimming Pool's Operator Manual.

Neghab M., Gorgi H.A., Baghapour M.A., Rajaeefard A. and Moemenbellah-Fard M.D. (2006). Bacterial Contamination of the swimming pools in Shiraz, Iran; Relationship to Residual Chlorine and Other Determinants. Pakistan Journal of Biological Sciences 9: 2473-2477.

Norovirus Working Group. (2007). Guidance for the management of Norovirus infection in cruise ships. Maritime and Coastguard agency, and Association of Port Health Authorities and Health Protection Agency.

National Pest Management Association. (2006). Urban IPM handbook: an integrated approach to management of pests in and around structures. Fairfax, VA.

Nuneaton and Borough Council. (2005). Cleaning in food premises – Detailed information.

Odihiri R. (2005). European Commission Working Document EMB/1104 on food contact materials. Food Standards Agency, UK.

Oxford City Council. (2010). Food hygiene training. Oxford, UK.

Polglaze J. (2003). Can we always ignore ship-generated food waste? Marine Pollution Bulletin 46: 33-38.

Pool Water Treatment Advisory Group. (2015). Code of Practice.

Porter J.D., Ragazzoni H.P., Buchanon J.D., Waskin H.A., Juranek D.D. and Parkin W.E. (1988). *Giardia* transmission in a swimming pool. American Journal of Public Health 78: 659-662.

Raspor P. (2008). Total food chain safety: how good practices can contribute? Trends in Food Science and Technology 19: 405-412.

Rhonda Cynon Taf. (2010). A Guide to compliance with Food Hygiene Legal Requirements for caterers.

Rooney R.M., Bartram J.K., Cramer E.H., Mantha S., Nichols G., Suraj R. and Todd E.C. (2004). A review of outbreaks of waterborne disease associated with ships: evidence for risk management. Public Health Rep 119(4): 435-442.

Seaman P. and Eves A. (2006). The management of food safety--the role of food hygiene training in the UK service sector. International Journal of Hospitality Management 25(2): 278-296.

Simsir M., Kumruoglu L.C. and Ozer A. (2009). An investigation into stainless-steel/structural-alloy-steel bimetal produced by shell mould casting. Materials and Design 30(2): 264-270.

Snyder J.D., Wells J.G., Yashuk J., Puhr N. and Blake P.A. (1984). Outbreak of invasive *Escherichia coli* gastroenteritis on a cruise ship. Am J Trop Med Hyg 33(2): 281-284.

South Kesteven District Council. (2003). Cleaning and disinfection. Guidelines for Food businesses. Environmental Health Services Council Offices, Lincolnshire.

South West London Health Protection Unit. (2003). Guidelines for the control of infection and communicable disease in nurseries and other institutional early years settings in South West London Sector.

Spitalny K.C., Richard M.D.L., Vogt M.D. and Witherell M.P.H. (1984). National survey on outbreaks associated with whirlpool spas. American Journal of Public Health 74(7): 725-726.

State of Arkansas. Rules and regulations pertaining to swimming pools and other related facilities.

Sturchler D.A. (2006). Exposure: a guide to sources of infections. ASM Press.

Stahl Wernersson E., Johansson E. and Hakanson H. (2004). Cross-contamination in dishwashers. Journal of Hospital Infection 56(4): 312-317.

Tatem A.J., Hay S.I. and Rogers D.J. (2010). Global traffic and disease vector dispersal. Proceedings of the National Academy of Sciences of the United States of America 103(16): 6242-6247.

Tatfeng Y.M., Usuanlele M.U., Orukpe A., Digban A.K., Okodua M., Oviasogie F. and Turay A.A. (2005). Mechanical transmission of pathogenic organisms: the role of cockroaches. J Vector Borne Dis 42(4): 129-134.

Tebbutt G.M. (1984). A microbiological study of various food premises with an assessment of cleaning and disinfection practices. Journal of Hygiene 93(2): 365-375.

The European Food Information Council. (2006). European Food Safety System: a shared responsibility.

United States Department of Agriculture. (2006). Safe food handling.

US Department of Health and Human Services. (2013). US FDA Food Code 2013.

US Food and Drug Administration Center for Food Safety and Applied Nutrition. (2007). National Science Teachers Association. Food Safety A to Z – Reference Guide.

USA Consumer Product Safety Commission. (2005). Guidelines for entrapment hazards: Making pools and spa safer.

Veiros M.B., Proenta R.P.C., Santos M.C.T., Kent-Smith L. and Rocha A. (2009). Food safety practices in a Portuguese canteen. Food Control 20: 936-941.

World Health Organization. (2001). Sustainable development and healthy environments. Sanitation on ships. Compendium of outbreaks of foodborne and waterborne disease and Legionnaires' disease associated with ships, 1970-2000.

World Health Organization. (2006a). Guidelines for safe recreational water environments. Volume 2: Swimming pools, spas and similar recreational water environments.

World Health Organization. (2006b). Pesticides and their application for the control of vectors and pests of public health importance. Department of Control of Neglected Tropical Diseases. WHO Pesticide evaluation scheme (WHOPES).

World Health Organization. (2007a). International Medical Guide for ships, 3rd edition.

World Health Organization. (2007b). Interim technical advice for inspection and issuance of ship sanitation certificates.

World Health Organization. (2011a). Guide to ship sanitation. 3rd edition.

World Health Organization. (2011b). Guidelines for drinking-water quality, 4th edition.

World Health Organization. (2011c). Handbook for Inspection of Ships and Issuance of Ship Sanitation Certificates.

World Health Organization. (2011d). Water safety in buildings.

World Health Organization. (2012). Water Safety Plans – Training package.

World Health Organization. (2013). Global epidemiological surveillance standards for influenza.

World Health Organization. (2014). Safe management of wastes from health-care activities. 2nd ed.

PART B

Guidelines for managing cases of communicable diseases on board passenger ships

Guideline I: Prevention and control of influenza-like illness on passenger ships

Guideline II: Prevention and control of gastroenteritis on passenger ships

Guideline III: Prevention and control of legionellosis on passenger ships

Guideline IV: Prevention and control of vaccine-preventable diseases on passenger ships; focusing on measles, rubella and varicella

Guideline I

Prevention and control of influenza-like illness on passenger ships

Purpose

- To reduce the incidence of ILI on board passenger ships.
- To give information to ships in order to properly manage cases of ILI on board passenger ships.
- To give general guidance for pandemic influenza preparedness.

Overview

Respiratory illnesses, including the common cold and influenza, are some of the most common infections affecting human beings (Eccles, 2005). Influenza is an important illness that can pass between people and cause seasonal increases, outbreaks and pandemics. Respiratory tract infections including outbreaks have been diagnosed on ships (Schlaich et al., 2009; Dahl, 1999; Peake et al., 1999).

This document is intended for the medical staff on ships but also describes the role of competent authorities at ports.

Annex 25 (page 270) presents background information for influenza including virus characteristics, modes of transmission, epidemiological data and information regarding the situation in Europe. The first part of these guidelines describes preventive and control measures that can be applied on board passenger ships when cases of ILI occur. It also describes case definitions for reporting of seasonal influenza according to the EU legislation, as well as guidelines for recognising ILI outbreaks on board ships. The second part describes general guidelines for pandemic influenza. These guidelines are consistent with the IHR and the EU legislation and were prepared in collaboration with the CLIA.

A. Guidelines for the prevention and control of seasonal influenza on passenger ships

1 Pre-embarkation

Vaccination

Vaccination of crew and passengers is an effective way of preventing influenza outbreaks. A voluntary vaccination programme against seasonal influenza is recommended for crew members. Shipping companies should vaccinate crew at risk of complications of influenza (Anon., 1997). A routine annual programme of vaccination against seasonal influenza may be considered (International Maritime Health Association, 2009; World Health Organization, 2009; Miller et al., 2000), with the aim of vaccinating at least 75 % of the crew of each ship (European Commission of the European Communities, 2009). It is recommended at least 50 % of the crew within each department of each ship are vaccinated and this is especially relevant on large ships ((European Commission of the European Communities, 2009). Records of crew members, who have received vaccination, including names and dates, should be kept in order to help in decision making regarding public health measures during a potential outbreak situation. A cost-effectiveness analysis for vaccination of crews on cruise ships has shown that it is not only cost-effective but it is cost saving (Ruben and Ehreth, 2002).

Although companies have no responsibility to inform their customers about vaccination of influenza, passengers in at-risk groups* should be advised by family doctors to be vaccinated (Brotherton et al., 2003; Centers for Disease Control and Prevention, 2001; Ferson et al., 2000; Miller et al., 2000) at least two weeks before the voyage, in order to develop immunity before boarding the ship. In this respect, passengers should seek the advice of family doctors or travel medicine practitioners. Travel companies and travel agencies should advise travellers to seek health information from a medical professional prior to their cruise.

It should be noted that as well as vaccination, other public health measures are also needed since the vaccine given to passengers or crew may not be effective against the virus strain circulating on board (Brotherton et al., 2003; Anon., 1988).

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* 1) Older age groups, usually 65 years and older; and
2) People with chronic medical conditions, particularly diseases of the following categories:
- chronic respiratory diseases;
- chronic cardiovascular diseases;
- chronic metabolic disorders;
- chronic renal and hepatic diseases;
- persons with deficient immunity (congenital or acquired);
- young people taking long-term salicylate therapy; and
- persons with conditions, which compromise respiratory function.

(European Commission of the European Communities, 2009)

Options for action to minimise the introduction of the disease onto the ship

There are several methods of reducing the number of ill passengers and crew boarding passenger ships. Travel companies and travel agencies can provide pre-travel information to customers about health issues with their travel package. In this context, information regarding ILI symptoms and the importance of preventive measures such as delaying travelling may be provided before the voyage. Information about the importance of not working while ill should be provided for all crew.

Dissemination of a health questionnaire at embarkation is another option to identify ill passengers or crew. If the company decides to implement such a measure, then before boarding a ship all persons (passengers, crew and visitors) may be asked to complete and sign a written health questionnaire which is designed to screen for the symptoms of influenza. Annex 26 (page 273) presents sample questionnaires prepared by the CLIA. Passengers, visitors or crew who have symptoms of ILI or have noted "Yes" to questions about influenza symptoms on a health questionnaire should undergo assessment, if possible by medical staff and preferably at a private place at the terminal. If they agree to remain isolated in a cabin, they may be allowed to board the ship, but this decision rests with the passenger shipping company. If they are in an at-risk group of complications, then they may be advised that it would be better to avoid travelling.

Crew who are present in terminals may observe all passengers and crew boarding the ship for symptoms of ILI. This can help identify passengers and crew who have symptoms suggestive of ILI.

The epidemiological situation, the activity of influenza virus and the characteristics (pathogenicity, virulence, etc.) of seasonal influenza at each time, should be considered when deciding which pre-embarkation prevention measures to apply.

2 During the voyage

Education and communication

Education and increased awareness of ILI and influenza are important for all crew and passengers (Cruise Lines International Association, 2009; International Maritime Health Association, 2009; World Health Organization, 2009; Uyeki et al., 2003; Centres for Diseases Control and Prevention, 1999a).

Medical staff should be trained regularly about clinical characteristics, diagnosis and treatment, preventive measures, surveillance and reporting requirements of ILI and influenza (Centers for Diseases Control and Prevention, 1999).

Crew should be educated regularly about ILI, to:

- recognise the signs, symptoms and modes of transmission (e.g. hand to mucous membrane transmission);
- understand the measures that prevent the spread: hand washing, coughing and sneezing etiquette, social distancing, waste disposal, wearing masks, elimination of handshaking events;
- recognise and report people with symptoms to designated crew.

Crew that come into contact with ill persons should be educated to properly use PPE (masks and gloves).

During normal conditions (non-outbreak situation), leaflets should be disseminated to passengers and crew who have developed symptoms of ILI, and their close contacts* (e.g. cabin mates). Examples of two leaflets prepared for pandemic (H1N1) 2009 influenza virus are presented in Annex 27 (page 275).

The leaflet should include information about:

- symptoms;
- hygiene rules (hand washing, coughing and sneezing etiquette, disposal of dirty tissues, social distancing, elimination of handshaking events, etc.);
- special considerations for high-risk groups;
- what to do in case of relevant symptoms;
- the potential for an ILI outbreak on board (Brotherton et al., 2003).

During an outbreak, all passengers should be educated about ILI including information on all issues listed above, any preventive measures being implemented and the progress of the outbreak. This may be achieved by distributing leaflets as described above or by organising group counselling sessions (Centers for Diseases Control and Prevention, 1999).

Supplies and equipment

Adequate medical supplies and equipment should be available on board to respond to an outbreak (Schlaich et al., 2009). The following list presents the WHO (2007) recommended medicines and equipment by the International Medical Guide for Ships 3rd edition as well as those policies further recommended by the specific WHO guidance for H1N1 on ships.

WHO List of recommended Medicines and Equipment by the International Medical Guide for Ships 3rd edition 2007 (World Health Organization, 2007)

- Antibiotics (to treat secondary pneumonia)
- Antipyretics
- Thermometers
- Intravenous fluids
- Oxygen set
- Ethanol 70 % hand cleanser

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* **"*Close contact*":** A close contact in a ship is considered to be a passenger or crew member who had been in close proximity and in such association with an infected person or enclosed environment for a prolonged period of time to have had opportunity to acquire the infection, such as, sharing a cabin, family members, travel group members, crew working in shifts at the same space and having cared for or had direct contact with respiratory secretions or body fluids of an active influenza-like illness. In addition, close contacts may be considered to include other fellow travellers that may have had prolonged close proximity contact with an ill passenger in crowded and semi-closed environment on board (e.g. during collective indoor recreational activities requiring close proximity or regularly having meals together with the infected person), according to case-by-case risk assessment within the previous seven days. In all cases, the ship's medical staff is responsible for listing names of these close contacts (World Health Organization, 2009).

- Gloves
- Masks
- Prednisone

Additional items recommended by specific WHO Guidelines on H1N1 influenza (World Health Organization, 2009)

- Antivirals (oseltamivir and/or zanamivir)
- Adequate lab sample medium and packaging
- Disinfectants
- Hand hygiene supplies

Surveillance

Standardised surveillance data for ILI should be recorded in the ILI log of the ship medical log (see Part A, Chapter 2) (Brotherton et al., 2003; Centers for Diseases Control and Prevention, 2001; Ferson et al., 2000; Miller et al., 2000; Miller et al., 1998). A standardised definition for ILI should be used, such as: "An acute respiratory infection with measured fever of ≥ 38 °C (100.4 °F) and cough; with onset within the last 10 days" (Centers for Diseases Control and Prevention, 2001; Ferson et al., 2000).

Data in the ILI log of the ship's medical log (Annex 8, page 233) should include, at a minimum: patient age, sex, onset date of symptoms, symptoms, complications (e.g. difficulty of breathing, purple or blue discoloration of the lips, vomiting or signs of dehydration), pre-existing medical conditions (e.g. asthma, diabetes, heart disease or pregnancy), recovery or death, country of residence and/or destination, vaccination and results of diagnostic testing (e.g. rapid viral and bacterial tests, chest x-ray).

Data in the ILI log of the ship's medical log should be routinely reviewed to assess trends in disease frequency (Centers for Diseases Control and Prevention, 1999). If the number of passengers or crew with ILI is greater than normally occurring on that ship over a defined period of time and itinerary, i.e. exceeds the threshold levels (provided in Annex 28, page 277) then an outbreak is occurring. Clustering of cases in time (e.g. > 5 cases of ILI one day) or place (e.g. in one area of the ship) or a case of an unusual disease (new disease, unusual severity, complications) should also be considered an outbreak alert.

The ship's master should be informed and remedial actions should be taken to contain the outbreak. As for all cases of diseases suspected to be of an infectious nature, the master should send a report to the next port of call (see Part A, Chapter 2).

A designated member of crew should be responsible for:

- reviewing the medical data collected in the medical log;
- identifying trends in the number of cases;
- supervising hygiene, preventive and control measures and awareness policy;
- coordinating outbreak management, if necessary.

Active surveillance (case finding)

Case finding among passengers and crew should be initiated by the ship's medical staff in order to detect new cases of ILI once an influenza outbreak has been identified (Centers for Diseases Control and Prevention, 2001; Centers for Diseases Control and Prevention, 1999; Centers for Diseases Control and Prevention, 1998; Miller et al., 1998). Case finding should include directly contacting passengers (e.g. passenger surveys) and crew and asking about current and recent illness; findings should be recorded.

Diagnosis and treatment

Rapid influenza diagnostic tests may be available on board (European Commission of the European Communities, 2009; Health Protection Agency, 2009; International Maritime Health Association, 2009; World Health Organization, 2009; Brotherton et al., 2003; Uyeki et al., 2003; Centers for Diseases Control and Prevention, 2001; Miller et al., 2000; Centers for Diseases Control and Prevention, 1999a; Centers for Diseases Control and Prevention, 1998). However, results of these tests should be interpreted with caution and false negative results should be taken into consideration* since the tests have very low sensitivity (50-70 %). Influenza rapid test kits may be of assistance in investigations as an early indicator of the likely cause of an outbreak (Brotherton et al., 2003). If an influenza outbreak is suspected, in order to support the diagnosis, the rapid viral tests can be used as an early indication, but nasopharyngeal specimens should be collected simultaneously for viral isolation (Centers for Diseases Control and Prevention, 2001). Moreover, rapid diagnostic tests do not identify the subtypes of the virus (e.g. H3N2 or H1N1), but only the group (e.g. influenza A or B).

Treatment including antivirals should be given based on medical assessment, case by case evaluation and according to ECDC and WHO recommendations.

Antivirals may be given to close contacts of ill persons (Brotherton et al., 2003; Centers for Diseases Control and Prevention, 2001; Miller et al., 2000; Anon. 1997) and particularly to those at high risk for complications.

Isolation

All patients presenting with symptoms of ILI should be isolated in cabins (Brotherton et al., 2003; Centers for Diseases Control and Prevention, 2001; Centers for Diseases Control and Prevention, 1999a;) for at least 24 hours after they are free of fever (without the use of fever-reducing medications).

* It should be taken into consideration that the sensitivity and specificity of rapid tests vary: sensitivities are approximately 50-70 % and specificities are approximately 90-95 %. Collection of specimens to be used with rapid tests should be done as close as is possible to the start of symptoms and usually no more than 4-5 days later in adults. The interpretation of positive results should take into account the clinical characteristics of the case. If an important clinical decision is affected by the test result, the rapid test result should be confirmed by another test, such as viral culture or polymerase chain reaction (CDC: http://www.cdc.gov/flu/professionals/diagnosis/rapidlab.htm).

It is important to limit the people who come into contact with isolated patients. Crew involved in the care of cases of ILI (including housekeeping and food and beverage crew) should not be in an at-risk group for influenza complications.

Social distancing

During an outbreak, people should be encouraged to avoid hand shaking and practice social distancing.

Hygiene measures and personal protective equipment

Hand hygiene

Passengers and crew should wash their hands frequently, as shown in Annex 15 (page 250).

During an outbreak, alcohol-based hand antiseptics containing 60 to 90 % ethanol concentration are effective against the influenza virus and should be available in places where hand washing is needed and no hand washing facilities exist.

Cleaning and disinfection

Crew responsible for cleaning contaminated areas should be trained in order to:

- properly use PPE (gloves, masks);
- follow protocols for disinfecting and cleaning materials which have been contaminated by body fluids;
- properly manage waste;
- avoid cross-contamination.

During non-outbreak situations, environmental infection control should focus on regular cleaning (and disinfection where needed) of the ship accommodation spaces. The ship's medical facility should have a plan for cleaning and disinfection.

During outbreaks, effective disinfection procedures should be performed more rigorously. All surfaces touched frequently by hands should be disinfected regularly (e.g. door handles, hand rails, elevator buttons, telephones, keyboards, tabletops, chair arms, toilet flush handles, tap handles, equipment handles, slot machines, sports equipment and other similar equipment). Disinfection should focus on additional areas such the cabins or other rooms occupied by infected people. Vacuuming of carpets should not take place in cabins occupied by infected people unless the carpet has been previously disinfected.

Disinfectants used should be effective against influenza virus and used according to the manufacturer's instructions (concentration, contact time, etc.). Different disinfectants and disinfection protocols may need to be applied to porous and non-porous surfaces.

Waste management

Infectious waste should be handled separately from the other types of waste on board and properly labelled and disposed of (see Part A, Chapter 9).

Personal protective equipment

Health care workers and crew that come into contact with passengers or crew diagnosed with an ILI should use face masks and disposable gloves. Personnel responsible for cleaning, or other persons entering an area occupied by patients must use disposable PPE (face masks and disposal gloves).

3 Before disembarkation

Reporting

MDH

According to IHR, the competent authority of the next port of call must always be informed if an infection or death has occurred on board. For ships on international voyages, the MDH according to IHR should be completed and sent to the competent authority according to the local requirements in the port of call. Some ports require the submission of MDH by all arriving ships.

The SHIPSAN ship communication form (S2) (Annex 11, page 238), or a similar form or system used by the ship including the same information, may be used in addition to the MDH for recording or reporting additional information.

National requirements for reporting

Additional reporting may be required according to the national legislation applied in the port of call.

In the EU, a specific case definition for reporting of influenza has been adopted. Possible, probable and confirmed cases of influenza must be reported to the competent authorities.

Figure 1 presents the clinical, epidemiological and laboratory criteria of reporting and the reporting requirements for seasonal influenza.

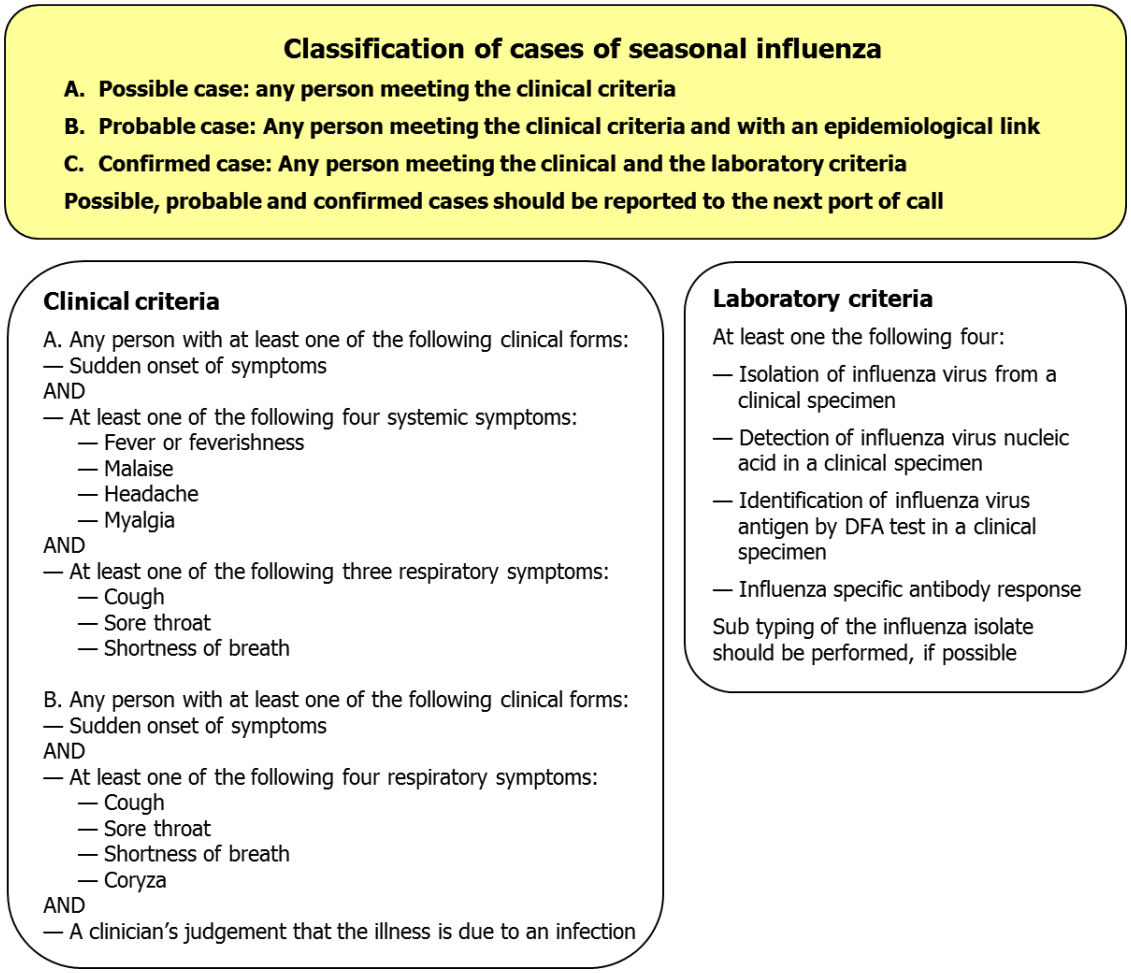


Figure 1: Requirements for reporting of seasonal influenza to the competent authorities in the EU

Shore side identification

The competent authorities should be informed if any support is needed before the ship arrives at the port. Information about what assistance is required should be provided, such as:

- the number of ill people who need hospitalisation;
- the number of clinical specimens which need to be sent for examination;
- any needs of supplies: disinfectants, PPE, medication, etc.

4 After disembarkation

Ill persons should not come into contact with other persons who disembark or are about to board the ship.

Ill persons should disembark together with their luggage, personal items, etc. from a separate area of the ship or at a separate time from which healthy persons disembark or embark for the next voyage.

During an outbreak, disinfection of frequently touched surfaces of the terminals should be considered (such as handrails, handles, etc.).

If during the previous voyage an outbreak occurred, then informative leaflets can be disseminated to passengers and crew on the next voyage in order to increase awareness and avoid a subsequent outbreak.

5 Competent authorities' actions

In the EUMS, actions of competent authorities at ports in response to infectious diseases occurring on passenger ships are regulated by the IHR 2005, EU legislation and national legislation.

The competent authorities' task is to take all the necessary measures in order to protect public health on board and to prevent the spread of a disease from the ship to the community.

The responsibilities of competent authorities regarding their response to a case of ILI on ships may vary among countries. Generally, the competent authorities' role is to perform a risk assessment in case of a threat of infectious diseases, to advise, implement or supervise response measures to be taken, to ensure that all appropriate measures are in place to protect public health on board and to prevent the spread of a communicable disease from the ship to the community. These measures must be in accordance with the international and national law and commensurate to the risk that the disease poses without causing unnecessary interference to international traffic. Consequently, public health measures should not disrupt the ship's itinerary, disembarkation, or travellers' ability to enjoy the voyage and destination, unless the rationale behind this is provided and such actions are fully justified.

Consistent policy, coordination and standardisation of competent authorities' actions among the EU countries and within the same country are important in order to prevent outbreaks and to avoid the duplication of actions and unnecessary intervention (Mouchtouri et al., 2009).

Personnel at competent authorities may consider entering a ship when an outbreak occurs in order to monitor all the necessary measures to contain the outbreak.

In response to outbreaks of seasonal influenza competent authorities may be involved in the following:

- ensuring that all the necessary measures described previously have been taken on board the ship in order to prevent the spread of the virus;
- receiving specimens from ships and sending them to the laboratory for analysis;
- supervising or making arrangements for the disembarkation of ill persons in such a manner which avoids the spread of the virus;
- arranging transport of persons with severe symptoms to a health care facility;
- notifying all possible, probable or confirmed cases according to the national surveillance requirements;
- communicating information to the public, if it is necessary.

B. Specific guidance during an influenza pandemic

The influenza virus is characterised by a great antigenic variability. Major modifications, called antigenic shifts may occur and result in worldwide epidemics also known as pandemics.

During a pandemic situation, additional or more rigorous control measures may need to be implemented both on board ships and on land. Any control measures imposed which affect the travelling public should be commensurate with the risk that the causative agent of the pandemic poses to travellers and the general public. Important factors that can be used for the risk assessment include characteristics of the infectious agent such as pathogenicity and virulence (hospitalisation rate, case fatality rate, etc.), immunity of the travelling population, general public and risk groups, and the incidence of the disease and geographical distribution based on information provided by local, national, European or international organisations and agencies such as ECDC and WHO.

The types of control measures implemented are likely to change as a pandemic evolves. Control measures are likely to be stringent at the beginning of a pandemic as little will be known about the new virus strain, and with limited geographic spread, focus will be on preventing the spread of the disease to new areas. As information on severity of disease, infectivity and risk groups is gathered, it is likely that control measures will be modulated to best suit the evolving situation. As the disease spreads globally, a shift in control strategies is likely to occur.

The WHO and ECDC give information and guidance regarding public health interventions during a pandemic. Ships should adopt policies in order to comply with public health measures that the competent authorities in Member States implement.

The following guidelines can be modified and applied during an influenza pandemic, depending on the characteristics of the pandemic.

Pre-embarkation

Denial of boarding: This will depend on the severity of the disease and the infectivity of the infectious agent. During the first period of the pandemic, it is reasonable that travellers with symptoms would be denied boarding. If the virus is highly pathogenic and the disease has a high fatality rate, then denial of boarding for symptomatic passengers would continue for the duration of the pandemic. In situations where the symptoms are mild to moderate, this approach may be relaxed and ill people isolated on board, as is recommended for seasonal influenza.

Vaccination: Vaccination of crew and passengers, with priority to those in at-risk groups, could be considered when a vaccine for the new strain of the virus becomes available. Vaccination might also be considered for employees working in the tourist sector such as guides, agents, tour operators, bus drivers and terminal station personnel during pandemic situations.

During the voyage

Epidemiological information: Patients may be asked for information regarding contacts with ill persons or visits to affected countries. This could be done either by the ship crew or in collaboration with a competent authority at ports.

Communication: Reminder messages through public announcements or daily newsletters and notes presented to the crew television can be used to increase awareness during a pandemic. Information that it is necessary to disseminate to travellers includes symptoms, preventive measures such as hygiene rules, special consideration for at high-risk groups and what to do in case of relevant symptoms.

Isolation: The isolation period should be for at least 24 hours after they are free of fever (without the use of fever-reducing medications) and will depend on other disease characteristics such as severity and infectivity. During the first period of a pandemic, the characteristics of the causative agent, including the period of infectivity, would not be known. Isolation and the use of PPE would be essential.

Quarantine: Quarantine of crew or passengers that are not displaying symptoms but are suspected to be infected due to contact with cases may be considered.

Before disembarkation

Reporting: Additional requirements for disease reporting as well as for reporting all previous ports of call may be implemented by national authorities.

Reference list

Anon. (1988). Leads from the MMWR. Acute respiratory illness among cruise-ship passengers--Asia. JAMA 259(9): 1305-1306.

Anon. (1997). Update: influenza activity - United States, 1997-98 season. MMWR Morb Mort Wkly Rep 46(46): 1094-1098.

Brotherton J.M., Delpech V.C., Gilbert G.L., Hatzi S., Paraskevopoulos P.D. and McAnulty J.M. (2003). A large outbreak of influenza A and B on a cruise ship causing widespread morbidity. Epidemiol Infect 130(2): 263-271.

Centers for Disease Control and Prevention. (1998). Update: outbreak of influenza A infection--Alaska and the Yukon Territory, July-August 1998. MMWR Morb Mort Wkly Rep 47(33): 685-688.

Centers for Disease Control and Prevention. (1999a). Influenza in travellers to Alaska, the Yukon Territory, and on west coast cruise ships, summer of 1999. Can Commun Dis Rep 25: 137-139.

Centers for Diseases Control and Prevention. (1999b). Preliminary Guidelines for the Prevention and Control of Influenza-Like Illness Among Passengers and Crew Members on Cruise Ships.

Centers of Disease Control and Prevention. (2001). Influenza B virus outbreak on a cruise ship--Northern Europe, 2000. MMWR Morb Mort Wkly Rep 50(8): 137-140.

Cruise Lines International Association. (2009). Cruise Industry Influenza Protocol.

Dahl E. (1999). Anatomy of a world cruise. J Travel Med 6(3): 168-171.

Eccles R. (2005). Understanding the symptoms of the common cold and influenza. Lancet Infect Dis 5(11): 718-725.

European Commission of the European Communities. (2009). Proposal for a Council recommendation on seasonal influenza vaccination. COM(2009) 353 final/2. ECDC. Technical report. Guide to public health measures to reduce the impact of influenza pandemics in Europe: 'The ECDC Menu'.

Ferson M., Paraskevopoulos P., Hatzi S., Yankos P., Fennell M. and Condylios A. (2000). Presumptive summer influenza A: an outbreak on a trans-Tasman cruise. Commun Dis Intell 24(3): 45-47.

Health Protection Agency. (2009). Guidance to Shipping for pandemic influenza. London, UK.

International Maritime Health Association. (2009). Interim guidance regarding Influenza A(H1N1) for the Maritime Community.

Miller J., Tam T., Afif C., Maloney S., Cetron M., Fukata K., Klinov A., Hall H., Kertesz D. and Hochin J. (1998). Influenza A outbreak on a cruise ship. Can Commun Dis Rep 24(2): 9-11.

Miller J.M., Tam T.W., Maloney S., Fukuda K., Cox N., Hockin J., Kertesz D., Klimov A. and Cetron M. (2000). Cruise ships: high-risk passengers and the global spread of new influenza viruses. Clin Infect Dis 31(2): 433-438.

Mouchtouri V., Black N., Nichols G., Paux T., Riemer T., Rjabinina J., Schlaich C., Menel Lemos C., Kremastinou J., Hadjichristodoulou C. and SHIPSAN TRAINET project. (2009). Preparedness for the prevention and control of influenza outbreaks on passenger ships in the EU: the SHIPSAN TRAINET project communication. Euro Surveill 14(21).

Peake D.E., Gray C.L., Ludwig M.R. and Hill C.D. (1999). Descriptive epidemiology of injury and illness among cruise ship passengers. Ann Emerg Med 33(1): 67-72.

Ruben F.L. and Ehreth J. (2002). Maritime health: a case for preventing influenza on the high seas. Int Marit Health 53(1-4): 36-42.

Schlaich C., Reinke A., Savenich C., Reimer T., Oldenburg M., Baur X., Harneland A., Jaremin B., Nielsen P.S., Wichtmann E.M., Brandal L., Puskeppeleit M., De (2009) Guidance to the International Medical Guide for Ships 3(rd) edition: interim advice regarding the best use of the medical chest for ocean-going merchant

vessels without a doctor onboard: joint statement of WHO Collaborating Centres for the health of seafarers and the International Maritime Health Association - 2009 version. Int Marit Health 60(1-2): 51-66.

Schlaich C.C., Oldenburg M. and Lamshoft M.M. (2009). Estimating the risk of communicable diseases aboard cargo ships. J Travel Med 16(6): 402-406.

Uyeki T.M., Zane S.B., Bodnar U.R., Fielding K.L., Buxton J.A., Miller J.M., Beller M., Butler J.C., Fukuda K., Maloney S.A., Cetron M.S. and Alaska/Yukon Territory Respiratory Outbreak Investigation Team. (2003). Large summertime influenza A outbreak among tourists in Alaska and the Yukon Territory. Clin Infect Dis 36(9): 1095-1102.

World Health Organization. (2007). List of recommended Medicines and Equipment by the International Medical Guide for Ships 3rd edition.

World Health Organization. (2009). Interim WHO Technical advice for case management of pandemic (H1N1) 2009 on ships - Draft.

Guideline II

Prevention and control of gastroenteritis on passenger ships

Purpose

This chapter sets out recommendations for the prevention and control of gastroenteritis on passenger ships. The overview is followed by detailed guidance on how to recognise outbreaks of viral gastroenteritis, the modes of transmission of all forms of gastroenteritis, control measures and the management of outbreaks.

The layout of this chapter is suggested as a guide to ship companies, ships' crews, port health authorities and others to enable them to conduct their own analysis of their vulnerabilities and to assist in identifying mitigation actions.

1 Overview

Ships are no different from land-based hotels or residential establishments in that both will have people becoming affected by gastroenteritis from time to time. Some of these illnesses are directly transmissible to other people or have another source. Though passenger ships probably do not have a higher level of infectious gastroenteritis than ashore, outbreaks on ships tend to be reported in the news more often, which may give the impression that they occur more frequently there.

Gastroenteritis may be acquired directly from another person, through contaminated food or drinking water or through environmental sources. These infections can be caused by viruses, bacteria or protozoa. Gastroenteritis can also be caused by a release of toxins from bacteria or fungi that have grown on foodstuffs. It can also be caused by chemical contamination of food or water.

The major modes of infection are from hand to mouth by touching something which is contaminated, by eating or drinking a contaminated foodstuff or beverage or, in the case of viral infections, by breathing in aerosolised virus. The characteristics of a virus, compared to a bacterium, means that viral infections will spread very easily and require very prompt intervention if spread is to be prevented. Though viral gastroenteritis, e.g. norovirus infection, is unpleasant, it usually resolves quickly without side-effects. By contrast, bacterial gastroenteritis, e.g. salmonella infection, usually takes longer to develop and produces more severe symptoms, which last longer and which may require hospitalisation or even cause death in some circumstances.

Norovirus is the commonest cause of outbreaks of gastroenteritis ashore and frequently occurs in such places as schools, retirement homes and hospitals. When it happens on board a ship, it is usually because someone is infected ashore and comes on board either with illness or incubating it. If they have diarrhoea or vomiting, they will excrete large numbers of viral particles which will contaminate surfaces very easily. Vomiting creates clouds of aerosolised virus which, being airborne as droplet nuclei, can spread the virus over large areas. One person with norovirus can potentially

infect a large number of people. The outbreak may continue if effective control measures are not put in place.

However, with all types of gastroenteritis, good hygiene practices, both personal and food-handling, together with safe food sources and drinking water integrity, are the key issues in the prevention of outbreaks.

2 How to differentiate gastroenteritis outbreaks

The presenting symptoms indicate the nature of the illness.

	Virus infection	Bacterial infection
Onset	Usually sudden. People go from feeling well to feeling ill very quickly. May be confused with sea-sickness.	Onset is often more gradual.
Vomiting	Usually present. May be the only symptom. Often occurs frequently in a short period of time.	May be present.
Diarrhoea	Often present, usually very watery	Almost always present. May be bloody.
Fever	Rare	Affects up to 25 % in those > 65 years old.
Headache, muscle aches	Fairly frequent	Can occur, but less frequently.
Abdominal cramps	Frequent	Frequent
Severity	Usually mild	Usually more serious, often severe, occasionally life-threatening
Duration of symptoms	Short-lived. Usually 1-2 days	Often 5-10 days

The incubation period of viral gastroenteritis (and in particular norovirus) is short, usually 24-48 hours. Symptomatic people will produce very large numbers of viral particles in their faeces or vomit. The infective dose is very low (probably 10-100 virus particles). These two characteristics combine to give a high rate of secondary cases in people sharing a cabin. Usually, only supportive medical treatment is required.

Viral gastroenteritis may well be the cause of illness if the following characteristics apply:

- an abrupt onset of symptoms;
- fever is usually absent;
- the severity of illness is mild rather than serious;
- there is a steep rise in cases on a daily basis;
- secondary cases are common among close contacts.

If the symptoms of the first cases are more consistent with bacterial infection or food intoxication, then the emphasis should be on an immediate investigation into possible food- or water-borne infection. In any case (viral or bacterial infection), emphasis should be on early application of specific control measures (section 6.1) to prevent spread.

3 Modes of transmission of gastrointestinal illness

The main modes of transmission of gastroenteritis are:

- Direct faecal-oral. This is where the hands become contaminated, e.g. with faeces during handshaking with a person who visited the toilet and hands were not washed adequately afterwards. If the mouth is subsequently touched, transfer of microorganisms takes place. The infective dose of each organism is critical here. The infective dose for salmonella is approximately 1,000 bacteria, usually equivalent to visible faecal contamination. Normal hand washing with soap and hot water will reduce the bacterial load on the skin below that necessary to cause infection. By contrast, the infective dose for *Shigella* (or norovirus) is approximately 10 organisms; so that even hands that look clean can still transfer more than an infective dose.
- Foodborne (see Part A, Chapter 3). This is where food becomes contaminated, usually by contact with human or animal faeces. If contamination is bacterial, they may then multiply in the food if it is not stored at an appropriate temperature (5 °C (41 °F) or less*). One major route of infection is by cross-contamination between raw and cooked food which is then not thoroughly reheated (above 63 °C (145 °F)) before serving. This can also affect foods which are either not cooked, or only lightly cooked, e.g. salads and shellfish. Similarly, contamination can occur from an infected food handler of ready-to-eat foods that are handled without subsequent cooking (e.g. salads and sandwiches).
- Toxin production. Another mode of foodborne transmission is where a microorganism grows within the food, producing a bacterial toxin, which then causes illness, e.g. *Clostridium perfringens*. This is commonly found when temperature control of cooked food has been poor, with food left at warm temperatures for long lengths of time. Many of the toxins produced, e.g. Clostridia or *Staphylococcus aureus*, are heat-stable and will not be destroyed by subsequent reheating.
- Waterborne (see Part A, Chapters 4 and 5). This is usually due to faecal contamination of potable water supplies, where the disinfection process used has either failed or been unable to cope with the nature of the contamination, e.g. protozoa like *Cryptosporidium* spp., or the high level of contamination, e.g. when chlorine becomes deactivated in contact with protein from unclean tanks and, therefore, ineffective. Similarly, contaminated recreational water can be a source of infection.
- Environmental contamination (through surfaces). Similar to faecal-oral above, but the microorganisms are transferred by touching things or surfaces which have become contaminated. This is particularly important for viral infections, where airborne spread is readily facilitated by aerosols created by vomiting or toilet flushing. These aerosols can disperse quite widely and the virus particles then settle out.
- Transmission from animals or vectors (see Part A, Chapter 6). GI pathogens can be transmitted from animals (e.g. pets or domestic) to a person. Rodents and insects such as flies and cockroaches can act as mechanical vehicles and contaminate food or surfaces.

* SHIPSAN recommends temperature at ≤ 5 °C (41 °F) as best practice however some EU countries require that food can be stored in a temperature of 8 °C (46 °F).

4 Activity plan

The relationship of prevention and outbreak control activities by different agencies (ship, port health authorities, others) is shown in the table below.

Levels		Actions by the ship	Actions by the port health authorities	Actions by others
0	Every day preventive measures	Section 5.1	• Port health plan in place • Provide advice when requested	Section 5.2
1	Low-level gastroenteritis* activity on the ship (section 5.3)	Section 5.3	• Provide advice when requested	None
2	During an Outbreak†	• Activate Gastroenteritis Outbreak Management Plan (section 6) • Immediate control measures (section 6.1) • MDH/notify port health authority of next port of call • SHIPSAN ship communication form or similar form or system used by the ship including the same information	• Disembarkation precautions • Review on-board control measures • Convene outbreak control meeting, if required • Provide advice and support to ship • Inspect if appropriate • Consider need to notify in-country public health authorities • Notify next port of call	Section 6.2
3	After the event	• Residual deep cleaning, if necessary • Lessons learned. Modification of the Gastroenteritis Outbreak Management Plan if required. • SHIPSAN ship communication form or similar form or system used by the ship including the same information	• Determine if the ship is safe to sail • Inform the next port-of-call, if necessary • Forward results of microbiological samples	Section 7

* The SHIPSAN case definition for gastroenteritis is:

- acute diarrhoea (three or more episodes of loose stools in a 24-hour period or what is above normal for the individual, e.g., individuals with underlying medical conditions); or
- vomiting and at least one of the following symptoms: including one or more episodes of loose stools in a 24-hour period, or abdominal cramps, or headache, or muscle aches, or fever (temperature of ≥ 38 °C, 100.4 °F).

† The definition of an outbreak is an increase in the number of cases of gastroenteritis above the number normally occurring in that ship over a defined period of time and itinerary.

For reporting purposes, two different thresholds should be used. An initial report should be prepared and sent to the competent authority at ports, when the percentage of reportable cases reaches 2 % or more among passengers or 2 % or more among crew. A second report should be sent when the number of cases reaches 3 % or more among passengers or 3 % or more among crew (Centres for Disease Control and Prevention, 2005).

5 Everyday preventive measures/actions

5.1 Level 0 Everyday preventive measures/actions by the ship

General

- Examples of preventive measures are shown in Annex 29 (page 279).
- An information leaflet should be given to passengers, either on arrival on board or in the event of an outbreak ("pillow letter": identifying symptoms, personal hygiene and guidance for those who become affected).
- There should be an agreed Gastroenteritis Outbreak Management Plan, which specifies the duties for all crew members and responsibilities of the outbreak management team. HACCP principles can be applied to identify critical control points and help to develop a plan for outbreak management. Hazard analysis in prevention of gastroenteritis transmission on board ship can be found in Annex 30 (page 280).
- Crew members are our eyes and ears — there should be regular training to maintain awareness.

Medical

- The GI log (see Part A, Chapter 2) should be maintained and monitored, with alertness for the outbreak threshold.
- Early diagnosis is crucial. Medical staff should be aware of the case and outbreak definitions.
- It is recommended that anyone who presents with gastrointestinal symptoms should be isolated. For passengers, this should be for a minimum of 24 hours, preferably 48 hours, after resolution of their symptoms and for food handling and medical crew for a minimum of 48 hours. Ill people need to be separated from those who are well.
- People should be encouraged to report if they become symptomatic and should be isolated in their cabins, using only their own bathrooms/toilet facilities. Treatment of cases should occur in their cabins wherever possible. Provide hygiene advice to them and any contacts. Provide room service or beverages to them where appropriate.
- Where possible, crew should be isolated on their own or, where several are affected, they may be accommodated together (cohorting).
- The importance of effective hand hygiene should be emphasised (see hand hygiene below).
- A pre-prepared standard questionnaire about illness/activities/meals should be available in the ship's hospital (for example, see Annex 9, page 234).
- Faecal specimens should be collected for analysis during every outbreak. The threshold to initiate collection of these confirmation samples should be defined in advance. Proper faecal specimen collection containers should be available.

Cleaning

- Standard cleaning and disinfection procedures should be carried out by trained and supervised staff.
- There should be an agreed protocol for action in the event of a body fluid spillage in a public area. If there is a vomiting or diarrhoea event in a public area, it should immediately be covered and made inaccessible until cleaned by designated cleaners. This should be part of a protocol.
- Disinfectants effective against norovirus should be always available and used routinely in the cabins of any passengers/crew suffering from gastroenteritis (Annex 31, page 281).
- Environmental cleaning should be performed (Annex 32, page 283) with an appropriate virucidal disinfectant. All public toilets and hand contact surfaces, e.g. handrails, should be cleaned on a regular basis, which should be increased in frequency if an outbreak is occurring. The most effective way of removing viral contamination is to clean with detergent before applying disinfectant. Fresh sodium hypochlorite solution (1,000 mg/L) with a contact time of 10 minutes is considered effective against norovirus. Public toilets should be cleaned routinely and according to the level of the gastroenteritis action plan (e.g. every four hours and hourly during an outbreak). However, it is an irritant, frequently controlled under health and safety legislation and unsuitable for use on many soft fabrics which will be discoloured by it. Other disinfectant agents have been developed that are less damaging to furnishings and are now commonly used by the passenger ship industry. The advantages and disadvantages of these products need to be considered. There are also many products for which extravagant marketing claims are made unsupported by any rigorous scientific evidence. This is an area which needs more scientific research. A list of some disinfectants for which virucidal activity is claimed is shown in Annex 31 (page 281).
- Cleaning staff (trained) should be wearing disposable gloves routinely. During an outbreak, they should use additional protective clothing (disposable gloves and aprons).

Hand hygiene

- Explaining what is meant by "thorough hand washing" is important; rubbing the hands in hot water, preferably with a liquid soap, for at least 20 seconds followed by drying with a disposable towel (Annex 15, page 250). This is essential to mechanically remove any microorganisms from the skin. Using an alcohol-based hand gel alone is insufficient as alcohol is not an effective disinfectant for norovirus (Annex 31, page 281).

5.2 Level 0 Everyday preventative action by shipping companies

- Some shipping lines provide health advice to passengers before joining the ship and may also send a pre-embarkation health questionnaire (see Annex 26, page 273). Where this has not happened, routine health advice should be provided on board, either in the on-board activity programme or in guests' cabins. If there has been an outbreak on the previous cruise, passengers should be informed of this with instructions for hand washing and reporting of any gastrointestinal symptoms.

- The shipping company should have a protocol for disembarking symptomatic passengers, including written guidance for coach and taxi drivers and airlines (if appropriate). Where appropriate, they should also have a contingency plan for hotel accommodation for those too unwell to travel.
- The industry is encouraged to develop policies promoting hand washing in passengers and crew.

5.3 Level 1 Low-level gastroenteritis activity — action by the ship

- The ship should have clearly defined thresholds for determining when there are raised numbers of cases on board and triggering control measures. This will depend on the number of passengers, the length of the cruise and on the itinerary.

  Examples of such thresholds are;

  - 6 gastrointestinal cases within six hours;
  - 1 % of guests on ships with less than 1,000 passengers;
  - 0.5 % of guests on ships with more than 1,000 passengers;
  - a cluster of gastroenteritis cases in one area of the ship;
  - cruise ship GI surveillance data has shown that when the first two days of the voyage, two passengers reporting GI every 1,000 passengers, then the probability for having an outbreak is 6.82 %. The following table presents the number of GI cases reported in every 1,000 passengers and the probability of an outbreak to occur.

Number of GI cases reported in every 1,000 passengers	Probability of an outbreak (PPV)	ROC Area (95 % CI)
First two days of the cruise		
1	4.63 %	0.743 (0.555-0.932)
2	6.82 %	
3	6.68 %	
4	11.07 %	
First three days of the cruise		
1	3.50 %	0.873 (0.718-1.000)
2	7.61 %	
3	14.64 %	
4	22.76 %	
5	23.10 %	

- Surveillance data can be used by the ship to estimate the GI threshold levels of an outbreak. Annex 28 presents an example of a diagram showing the GI threshold levels by day of cruise and total number of passengers.
- Cruise ship GI surveillance data has shown that a 0.45 % daily attack rate is indicative of a pending outbreak (Centres for Disease Control and Prevention, 2011).

- Symptomatic people should be confined to their own cabins. Their close contacts should be given appropriate hygiene and hand washing advice.

6 Level 2 Management of an outbreak

6.1 Level 2 Management of an outbreak — actions by the ship

It is vital that the ship has a Gastroenteritis Outbreak Management Plan prepared in advance (Annex 33, page 285), with all crew aware of their responsibilities. The plan should include the following:

- Clearly identifiable outbreak criteria. A system to monitor the GI log such that elevated cases of gastroenteritis above what might be expected will trigger an alert.
- Arrangements for clinical support to diagnose cases. It is recommended that telephone advice is available.
- Declaring an outbreak. The most common definition of a gastroenteritis outbreak on board a ship is when an increase in the number of cases of gastroenteritis above the number normally occurring on that ship over a defined period of time and on a specific itinerary. For GI outbreak alert reporting purposes, two different thresholds should be used. An initial report should be prepared and sent to the competent authority at ports when the percentage of reportable cases reaches 2 % or more among passengers or 2 % or more among crew. A second report should be sent when the number of cases reaches 3 % or more among passengers or 3 % or more among crew (see also table footnotes). Case definition is EITHER acute diarrhoea (three or more episodes of loose stools in 24 hours or what is above normal for the individual e.g. for individuals with underlying medical conditions that may affect interpretation) OR vomiting and at least one additional symptom (one or more episodes of loose stools, abdominal cramps, headache, muscle aches or fever).
- Immediate control measures on suspicion of an outbreak.
  - Inform key managers/crew.
  - Promote awareness of possible cases.
  - Isolation of affected people in their cabins until clear of symptoms for up to 24 hours (preferably 48 hours) and 48 hours for crew.
  - Treat cases in their cabins wherever possible. Provide hygiene advice to them and any contacts. Provide room service to them.
  - Commence an enhanced cleaning regime, in accordance with ship's policy. This should specify the areas to be cleaned, the frequency of cleaning and the virucidal disinfectant to be used.
  - Stop self-service of food and beverages wherever possible.
- Convene an on board outbreak management team. The role of the team is to ensure the following are considered.
  - Who is leading the team?
  - Is an outbreak occurring?
  - What additional prevention or control measures required.

- Provide information to passengers and crew (thorough hand washing, immediate reporting of symptoms, remaining isolated until medically assessed).
- Emphasise the need for people to shower before using recreational water amenities.
- Collect appropriate specimens. Arrange appropriate shore side testing.
- Collect and analyse epidemiological data (such as food histories) to identify the cause of the outbreak. The gastrointestinal disease questionnaire should be used (Annex 9, page 234).
- Investigate galleys, potable water supplies or recreational water areas where appropriate.
- Liaise with shore side Port Health according to local regulations.

- Submit a MDH to the next port of call as required by that country.
- Set criteria for declaring the outbreak over. Reduce the additional measures and record any lessons learned.

6.2 Level 2 Outbreak actions by others (agencies and owners)

- Shipping line — will need to consider whether additional support to the ship is necessary, or if additional control measures are needed.
- Port health authorities — Guiding questions could include: Is the ship managing the outbreak satisfactorily? Is an inspection necessary? Have the arrangements for collection of biological specimens been made known to the ship? Is additional support to the ship required? Are changes to the disembarkation procedures necessary? Is there a need to involve other agencies, e.g. the in-country health protection service? Have arrangements for sending information to the ship after departure been made clear (e.g. microbiology test results)? Is there a need to contact the port health authority at the next port of call?
- In-country health protection service — may need to consider if an epidemiological investigation is justified or if additional support is needed by the port health authority.

7 Level 3 After the outbreak action

- There should be enhanced cleaning carried out on the ship on turnaround days to help prevent a continuation of illness into the next voyage.
- The results of any epidemiological investigation by the in-country health protection service should be shared with the port health authority, the ship and the shipping company as early as possible, as operational decisions may remain to be taken depending on the outcome.

8 Further guidance

An extensive bibliography of scientific publications can be found on the EU SHIPSAN website. Annex 29 (page 279) provides an example analysis in prevention of gastroenteritis transmission and Annex 34 (page 286) describes the epidemiology of gastrointestinal illness on board ships.

The Centres for Disease Control Vessel Sanitation Program have publications on gastroenteritis and norovirus on board ships at www.cdc.gov/nceh/vsp/pub/pub.htm.

The Health Protection Agency (London) has published, jointly with the Association of Port Health Authorities and the Marine and Coastguard Agency, *Guidance for the Management of Norovirus Infection on Cruise Ships* (Health Protection Agency, 2007), available at https://www.gov.uk/government/organisations/public-health-england (select "Publications", then "Guidance" under the publication type and enter *cruise ships* in the dialogue box).

Reference list

Centres for Disease Control and Prevention. (2011). Vessel Sanitation Program - 2011 Operations Manual. U.S. Public Health Service, Centers for Disease Control and Prevention/ National Center for Environmental Health.

Health Protection Agency. (2007). Guidance for the management of norovirus infection in cruise ships. Health Protection Agency, Maritime and Coastguard Agency, Association of Port Health Authorities.

Guideline III

Prevention and control of legionellosis on passenger ships

Purpose

- To provide guidance on preventing the colonisation of ships' water systems by *Legionella* bacteria.
- To provide guidance for case/cluster/outbreak investigation.
- To promote a consistent approach of the competent authorities response actions in the EU.

1 Overview

Legionnaires' disease was first recognised as a human infection in 1976 and the first ship associated case was recorded in the Mediterranean in 1977 (Meenhorst, 1979). Since then it has continued to be a public health concern on passenger ships. The surveillance of Legionnaires' disease in Europe is undertaken by the European Legionnaires' disease Surveillance Network (ELDSNet), which is coordinated by ECDC. ELDSNet operating procedures describe the process that competent authorities follow for reporting and responding to cases of travel-associated Legionnaires' disease, including the deadlines required from network members in the country of infection to inform ECDC of the steps taken to investigate and control reported clusters. Moreover, operating procedures define the roles and responsibilities of the network's coordinating centre at ECDC, the national competent authorities in the collaborating countries (EUMS, Iceland and Norway) and the ELDSNet national network members nominated by their governments.

The guidelines for actions of competent authorities at ports descirbed in this chapter are based on the ELDSNet operating procedures. Updated information on surveillance, prevention and control of travel associated Legionnaires' disease can be found at: http://ecdc.europa.eu.

Moreover, this chapter describes how the water systems on ships can be colonised and how infection may occur. They also detail preventive measures for the every day operation of the ship.

Preventive and control measures, are based on the ESGLI/ EWGLI Technical Guidelines for the Investigation, Control and Prevention of Travel Associated Legionnaires' disease (European Working Group for Legionella Infections, 2011). Annex 35 (page 287) provides background information on Legionellosis, the causative agent and outbreaks on ships. Updated information on Technical Guidelines for the Investigation, Control and Prevention of Travel Associated Legionnaires' disease can be found in ELDSNet website http://ecdc.europa.eu/en/healthtopics/legionnaires_disease/ELDSNet/Pages/index.aspx.

What supports *Legionella* colonisation — characteristics of ships?

- **Water temperature between 25-45 °C (77-113 °F):** Due to the extended length of pipes it is difficult to maintain high temperature in all parts of the ship's hot water system and low temperatures in the cold water system.
- **Design of the water system:** Ship water systems may be complex in nature and can be altered during refits; contain plumbing materials that may no longer be approved; may have deadlegs/blind lines present; be difficult to control; have limited access for monitoring, maintenance and repairs.
- **Standing water:** Large capacity water tanks and extended water storage time may result in a low chlorine residual in the water. Low cabin occupancy and water system repairs need to be considered. Standing water encourages formation of biofilms.
- **Build-up of deposits:** Scale, corrosion, and sludge may build up in the base of calorifiers.
- **Cleaning:** Cleaning of water system pipes, taps, showers and tank surfaces may be difficult due to limited access. Removal of deposits and measures to reduce biofilms and nutrients are required.
- **Materials:** Natural rubber and natural fibres should not be used in washers and seals. Only materials approved for contact with drinking water and shown not to encourage microbial growth should be used for the construction of water systems.
- **Piping complexity:** Piping of recreational water facilities and other equipment is often complicated and in confined spaces, making it difficult to inspect and maintain.
- **Knowledge:** There may be limited expertise available on board.
- **System alterations:** Water systems on board ship are often complex. Alterations and running repairs can result in deadlegs/blind lines.

How the infection occurs

Tiny aerosolised droplets of water contaminated by legionellae bacteria are inhaled or contaminated water is aspirated. The water in these aerosolised droplets rapidly evaporates leaving dry particles (droplet nuclei) containing any bacteria in the original droplet. The aerosolised droplets or particles are too small to see with the naked eye but can enter the lung of a person and start to multiply, causing an infection. Infection cannot be transmitted from person to person. There are two main types of respiratory infection caused by legionellae: Pontiac fever (an acute, self-limiting, ILI without pneumonia) and Legionnaires' disease (a rapid and potentially fatal pneumonia). In addition legionellae very rarely cause non-pneumonic infections. All are described by the term "legionellosis".

Legionellae in ships' facilities

Legionella spp. can colonise any water system containing water between 25-45 °C (77-113 °F) but grow most rapidly between 30 °C (86 °F) and 45 °C (113 °F). They may colonise air conditioning systems, swimming pools and other recreational water facilities, saunas, evaporative condensers, humidifiers, water systems in dental units, respiratory therapy devices, taps, shower heads, water-closets, decorative fountains, hoses, filters, softeners and other features of the distribution system.

Legionella spp. have been isolated from water samples taken from hot and cold potable water distribution systems (Goutziana et al., 2008; Azara et al., 2006) and hydrotherapy systems and spas (Kura et al., 2006b; Jernigan et al., 1996a) of passenger ships.

Water distribution systems (Castellani et al., 1999) and whirlpool spas of passenger ships (Kura et al., 2006a; Jernigan et al., 1996b) have been identified as a source of infection, while a possible link with an air-conditioning system has been documented (Joseph et al., 1995).

Legionella colonisation is a particular problem in hot tubs and spas because the water is maintained at a high temperature that supports the growth of the bacteria. Furthermore, dead skin cells and dirt from bathers act as nutrients to the bacteria, the piping provides a surface for biofilm growth as in potable water system and finally, bubbles create aerosolised water droplets that can be inhaled.

2 Legionellosis disease prevention and control on ships

2.1 Every day preventive measures on board ships

2.1.1 Medical issues

- Ship medical crew should be aware of the **symptoms** of legionellosis, **incubation period and case definition**, which are described in Table 12 and Table 13.

Table 12: Legionnaires' disease and Pontiac fever characteristics (World Health Organization, 2007)

Characteristics	Legionnaires' disease	Pontiac fever
Incubation period	2-10 days, rarely up to 20 days	5 hours - 3 days (most commonly 24-48 hours)
Duration	Weeks	2-5 days
Case–fatality rate	Variable depending on susceptibility; in hospital patients, can reach 40-80 %	No deaths
Attack rate	0.1-5.0 % of the exposed general population 0.4-14.0 % in hospitals	Up to 95 % of the exposed population
Symptoms		
ILI (moderate to severe influenza)	+/–	+
Often non-specific	+	–
Loss of strength (asthenia), tiredness	+	+
High fever	+	+
Headache	+	+
Dry cough	+	+
Sometimes expectoration blood-streaked	+	–
Chills	+	+

Muscle pain (myalgia)	+	+
Joint pain (arthralgia)	–	+
Difficulty in breathing (dyspnoea), chest pain	+	–
Difficulty in breathing (dyspnoea), dry cough	–	+
Diarrhoea	25-50 % of cases	+
Vomiting, nausea	10-30 % of cases	In a small proportion of people
Central nervous system manifestations, such as confusion and delirium	50 % of cases	–
Renal failure	+	–
Hyponatraemia (Serum sodium < 131 mmol/L)	+	–
Lactate dehydrogenase levels (> 700 units/mL)	+	–
Failure to respond to beta-lactam antibiotics or aminoglycosides	+	–
Gram stain of respiratory specimens with numerous neutrophils and no visible organisms	+	–
Chest pain	+	–

Table 13: Case definition for Legionnaires' disease (Commission Implementing Decision 2012/506/EU)

<u>Confirmed case</u> is any person meeting the clinical criteria AND at least one laboratory criterion for a confirmed case.	
Clinical description	Any person with pneumonia
Laboratory criteria for confirmed diagnosis of legionellosis (at least one of the following three)	– Isolation of *Legionella* spp. from respiratory secretions or any normally sterile site. – Detection of *Legionella pneumophila* antigen in urine. – Significant rise in specific antibody level to *Legionella pneumophila* serogroup 1 in paired serum samples.
<u>Probable case</u> is any person meeting the clinical criterion AND at least one laboratory criterion for a probable case.	
Laboratory criteria for probable case*	– Detection of *Legionella pneumophila* antigen in respiratory secretions or lung tissue e.g. by DFA staining using monoclonal-antibody derived reagents. – Detection of *Legionella* spp. nucleic acid in respiratory secretions, lung tissue or any normal sterile site. – Significant rise in specific antibody level to *Legionella pneumophila* other than serogroup 1 or other *Legionella* spp. in paired serum samples. – Single high level of specific antibody to *Legionella pneumophila* serogroup 1 in serum.

* Laboratory results should be confirmed by a national reference laboratory.

- **Surveillance**: Cases of pneumonia or other respiratory symptoms should be recorded in the ship medical log.
- **Laboratory diagnostic methods** for *Legionella* include the urinary antigen test and culturing the organism from body fluids and tissues. Commercial enzyme immunoassays kits are available for detecting *L. pneumophila* serogroup 1 antigen in urine and may be available on board. However, results of these tests should be interpreted with caution as false positive and false negative results can occur. Rapid diagnostic kits cannot be used for the detection of all *Legionella* spp. and serogroups. Most kits can detect only *L. pneumophila* serogroup 1, but patients may have been infected by other serogroups. Samples should be sent to a shore laboratory for confirmation, preferably to a national reference laboratory or other laboratory experienced in the diagnosis of Legionnaires' disease.
- One **named person** should be responsible for implementation of measures for *Legionella* control on board the ship. The named person should be trained in *Legionella* control. Other crew responsible for the operation of water systems on board should have knowledge of the importance of controlling *Legionella*.

2.1.2 Environmental health preventive measures

Water distribution system

Any WSP established on board the ship must include provisions for *Legionella* control. *Legionella* spp. colonisation must be included in the risk assessment of the water distribution system. Requirements for control measures, operational monitoring, record keeping and corrective actions for the potable water distribution are described in Part A, Chapter 4. Control measures such as temperature control, regular cleaning and disinfection, flushing, and actions after system repairs are described below.

Construction — materials

All water systems components should be made of appropriate materials. Materials such as natural rubber, hemp and linseed oil based jointing compounds and fibre washers should not be used in water systems. Materials and fittings for use in water systems should have been shown not to support microbial growth and be suitable for use in contact with potable water.

Water systems should be designed and constructed so as to avoid poor water movement and turnover.

Temperature control

Water systems should:

- avoid water temperatures between 25 °C (77 °F) and 49 °C (120 °F) to prevent *Legionella* colonisation;
- ideally, maintain cold water below 25 °C (77 °F);

- ideally, maintain hot water above 50 °C (122 °F).

It is recommended that hot water should be produced or stored at 60 °C (140 °F) and distributed such that a temperature at least 50 °C (122 °F), and preferably 55 °C (131 °F), is achieved within one minute at outlets. Care is needed to avoid much higher temperature because of the risk of scalding.

In addition to the monitoring of the water temperature at the tap it is useful to monitor the water temperature within the pipes by use of a contact thermometer. This is particularly important when thermostatic mixer valves are fitted to outlets. Measurement of the temperature of the hot water in the flow and return loops throughout the ship and not just the combined flows and returns to the water heater can rapidly detect areas of poor circulation. When operating efficiently, there should only be a few degrees difference in the temperatures of the individual flows and returns.

Flushing

Stagnation or slow water movement encourages biofilms to form in the water system.

All taps and showers are to be run in cabins for several minutes at least once a week if they are unoccupied and always prior to occupation.

Regular cleaning and disinfection

The purpose of cleaning is to remove scale, salt, sediments, sludge, dirt and debris from the water tanks and distribution system.

Disinfection must be applied in order to reduce the number of microorganisms in the water to levels that cannot cause harm.

A schedule should be established for regular cleaning and disinfection of all water system components.

- Filling hoses (flushed for at least three minutes with potable water before use and disinfected at least every six months).
- Water system pumps (every six months).
- Water tanks (every year).
- Pipes and taps of the distribution system (every year).
- Hot water heaters (every year).
- Shower heads and taps (every six months or depending on the inspection findings).
- Hot water storage tanks (emptied when not in use).

Cleaning and chemical and thermal disinfection procedures for water distribution systems are described in Annex 36 (page 289) and Annex 37 (page 290).

Preventive measures during repairs and before cleaning

Before repairs to parts of the water system where water has a low flow rate or is static, water should be drained. Following repairs, that part of the system should be disinfected (Annex 36, page 289 and Annex 37, page 290).

If tanks and calorifiers are heavily contaminated with organic materials, then disinfection is necessary before and after cleaning. Where possible, aerosol generation during cleaning should be avoided.

PPE should be worn during cleaning (Annex 38, page 292).

Regular sampling

Regular sampling of the potable water system is recommended at least every six months. Table 14 presents the action levels following routine *Legionella* sampling in hot and cold water systems.

Table 14: Action levels following *Legionella* sampling in hot and cold water systems (EWGLI, 2011)

Legionella **bacteria (cfu/litre)**	**Action required**
More than 1,000 but less than 10,000	Either: (i) If a small proportion of samples (10-20 %) are positive, the system should be re-sampled. If a similar count is found again, then a review of the control measures and risk assessment should be carried out to identify any remedial actions; (ii) If the majority of samples are positive, the system may be colonised, albeit at a low level, with *Legionella*. Disinfection of the system should be considered but an immediate review of control measures and a risk assessment should be carried out to identify any other remedial action required.
More than 10,000	The system should be re-sampled and an immediate review of the control measures and risk assessment carried out to identify any remedial actions, including disinfection of the system.

Hot tubs and spa pools

Requirements and recommendations for the maintenance of hot tubs and spa pool are described in detail in the recreational water chapter of the manual, (Part A, Chapter 5) and include measures to control the proliferation of legionellae.

- Spa pools are to be treated with a free residual chlorine level of 3-10 mg/L the levels should be monitored at least every one hour.
- A complete draining, cleaning and renewal of the water should be done regularly.

- Sand filters are to be backwashed whenever they are drained, or earlier as needed (see Part A, items 5.13 and 5.44).
- The whole system is to be cleaned and disinfected once a week or earlier according to the draining frequency.
- Air injection lines should be cleaned and disinfected preferably monthly.

Table 15 presents the action levels following *Legionella* sampling in spa pools.

Table 15: Action levels following *Legionella* sampling in spa pools

Legionella **(cfu/litre)**	**Action required**
More than 100	Close pool immediately and exclude the public from the area. Shock dose the pool with 50 mg/L chlorine for five hours circulating the water sufficiently to ensure all parts of the pipe-work are disinfected. Drain clean and re-disinfect. Review control and risk assessment and carry out any remedial measures identified. Refill and retest as soon as possible and then 1-4 weeks later. Keep closed until legionellae are not detected and the risk assessment is satisfactory.

Air handling and conditioning systems

Air handling and conditioning systems should be designed and constructed in order to avoid accumulation of water in ducts and allow cleaning and disinfection. Standing water in duct and condensate trays can potentially be contaminated by *Legionella*.

Filters of air conditioning systems should be inspected regularly and cleaned and disinfected, or replaced when necessary.

Drains should be regularly inspected in order to ensure that are properly working. Condensate trays and sumps should be regularly cleaned and disinfected.

Humidification, if required, should ideally be by steam injection. If spray-type humidifiers are installed, then regular disinfection of the water spray system is needed (UK Maritime and Coastguard Agency, 1998).

2.2 Case/cluster/outbreak management

2.2.1 Medical issues

Identify cases and clusters

A case of Legionnaires' disease may be identified during the voyage when a passenger or member of crew seeks medical consultation. Clinical or radiological evidence of pneumonia may suggest Legionnaires' disease. However, microbiological diagnosis is necessary for confirmation.

Alternatively, a case of Legionnaires' disease may be identified after the patient has disembarked. In this case, the ship may receive information about the incident through another source for example ELDSNet or a national surveillance centre. However, the patient might be exposed to other possible sources contaminated by *Legionella* such as hotels or land-based facilities and therefore, case investigation should identify all potential sources of infection.

In both circumstances, if the patient was on the ship during the likely incubation period, since the ship has been linked to a case, investigation of the ship as the potential source should begin including sampling and appropriate environmental control measures.

Medical treatment

Medical treatment should be given based on the medical assessment results.

Microbiological diagnosis — specimen collection

See page 181, section 2.1.

Case investigation

Patients with pneumonia who are considered suspected cases of Legionnaires' disease should complete a case investigation questionnaire. Relatives may have to be asked if the patient is too ill to answer. An example of such a questionnaire is given in Annex 39 (page 293). Case investigation is described in section 2.3, page 190.

2.2.2 Environmental measures

Environmental measures that should be immediately undertaken, when the ship is suspected as a possible source of contamination, include the following (European Working Group Legionella Infections, 2007).

- Closing any facility thought to be a potential source of infection.
- Pre-disinfection sampling. Samples should be collected by a trained person from any likely sources that the patient was exposed to and be sent for analysis to a laboratory in collaboration with the competent authority at the port. Sampling points should be selected based on risk assessment and other available information in the case of an outbreak investigation. Points that are most likely to be the source of infection should be sampled.

- A preliminary risk assessment of the ships water systems to include temperature checking and comparison with any available schematic. This may identify additional areas that should be sampled.
- Disinfection (Annex 36 (page 289) and Annex 37 (page 290)).
- Audit of policies, systems and procedures for *Legionella* prevention.
- Review maintenance and monitoring regimes and records.
- Interview of key crew who are responsible for operation and maintenance of water systems and medical staff.
- Arranging a sampling schedule.
- Post-disinfection sampling from points representing different loops of the water systems.
- Swab samples from fixtures and fittings of the recreational and decorative water facilities, cabin showers, taps and whirlpool baths.

Water distribution system

Pre-disinfection water system sampling

A sample schedule should be immediately arranged to obtain representative samples from the water system. Samples and/or swabs should be collected from the hot and cold water system at the following locations: cabin taps and showers heads, beauty salon, hairdressers, communal showers, recreational water facilities, air conditioning systems and decorative water features. Sampling procedures are described in Annex 40 (page 296).

Disinfection

Thermal or chemical disinfection should be conducted immediately after sampling. Annex 36 (page 289) and Annex 37 (page 290) describe thermal disinfection protocol and super-chlorination.

Recreational water facilities

Water sampling should include all recreational water facilities including hot tubs/spa pools. Samples should also be taken from the filter media.

If a recreational water facility is suspected as the source of infection, it should be immediately closed to the public. After pre-disinfection sampling, the facility should be drained, cleaned and disinfected. The pool and all other parts of the system including the balance tank should be drained, disinfected and then cleaned. The disinfection should be done with a solution containing 50 mg/L of free chlorine for five hours. All inside surfaces of the pool, the balance tank and filter housing should be cleaned; the jets should be removed and cleaned. The filter media should be changed. The pool should only be reopened to the public after microbiological testing has confirmed it is no longer contaminated with legionellae.

Air handling and conditioning systems

Samples should be collected from the condensation trays in air conditioners and fan coils. After sampling, they should be cleaned and disinfected.

Decorative fountains

Samples should be collected from the fountain pool, balance tank and filter. After sampling, the system should be drained and disinfected and all parts of the system should be cleaned.

Following disinfection, water systems should be re-sampled and monitored for the presence of *Legionella*.

Post-disinfection sampling schedule

Post-disinfection samples should be collected a few days after the system has been disinfected to allow it to re-stabilise and ensure the disinfectant has been flushed out.

System re-assessment

The WSP or other *Legionella* control programme of the company and system schematics should be re-assessed and reviewed. Modifications to the construction of the water system might be needed and additional control measures may need to be implemented. Changes in the construction might be needed.

2.2.3 Measures to be taken before disembarkation

Reporting

MDH

For ships on international voyages, the MDH according to IHR should be completed and be sent to the competent authority if a case or suspected case of legionellosis has occurred on board. MDH should contain the number of people with pneumonia symptoms on board.

The SHIPSAN ship communication form (S2) (Annex 11, page 238), or a similar form or system used by the ship including the same information, may be used in addition to the MDH for recording or reporting additional information.

National requirements for reporting

Additional reporting may be required according to the national legislation applied in the port of call.

In the European Union, probable or confirmed cases must be reported to the port health/competent authorities (Table 13, page 182).

The competent authorities should be informed if any support is needed (clinical specimen examination, sampling, disinfection, hospitalisations) before the ship arrives at port.

2.2.4 After disembarkation measures

All necessary control measures such as disinfection, repairs, change of filter media and others should be taken to avoid the recurrence of an outbreak in the next voyage.

2.3 Port competent authority actions

Competent authorities in Europe follow guidelines and protocols according to the European Guidelines. ELDSNet operating procedures provide a standardised approach to reporting cases and detecting and responding to clusters of Travel-Associated Legionnaires' Disease (TALD) across European Member States. The ELDSNet operating procedures define single cases and clusters of Legionnaires' disease as described below:

Single cases: Cases who in the two to ten days before onset of illness stayed at or visited a commercial accommodation site that has not been associated with any other cases of Legionnaires' disease, or cases who stayed at an accommodation site linked to other cases of Legionnaires' disease more than two years previously.

Clusters: Two or more cases who stayed at or visited the same commercial accommodation site in the two to ten days before onset of illness and whose onset is within the same two-year period.

Outbreaks: Two or more cases who stayed at or visited the same commercial accommodation site in the two to ten days before onset of illness and whose onset is within the same two-year period and where environmental investigations provide additional evidence suggesting a common source of infection.

If a case or clusters of Legionnaires' disease among passenger or crew has been confirmed and one or more water facilities of the ship have been identified as the source of infection, then other passengers and crew who have disembarked and have been exposed to the source of contamination should be contacted and asked if they have developed symptoms of Legionnaires' disease. The investigation should be undertaken by a competent authority. The ship crew should provide the competent authority with the necessary information upon request*. Legionnaires' disease is an obligatory reportable disease in the EUMS. Port competent authorities must report any probable or confirmed case detected on board ships and the actions taken to the national competent authority according to the local and national rules and procedures.

* Rarely, cases are reported as travel associated even though the travel history is longer than 10 days (up to a maximum of 14 days) before onset of symptoms (it is known that a longer incubation period can sometimes be associated with underlying disease, especially immunosuppression and being of an elderly age).

Reference list

Azara A., Piana A., Sotgiu G., Dettori M., Deriu M.G., Masia M.D., Are B.M. and Muresu E. (2006). Prevalence study of Legionella spp. contamination in ferries and cruise ships. BMC Public Health 6: 100.

Castellani P.M., Lo M.R., Goldoni P., Mentore B., Balestra G., Ciceroni L. and Visca P. (1999). Legionnaires' disease on a cruise ship linked to the water supply system: clinical and public health implications. Clin Infect Dis 28(1): 33-38.

European Centre for Disease Prevention and Control. 2012. European Legionnaires' Disease Surveillance Network (ELDSNet): Operating procedures. Stockholm.

European Working Group for Legionella Infections. (2011). EWGLI Technical Guidelines for the Investigation, Control and Prevention of Travel Associated Legionnaires' disease.

European Working Group for Legionella Infections. (2007). 4th EWGLI training course: Investigating outbreaks of legionnaires' disease: risk assessment, sampling and control. Health Protection Agency, UK.

Goutziana G., Mouchtouri V.A., Karanika M., Kavagias A., Stathakis N.E., Gourgoulianis K., Kremastinou J. and Hadjichristodoulou C. (2008). Legionella species colonization of water distribution systems, pools and air conditioning systems in cruise ships and ferries. BMC Public Health 8: 390.

Jernigan D.B., Hofmann J., Cetron M.S., Genese C.A., Nuorti J.P., Fields B.S., Benson R.F., Carter R.J., Edelstein P.H., Guerrero I.C., Paul S.M., Lipman H.B. and Breiman R. (1996a). Outbreak of Legionnaires' disease among cruise ship passengers exposed to a contaminated whirlpool spa. Lancet 347(9000): 494-499.

Joseph C.A., Hutchinson E.J., Dedman D., Birtles R.J., Watson J.M. and Bartlett C.L. (1995). Legionnaires' disease surveillance: England and Wales 1994. Commun Dis Rep CDR Rev 5(12): R180-R183.

Kura F., Amemura-Maekawa J., Yagita K., Endo T., Ikeno M., Tsuji H., Taguchi M., Kabayashi K., Ishii E. and Watanabe H. (2006a). Outbreak of Legionnaires' disease on a cruise ship linked to spa-bath filter stones contaminated with Legionella pneumophila serogroup 5. Epidemiol Infect 134(2): 385-391.

Meenhorst P., van der Meer J.M. and Borst J. (1979). Sporadic cases of Legionnaires' disease in the Netherlands. Ann Intern Med 90(4): 529-532.

UK Maritime and Coastguard Agency. (1998). Contamination of ships' air conditioning systems by Legionella bacteria. Marine guidance note (as amended). MGN 38 (M+F).

World Health Organization. (2007). Legionella and the prevention of Legionellosis.

Guideline IV

Prevention and control of vaccine-preventable diseases on passenger ships; focusing on measles, rubella and varicella

Purpose

- To reduce the risk of outbreaks of vaccine-preventable diseases aboard passenger ships.
- To provide guidance for the management of passengers and crew members who present with acute skin rash*, measles, rubella or varicella.
- To provide guidance for case and outbreak management aboard passenger ships.
- To provide guidance to stakeholders and public health authorities for a consistent response in proportion to the risk.

1 Overview

Outbreaks of vaccine-preventable diseases such as varicella (n = 4), measles (n = 3), rubella (n = 2), meningococcal meningitis (n = 1) and a multi-pathogen Varicella-Measles-rubella outbreak (n = 1) and a multi-country Hepatitis A outbreak (n = 1) have been reported worldwide in recent years (1996-2015) on passenger ships (EU SHIPSAN ACT Joint Action, 2015, unpublished). The majority of these outbreaks were limited to crew members. In two measles outbreaks, crew were the likely index cases leading to secondary cases among both crew members and passengers, as well as substantial spread to those on land (Nieto-Vera et al., 2008; Lanini et al., 2014). Most outbreaks were protracted, lasting for over a month with two outbreaks taking up to 3 months to control. The cause of the majority of these outbreaks was inadequately vaccinated crew members; a significant proportion of crew are non-immune to routine Vaccine-Preventable Diseases (VPD) (EU SHIPSAN ACT Joint Action, 2015, Unpublished).

This guideline focuses on the three most common outbreak-prone VPD on passenger ships according to available evidence (EU SHIPSAN ACT Joint Action, 2015, unpublished): measles, rubella and varicella. These viruses all present with an acute skin rash, are spread from person-to-person and are transmitted via the respiratory route. Infected persons shed virus and are contagious a few days before the onset of clinical symptoms and several days afterwards. Measles virus is particularly contagious, with greater than 90 % secondary attack rates among susceptible individuals (World Health Organization, 2013) and disease can be more severe in infants and the elderly. Although rubella is typically a mild, self-limited disease in adults, infection in pregnant women can result in serious adverse health outcomes for the foetus (Public Health England, 2013).

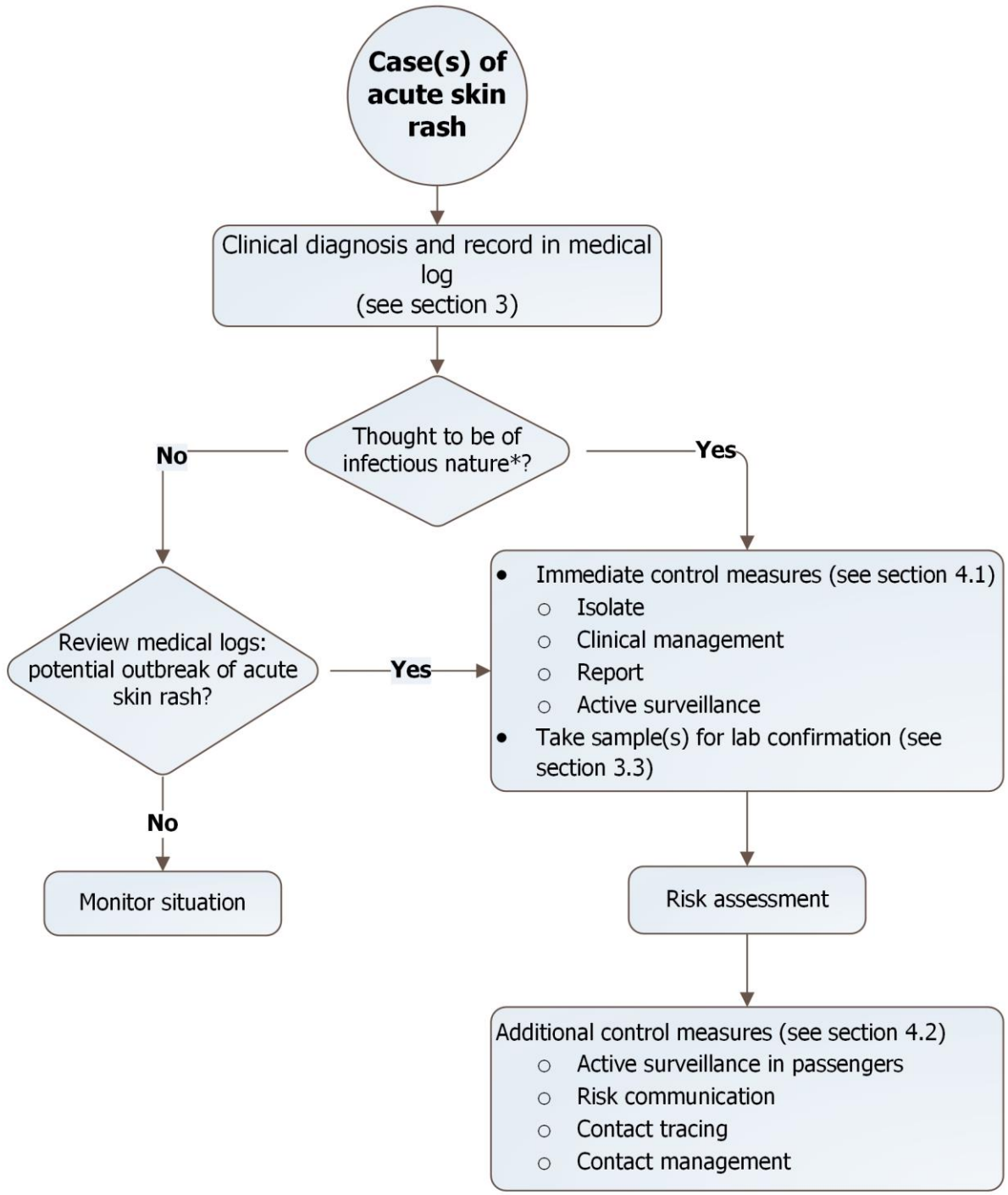
* In the absence of a medical doctor, the master should regard any acute skin rash or eruption (excluding allergic reactions), with or without fever, as the grounds for suspecting the existence of a disease of an infectious nature. See Chapter 2 on Communicable Disease Surveillance.

Varicella is the most commonly reported VPD by passenger ships and a frequent cause of outbreaks. Complications occur more frequently in persons older than 15 years, and as crew members and most cruise ship passengers are adults, outbreaks have the potential to involve serious illness (US-CDC, 2014). Ships provide an environment conducive for the transmission of such viruses including a common ventilation system for a large population, tightly spaced beds or bunks and close social interactions (Ziebold, et al., 2003; Public Health Agency Canada, 2005; Mitruka et al., 2012), and passengers originate from diverse countries with variable vaccine schedules and coverage, so efforts for prevention and timely control are particularly important.

Of importance, the member states of the World Health Organization (WHO) European Region have the goal of eliminating (interruption of indigenous transmission) measles and rubella by 2015 (World Health Organization, 2010) and WHO-Europe has called for urgent action to address immunity gaps. Measles and rubella are preventable by vaccine providing lifelong immunity to most recipients.

This guideline presents guidance for the prevention for VPDs; the diagnosis, surveillance and control of cases of acute skin rash; and the specific control measures for measles, rubella and varicella cases or outbreaks.

Summary of the public health response to a case of acute skin rash



* In the absence of a medical doctor, the master should regard any acute skin rash or eruption (excluding allergic reactions in persons with a history of allergies), with or without fever, as the grounds for suspecting the existence of a disease of an infectious nature.

2 Prevention of Vaccine-Preventable Diseases

2.1 Pre-embarkation preventive measures

Ship Crew

- Seafarers should be requested to carry their general vaccination certificates, as well as specific certificates (e.g. for Yellow Fever), with them when attending pre-employment medical examinations and during voyages.
- Shipping companies are recommended to provide and document the required vaccinations to crew members as part of their occupational health programmes e.g. as part of pre-employment medical examinations.
- The medical doctor who performs a pre-employment exam should undertake an individual risk assessment of each crew member according to maritime medicine vaccination guidelines and consider routine and mandatory vaccines, and those against specific occupational risks according to national schedules (Schlaich et al,. 2014; World Health Organization, 2014).
- In the absence of documented vaccination or history of infection, serological testing for measles, rubella and/or varicella can be undertaken to provide evidence of immunity to infection.
- In the absence of documented vaccination or history of infection, companies may choose to vaccinate crew members with the required multivalent (MMR) and/or varicella vaccine without undertaking serological testing, provided there is agreement of the crew member to be vaccinated. This strategy is highly recommended when crew originate from a country with poor vaccine coverage*, or hold positions that put them in contact with high-risk populations (e.g. child-care, medical or beauty salon personnel) (Idnani 2010; Acevedo et al., 2011; World Health Organization, 2014).
- Shipping companies should keep up-to-date medical records of staff and their vaccination status.
- In line with the WHO Handbook for Inspection of Ships and Issuance of Ship Sanitation Certificates (World Health Organization, 2011), a list of staff taking care of children and which vaccines they have received (vaccination list) is required.
- The 'International Certificate of Vaccination or Prophylaxis' should be used appropriately in accordance with the IHR (Annex 41, page 300).

Passengers

- Shipping companies are advised to recommend to passengers, regardless of their itinerary, to visit their health care provider in order to seek travel advice and ensure that all routine

* Measles and rubella vaccine coverage data is available by country at: http://apps.who.int/immunization_monitoring/globalsummary; for varicella, a higher susceptibility of young adults to infection from tropical countries has been found compared to temperate countries (World Health Organization, 2014).

vaccinations (including MMR(V)) are up to date according to national programmes. This is in-line with existing travel health guidelines such as:

- WHO International Travel and Health advice on traveller vaccinations http://www.who.int/ith/updates/20110427/en/
- Public Health England and the National Travel Health Network and Centre's 'Travel health guidance on board cruise ships'. Available at: www.nathnac.org/pro/factsheets/pdfs/Cruise_PHE.pdf
- Health Protection Scotland's TRAVAX (travel health services for health professionals). Available at: www.travax.nhs.uk
- US-Centers for Disease Control and Prevention Yellow Book Chapter 2 'The Pre-travel Consultation'. Available at: http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-2-the-pre-travel-consultation/general-recommendations-for-vaccination-and-immunoprophylaxis

- Shipping companies are recommended to disseminate a health questionnaire at embarkation to identify sick passengers and crew who can then be sent for a medical assessment.
- Travel companies and travel agencies are recommended to provide health advice to passengers before joining the ship (e.g. as part of the travel package), including information on vaccine-preventable diseases.

General advice to travellers

- Travellers should discuss their travel route with their doctor and receive any relevant travel-specific vaccinations with consideration to potential exposures on board the ship and at port stops, and according to any risk groups (Mitruka et al., 2012; World Health Organization, 2014).
- Pregnant women and women of childbearing age should be immune to rubella before travel (Slaten and Mitruka, 2013).

2.2 During voyage (every day) preventative measures

General:

- Standard cleaning and disinfection procedures should be carried out by trained and supervised staff.
- Routine generic health advice should be provided to passengers and crew including personal hygiene and through hand washing.
- There should be an agreed Outbreak Management Plan, which specifies the duties for all crew members and responsibilities of the outbreak management team.

Supplies and equipment:

- Adequate medical supplies and equipment should be available on board to respond to an outbreak.

3 Diagnosis of acute skin rash and surveillance

3.1 Clinical diagnosis

Measles, rubella and varicella all involve an acute skin rash. However, there is a wide range of other infectious and non-infectious agents that may cause acute skin rash including vector-borne diseases (dengue fever, Chikungunya, rickettsial disease), scabies, viral haemorrhagic fevers, meningococcal disease, dermatological conditions and cutaneous drug reactions. In general, clinical signs are unreliable as the sole criteria for diagnosis and **therefore laboratory assessment is required for accurate diagnosis** (see section 3.3).

Medical staff should be aware of the symptoms, incubation period, infectious period and case definitions of measles, rubella and varicella (Table 16) and undergo regular training. Treatment should be given based on medical assessment, case by case evaluation, and according to European Centre for Disease Control (ECDC) and WHO guidelines (World Health Organization, 2007). Advice on these or other acute skin rash conditions should be gained from competent authorities when needed.

Table 16: The main clinical characteristics of measles, rubella and varicella (World Health Organization, 2007; American Public Health Association, 2008; Public Health England, 2013; World Health Organization, 2013)

Characteristics	Measles	Rubella (German measles)	Varicella (Chickenpox)
Agent	Measles virus	Rubella virus	Varicella-zoster virus
Signs and symptoms	• Fever • maculopapular rash (i.e. non-vesicular rash) • cough **or** coryza (runny nose) **or** conjunctivitis (red eyes)	• Maculopapular rash • swelling of the lymph glands behind the ears and at the back of the neck (cervical, suboccipital or post-auricular adenopathy) **or** joint pain and stiffness (arthralgia/arthritis)	• A rash of red spots, rapidly becoming fluid-filled blisters (vesicles) • often intensely itchy • appearance of new vesicles over three to four days, as older lesions form crusts and heal • fever
Incubation Period	7-18 days (usually 10-12 days)	12-23 days (usually 14-17 days)	10-21 days (usually 14-16 days)
Infectious period: • Before rash onset • After rash	 4 days 4 days	 7 days 5 days	 1 – 2 days Until all lesions are

onset			crusted (usually about 5 days)
• Subclinical cases		Rubella virus infections are asymptomatic or subclinical in > 50 % of instances, but infected persons can still shed and transmit the virus	
Duration	Generalised rash: 4-7 days	Adult prodrome: 1-5 days	Vesicular rash: 3-4 days
Case-fatality rate	3-5 % in developing countries	–	1:5000 in adults
Reported attack rates among ship crew (EU SHIPSAN ACT Joint Action, 2015, unpublished)	2.4 %	0.8 – 6.0 %	3.4 %
Transmission route	Airborne or droplet, contact with naso-pharyngeal secretions	Droplet or direct contact with naso-pharyngeal secretions	Airborne or droplet, contact with vesicles
Complications	• Otitis media *(middle ear infection)* • pneumonia, • laryngotracheobronchitis (croup) • diarrhoea, • encephalitis	• In pregnancy: can transmit the infection to the foetus, which, as a result, may be born deaf and with heart and eye defects • arthralgia • leukopenia thrombocytopenia • encephalitis	• Bacterial infection of the skin lesions causing: renewed fever, redness and swelling of the skin around the infected area • pneumonia • haemorrhagic complications • encephalitis

3.2 Laboratory diagnosis and confirmation

- It is recommended, where feasible, that all cases of acute rash suspected to be of infectious nature on ships are confirmed by laboratory testing.
- Laboratory criteria for testing can be found in the case definitions (Annex 42, page 301).
- For countries in the measles elimination phase (which includes all countries in Europe), laboratory investigation of all suspected sporadic measles cases is mandatory.

- During an outbreak, laboratory confirmation should be sought for at least the initial 5-10 cases. Once an outbreak is confirmed, subsequent cases can be primarily confirmed based on epidemiological linkage to a laboratory-confirmed case. However, laboratory confirmation should be sought for all suspected cases in pregnant women, even if the outbreak is confirmed and regardless of the background incidence or number of previously confirmed cases (World Health Organization, 2013).

Diagnostic procedures, specimen collection and transportation:

Whenever possible, the competent authority should contact the relevant laboratory in order to get advice on the specimen collection and transportation procedure.

For maculopapular rash (or suspected measles or rubella):

Diagnosis is usually done by:

- virus genome detection by Polymerase Chain Reaction (PCR) in throat swab or oral fluid collected within 7 days after onset of exanthema; or
- Immunoglobulin M (IgM) test in serum; in approximately one third of the infected individuals, IgM will appear on the third day after onset of exanthema (skin rash) and will persist for at least 28 days.
  - Collect a throat (oropharyngeal), nasal or NP (nasopharyngeal) sample using a synthetic swab and place in a tube with viral transport medium.
  - Collect whole blood (5 ml for older children and adults and 1 ml for infants and younger children) in sterile dry tube and process to serum.
  - Ensure samples are labelled correctly and are accompanied by a specimen form.
  - Transport samples according to Directive 2008/68/EC on the inland transport of dangerous goods, in triple packaging, at 4-8 °C (39-46 °F).
  - Send samples to the laboratory as soon as possible, ideally specimens should be received within 48 hours.

When rash consists of fluid-filled blisters (or suspected Varicella):

Material from skin lesions are the preferred specimen for laboratory confirmation of varicella disease (US Centers for Disease Control and Prevention, 2014).

  - Vesicular lesions: Remove the top of the vesicle, swab the base vigorously enough to ensure cell collection, put the dry swab into a snap-cap tube or other closable container.
  - Scabs: Collect several dry scabs from crusted-over lesions and place each in a separate container for shipping.
- No transport medium is needed, and specimens may be stored at room temperature.
- Ensure samples are labelled correctly and are accompanied by a specimen form.

- Transport samples in triple packaging and according to Directive 2008/68/EC on transport of dangerous goods.

3.3 Surveillance

All cases of vaccine-preventable disease and acute skin rash thought to be of infectious nature should be recorded in the standardised illness ship medical log (see Part A, Chapter 2). In the absence of a medical doctor, the master should regard any acute skin rash or eruption*, with or without fever, as the grounds for suspecting the existence of a disease of an infectious nature. For possible, probable and confirmed cases of measles, rubella and varicella, standardised surveillance definitions should be used, such as the EU case definitions provided (Annex 42, page 301).

A skin rash is defined as: abnormal areas on the skin that may appear as discoloured bumps or flat spots or areas, or blisters or bumps containing fluid or pus that are intact or crusted over.

Due to the highly infectious nature of some VPDs, all cases (even one individual case) or outbreaks of acute skin rash thought to be of infectious nature constitutes an alert and should lead to the filling out of the ship communication form (see form S2, Annex 11, page 238, and Part A, Chapter 2). All cases should be reported to the competent authority, via the Maritime Declaration of Health.

In determining whether or not there is an outbreak, the following outbreak definitions can be used:

As for other infectious diseases, the outbreak definition is 'the occurrence of cases of disease with a frequency in excess of what would normally be expected (for the specific itinerary and time). Normal expectancy is determined from historical/baseline data for the ship.

In the WHO European Region, outbreaks of measles and rubella are defined as follows (World Health Organization, 2013).

Measles outbreak: two or more laboratory-confirmed cases which are temporally related (with dates of rash onset occurring between 7 and 18 days apart) and epidemiologically or virologically linked, or both;

Rubella outbreak: two or more laboratory-confirmed cases which are temporally related (with dates of rash onset occurring between 12 and 46 days apart) and epidemiologically or virologically linked, or both.

A suggested Varicella outbreak definition is a follows.

Varicella outbreak: two or more laboratory-confirmed cases which are temporally related (with dates of rash onset occurring between 10 and 21 days apart) and epidemiologically or virologically linked, or both.

* Excluding allergic reactions in persons with a history of allergies.

4 Case and outbreak management on the ship

- It is vital that the ship has a medical isolation management plan prepared in advance (see 1.11 in Chapter 1) with all crew aware of their responsibilities.
- Due to the contagious nature and elimination goals for measles and rubella, just one case of acute rash thought to be of infectious nature is an alert and should **lead to the immediate control measures described below (4.1.1-4.1.5).**

Although lab confirmation is required for suspect measles and rubella cases, immediate control measures should be immediately implemented before the lab result is received.

4.1 Immediate control measures

4.1.1 Isolation and PPE

- Isolation of all acute skin rash cases suspected to be infectious in nature immediately upon identification (World Health Organization, 2013).
- Isolation in a single-berth cabin with door closed (WHO, 2013).
- Isolate until:
  - measles, rubella and varicella are ruled out by laboratory (World Health Organization, 2013); or
  - the duration of the infectious period of the suspected disease, see Table 16 (if in doubt, until seven days after rash onset).
- Crew member may return to work when no longer infectious (Cramer et al, 2012).
- No visit/contact by MMRV unimmunised persons (for rubella, it is important for unimmunised pregnant women not to be in contact with a case).
- Regular hand washing by patient and carer.

4.1.2 Report

- See Surveillance section 3.3 for case definitions and forms.
- Immediately report any case or outbreak to the competent authority at the next port of call — submit MDH as required by that country. Information on control measures implemented should also be included.
- Liaise with shore side competent authority according to national regulations and practices.
- Regular updated reports should be provided to the relevant competent authority regarding any further cases and the outcome of the event.

4.1.3 Clinical/case management including personal protective equipment

- WHO Medical guide for ships (3rd edition) (World Health Organization, 2007) describes treatment for various infectious diseases including varicella and rubella.
- Patients should be nursed by someone immune to the disease. If disease is not confirmed, carer should be immune to MMRV.

- Regular hand washing by patient and carer.
- Collect appropriate specimens (see 3.3 above) and arrange appropriate shore side testing.
- Disembarkation — prevent persons from sailing: undertake case by case assessment (WHO, 2013); if a case patient is disembarked they should be referred to the competent authority.

4.1.4 Cleaning and disinfection

Linen and other articles may be soiled by discharges from nose and throat so should undergo effective cleaning and disinfection measures (see Part A, items 7.1.3 and 7.6.5). Infectious waste should be handled and stored appropriately (see Part A, items 9.5.3 and 9.5.4).

4.1.5 Active surveillance

- Review of crew and passenger medical logs to search for retrospective acute skin rash cases (Cramer et al., 2012).
- Case finding among crew who were in contact with the case should be initiated by the ship's medical staff.

4.2 Supplementary control measures according to risk assessment

An assessment of the likelihood of transmission on the ship should only be done after careful individual risk assessment on a case-by-case basis. Guidance should be sought from the relevant competent authority. The below measures should be considered according to the risk assessment for all probable and confirmed VPD cases and may also be considered when a possible case is assessed as likely to have a VPD based on symptoms, immunisation status, travel history, belonging to a high-risk population; or if there is an outbreak (see outbreak definitions in 3.3).

4.2.1 Active surveillance in passengers

- Case finding should be expanded to include directly contacting passengers (interview case to identify contacts, health advice for passengers including to report illness e.g. through distributing leaflets) and findings should be recorded in a log.
- Case finding should continue among embarking passengers and crew on subsequent voyages for the duration of one incubation period after the last confirmed infection (US Centers for Disease Control and Prevention, 1998).

4.2.2 Risk communication

- Notification to passengers (on board, disembarking, and embarking), particularly pregnant women about their risk for exposure to rubella, measles or varicella and to report immediately if they become unwell with acute skin rash.
- Crew should be encouraged to report if they become symptomatic and stay in their cabins until seen by medical personnel.

4.2.3 Contact tracing: Identification of passengers and crew following exposure to an ill person

Persons (passengers and crew) who have been in contact with a VPD case during their infectious period should be identified and followed up. Contact investigation should include assessment of their susceptibility to infection (see below) and their overall health status, including pregnancy status and risk factors for severe illness (World Health Organization, 2013). It is best practise to keep a log (line-list) of contacts. An example of such a log can be found at Annex 41 (page 300).

Contact tracing is usually considered when control interventions are expected to be effective. For example, for measles and varicella, the main intervention for preventing further spread is Post Exposure Prophylaxis (PEP), see below. Contact tracing of passengers and crew is strongly recommended if PEP can still protect susceptible persons, prevent complications, and limit further transmission — provided that risk assessment, available resources, and the feasibility of control allow that effort (European Centre for Disease Control and Prevention, 2010; Robert Koch Institute, 2011).

A definition of a case 'contact' should be defined for the event (case outbreak). The following are suggestions:

- a person who has had ≥ 5 minutes of direct face-to-face contact with a case during the infectious period (see Table 16, page 198 for infectious periods) (US Centers for Disease Control and Prevention, 2014);
- those who have shared confined space (e.g. shared bedroom or working area) in close proximity for a prolonged period of time, such as one hour, with a case during the infectious period;
- crew-contacts include intimate partners, cabin mates, bathroom mates, dining mates, workmates and social contacts (Cramer et al., 2012);
- on small passenger ships, all passengers and crew could be considered close contacts, since living conditions on board are comparable to general households (Schlaich, 2012).

Generally, all passengers and crew should be considered for contact tracing. For measles, priority should be given to children under two years of age as they are likely to be unvaccinated (or not fully vaccinated) and have a higher risk of complications; and pregnant women and immunocompromised patients who might benefit from Human Normal Immunoglobulin (HNIG) (see national recommendations) (European Centre for Disease Control and Prevention, 2010). Contact tracing can be escalated according to the magnitude and severity of the event.

Contact tracing after disembarkation

Contact tracing in disembarked passengers and crew is highly resource intensive and therefore a risk assessment should be conducted to determine whether contact tracing should be undertaken and, if yes, then over which time period (e.g. those having disembarked in the last X days). Countries close to measles elimination may consider contact tracing of all passengers if a probable or confirmed case of measles arrives who has been travelling while being infectious, even after the time for effective PEP has elapsed. The rationale is to identify secondary cases and ensure

appropriate interventions to limit further spread (European Centre for Disease Control and Prevention, 2010).

To enable contact tracing after disembarkation, the ship should ensure that passenger lists include up-to-date contact details (phone number, home address and passport number) are available for all passengers and crew and can be shared in a timely way with public health authorities. Personal data must be kept confidential as per IHR article 45 and EU legislation (Directive 95/46/EC, Directive 2002/58/EC, Directive 2006/24/EC and Regulation (EC) 45/2001).

4.2.4 Contact management: management of passengers and crew following exposure to an ill person

(i) Monitor health:

Recommend contacts, among passengers and crew members, to monitor their health for the length of the incubation period (for up to 18 days for measles, 23 days for rubella, 21 days for varicella) after their last exposure to an infectious case and to report any symptoms to the shipboard infirmary immediately. If a contact is pregnant, medical advice should be sought.

(ii) Quarantine:

In certain situations, it may also be advisable to quarantine **susceptible persons who were high-risk exposure case contacts** (European Centre for Disease Control and Prevention, 2014) (see definition in the box below) e.g. crew mates who share the same cabin. Advice should be sought from the relevant competent authority.

(iii) Post-exposure prophylaxis for measles and varicella:

When a case has been confirmed as measles or varicella, post-exposure vaccination of **susceptible persons who were case contacts** plus administration of immunoglobulin to risk groups could be recommended on a case-by-case basis (see below). It may be necessary to expand outbreak response immunization **beyond case contacts, to include all susceptible persons** (World Health Organization, 2013).

A risk assessment should be conducted to determine which crew and/or passengers with no, or unknown, history of infection should be vaccinated. Should susceptible contacts have already disembarked then contact tracing may be required (see above). Cooperation should be established with the relevant competent authority for decision making and contact tracing implementation.

Susceptible persons: Persons without a history of laboratory-confirmed infection, and without immunization records demonstrating the receipt of the age-appropriate number of doses of vaccine or serologic evidence of immunity (presence of IgG) should be considered susceptible. In some countries, persons born prior to a certain time are considered immune (e.g. in the United States of America those born before 1957 are considered immune to measles and rubella) (World Health Organization, 2013).

If an outbreak is still ongoing, the shipping company should provide advice for the vaccination of **susceptible embarking passengers** (European Centre for Disease Control and Prevention, 2014). Advice should be sought from the relevant competent authority.

Measles:

- Where consent has been given by the contact, vaccine should be given within 72 hours of exposure (WHO, 2013).
- HNIG may be recommended for susceptible contacts with a high risk for complications (contacts under one year of age, pregnant women, or immunocompromised persons) after local risk assessment and according to national guidelines. HNIG should be used as soon as possible after exposure and may be used within six days of exposure (Public Health England, 2013; WHO, 2013).

Varicella:

- Vaccination within three to five days of exposure to the virus will prevent most cases of varicella (WHO, 2013).
- If a crew member develops varicella while in port, or a susceptible crew member is exposed to a case, consider vaccinating all susceptible crew members to prevent an outbreak (WHO, 2013)
- Consider vaccinating passengers with contact to infected crew member(s) if requested (US Centers for Disease Control and Prevention, 2014).
- High-risk contacts for whom varicella vaccine is contraindicated (i.e. pregnant women or immunosuppressed persons) should be evaluated for administration of Varicella Zoster Immunoglobulin (VZIG). VZIG should be administered as soon as possible but may be effective if administered as late as 10 days after exposure (US Centers for Disease Control and Prevention, 2014). An alternative to the VZIG administration is oral Acyclovir (80 mg/kg/day) for seven days. It should be administered in the seven days following the exposure.
- Susceptible crew members who receive the first dose of varicella vaccine or VZIG may return to work immediately after vaccination. Susceptible crew members that do not receive varicella vaccine should have no passenger contact, minimise contact with other crew members, and be placed under health monitoring for signs and symptoms of varicella (Cramer et al., 2012).

Rubella:

- Immunization of contacts will not necessarily prevent infection or illness (American Public Health Association, 2008) and is therefore not recommended.

Additional information

Immunization efforts in an outbreak setting are aimed at reducing the extent and duration of the outbreak and helping with interrupting transmission by raising population immunity. When deciding on the need, target groups and the most appropriate strategies for outbreak response immunization, it is important to take into account the results of the assessment of risk of a large-

scale outbreak, financial and human resources, vaccine availability, regulatory framework and the attitude towards immunization and the disease among potential target groups and health care workers. The potential impact of the intervention will be greater if implemented early in the course of the outbreak and in settings with a substantial number of susceptibles, where the risk of widespread transmission is higher (World Health Organization, 2013).

For guidance on reviewing proof of vaccination, WHO guidance is available (WHO, 2016, unpublished). Under the International Health Regulations (2005), vaccination or other prophylaxis must be administered after the agreement of the traveller or his/her parents or guardians (article 23). Requirements related to vaccination and other prophylaxis can be found under IHR articles 23 (informed consent, safety standards), article 31 (health measures relating to entry of travellers), article 32 (treatment of travellers), article 36 (certificates of vaccination or other prophylaxis), article 40 (charges for health measures). Vaccines and prophylaxis for travellers administered under the IHR should be of suitable quality and approved by WHO (WHO, 2016, unpublished).

Vaccination or prophylaxis as a health measure to contain infectious diseases on board ships should be based on the International Labour Organization (ILO) Maritime Labour Convention (MLC) 2006 Regulation 4.1 where applicable.

5 Control measures by competent authorities and other stakeholders (agencies and owners)

Competent authorities are responsible for supervising or applying health measures on a ship when evidence for public health risk exists. For VPDs, this may include (WHO, 2016, unpublished):

- event verification;
- assistance with diagnosis (e.g. differential diagnosis, laboratory testing);
- assistance with ascertaining immediate arrangements via preliminary assessment and reporting;
- undertaking a risk assessment to determine a proportionate response, including contact tracing;
- assistance with outbreak investigation and response:
  - assistance with conducting case and contact tracing, particularly of disembarked passengers;
  - applying control measures including facilitating distribution or supply of treatment or vaccines;
- communication from port to national level (to the IHR and EWRS Focal Point), and between ports, as required;
- inspection of control measures, including as a minimum:
  - varicella: standard precautions, laundry, and eating utensils handling and ventilation of isolation cabin;
  - measles: isolation practices;
  - rubella: standard precautions.

Reference list

Acevedo F., Diskin A.L. and Dahl E. (2011). Varicella at sea: a two-year study on cruise ships. Int Marit Health, 62(4), 254-261.

American Public Health Association. (2008). Control of Communicable Diseases Manual (19th ed.). Washington DC: American Public Health Association.

Cramer E.H., Slaten D.D., Guerreiro A., Robbins D. and Ganzon A. (2012). Management and control of varicella on cruise ships: a collaborative approach to promoting public health. J Travel Med, 19(4), 226-232.

European Centre for Disease Control and Prevention. (2010). Risk Assessment Guidelines for Diseases Transmitted on Aircraft. Stockholm: ECDC.

European Centre for Disease Control and Prevention. (2014). Rapid risk assessment - Measles on a cruise ship, Mediterranean Sea, 5 March 2014. Stockholm, Sweden: ECDC.

Idnani N. (2010). Varicella among seafarers: a case study on testing and vaccination as a cost-effective method of prevention. Int Marit Health, 61(1), 32-35.

Lanini S., Capobianchi M.R., Puro V., Filia A., Del Manso M., Karki T., Nicoletti L. , Magurano F., Derrough T., Severi E., Bonfigli S., Lauria F., Ippolito G., Vellucci L., Pompa M.G. and Central task force for measles. (2014). Measles outbreak on a cruise ship in the western Mediterranean, February 2014, preliminary report. Euro Surveill, 19(10).

Mitruka K., Felsen C.B., Tomianovic D., Inman B., Street K., Yambor P. and Reef S.E. (2012). Measles, rubella, and varicella among the crew of a cruise ship sailing from Florida, United States, 2006. J Travel Med, 19(4), 233-237.

Nieto-Vera J., Masa-Calles J., Davila J., Molina-Font J., Jimenez M., Gallardo-Garcia V. and Mayoral-Cortes J.M. (2008). An outbreak of measles in Algeciras, Spain, 2008--a preliminary report. Euro Surveill, 13(20).

Public Health Agency Canada. (2005). Canada Communicable Disease Report (CCDR). In N. Beaudoin (Ed.), (Vol. 31, pp. 1-17). Ottawa, Ontario, Canada.

Public Health England. (2013). Immunisation against infectious disease (the green book). London: Public Health England.

Robert Koch Institute. (2011). Contact Tracing Risk Assessment Profile (CT-RAP) for public ground transport. Berlin, Germany: Robert Koch Institute.

Schlaich C. (2012). Targeting public health events on ships. J Travel Med, 19(4), 207-209.

Schlaich C., Riemer T., & Preisser A.M. (2014). 31.1 Vaccination/immunization in the maritime environment. In L. Canals, T. Carter, H. Hansen, A. M. Horneland, A. H. Schreiner, K. Seidenstücker, A. J. Ulven and R. Verbist (Eds.), Textbook of Maritime Medicine v2. Norway: The Norwegian Centre for Maritime Medicine.

Slaten D.D. and Mitruka K. (2013). Cruise Ship Travel In M. Centers for Disease Control and Prevention and Gary W. Brunette, MPH (Ed.), CDC Health Information for International Travel 2014, The Yellow Book. US-CDC.

US Centers for Disease Control and Prevention. (1998). Rubella among crew members of commercial cruise ships--Florida, 1997. MMWR Morb Mortal Wkly Rep, 46(52-53), 1247-1250.

US Centers for Disease Control and Prevention. (2014). Guidance for Cruise Ships on Varicella (Chickenpox) Management. Atlanta, Georgia.

World Health Organization. (2007). WHO International Medical Guide for Ships (3rd ed.). Geneva: World Health Organization.

World Health Organization. (2010). Regional Committee for Europe resolution EUR/RC60/R12 on renewed commitment to elimination of measles and rubella and prevention of congenital rubella syndrome by 2015 and sustained support for polio-free status in the WHO European Region. Copenhagen: WHO Regional Office for Europe.

World Health Organization. (2011). Handbook for Inspection of Ships and Issuance of Ship Sanitation Certificates. Geneva, Switzerland: WHO.

World Health Organization. (2013). Guidelines for measles and rubella outbreak investigation and response in the WHO European Region. Copenhagen: WHO Regional Office for Europe.

World Health Organization. (2014a). Vaccine-preventable diseases and vaccines International travel and health. Geneva: World Health Organization.

World Health Organization. (2014b). Varicella and herpes zoster vaccines: WHO position paper, June 2014. WHO Weekly Epidemiological Record, 89(25), 265-288.

Ziebold C., Hassenpflug B., Wegner-Brose H., Wegner K. and Schmitt H.J. (2003). An outbreak of rubella aboard a ship of the German Navy. Infection, 31(3), 136-142.

ANNEXES

Annex 1: Administrative issues

Inspection team — competency framework

Principles of inspections (according to ISO 19011:2002)

- **Ethical conduct:** *the foundation of professionalism.* Trust, integrity, confidentiality and discretion are essential elements.
- **Fair presentation:** *the obligation to report truthfully and accurately.* Inspection findings, conclusions and inspection reports reflect truthfully and accurately the inspection activities. Significant obstacles encountered during the inspection and unresolved diverging opinions between the inspection team and the ship representative are reported.
- **Due professional care:** *the application of diligence and judgement in inspections.* Inspectors exercise care in accordance with the importance of the task they perform and the confidence placed in them. Having the necessary competence is an important factor. Further principles relate to the inspection, which is by definition independent and systematic.
- **Independence:** *the basis for the impartiality of the inspection and objectivity of the inspection conclusions.* Inspectors are independent of the activity being inspected and are free from bias and conflict of interest. Inspectors maintain an objective state of mind throughout the inspection process to ensure that the inspection findings and conclusions will be based only on the evidence found during inspection.
- **Evidence-based approach:** *the rational method for reaching reliable and reproducible inspection conclusions in a systematic inspection process.* Inspection evidence is verifiable. It is based on samples of the information available since an inspection is conducted during a finite period of time and with finite resources. The appropriate use of sampling is closely related to the confidence that can be placed in the inspection conclusions.

Knowledge and skills

Inspectors participating at the routine inspections must be able to:

- apply inspection principles, procedures and techniques on ships;
- have excellent written and oral communication skills in English;
- plan and organise the work effectively;
- conduct the inspection within a set time schedule;
- prioritise and focus on matters of significance;
- collect information through effective observation, interviews and review of relevant records and documents;
- communicate effectively;
- prepare inspection reports;
- maintain the confidentiality and security of information;

- work well in an international and intercultural environment;
- be familiar with relevant EU policies and activities related to the training course.

Knowledge of additional official languages of the European Union would be advantageous.

Personal attributes

Inspectors conducting an inspection according to the manual are expected to be:

- observant (e.g. to pay attention to details),
- ethical (e.g. honest, fair, truthful),
- perceptive (e.g. able to understand situations),
- self-reliant (e.g. acts and functions independently while interacting effectively with others),
- diplomatic (e.g. discreet in dealing with people),
- open-minded (e.g. willing to consider alternative ideas),
- tenacious (e.g. focused on achieving objectives),
- decisive (e.g. reach timely conclusions based on logical reasoning),
- versatile (e.g. adjust readily to different situations).

Conflict of interest

Inspectors participating should declare any personal or other interest in any service subject to inspection, which could involve a conflict of interest or could compromise, or appear to compromise, their professional judgement, objectivity or independence.

Identification

Inspectors should carry identification, which clearly proves their identity during inspection.

Acceptance of gifts, hospitality or services

Inspectors should not accept personal gifts, hospitality or services.

Judgements

Inspectors should:

- ensure that judgements accurately and reliably reflect hygiene conditions observed and risks and/or hazards identified;
- demonstrate a clear link between judgements reached and the evidence on which they are based;
- be as open as possible about judgements made and the basis for judgements, restricting information only when the interests of others clearly demand it.

Confidentiality

Inspectors should respect the confidentiality of information with due regard to reporting obligations.

Maintaining professional standards

Inspectors should inform the director of the competent authority and the EU SHIPSAN ACT, where the conduct of a colleague may be unsafe, illegal, unethical or in conflict with the provisions of this code of conduct.

Employing body

Inspectors should act in accordance with all codes of conduct and policies, and procedures of the competent authority.

Scheduling inspections

A common inspection schedule will be prepared by the EUMSs annually, in order to avoid duplication of inspections. EUMS should cooperate for the preparation of the annual inspection schedule, which will remain confidential. Shipping companies will receive a 48 hours' notice prior to the inspection.

Revision and amendments

The manual will be revised at regular intervals as the evidence base increases and/or to take into account any new relevant guidance and legislation. The review should be conducted every five years, and amended as proposed by participating competent authorities (e.g. port health), the cruise and ferry industry and approved by the EU SHIPSAN partnership.

Publication of inspection results

Publication of inspection results will be in accordance with the Regulations (EC) No 178/2002, 852/2004 and 882/2004. Inspection results will be recorded in a central database. For the protection of data confidentiality, please refer to paragraph iv (page 2).

Annex 2: Hygiene inspection guidelines

Before the inspection

Inspectors should carry out their work within the standards given in the European manual for hygiene standards and communicable disease surveillance on passenger ships.

Inspectors should:

- carry out their duties in a courteous and unbiased manner, with the minimum level of disruption necessary to the service and with respect to the dignity, privacy and rights of service users;
- take into account the age, understanding, circumstances and abilities of service users;
- be as available as possible to any responsible crew, who might wish to speak to them.

Inspectors should agree who is leading the inspection, what will be inspected (locations and systems) and by whom. The ship registry will be taken into consideration when planning the inspection. A short written document including the results of previous inspection and ship characteristics should be prepared before the inspection. Non-compliances cited during the previous inspection should be checked by the inspectors. The boarding time and time leaving the ship, should be considered to allow good time management. Adequate time needs to be allocated for inspection, debriefing statement writing and presentation and discussion of inspection.

In the password protected area of the EU SHIPSAN ACT Information System (https://sis.shipsan.eu) inspectors can download the inspection outlines, the manual and record the inspections findings. At the end of this Annex the Passenger Ship Registry Form (R1) is presented. This form should be completed during the inspection and the results should be entered in the SHIPSAN ACT Information System.

Inspectors should have with them the following documents and technical equipment.

1) Identification card
2) The European manual for hygiene standards and communicable disease surveillance on passenger ships
3) A printed version of the previous inspection report
4) Debriefing statement
5) Hard copy or electronic version of a blank inspection report
6) Hard copy of the Passenger Ship Registry Form (R1)
7) Seals and stamps
8) Pens, clipboard and notepad
9) Flashlight (ideally explosion-proof)
10) Calibrated food probe thermometer
11) Maximum registering water-resistant thermometer for dishwashers
12) Laptop and a memory stick (if available)
13) In case of water sampling, a kit containing:
– on-site water testing kit: pH-meter and chlorine testing kit,
– gas burner or ethanol-spray (70 %),
– disposable paper towels,
– sterile glass bottles containing sodium thiosulphate,
– swabs.
14) A digital camera (permission should be asked by designated ship

officers for taking pictures)
15) Freshly laundered or disposable over clothing and disposable gloves
16) Ear protection
17) Hair covering
18) Safety shoes with non-slip and anti-spark soles
19) Light intensity sensor device
20) Disinfection tissues (suitable for food contact surfaces) to disinfect the food probe thermometer
21) Printer to go with the laptop (if available)
22) Mobile telephone

During the inspection

Once on board, inspectors should inform the designated crew that a hygiene inspection will be conducted. An inspection should start with an introductory discussion with the designated crew on matters relating to hygiene systems and procedures applied on board.

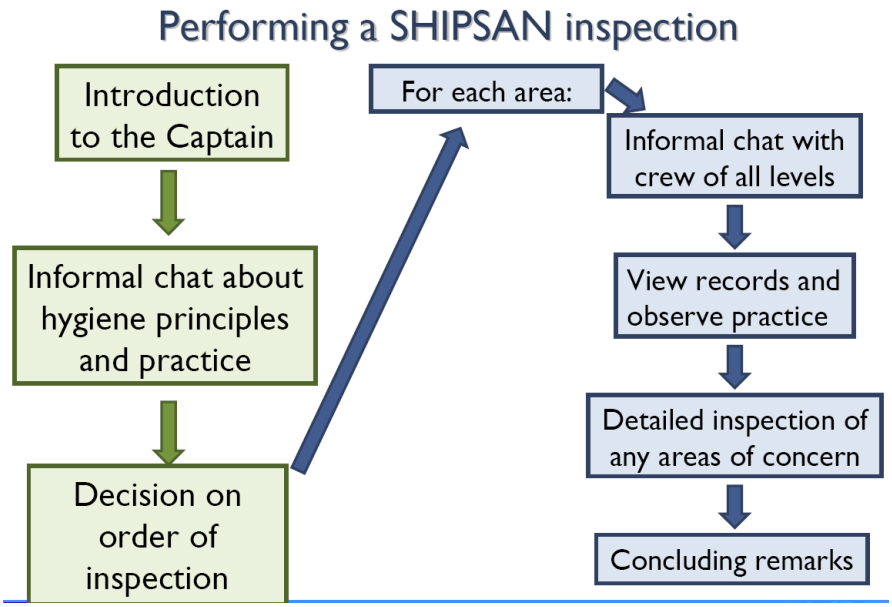
The lead inspector will introduce the team to the Captain and the managers and will compose the final inspection report after incorporating all other inspectors' findings. He/she will be the contact point for inspection.

The inspectors should be flexible to avoid or minimize interruptions and operational conflicts during the inspection. Inspectors should ask when activities such as food preparation, receiving and service, water loading, waste offloading, are going to take place and ensure that inspection is scheduled so as to inspect these activities.

Inspectors must wear appropriate clothing and PPE while carrying out an inspection on board, such as ear noise protection, jacket and hair covering, where necessary.

The inspector(s) must inspect all areas (medical facilities, cabins, galleys, pantry and food stores, swimming pools, spas, recreation facilities, potable water supplies, waste, toilets and facilities near the engine room, sewage treatment plant and ballast water tanks, etc.), systems and services included in the manual and verify the correct implementation of these systems and services and the hygiene conditions of areas inspected. There may be a need to carry out a more detailed visual and physical inspection of the ship. The inspector should typically look for risks arising from the activities on board the ship. Inspectors should explain the deficiencies identified and advise the crew on better practice as far as possible. Potential repeated deficiencies will be checked.

Inspection outlines will be used during the inspection. Inspectors should take contemporaneous notes on each deficiency identified as well as good practices observed.



Certificates and other logs and documents that are already carried on board and required by IHR and IMO, including the records of the prerequisite programmes according to HACCP may be reviewed, based on the findings of the inspection.

Manual measurements to be conducted include free chlorine and pH in potable water and RWFs, temperatures of food, potable water, pools water, in food areas, water temperatures of dishwashing machines, etc. Calibrated thermometers and other devices should be used.

Environmental samples including food or water should be taken, if necessary. This will be decided by the inspectors.

If there is evidence of a serious threat to public health or major deficiency concerning the safety of crew and passengers this will be discussed with the master of the ship immediately. In this situation, general rules of notification as given by the International Health Regulations do apply.

Inspectors should plan the inspection in such a way so as to have enough time to write the debriefing statement and to hold a closing meeting with the captain and other designated crew before disembarkation. Once the inspection is completed, the captain or other designated crew will be informed of the inspection findings, which will include deficiencies and good practices observed. Discussion could include consideration of previous inspection reports, consideration of relevant current documentation and identification of all food and water related issues identified on the ship. A debriefing statement will be prepared by the competent authority before leaving the ship and be given to the captain while the inspectors are still on board. Deficiencies reported should be prioritised according to the public health risk, as far as it is possible.

A debriefing statement is shown below:

Debriefing Statement of the routine inspection on board of ……..

During the closing meeting of the routine inspection on board of …….. on the ……., ……. at the port of ……, ……. the crew members and the Captain of the ship have been verbally informed by the inspectors about the detailed findings of the inspection. The total number of the inspection findings is …….. and were divided in the following areas:

AREA	No of inspection findings	Brief description of inspection findings (e.g. ship areas)
Medical Facilities		
Communicable disease surveillance		
Food safety		
Potable water safety		
Recreational Water Safety		
Pest management		
Housekeeping and facilities		
Hazardous chemical agents		
Waste management		
Ballast water management		

The final inspection report will be sent to the ship maximum two weeks after the inspection.

For the Port Health Authority

Name:

Signature:

For the Ship

Name:

Signature:

After the inspection

Inspectors should record findings in the inspection report.

After the inspection is completed, inspection results should be entered into the SHIPSAN ACT database. The following data will be recorded in the database regarding inspection results:

- information on the type of inspection (routine, follow-up, especially requested),
- deficiencies,
- recommendations for each deficiency,
- date of inspection,
- the inspection report (as shown below),
- inspectors and employing authorities (authorisation),
- name of the competent (port health) authority if different from the above,
- name of the port (coded).

The inspection results will be shared among the partners through the database, in the secured password protected area.

An inspection report will be used as shown below:

Final inspection report*

Ship Name	Inspection Date	Port of call	Time Inspection Started	Results Presented to
Company	No. Pax.	No. Crew	Time Inspection Completed	Inspectors
				Inspector in Training

Areas inspected (please tick the checkboxes under the column "Inspected" for the areas inspected. If the area does not exist please tick the checkboxes under the column "N/A" (Not Applicable). In the case the area exists but was not inspected please leave both checkboxes blank)

N/A	Inspected		N/A	Inspected		N/A	Inspected	
☐	☐	Medical facilities	☐	☐	Accommodation/public spaces	☐	☐	Gym
☐	☐	Galley	☐	☐	Toilets and hand washing facilities	☐	☐	Engine room
☐	☐	Pantry	☐	☐	Bulk chemical storage room	☐	☐	Sewage treatment/discharge
☐	☐	Service areas	☐	☐	Garbage room	☐	☐	Ballast water
☐	☐	Bars	☐	☐	Medical waste storage	☐	☐	Other:
☐	☐	Food stores	☐	☐	Garage	(please specify).....		
☐	☐	Filling line, chlorinator, hoses	☐	☐	Nursery and play areas			
☐	☐	Distribution chlorinator	☐	☐	Hairdressers			
☐	☐	Potable water tanks	☐	☐	Beauty salons			
☐	☐	Heaters	☐	☐	Pet / animal housing areas			
☐	☐	Potable water distribution system	☐	☐	Laundry			
☐	☐	Swimming pools	☐	☐	Ventilation			
☐	☐	Hot tubs	☐	☐	Chemical mixing room			

***Introductory paragraph**: (describe briefly the satisfactory findings of the inspection and give an overall characterisation of the inspection result)*

……

……

……

A. Non-compliance with requirements of the EU legislation

(The following items should describe any non-compliance with legal requirements [LEG] of the "European Manual for Hygiene Standards and Communicable Disease Surveillance on Passenger Ships". If the inspection results do not include any non-compliance with legal requirements this should be noted "NO deficiency with legal requirements of the European Manual cited during the inspection")

Item:	
Location:	
Non-compliance with requirement of European Manual	

Recommendation/Corrective action
Timeframe to complete the corrective action

B. Non-followed recommended standards of the European Manual

(The following items should describe any non-followed recommended standards [ST] of the European Manual)

Item:	
Location:	
Non-followed recommended standard of the European Manual:	
Recommendation/Corrective action	
Timeframe to complete the corrective action	

C. Notations

(The following items should describe any minor not significant observations or slight non-compliances with requirements of the EU legislation or non-followed recommended standards of the European Manual)

Item:	
Location:	
Non-compliance with requirement/non-followed recommended standard of the European Manual	
Recommendation/Corrective action	
Timeframe to complete the corrective action	

Signature:	**Stamp:**

**This report describes the findings of the inspection which was based on the European Manual for Hygiene Standards and Communicable Diseases Surveillance on Passenger Ships (2016).*

Certificates, logs, records or other documentation that can be reviewed during inspection depending on the inspection findings

- SSCEC/SSCC under the IHR 2005
- Other certificates
- Medical log
- Food suppliers and contact details (purchase/orders, delivery/receipt)
- HACCP plan
- Training certificates
- Internal/external audit
- Menus of passengers and crew
- Recipe specifications
- Food temperature records (e.g. delivery, storage, cook, blast chilling, service)
- Free chlorine records for potable water
- Free chlorine records for swimming pools water
- Pest management records
- Microbiological water samples results records
- Cleaning schedules/plans (cleaning and sanitation plans for all passengers and crew areas including worthy spaces)
- Disinfection records for potable water system
- Disinfection records for pools
- Equipment maintenance
- Infection control plan
- Potable water cross connection control plan
- Calibration records
- Previous inspection reports

Passenger Ship Registry Form

Id *(auto-generated)*:			
IMO:		**Registration:**	
Name: *			
Previous names of the ship:			
Port Of Registry: *			
Ship Type: *	Passenger (for SHIPSAN Inspections)	**Gross Tonnage:**	
Category:	*(Ship / Inland Navigation Vessel)*		
Home Port: *			
Keel Date: *		**Time spent in European waters per year (months):**	
Telephone:		**Telefax:**	
Telex:		**Email:**	
Receive Emails:	*(Yes / No)*		
Notification Emails:		**Website:**	
Receive SMS:	*(Yes / No)*		
Notification Mobile for SMS receiving:			
Build Year:			
INMSARSAT:		**MMSI:**	
Flag:			
Owner:		**Operating Line:**	
Remarks:			

More Details (Passenger Ships Only)

Nb. of Passengers:		**Nb. of Crew:**	
Nb. of Decks:		**Nb. of Galleys:**	
Nb. of Bars:		**Nb. of Pools:**	
Decks:			
Nb. of Whirlpools:		**Nb. of Crew Cabins:**	
Nb. of Passenger Cabins:			
Nb. of Restaurants/Food outlets/including crew messes:		**Nb. of Food storage rooms - Cold rooms:**	
Nb. of Food storage rooms - Refrigeration compartments:		**Nb. of Food storage rooms - Cargo holds:**	

* Mandatory fields

Nb. of Food storage rooms - Ballast tanks:		**Total number of Recreational water facilities:**	
Sea Water Swimming Pool:	*(Yes / No)*	**Nb Sea Water Swimming Pool:**	
Fresh Water Swimming Pool:	*(Yes / No)*	**Nb Fresh Water Swimming Pool:**	
Spa Pool:	*(Yes / No)*	**Nb Spa Pool:**	
Water Park:	*(Yes / No)*	**Nb Water Park:**	
Nb Potable Water Tanks:			
Water Production On Board:	*(Yes / No)*	**Volume:**	
Water Production Type:	*(Reverse Osmosis / Evaporate / Other)*	**If Other Please Specify:**	
Medical Facilities:	*(Yes / No)*	**Nb Medical Facilities:**	
Dental Services:	*(Yes / No)*	**Nb Dental Services:**	
Doctor On Board:	*(Yes / No)*	**Nb Doctor On Board:**	
Nurse On Board:	*(Yes / No)*	**Nb Nurse On Board:**	
Haemodialysis:	*(Yes / No)*	**Nb Haemodialysis:**	
Hospital Beds:	*(Yes / No)*	**Nb Hospital Beds:**	
Intensive Care Unit:	*(Yes / No)*	**Nb Intensive Care Unit:**	
Nursery (child centre):	*(Yes / No)*	**Nb of Nursery (child centre):**	
Laundries:	*(Yes / No)*	**Nb Laundries:**	
Gyms:	*(Yes / No)*	**Nb Gyms:**	
Hairdressers:	*(Yes / No)*	**Nb Hairdressers:**	
Beauty Salons:	*(Yes / No)*	**Nb Beauty Salons:**	
Decorative Fountains:	*(Yes / No)*	**Nb Decorative Fountains:**	
Mortuary:	*(Yes / No)*	**Nb Mortuary:**	
Kennels:	*(Yes / No)*	**Nb Kennels:**	

Annex 3: Record keeping and training for crew included in the manual

Chapter	Subject	Details	Duration on board/ashore
2. Communicable disease surveillance	GI questionnaire		12 months
	Medical log		
	Ship communication form		
	Communicable Diseases Surveillance Routine Recording Form		
	Logs for anti-diarrheal medication		
	Training records	Date, name, subject	
	Vaccination records		
	GI or ILI recording form		
3. Food safety	HACCP records		12 months
	Training records		
	Medical permission for food handlers		
	Suppliers list		
	Deliveries records	Delivery details (date and time of delivery, officer in charge) and item details (expiry date and lot numbers or other details)	
	Calibration records		
	Temperature records	Equipment or process/type of food, location, date, time, temperature, signature	
	Records of cleaning	Area or item cleaned, type of materials and chemicals used, method, function and station of the crew member, signature of crew member, signature of supervisor	
	Records of suppliers of materials and articles		
4. Potable water safety	Parameters monitored on the ship	Free halogen, pH, temperatures, *E. coli*, etc.	12 months
	Training programmes	Date, subject of training, name of trainee, name of trainer	
	Potable water hoses disinfection	Date, disinfectant used, method used	
	Water quality reports from suppliers		
	Inspection cleaning and disinfection of potable water tanks	Date, responsible person, inspection findings, type of work	
	Piping system inspection log	Date, responsible person, inspection findings	
	Backflow prevention devices inspection and testing log	Exact position of the device, date, results of test or inspection	
	Monitoring of stagnant water		
	Calibration of equipment	Date and time, value of the analyser, value measured with test kit, actions taken	
5. Recreational water safety	Water quality parameters	Date, time, test value of parameters	12 months (24 months for records related to hot tubs/spas)
	Logs and charts		
	Backwash	Date, pressure indication before and after backwash time	
	Filter inspection	Date, time, status	
	Filter media change	Date, time	
	Shock treatment	Date, time	
	Draining of pools	Date, time	

	Maintenance work	Date, time, process, type of equipment	
	Repair work	Date, time, description of problem and repair job	
	Calibration of analysers	Date, time, results of manual and electronic measurements	
	Thorough cleaning	Date	
	Accidental faecal or vomit release	Date, time of closure, remedial actions taken, time of opening	
	Water quality parameters out of limits	Date, time, parameter values, remedial actions taken	
	Operation of flow-through mode	Date, time, operational mode	
	Training records	Date, time, name, position, trainer, training hours	
	Injuries/deaths	Date, time, description of event and its reasons	
6. Pest management	Active and passive surveillance plan	Locations inspected, dates, time and names of inspectors, the number, the species and the life stage of pests	
	Records for active and passive surveillance inspection results and corrective actions	Records for active surveillance, the inspection results, the corrective actions taken, the effectiveness of the corrective actions	12 months
	Training records	Date, time, name, position, trainer, training hours	
	List of the pesticides carried on board		
7. Housekeeping and facilities	Cleaning and disinfection logs	Date, method and signature	12 months
8. Hazardous chemical agents	Authorisation for each of the Biocidal Products used on board		
	Training records	Names, date of training, course title	12 months
9. Waste management	Records of hazardous waste disposal to approved contractors		
	Sewage discharge record book/log	Time, location, rate	
	Garbage Record Book	When garbage is discharged: (a) into the sea, (b) port reception facilities or other ships, (c) incinerated, (d) accidental or other exceptional discharge	Two years after the last entry is made on the record
	Oil record book		
	Training records	Date, name, subject of training taken	
	Waste Delivery Receipt (MEPC.1/Circ.645)	**(VOLUNTARY)** The designated representative of the reception facility provider should provide the waste delivery receipt form to the master of a ship that has just delivered waste.	This form should be retained on board the ship along with the appropriate Oil Record Book, Cargo Record Book or Garbage RB for two years
	Waste Notification Receipt	Master of the ship should send in advance to the port reception facility specifying date type and quantity	
10. Ballast water management	Ballast Water Record Book	Date and time, volume of water transferred, whether it was according to the plan, signature	Two years after the last entry
	Ballast Water Reporting Form(s)	Date of the event, geographical location, ship's tank and cargo holds, temperature, salinity, amount of water loaded or discharged	
	Monitoring of microbiological parameters		

Training of crew

Food safety	HACCP Personal hygiene and hygiene practices Crew health Food pathogenic microorganisms Cross-contamination Cleaning, disinfection and maintenance of food preparation areas, utensils and equipment Time and temperature control of foods during purchasing, storage, handling, preparation and service
Potable water	WSP: - monitoring procedures - control measures - operational limits - corrective actions
Recreational water safety	Management Plans for all RWFs: - Treatment Plan - Monitoring Plan - Cleaning Plan - Maintenance Plan - Emergency Plan
Pest management	IPM Plan Application methods of pesticides Knowledge of used pesticides
Housekeeping	Body fluid spillage policy Uniform policy Cleaning and disinfection of all accommodation and public spaces Nursery and play areas (pathogenic microorganisms, cross-contamination, personal health and hygiene, hand washing and communicable disease symptoms) Hairdresser, beauty salons and gym (pathogenic microorganisms, cross-contamination, personal health and hygiene, hand washing and communicable disease symptoms) Pet and animal housing areas (care of pets, infectious symptoms and cleaning and disinfection of kennels)
Hazardous chemical agents	Health hazards Safe use of hazardous chemical agents Handling of chemical agents
Waste management/Ballast water management	Health risks involved in waste accumulation and spoilage Use of PPE Handling of medical wastes Ballast water management plan

Annex 4: Corrective action statement

Corrective Action Statement*

Ship Name	IMO number	Port and date conducted the inspection

The following actions have been taken to correct each of the non-compliance noted during the inspection

A. Non-compliance with legal requirements of the EU legislation

(The following items should describe any non-compliance with legal requirements [LEG] of the "European Manual for Hygiene Standards and Communicable Disease Surveillance on Passenger Ships". If the inspection results do not include any non-compliance with legal requirements this should be noted "NO deficiency with legal requirements of the European Manual cited during the inspection")

Number of Inspection Report item:	
Non-compliance with requirement of European Manual	
Corrective action taken	

B. Non-followed recommended standards of the European Manual

(The following items should describe any non-followed recommended standards [ST] of the European Manual)

Number of Inspection Report item:	
Non-followed recommended standard of the European Manual	
Corrective action taken	

C. Notations

(The following items should describe any minor not significant observations or slight non-compliances with requirements of the EU legislation or non-followed recommended standards of the European Manual)

Number of Inspection Report item:	
Observation:	
Corrective action taken	

Signature:

***To be sent to INSPECTION@SHIPSAN.EU or recorded to the Shipsan Act Information System**

Annex 5: Recommended medical facilities, medication and medical staff competency for passenger ships making international voyages

TYPE OF SHIP	Duration of voyage					
	13 to 36 hours		36 to 72 hours		More than 72 hours	
	Service	Personnel	Service	Personnel	Service	Personnel
Passenger ferry group 1 (PFG1) ≤ 500 crew and pax	**BMF**** (Basic Medical Facility)		**CMF*** (Complete Medical Facility)	**1 RN***	**CMF****	**1 DR****
	BPH** (Basic Pharmacy)		**CPH*** (Complete Pharmacy)		**CPH****	**1 RN****
Passenger ferry group 2 (PFG2) = 500 to 1500 crew and pax	**BMF****	**1 RN***	**CMF***	**1 RN****	**CMF****	**1 DR****
	BPH*		**CPH***		**CPH****	**2 RN****
Passenger ferry group 3 (PFG3) = 1500 to 2500 crew and pax	**CMF****	**1 RN***	**CMF****	**1 DR****	**CMF****	**1 DR****
	CPH**		**CPH****		**CPH****	**3 RN****
Passenger ferry group 4 (PFG4) = 2500 to 4000 crew and pax	**CMF****	**1 RN****	**CMF****	**1 DR****	**CMF****	**2 DR****
	CPH**		**CPH****	**1 RN****	**CPH****	**3 RN****
Passenger ferry group 5 (PFG5) = more than 4000 crew and pax	**CMF****	**1 DR****	**CMF****	**1 DR****	**CMF****	**1 DR**** Per 1500 c/p
	CPH**	**1 RN****	**CPH****	**1 RN****	**CPH****	**1 RN**** Per 1000 c/p
Cruise ship group 1 (CSG1) ≤ 500 crew and pax	**BMF****		**CMF***	**1 RN***	**CMF****	**1 DR****
	BPH**		**CPH***		**CPH****	**1 RN****
Cruise ship group 2 (CSG2) = 500 to 1500 crew and pax	**BMF****	**1 RN***	**CMF***	**1 RN****	**CMF****	**1 DR****
	BPH**		**CPH***		**CPH****	**2 RN****
Cruise ship group 3 (CSG3) = 1500 to 2500 crew and pax	**CMF****	**1 RN***	**CMF****	**1 DR****	**CMF****	**1 DR****
	CPH**		**CPH****		**CPH****	**3 RN****
Cruise ship group 4 (CSG4) = 2500 to 4000 crew and pax	**CMF****	**1 RN****	**CMF****	**1 DR****	**CMF****	**2 DR****
	CPH**		**CPH****	**1 RN****	**CPH****	**3 RN****
Cruise ship group 5 (CSG5) = more than 4000 crew and pax	**CMF****	**1 DR****	**CMF****	**1 DR****	**CMF****	**1 DR**** Per 1500 c/p
	CPH**	**1 RN****	**CPH****	**1 RN****	**CPH****	**1 RN**** Per 1000 c/p
Doctor (DR) **Recommended*** **Nurse (RN)** **Minimum standard****						

Medical staff competency

Medical staff (physicians and registered nurses) should have competency and the following qualifications:

- Current physician or registered nurse license;
- Fluency in the official language of the cruise/ferry line, the ship and that of most passengers;
- Familiarity with hazardous chemical agents used on board and management of any medical condition linked to their use/manipulation;
- And:
  - Three years of post-graduate/post-registration clinical practice in general and emergency medicine;

  or

  - Board certification in emergency medicine or general medicine/family practice or internal medicine and competent skill level in advanced life support and cardiac care and competent skill level in minor surgery (e.g. suturing, etc.).

Medication

Medical facilities should have emergency medications and supplies for management of common medical emergencies such as:

- gastrointestinal system medications,
- cardiovascular system medications,
- respiratory system medications,
- infectious disease medications,
- eye medications,
- ear, nose and oropharynx (throat) medications,
- skin disease medications.

Medical Plan

Passenger ship medical facilities should include a contingency Medical Plan defining:

- one or more locations on the ship that could be used as a medical facility and should:
  - be in a different fire zone;
  - be easily accessible;
  - have lighting and power supply on the emergency system;
- crew members assigned to assist the medical team as appropriate to the level of the contingency.

Annex 6: Surveillance of communicable diseases on board ships

Collection of surveillance data by competent authorities from passenger ships sailing in European waters can improve the evidence base for hygiene standards enforced to control and prevent communicable diseases and outbreaks on passenger ships. This can aid shipping companies in strategic planning for the prevention of communicable diseases on their ships. It can also be of benefit to port health authorities when assessing the risks from communicable diseases and public health events for each ship and in evaluating preventive actions. Finally, the surveillance data can help to assess the application of EU and international systems on early detection and response (EWRS, IHR) and to assist in contact tracing.

Surveillance based on collection of data at the ship infirmary, using standard clinical syndrome definitions, is the most appropriate method to identify outbreaks on board ships, since it is difficult to obtain reliable and timely laboratory results to confirm a diagnosis.

Annex 7: Gastrointestinal illness log (recommended log)

The log included below may be used for recording and reporting cases and outbreaks of acute gastroenteritis. This may be useful for passenger shipping companies or ships which have no designated recording and reporting formats.

Ship name:		Voyage number:		Dates	From:	__/__/__	To:	__/__/__	Page:		of	
Total number of passengers on board:		Total number of ill passengers:		Total number of crew on board:					Total number of ill crew:			

Visit date (mm/dd/yy)	Name (Last, First)	Unique Number Identifier*	Age	Gender (M/F)	Pax/Crew	Cabin No.	Date on ship (mm/dd/yy)	Date off ship (mm/dd/yy)	Pax Meal Seat /Crew Pos.	Illness Onset		Diarrhoea		Vomiting	Fever			Abd. cramps	Headache	Myalgia	Stool specimens		Antidiarrhoeal medications (Y/N)	case fulfils definition of GI for surveillance purposes (Y/N)	Underlying illness (specify)	Lab results for…	Positive lab result: (Y/N/NT)
										Date	Time	Y/N	Blood Y/N	Y/N	Y/N	Fever degrees	°C/°F	Y/N	Y/N	Y/N	Requested	Received					
																					Y/N	Y/N					

*This number rather than the name may be reported to competent authority to protect patient confidentiality.

Annex 8: Influenza-like illness log (recommended log)

This log is designed for possible use by passenger shipping companies and ships with no designated recording and reporting systems for ILI.

Ship name:		Voyage number:		Dates	From:	__/__/__	To:	__/__/__	Page:		of	
Total number of passengers on board:		Total number of ill passengers:			Total number of crew on board:				Total number of ill crew:			

Visit date (mm/dd/yy)	Name (Last, First)	Unique Number Identifier**	Date on ship (mm/dd/yy)	Date off ship (mm/dd/yy)	Age	Gender (M/F)	Pax/Crew	Cabin No.	CREW: country where hired	Pax Meal Seat /Crew Pos.	Illness Onset		Cough	Malaise	Fever			Shore throat	Shortness of breath	Headache	Coryza	Myalgia	Rapid Flu Test	CXR	Flu Vaccine During Past Year	Flu Vaccine Date	Medications (Y/N)	case fulfils definition of ILI for surveillance purposes (Y/N)	Reportable case Specify (Case Under Investigation /Probable /Confirmed)	Underlying illness	Complications
											Date	Time	Y/N	Y/N	Y/N	Fever degrees	°C/F	Y/N	Y/N	Y/N	Y/N	Y/N	ND/P/N*	ND/P/N*	Y/N/U	(mm/dd/yy)					

*ND = test Not Done, P = Positive test result or +CXR infiltrates, N = Negative test result or +CXR infiltrates, U = Unknown
**This number rather than the name may be reported to competent authority to protect patient confidentiality

Annex 9: Example of gastrointestinal illness questionnaire

Ship name:			Voyage No.:	Date:
Last name:			First name:	
Date of Birth:	Date joined the cruise:		Age (in years):	Sex M/F
Cabin number:			Total number of people in cabin:	
Dining seating:			Dining table number:	
Symptoms started date:			Time: (hh:mm)	AM/PM
Do you know other people ill with the same symptoms?				Yes/No
If yes, please list their names:				
Did you stay overnight or longer in a boarding city before you joined the ship?				Yes/No
If yes, where?	City:	State:	Country:	
Was the overnight stay in a hotel/motel/commercial residence?				Yes/No
If yes, what was the name and address of the hotel, motel/commercial residence: Name: Address: Town: Country:				
How did you travel to the city where you boarded the ship for this cruise? Select all that apply.				
[ ] Airplane	Airlines:		Flight No.:	
[ ] Automobile				
[ ] Bus/Motorcoach				
[ ] Train				
[ ] Other	Please specify:			
Are you a member of a tour group?				Yes/No
Prior to boarding the ship, did you participate in a pre-embarkation tour/package?				Yes/No
If yes, which tour(s)/package(s) did you participate in? (list all)				
Prior you got your illness, did you go ashore at any of the ports of call?				Yes/No
If yes, please list the ports of call where you went ashore				
Did you participate in any shore excursions at any port of call?				Yes/No
If yes, which shore excursions did you participate in? (list all)				
Did you eat anything while you were ashore at any port of call?				Yes/No
If Yes, please give details of the place and list all foods consumed ashore:				
Did you drink anything (including drinks with ice) while ashore at any port of call?				Yes/No
If Yes, please give details of the place and list all beverages consumed ashore:				
What did you think is the cause of your illness?				

Last Name:		First Name:					
Meals and activities on board vessel prior to illness Please list the specific vessel locations of the meals you consumed and the vessel activities you participated in before you became ill							
Day of illness onset Give Date: .../.../...		**Day before illness onset**		**Two days before illness onset**		**Three days before illness onset**	
Breakfast Place: ..... Time: ..... Items eaten/ drunk		**Breakfast** Place: ..... Time: ..... Items eaten/ drunk		**Breakfast** Place: ..... Time: ..... Items eaten/ drunk		**Breakfast** Place: ..... Time: ..... Items eaten/ drunk	
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....
Lunch Place: ..... Time: ..... Items eaten/ drunk		**Lunch** Place: ..... Time: ..... Items eaten/ drunk		**Lunch** Place: ..... Time: ..... Items eaten/ drunk		**Lunch** Place: ..... Time: ..... Items eaten/ drunk	
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....
Dinner Place: ..... Time: ..... Items eaten/ drunk		**Dinner** Place: ..... Time: ..... Items eaten/ drunk		**Dinner** Place: ..... Time: ..... Items eaten/ drunk		**Dinner** Place: ..... Time: ..... Items eaten/ drunk	
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....
Snack Place: ..... Time: ..... Items eaten/ drunk		**Snack** Place: ..... Time: ..... Items eaten/ drunk		**Snack** Place: ..... Time: ..... Items eaten/ drunk		**Snack** Place: ..... Time: ..... Items eaten/ drunk	
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....
Activities		**Activities**		**Activities**		**Activities**	
AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....

Annex 10: Model Maritime Declaration of Health (MDH)

MODEL OF MARITIME DECLARATION OF HEALTH

To be completed and submitted to the competent authorities by the masters of ships arriving from foreign ports.
Submitted at the port of …… Date ……
Name of ship or inland navigation vessel …… Registration/IMO No …… arriving from …… sailing to ……
(Nationality)(Flag of vessel) …… Master's name ……
Gross tonnage (ship) ……
Tonnage (inland navigation vessel) ……
Valid Sanitation Control Exemption/Control Certificate carried on board? Yes …… No …… Issued at …… date ……
Re-inspection required? Yes …… No ……
Has ship/vessel visited an affected area identified by the World Health Organization? Yes …… No ……
Port and date of visit ……
List ports of call from commencement of voyage with dates of departure, or within past thirty days, whichever is shorter:
……

Upon request of the competent authority at the port of arrival, list crew members, passengers or other persons who have joined ship/vessel since international voyage began or within past thirty days, whichever is shorter, including all ports/countries visited in this period (add additional names to the attached schedule):
(1) Name ……joined from: (1) ……(2) ……(3) ……
(2) Name ……joined from: (1) ……(2) ……(3) ……
(3) Name ……joined from: (1) ……(2) ……(3) ……

Number of crew members on board ……
Number of passengers on board ……

Health questions

(1) Has any person died on board during the voyage otherwise than as a result of accident? Yes …… No ……
If yes, state particulars in attached schedule. Total no. of deaths ……

(2) Is there on board or has there been during the international voyage any case of disease which you suspect to be of an infectious nature? Yes …… No…… If yes, state particulars in attached schedule.

(3) Has the total number of ill passengers during the voyage been greater than normal/expected? Yes …… No ……
How many ill persons? ……

(4) Is there any ill person on board now? Yes …… No …… If yes, state particulars in attached schedule.

(5) Was a medical practitioner consulted? Yes …… No …… If yes, state particulars of medical treatment or advice provided in attached schedule.

(6) Are you aware of any condition on board which may lead to infection or spread of disease? Yes …… No ……
If yes, state particulars in attached schedule.

(7) Has any sanitary measure (e.g. quarantine, isolation, disinfection or decontamination) been applied on board? Yes …… No ……
If yes, specify type, place and date ……

(8) Have any stowaways been found on board? Yes …… No …… If yes, where did they join the ship (if known)? ……

(9) Is there a sick animal or pet on board? Yes …… No ……

Note: In the absence of a surgeon, the master should regard the following symptoms as grounds for suspecting the existence of a disease of an infectious nature:

(a) fever, persisting for several days or accompanied by (i) prostration; (ii) decreased consciousness; (iii) glandular swelling; (iv) jaundice; (v) cough or shortness of breath; (vi) unusual bleeding; or (vii) paralysis.

(b) with or without fever: (i) any acute skin rash or eruption; (ii) severe vomiting (other than sea sickness); (iii) severe diarrhoea; or (iv) recurrent convulsions.

I hereby declare that the particulars and answers to the questions given in this Declaration of Health (including the schedule) are true and correct to the best of my knowledge and belief.

Signed……
Master
Countersigned ……
Ship's Surgeon (if carried)
Date ……

ATTACHMENT TO MODEL OF MARITIME DECLARATION OF HEALTH

Name	Class or rating	Age	Sex	Nationality	Port, date joined ship/vessel	Nature of illness	Date of onset of symptoms	Reported to a port medical officer?	Disposal of case[1]	Drugs, medicines or other treatment given to patient	Comments

[1] State: (1) whether the person recovered, is still ill or died; and (2) whether the person is still on board, was evacuated (including the name of the port or airport), or was buried at sea.

Annex 11: Ship communication form

S2 SHIP COMMUNICATION FORM

This form should be completed by the designated crew of the ship. It should be used for any events which includes outbreaks, clusters and any single case listed in Annex A, or a case with fever and one or more symptoms listed in Annex B (this does not include single cases of mild ILI and GI) or a case of acute skin rash thought to be of infectious nature (with or without fever). This form doesn't replace the MDH but can be used to record and report further information.

General Information

ID *(autogenerated)*:

Type (*Case/Outbreak*)**:**

Status (*Initial/Update/Final*)**:**

Date Time:

Ship:

Voyage identification code:

Cruise/travel/voyage length (*days*):

Embarkation Port (port of call from commencement of voyage):

Embarkation Date:

End of cruise/voyage Port:

End of cruise/voyage Date:

Next arrival Port:

Next arrival Date:

Number of passengers aboard, at the time of reporting:

Number of crew members aboard:

Ports of call:

Dissemination Public Health Authorities:

View Related S1 Communicable Disease Surveillance Routine Recording Form (online)

Outbreak occurrence

What type of outbreak is occurring (*Biological including infectious disease, Chemical, Radiological, Other*)**:**

If Other, specify:

Outbreak Details:

Outbreak Syndrome (*Gastro-intestinal illness, Influenza-like-illness, Fever and Rash, Other*)**:**

If Other, specify:

Date of the beginning of the reported outbreak:

Please specify possible diagnosis:

Total number of ill passengers aboard since the beginning of the outbreak:

Total number of ill crew members aboard since the beginning of the outbreak:

Number of Hospitalized Passengers:

Number of crew members admitted to hospital ashore:

Number of deaths since the beginning of the outbreak:

Case occurrence

Has this case died on board during the voyage otherwise than as a result of accident? (*Y/N*)**:**

Cause of Death:

Has any person developed fever and one or more of the symptoms and signs in ANNEX B? (*Y/N*)**:**

If yes please report the symptoms and signs:

- Decreased level of consciousness
- Jaundice
- Persistent cough
- Recurrent convulsion
- Recent weakness or paralysis
- Severe diarrhoea
- Severe vomiting
- Shortness of breath
- Skin rash
- Swollen glands
- Unusual bleeding

Is there a case of acute skin rash thought to be of infectious nature (with or without fever)? (*Y/N*)**:**

Do you suspect that this case has an illness listed in ANNEX A? (*Y/N*)**:**

What is the possible diagnosis?: **Hospitalized**(*Y/N*)**:**

Date of beginning of symptoms:
Country of residence: **Port of disembarking:**
Age: **Sex:**

Management of Case or Outbreak

What is the possible source of the case or the outbreak? (*Person to Person, Water, Food, Vectors or infestations, Other environmental, Unknown*)**:**

Source details:

What control measures have been taken aboard or are planned: e.g. isolation, advice, contact tracing, medication, given:

- activation of outbreak management plan
- convene outbreak management team
- isolation and treatment of cases in cabin
- use of face mask and disposable gloves
- case finding-awareness raising
- disinfection and enhanced cleaning
- health advice provided incl. hand hygiene
- social distancing
- case disembarkation
- prophylaxis-vaccination
- contact tracing
- notification of PHA via MDH
- investigate and control suspected source
- review-analyse medical log data
- Other If Other, specify:

Samples Taken? (*Y/N*)**:**

If Yes, which samples?:

- *Human*
- *Water*
- *Food*
- *Environmental*
- *Other*

Sample details:

Has any laboratory or diagnostic test been carried out on board? (*Y/N*)**:**

Onboard Laboratory Results: **Do you have ashore laboratory results pending?** (*Y/N*)**:**

Is there any ashore laboratory confirmation? (*Y/N*)**:** **Laboratory Ashore Results:**

Total number of laboratory-confirmed cases:

Is any port health support needed for investigation and/or preventive action? (*Y/N*)**:**

Support needed, Specify Details:

- investigation
- inspection
- medical support
- evacuation
- ambulance arrangement
- supplies
- collect & deliver specimens
- autopsy
- Other If Other, specify:

Ship's duty officer's contact details, including telephone number:

Attachment

ATTACHMENT E.G. LINELIST/LOG OF PATIENTS QUESTIONNAIRE/LAB RESULTS (UPLOAD):
DESCRIPTION OF ATTACHMENT:

ANNEX A (list of communicable diseases that should be reported)

Acquired immunodeficiency syndrome (AIDS) and human immunodeficiency virus (HIV) infection
Anthrax
Avian influenza A/H5 or A/H5N1 in humans
Botulism
Brucellosis
Campylobacteriosis
Chlamydia infection
Cholera
Cryptosporidiosis
Diptheria
Echinococcosis
Giardiasis
Gonorrhoea
Haemophilus meningitis, invasive disease
Hepatitis A
Hepatitis B, acute
Hepatitis C
Influenza including influenza A(H1N1)
Legionnaires' disease
Leptospirosis
Listeriosis
Malaria
Measles
Meningoccocal invasive disease,
Mumps
Pertussis
Plague
Pneumococcal invasive diseases
Poliomyelitis
Q fever
Rabies
Rubella
Rubella, congenital
Salmonellosis
Severe acute respiratory syndrome (SARS)
Shiga/vero toxin producing Escherichia coli infection (STEC/VTEC)
Shigellosis
Smallpox
Syphilis
Syphilis congenital and neonatal
Tetanus
Toxoplasmosis, congenital
Trichinellosis
Tuberculosis
Tularaemia
Typhoid/paratyphoid fever
Varicella
Viral haemorrhagic fevers
West Nile fever
Yellow fever
Yersiniosis

The case definitions of the above diseases are included in the Commission Implementing Decisions 2012/506/EU of 8 August 2012, amending Decision 2002/253/EC.

ANNEX B (signs and symptoms)

Fever -	a measured temperature of 38°C [100°F] or greater.
Shortness of breath -	gasping for air; unable to catch his or her breath; breathing too fast and shallow to get enough air.
Skin rash -	presence on skin of multiple red bumps; red, flat spots; or blister-like bumps filled with fluid or pus that are intact or partly crusted over. Rashes may be discrete, may run together, and may include one or more areas of the body.
Persistent cough -	a cough that is either frequent or severe enough to catch the attention of others on board the ship or a severe cough that lasts three weeks or more.
Decreased level of consciousness -	condition of an ill person when he or she is not fully aware of what is going on around himself or herself, may appear confused, or may be unusually difficult to awaken. An ill person with decreased consciousness may not know the date or their name.
Unusual bleeding -	noticeable and unusual bruising or bleeding from the gums, ears, and nose or on areas of skin for which there is no obvious explanation.
Swollen glands -	enlargements of glands located in the head, neck, or groin, notably of salivary or parotid glands or lymph nodes.
Recent weakness and paralysis -	new or recently occurring weakness or partial or complete inability to move the arms, legs, or the muscles used for swallowing or breathing.
Severe vomiting -	vomiting accompanied by signs of dehydration.
Severe diarrhoea -	diarrhoea accompanied by signs of dehydration.
Jaundice -	yellowish discoloration of skin, eyes, and/or other bodily tissues or fluids.
Recurrent convulsion	an intense, paroxysmal, involuntary muscular contraction or a series of such contractions

DEFINITIONS

- **Case**: A case is any person who has died (otherwise than as a result of accident, regardless of cause) on board or any person with a reportable illness as listed in ANNEX A or a person with fever (>=38°C) and symptoms as listed in ANNEX B or a case of acute skin rash thought to be of infectious nature (with or without fever)?

- **Outbreak of disease**:
  - Outbreak definition: The occurrence of cases of disease with a frequency in excess of normal expectancy (historical/baseline) data for the specific itinerary and time.
    Normal expectancy is determined from historical/baseline data for the ship.
    For an illness which is not expected to occur on board, two or more cases are considered outbreak.
  - Outbreak definition for GI: An increase in the number of cases of GI above the number normally occurring in that ship over a defined period of time and itinerary. For reporting purposes, two different thresholds should be used.
    An initial report should be prepared and sent to the competent authority at ports, when the percentage of reportable gastroenteritis cases reaches 2% or more among passengers or 2% or more among crew.
    A second report should be sent when the number of reportable gastroenteritis cases reaches 3% or more among passengers or 3% or more among crew.
  - Outbreak definition for ILI: An increase in the number of cases of ILI above the number normally occurring in that ship over a defined period of time and itinerary.

Annex 12: Communicable diseases surveillance routine recording form

S1 Communicable Disease Surveillance Routine Recording Form

This form should be completed by the designated crew of the ship at the end of the day. Totals to be aggregated from ships daily ILI and GI logs.

General Information

ID *(autogenerated)*:

Current Threshold:

Status (*In progress/Finalized*):

Visit Date:

SHIP:

Voyage or cruise identification code:

Cruise/travel/voyage length (*days*):

Embarkation port (port of call from commencement of voyage):

Embarkation Date:

End of cruise/voyage Port:

END OF CRUISE/VOYAGE DATE:

Next port of call:

Next port of call (Date):

Total number of passengers on board:

Total number of crew on board:

Ports of call:
Dissemination Public Health Authorities:

Deaths

Number of deaths related to GI:
Number of deaths related to ILI:

Attachment

Attachment (upload):

Description of Attachment:

GI/ILI Routine Surveillance

Day of Cruise /voyage	Passengers							Crew					
	GI cases (new cases daily)	GI Cum %	ILI cases (new cases daily)	ILI Cum %	Daily attack rate (%)	Total number of passengers on board	Currently Ill	GI cases (new cases daily)	GI Cum %	ILI cases (new cases daily)	ILI Cum %	Daily attack rate (%)	Total number of crew on board

- **Threshold for daily attack rate % (only for GI) >=0.45%**
- **Threshold (Cummulative %)**

Cases per day percentage 0% and <0.5%
Cases per day percentage >=0.5% and <2%
Cumulative percentage >=2%
Cumulative percentage >=3%
Closed event

GI/ Log

Total number of ill passengers (GI): **Total number of ill crew (GI):**
Total number of passengers: **Total number of crew:**
Date From: **Date To:**

UPLOAD GI_LOG
or / and
Data entry of GI_LOG (*online*)

No:
Visit Date:
Name:
Unique Number Identifier:
Age:
Gender:
Pax/Crew:
Cabin No:
Date On Ship:
Date Off Ship:
Pax Meal Seat /Crew Pos.:
Illness Onset Date:
Illness Onset Date:

Diarrhoea:
Diarrhoea Blood:
Vomiting:
Fever:
Fever °C/°F:
C/F:
Abd. Cramps:
Headache:
Myalgia:
Stool Specimens Requested:
Stool Specimens Received:
Antidiarrhoeal medications:

Case fulfils definition of GI for surveillance purposes:
Underlying illness:
Lab Results For:
Positive Lab Result:

Print GI_Log (online)
GI Analysis (Reporting) (online)

ILI/ Log

Total number of ill passengers (ILI): **Total number of ill crew (ILI):**
Total number of passengers: **Total number of crew:**
Date From: **Date To:**

UPLOAD ILI_LOG
or / and
Data entry of ILI_LOG *(online)*

No:

Visit Date:	Cough:	Flu Vaccine During Past Year:
Name:	Malaise:	Flu Vaccine Date:
Unique Number Identifier:	Fever:	Medications:
Age:	Fever °C/°F:	Case fulfils definition of ILI for surveillance purposes:
Gender:	C/F:	Reportable case Specify:
Pax/Crew:	Shore throat:	Underlying illness:
Cabin No:	Shortness of breath:	Complications:
CREW: country where hired:	Headache:	
Date On Ship:	Coryza:	
Date Off Ship:	Myalgia:	
Pax Meal Seat /Crew Pos. :	Rapid Flu Test:	
Illness Onset Date:	CXR:	

Print ILI_Log (online)
ILI Analysis (Reporting) (online)

Produce Epidemic Curve (online)
View Related S2-Ship Communication Form (online)
Download GI - ILI Excel Files Here (for upload to GI log / ILI log) *(online)*

DEFINITIONS

Gastrointestinal Illness (GI): - according to USA Vessel Sanitation Program (VSP)

Acute diarrhoea (three or more episodes of loose stools in a 24 hour period or what is above normal for the individual, e.g. individuals with underlying medical condition that may affect interpretation)

or

Vomiting and at least one of the following symptoms:

- one or more episodes of loose stools in a 24 hour period
- abdominal cramps
- headache
- muscle aches
- fever >=38 °C

Influenza Like Illness (ILI): - according to World Health Organization (WHO)

An acute respiratory infection with:

- measured fever of ≥ 38 C°
- and cough;

with onset within the last 10 days

Cruise/Ferry: Any seagoing or inland passenger ship (with more than 12 passengers) on an international voyage, sailing within the EU waters, providing accommodation and/or food (other than "prepacked" food items that are prepared on a licensed premise ashore) to passengers, and/or potable water from the ship water distribution system to passengers.

Annex 13: Identification of physical, chemical and microbiological hazards for food

Type of hazard	Description of hazards
Physical hazards	• This category includes foreign bodies and material which may contaminate food. • Examples of physical hazards include glass, plastic, wood, metal, insects and hair.
Chemical hazards	• This category includes a wide variety of chemical residues. Chemical hazards may occur following use of chemicals in food production and processing, or cleaning, disinfection and pest control. • These chemical residues can be manmade or naturally occurring substances. • Examples include allergens, food additives, pesticides and cleaning products.
Microbiological hazards	• Biological hazards can be bacterial (*Escherichia coli* O157:H7, *Listeria monocytogenes*, *Staphylococcus aureus*, *Salmonella* spp., *Clostridium botulinum*, *Vibrio parahaemolyticus*, etc.), fungal (*Penicillium* spp., *Aspergillus* spp., *Fusarium* spp., aflatoxins etc.), viral (norovirus, hepatitis A, other enteric viruses etc.) or parasites (*Giardia* spp., *Cryptosporidium* spp., *Taenia* spp., *Trichinella* spp., etc.). • These microorganisms may be present in food when it arrives on board, or food may be contaminated once on board the ship and given the right conditions, may multiply to harmful levels.

Annex 14: Model training plan

Category A: Refers to "low-risk food handlers". Crew working in support of the food operation, or whose activities do not directly involve preparation and handling of high-risk or open unwrapped foods.
Category B: Refers to "high-risk food handlers". Crew directly involved with the preparation and cooking of foods, particularly those of a high-risk nature.
Category C: Refers to supervisors and managers. Officers and supervisors directly involved with preparation and cooking of food or those in a catering management position.

Training stages

This training should be divided into three stages (1, 2 and 3) as summarised below.

All food handlers:

Frequency of training

- before starting work for the first time, should receive written, verbal or electronic instruction in the essentials of food hygiene (stage 1).

Awareness instructions

- thereafter, should receive appropriate hygiene awareness instruction:
  - before starting work for training stage 1, within four weeks of employment or eight weeks for part-time crew for training stage 2 and within three months for training stages 3 (Level 1);
  - training stage 3 (level 2 and/or 3), if required according to responsibilities, should be received in a timely manner;
- should be able to demonstrate their food hygiene knowledge.

The training of food handlers should be updated according to needs.

Food handlers category	**Stage 1** ***Essentials of food hygiene***	**Stage 2** ***Hygiene awareness instruction***	**Stage 3** ***Level 1***	***Level 2 and/or 3***
Category A	Before starting work for the first time	Within four weeks of employment or eight weeks in part-time crew	--	--
Category B	Before starting work for the first time	Within four weeks of employment or eight weeks in part-time crew	Within three months	--
Category C	Before starting work for the first time	Within four weeks of employment or eight weeks for part-time crew	Within three months	Good Practice according to responsibilities

Category A food handlers

Food handler category A

- This category includes handlers of "low-risk food" or "wrapped food".

- These food handlers must complete **stage 1** and **stage 2**.

Training content stage1

Training stage 1

(This stage is for "low-risk food handlers")

- Essentials of food hygiene.

Food handlers must:

- ensure that they are clean and wear clean clothing;
- ensure their hair and beards are trimmed and fully covered;
- always wash their hands thoroughly before starting work, before handling food, after using the lavatory, after handling raw foods (which requires cooking or other process) or waste, after every break, after blowing their nose, eating, drinking or smoking;
- inform their supervisor, before commencing work, of any skin, nose, throat, stomach or bowel trouble, fever or infected wound;
- ensure cuts and sores are covered with a waterproof, high visibility dressing;
- avoid unnecessary handling of food items;
- not smoke, eat or drink in a food room, and never cough or sneeze over food or food preparation surfaces and equipment;
- inform their supervisor if they see something wrong, which could affect food safety;
- not prepare food too far in advance of service;
- keep perishable food either refrigerated or hot;
- Make sure that they keep the preparation of raw (which requires cooking or other process) and ready-to-eat food strictly separate;
- ensure that all equipment and surfaces are kept clean at all times;
- when reheating food, ensure it gets sufficiently hot throughout (reheating can be carried out only once);
- follow all food safety instructions in the ships operational manuals, on food packaging and from their supervisor;

Training content stage 2

Training stage 2

(This stage is for "low-risk food handlers")

- The ship food operators'/business's policy — priority given to food hygiene and safety.
- Personal health and hygiene — the need for high standards, reporting of illness, rules on smoking.
- Food contaminants — physical, chemical and microbiological.
- Pathogenic microorganisms.
- Cross-contamination — causes and prevention.
- Food storage — protection and temperature control.
- Waste disposal.
- Cleaning and disinfection — materials, methods and storage.
- Awareness of pests, actions to prevent and control pests.
- Reporting to supervisor of signs or actual presence of pests identified.

Food handler category B

Category B food handlers

- This category includes handlers of "high-risk food" or "unwrapped food".
- These food handlers should be trained according to **stage 3 (Level 1)**.

Training content stage 3 (Level 1)

Training stage 3 (Level 1)

(This stage is for "high-risk food handlers")

- Content of training **stage 1** and **stage 2**.

and

Stage 3 (Level 1)

- Foodborne diseases, symptoms and causes.
- Food poisoning microorganisms' types and sources.
- Basic microbiology, toxins, spores, growth and destruction.
- Premises and equipment.
- Relevant legal obligations.
- Effective temperature control of food (storage, thawing, cooking, cooling, hot and cold holding and reheating).
- Preventing food contamination and spoilage.
- Cleaning, disinfection and sterilisation.

Category C food handlers

Food handler category C

- This category includes managers or supervisors who handle any type of food, or who have control of food handlers.
- The supervisors and managers should be trained according to stage 3 (Level 2 and/or 3).

Training stage 3 (Level 2 and/or 3)

Training content Stage 3 (Level 2 and 3)

(This stage is for "supervisors" and "managers")

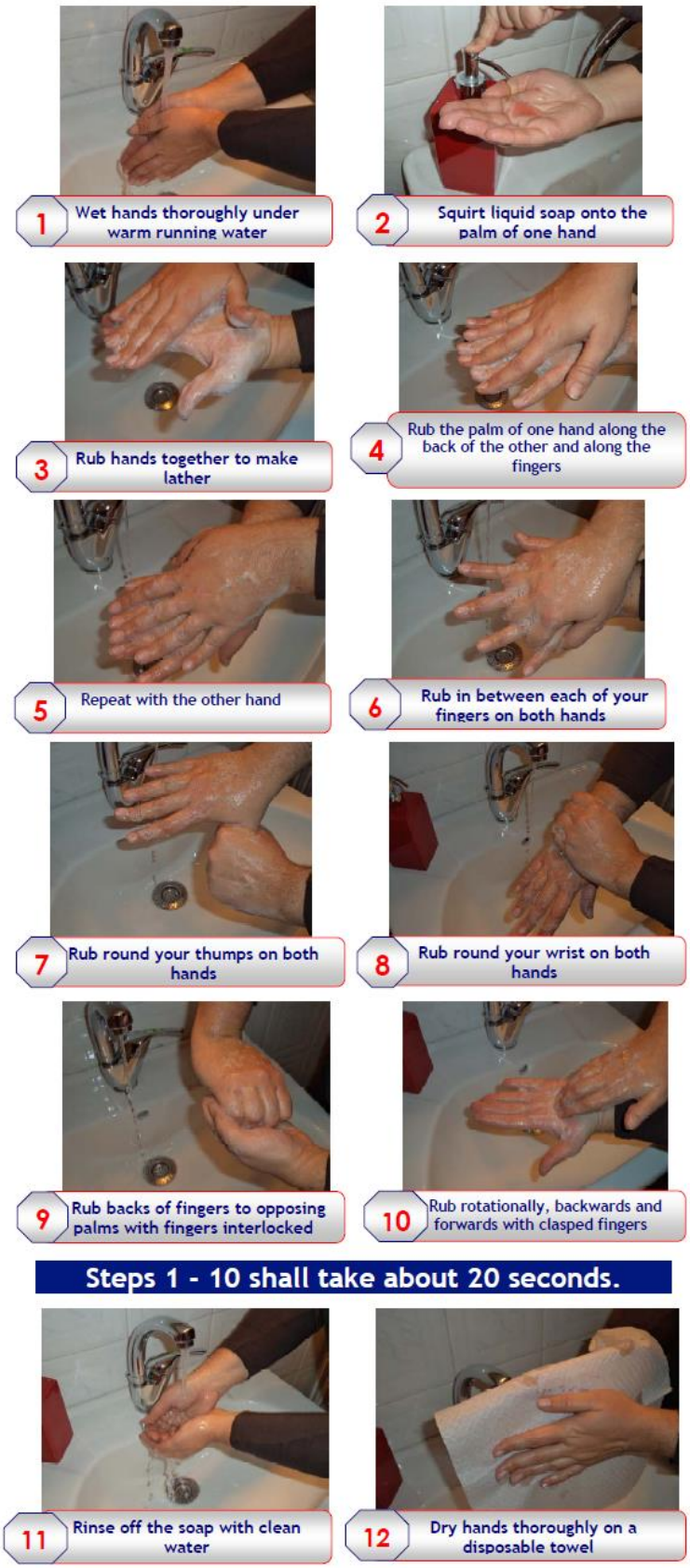
- Content of training **stage 1**, **stage 2** and **stage 3 (Level 1)** and **Level 2 and/or 3.**
- Implementation of HACCP principles.
- Effective supervision of food handlers with regard to all hygiene and food safety issues.
- Carrying out food hygiene inspections and audits.
- Assisting in the development, application and review of hazard analysis and HACCP principles implementation.
- Providing guidance and advice on the management of food hygiene in the passenger ship food operations.
- Technical knowledge necessary for management of complex food production processes.
- Designing an improvement plan based on process quality management principles.

Duration of Level 2 and Level 3

- The duration of training Level 2 should be from 12 to 24 hours.
- The duration of training Level 3 should be from 24 to 40 hours.

Annex 15: Hand washing method

To download the hand washing method click on the following link: http://www.shipsan.eu/downl/Handwashing_guide.pdf



Annex 16: Guidance on development and use of WSPs

Introduction to WSP

The management of potable water on ships should cover design, construction, commissioning, operation, monitoring and maintenance, in order to ensure that there are hygienic safeguards for the whole water supply process. The WHO has developed a HACCP-like system for drinking water called a WSP and EU SHIPSAN ACT has adopted this approach for managing potable water quality on passenger ships.

Definition

A WSP is a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from source to consumer in order to ensure the safety of potable water (World Health Organization, 2011).

Purpose

The WSP approach has been developed to organise and systematise practices applied to potable water and ensure the applicability of these practices to the management of potable water quality. All ships should have a WSP in order to ensure the quality of potable water that reaches consumers.

Although many water suppliers provide potable water of adequate quality without using a WSP, the adoption and implementation of its procedures have the following benefits:

- it provides a systematic, detailed and prioritised assessment of potential hazards;
- it ensures operational monitoring of control measures;
- it provides an organised and structured system to minimise the likelihood of failures;
- it is a dynamic approach that can lead to future improvements in the water supply management;
- it assists competent authorities in conducting inspections.

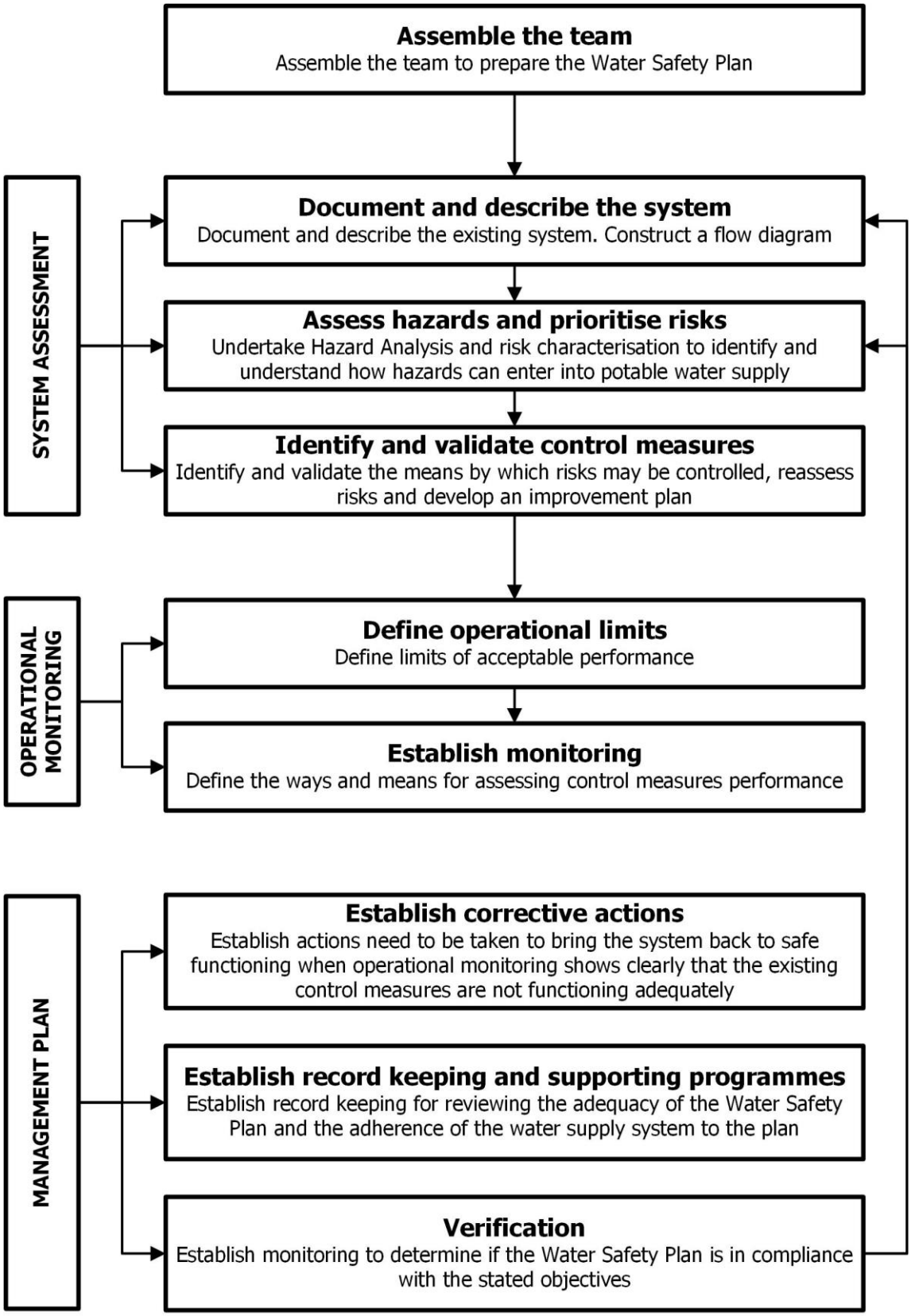


Figure 2: Overview of key steps in developing a WSP

WSP components (principles)

The WSP approach adopts many of the principles of other risk assessment approaches such as HACCP and the multi-barrier approach. The basic elements of a WSP are outlined below and in Figure 2.

System assessment: This fully describes the water supply process, identifies the possible hazards and hazardous events, prioritises control of risks and records the control measures applied for the prevention of consequences. The scope of the system assessment is wide enough to ensure that sufficient control measures are put in place to ensure all water safety health-based targets are met. Table 18 includes an example of the system assessment of a ship water system.

Operational monitoring: This helps evaluate the performance of each control measure identified and also involves reporting any deviations from the operational limits.

Management Plan: This sets out the corrective actions to be taken when operational monitoring indicates deviations from operational limits. It also includes the measures taken for record keeping, verification monitoring and incident investigation.

Risk characterisation

All identified hazardous events must then be considered and prioritised bearing in mind two criteria, the probability that it will occur (likelihood) and the likely consequences (Table 17).

Table 17: Typical significance scale

	Consequences		
Likelihood	Minor 1	Moderate 2	Major 3
A (likely)	M	H	H
B (moderate)	L	M	H
C (unlikely)	L	L	M

H: High risk, M: Moderate risk, L: Low risk

Table 18: Examples of the system assessment procedure for the ship potable water system

This is not a complete system assessment procedure, but for illustration only and should not be used. Each ship should do its' own assessment.

PROCEDURE	Possible hazardous event	Likelihood	Consequences	Control measures	Operational limits	Operational monitoring	Corrective actions	Record keeping
SOURCE WATER	Source contaminated with microbiological hazards	C Unlikely	3 Major	1. Check the water quality reports and certifications from the supplier before loading 2. Continuous chlorination at the time of bunkering	1. Absence of microbiological hazards in the collected reports 2. Chlorine residual no less than 2 mg/L	Measurement of disinfectant residual	Filtration and disinfection or use of an alternative source	All water quality reports should be kept on the ships records for 12 months. Free chlorine measurement records should be kept on the ships records for 12 months.
BUNKERING	Filling hose contamination	B Moderate	2 Moderate	Routine cleaning and disinfection Proper storage and labelling Handlers training	No defections detected during inspection	Routine inspections	Cleaning and disinfection Repair or replace	Inspection records Repair records Cleaning and disinfection records
STORAGE	Corrosion of storage tanks	A Likely	1 Minor	Routine cleaning and maintenance	No corrosion detected during inspections	Routine inspections	Cleaning and disinfection Coating	Inspection Records Cleaning and disinfection records
DISTRIBUTION	Cross connection between potable water and non-potable water	C Unlikely	3 Major	Cross connection control programme (identification of cross connection, installation of the proper backflow prevention assemblies)	No defections on the backflow prevention devices	Routine inspection and annual testing of backflow prevention assemblies	Repair or replace backflow prevention assemblies	Inspection and testing records

Definition of control measures

Suitable control measures must be identified to ensure the prevention of potable water contamination incidents. All control measures for significant hazards or hazardous event must be assessed and recorded. The measures should be indicated on the flow diagram/table corresponding to the possible hazardous events.

Control measures include water treatment procedures, routine monitoring and inspections, maintenance, repair or replacement of equipment, cross connection control, labelling of pipes and hoses and training of the crew, temperature controls and flushing of infrequently used equipment.

Definition of validation

Validation is an investigative activity to identify the effectiveness of control measures. It provides the evidence that elements of the WSP can effectively meet the water quality targets

Water production and private water supplies

Potable water produced at sea using low pressure evaporator or reverse osmosis plants are considered to be private water sources and should be controlled as such with appropriate monitoring and risk assessment.

Operational monitoring

Control measures must be monitored in order to spot any deviations from the operational limits. Operational monitoring should include measurement of selected water parameters, and the equipment and construction inspection procedures. Operational monitoring must provide early warning of failure of halogenation or any other operational limit violations to enable effective water system management. In most cases, operational monitoring involves basic water quality tests (pH, halogen residuals) and routine hygienic inspections.

An operational monitoring plan should be put in place and include the following basic elements:

- define the sampling points and frequency of sampling;
- list the equipment required for monitoring water systems;
- establish the monitoring equipment standards (calibration, certification);
- ensure compliance with standard methods of water examination;
- define the locations to be inspected and frequency of inspections;
- define the required qualifications of crew carrying out the monitoring.

Operational limits

Auditing the performance of control measures requires setting of operational limits for each one. An operational limit is a criterion which indicates whether the control measure is functioning as

designed. Operational limits might be either the upper limits or lower limits of the parameter values (such as pH, halogen residual, temperature) or observable factors.

Corrective actions

Corrective actions are to be taken when the results of monitoring at a control point indicate a loss of control and may include repair or replacement of equipment, superhalogenation/shock dosing, flushing and dumping and then re-bunkering or reloading, etc. Corrective actions should include the following steps:

1) ensure water safety until correction;
2) correct problem;
3) identify cause of problem;
4) take steps to ensure that the problem will not re-occur;
5) evaluate if the lessons learned should be communicated to other ships.

Record keeping

The documents required include the following:

- requirements for general system documentation (water manual, periodical maintenance system, routines for handling of deviations/corrective actions, emergency preparedness, etc.),
- details on HACCP,
- requirements for auditing and revising the general system documentation and the Water Safety Plan,
- system assessment and supporting information, description of the system and flow diagram
- WSP team formation,
- the operational monitoring programme and results,
- the parameters measured and operational limits,
- water treatment methods used,
- outcomes of inspections,
- outcomes of audits,
- outcomes of adverse incidents.

Supporting programmes

Supporting programs may include the following:

- standard operating procedures for hygienic working practices;
- quality assurance/quality control programme for chemicals and materials;
- calibration and preventive maintenance programme for equipment used for monitoring the main control measures;

- crew members training to ensure they are skilled to do their jobs and understand the risks associated with water quality;
- regulatory issues related to water quality.

Audit

Regular audit of record keeping activities and other activities should take place at main control measures, including test results data analysis.

Auditing includes a) checks of the records of the corrective actions taken in response to main non-conformances at the main control measures and b) audit of practices to check that they are being used including taking corrective actions in case of non-conformance. Responsible person for regular audit is the team leader.

Periodic audit should be conducted:

- at intervals (e.g. once every week);
- following substantial changes to the source, the distribution or storage system or treatment process;
- following significant incidents.

Periodic audit should include the following, in addition to review of the WSP:

- examination of the records to ensure that system management is being carried out as described in the WSP;
- ensuring that operational limits are kept within specification and that compliance is being maintained;
- ensuring that verification programmes are operated (check logs for water sampling results — ensure that corrective actions have been taken after positive microbiological test results);
- assessment of implementation programmes and development of strategies for improvement and updating the WSP; and
- in some circumstances, sanitary inspection, which may cover the whole of the water-supply system including sources, production plans, treatment stations, storage tanks, and distribution systems;
- regular monitoring for blind lines;
- regular monitoring for infrequently used cabins, washrooms, etc.;
- weekly review of stagnant lines and updating of the list of taps requiring regular flushing;
- identification of new chemicals added to the water.

Non-conformities should be recorded by the persons responsible for the operational monitoring. Non-conformities should be reported to the Team leaders on board the ship.

Verification monitoring

In order to provide a final assurance that the water supply system is operating safely, verification monitoring should be established. This includes:

- water quality monitoring (regular analysis of chemical and microbiological quality e.g. faecal bacteria, Legionella, turbidity, heavy metals),
- audit of operational activities,
- consumer satisfaction,
- validation of system capacity.

Reference list

World Health Organization. (2011). Guidelines for drinking-water quality. 4th edition.

Annex 17: Suggested competences for the training of crew responsible for the WSP implementation

The persons responsible for conducting the risk assessment should have the knowledge:

- to understand the source of hazards (physical, microbiological, chemical) and the reason for their presence;
- to recognise hazardous events on ship water systems;
- to characterise risks;
- to decide about control measures and corrective actions;
- to collect all the information needed to conduct the risk assessment;
- to interpret information collected to conduct the risk assessment.

The team leader/manager responsible for the WSP should:

- be a senior officer working on the ship;
- have the knowledge to ensure that the WSP is implemented effectively;
- understand the hazards and hazardous events;
- have knowledge of the structure and policy of the company;
- recognise non-conformities of the operational limits as set out in the WSP;
- be able to supervise and make sure that control measures and corrective actions are correctly implemented;
- recognise when revisions of the WSP are needed;
- communicate effectively with all crew involved in the water system operation.

The persons responsible for the every-day operation of the water systems should be able to:

- carry out the monitoring procedures, control measures and corrective actions;
- implement correctly the procedures described in the WSP;
- recognise non-conformities and the need to report them;
- maintain the records and documents.

Annex 18: Parameters for water quality monitoring (Council Directive 98/83/EC and Council Directive 2013/51/EURATOM)

Water intended for human consumption shall be wholesome and clean if it meets the minimum requirements set out in the following table regarding microbiological parameters.

Microbiological parameters	
Parameter	**Parametric value**
Escherichia coli (*E. coli*)	0/100 mL
Enterococci	0/100 mL

Water intended for human consumption shall be wholesome and clean if it meets the minimum requirements set out in the following table regarding chemical parameters.

Chemical parameters			
Parameter	**Parametric value**	**Unit**	**Notes**
Acrylamide	0.10	µg/L	Note 1
Antinomy	5.0	µg/L	--
Arsenic	10	µg/L	--
Benzene	1.0	µg/L	--
Benzo(a)pyrene	0.010	µg/L	--
Boron	1.0	mg/L	--
Bromate	10	µg/L	Note 2
Cadmium	5.0	µg/L	--
Chromium	50	µg/L	---
Copper	2.0	mg/L	Note 3
Cyanide	50	µg/L	--
1,2-dichloroethane	3.0	µg/L	--
Epichlorohydrin	0.10	µg/L	Note 1
Fluoride	1.5	mg/L	--
Lead	10	µg/L	Note 3 and 4
Mercury	1.0	µg/L	--
Nickel	20	µg/L	Note 3
Nitrate	50	mg/L	Note5
Nitrite	0.50	mg/L	Note 5
Pesticides	0.10	µg/L	Note 6 and 7
Pesticides - Total	0.50	µg/L	Note 6 and 8
Polycyclic aromatic hydrocarbons	0.10	µg/L	Sum of concentrations of specified compounds; Note 9
Selenium	10	µg/L	
Tetrachloroethene and trichloroethene	10	µg/L	Sum of concentration of specified parameters
Trihalomethanes - Total	100	µg/L	Sum of concentrations of specified compounds; Note 10
Vinyl chloride	0.50	µg/L	Note 1

Note 1: The parametric value refers to the residual monomer concentration in the water as calculated according to specifications of the maximum release from the corresponding polymer in contact with the water.
Note 2: Where possible, without compromising disinfection, MS should strive for a lower value. For water referred to in Article 6(1) (a), (b) and (d), the value must be met, at the latest, 10 calendar years after the entry into force of the Directive. The parametric value for bromate from five years after the entry into force of this Directive until 10 years after its entry into force is 25 µg/L.
Note 3: The value applies to a sample of water intended for human consumption obtained by an adequate sampling method at the tap and taken so as to be representative of a weekly average value ingested by consumers. Where appropriate the sampling and monitoring methods must be applied in a harmonised fashion to be drawn up in accordance with Article 7(4). MS must take account of the occurrence of peak levels that may cause adverse effects on human health.
Note 4: For water referred to in Article 6(1) (a), (b) and (d), the value must be met, at the latest, 15 calendar years after the entry into force of this Directive. The parametric value for lead from five years after the entry into force of this Directive until 15 years after its entry into force is 25 µg/L. MS must ensure that all appropriate measures are taken to reduce the concentration of lead in water intended for human consumption as much as possible during the period needed to achieve compliance with the parametric value. When implementing the measures to achieve compliance with that value MS must progressively give priority where lead concentrations in water intended for human consumption are highest.

Note 5: MS must ensure that the condition that [nitrate]/50 + [nitrite]/3 ≤ 1, the square brackets signifying the concentrations in mg/L for nitrate (NO_3) and nitrite (NO_2), is complied with and that the value of 0.10 mg/L for nitrites is complied with ex water treatment works.

Note 6: Pesticides means:

- organic insecticides,
- organic herbicides,
- organic fungicides,
- organic nematodicide,
- organic acaricides,
- organic algicides,
- organic rodenticides
- organic slimicides,
- related products (inter alia, growth regulators)

and their relevant metabolites, degradation and reaction products. Only those pesticides which are likely to be present in a given supply need be monitored.

Note 7: The parametric value applies to each individual pesticide. In the case of aldrin, dieldrin, heptachlor and heptachlor epoxide the parametric value is 0.030 µg/L.

Note 8: "Pesticides – Total" means the sum of all individual pesticides detected and quantified in the monitoring procedure.

Note 9: The specified compounds are:

- benzo(b)fluoranthene,
- benzo(k)fluoranthene,
- benzo(ghi)perylene,
- indeno(1,2,3-cd)pyrene.

Note 10: Where possible, without compromising disinfection, MS should strive for a lower value. The specified compounds are: chloroform, bromoform, dibromochloromethane, bromodichloromethane. For the water referred to in Article 6(1)(a), (b) and (d), the value must be met, at the latest, 10 calendar years after the entry into force of this Directive. The parametric value for total THMs from five years after the entry into force of this Directive until 10 years after its entry into force is 150 µg/L.

In the event of non-compliance with the parametric values or with the specifications set out in the following table, ships in collaboration with competent authorities should consider whether that non-compliance poses any risk to human health. They should take remedial action to restore the quality of the water where that is necessary to protect human health.

Indicator parameters			
Parameter	**Parametric value**	**Unit**	**Notes**
Aluminium	200	µg/L	--
Ammonium	0.50	mg/L	--
Chloride	250	mg/L	Note 1
Clostridium perfringens (including spores)	0	number/100 mL	Note 2
Colour	Acceptable to consumers and no abnormal change		--
Conductivity	2500	µS/cm at 20 °C	Note 1
Hydrogen ion concentration	≥ 6.5 and ≤ 9.5	pH units	Note 1 and 3
Iron	200	µg/L	--
Manganese	50	µg/L	--
Odour	Acceptable to consumers and no abnormal change		--
Oxidisability	5.0	mg/L O_2	Note 4
Sulphate	250	mg/L	Note 1
Sodium	200	mg/L	--
Taste	Acceptable to consumers and no abnormal change		--
Colony count 22 °C	No abnormal change		--
Coliform bacteria	0	number/100 mL	Note 5
Total organic carbon (TOC)	No abnormal change	µg/L	Note 6
Turbidity	Acceptable to consumers and no abnormal change		Note 7
Tritium	100	Bq/L	Notes 8 and 10
Total indicative dose	0.10	mSv/year	Notes 9 and 10

Note 1: The water should not be aggressive (causing metal work to corrode).

Note 2: This parameter need not be measured unless the water originates from or is influenced by surface water. In the event of non-compliance with this parametric value, the MS concerned must investigate the supply to ensure that there is no potential danger to

human health arising from the presence of pathogenic microorganisms, e.g. cryptosporidium. MS must include the results of all such investigations in the reports they must submit under Article 13(2).
Note 3: For still water put into bottles or containers, the minimum value may be reduced to 4.5 pH units. For water put into bottles or containers which is naturally rich in or artificially enriched with carbon dioxide, the minimum value may be lower.
Note 4: This parameter need not be measured if the parameter TOC is analysed.
Note 5: For water put into bottles or containers the unit is number/250 mL.
Note 6: This parameter need not be measured for supplies of less than 10,000 m^3 a day.
Note 7: In the case of surface water treatment, MS should strive for a parametric value not exceeding 1.0 NTU (nephelometric turbidity units) in the water ex treatment works.
Note 8: Monitoring frequencies to be set later in Annex II.
Note 9: Excluding tritium, potassium-40, radon and radon decay products; monitoring frequencies, monitoring methods and the most relevant locations for monitoring points to be set later in Annex II.
Note 10: 1. The Commission shall adopt the measures required under Note 8 on monitoring frequencies, and Note 9 on monitoring frequencies, monitoring methods and the most relevant locations for monitoring points in Annex II. Those measures, designed to amend non-essential elements of this Directive, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 12(3).
When elaborating those measures the Commission shall take into account, inter alia, the relevant provisions under existing legislation or appropriate monitoring programmes including monitoring results as derived from them.
2. A Member State is not required to monitor drinking water for tritium or radioactivity to establish total indicative dose where it is satisfied that, on the basis of other monitoring carried out, the levels of tritium or the calculated total indicative dose are well below the parametric value. In that case, it shall communicate the grounds for its decision to the Commission, including the results of this other monitoring carried out.

Parametric values for radon, tritium and ID of water intended for human consumption			
Parameter	**Parametric value**	**Unit**	**Notes**
Radon	100	Bq/L	Note 1
Tritium	100	Bq/L	Note 2
ID (Indicative Dose)	0.10	mSv	

Note 1: a) MS may set a level for radon which is judged inappropriate to be exceeded and below which optimisation of protection should be continued, without compromising water supply on a national or regional scale. The level set by a MS may be higher than 100 Bq/L but lower than 1000 Bq/L. In order to simplify national legislation, MS may choose to adjust the parametric value to this level.
b) Remedial action is deemed to be justified on radiological protection grounds, without further consideration, where radon concentrations exceed 1000 Bq/L.

Note 2: Elevated levels of tritium may indicate the presence of other artificial radionuclides. If the tritium concentration exceeds its parametric value, an analysis of the presence of other artificial radionuclides shall be required.

Annex 19: Recommendations for flushing outlets

In order to avoid stagnation of water in the system, the ship should establish a flushing programme in order to prevent stagnation at any place of the ship for more than seven days. The procedure to be followed when flushing is described below.

Determining the duration of the flushing required

The flushing duration depends on the maximum flow rate at the outlet and the volume of water stored in the stagnant part of the system (volume of the pipe from the outlet to the loop or to the closest connection with a line that is neither blind nor stagnant). Twice the quantity of the stagnant volume should be discharged. The volume of the stagnant water can be determined by either engineering calculations or as a general rule by waiting for the temperature of the hot water to reach a maximum. This means that the tap should run for twice this duration at the maximum flow rate. Theoretically, the cold water from the same tap should be flushed for the same duration and flow rate as the hot one. If the above are not followed then each tap should be flushed for several minutes (e.g. 3-4 minutes).

Flushing of outlets

Open the tap at maximum flow rate and wait for the required time. If it is a mixer type tap first flush the hot water then the cold water.

Flushing of lines connected to the devices

Disconnect the device (and drain if possible) and then flush the line (procedures as per flushing of outlets).

Flushing of cabins

First flush the hot lines and then flush the cold water lines. If all the taps of the cabin are opened simultaneously then make sure sufficient quantity of water flows from the taps. If the pressure drops, then flush the taps in turns. The toilet should also be flushed.

Note 1. In cases where there is no sufficient drainage, it may be necessary to have large containers to collect the flush water or additional piping to direct the flow to a drain. The content of the container can then be discharged to a drain.

Note 2. If water is contaminated or there is suspicion of water contamination, aerosolisation should be avoided. When aerosol formation is inevitable, PPE should be provided to the responsible persons.

Annex 20: Recommended Faecal and Vomit Accident Release Plan for RWF

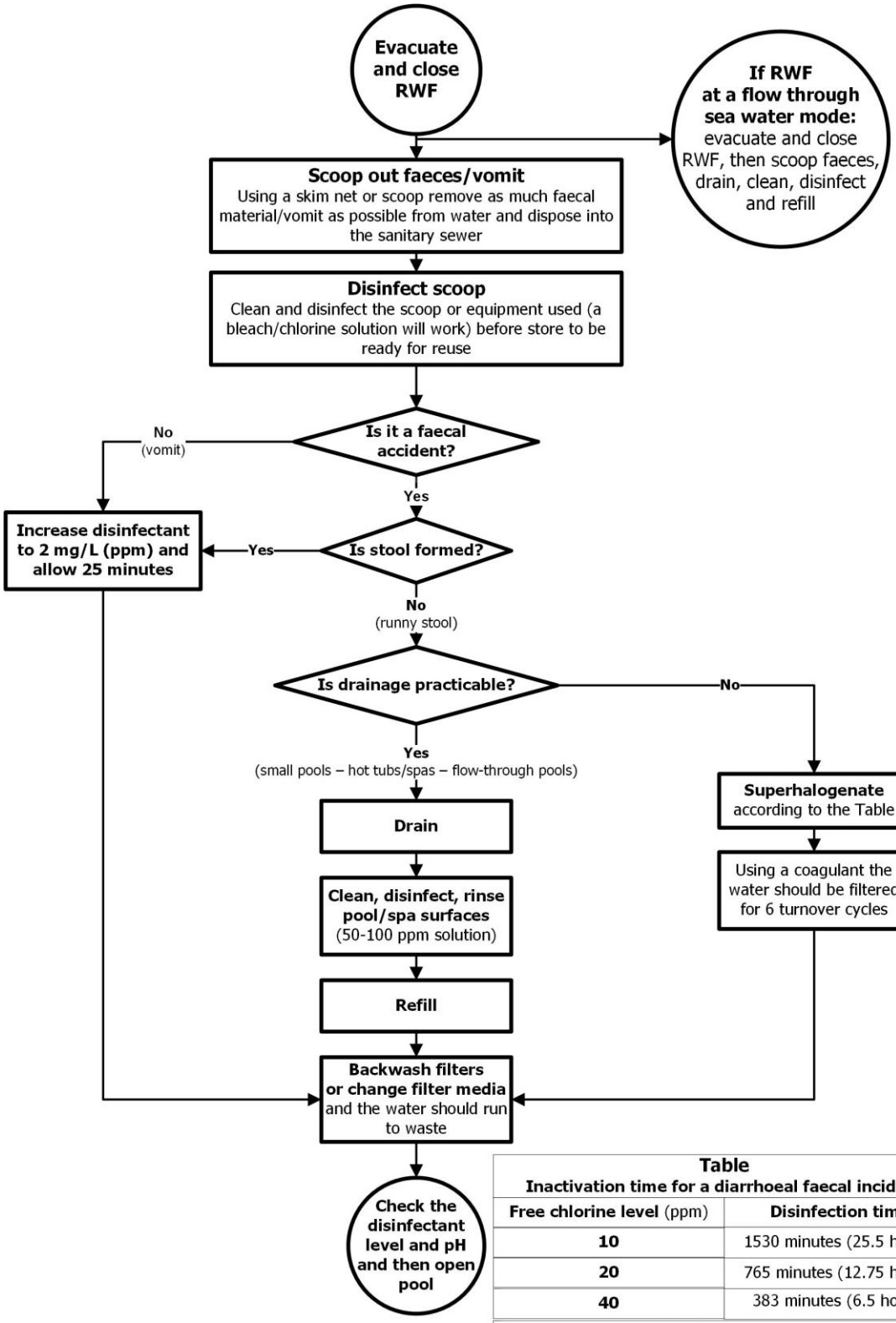


Table
Inactivation time for a diarrhoeal faecal incident

Free chlorine level (ppm)	**Disinfection time**
10	1530 minutes (25.5 hours)
20	765 minutes (12.75 hours)
40	383 minutes (6.5 hours)

Superhalogenation should be that the product between halogen residual and recirculation time is as follows:
_____ mg/L (ppm) x _____ minutes = 15300

Maintain pH of 7.2-7.5 during contact time

Annex 21: Rules for sampling and testing of water from recreational water facilities

General rules for chemical and microbiological testing	
1	Handle the testing equipment and reagents with clean hands. Rinse off any reagents that get on your skin.
2	Collect the sample from a location that contains well-mixed pool water and "grab" a sample from a depth of 5-30 cm (2-12 in).
3	Carry out the tests immediately after samples are taken.
4	Carefully follow instructions for test kits (time and temperature are important parameters of testing).
5	Store the equipment, properly boxed or cased, in a cool, clean, dry place. Do not interchange parts such as sample cells, caps or droppers.
Additional rules for microbiological testing	
1	Sampling bottles should be clean and sterilised.
2	For disinfected waters prior to sampling and sterilisation in the oven a dechlorinating agent (e.g. sodium thiosulphate: Na2S2O3 5H2O) should be placed in the bottle: a quantity of 20-50 mg for a litre of water sample.
3	The sampling process should be according to the following: Remove the bottle cap with caution and place it in clean and sterile spot. Hold the bottle from the bottom and immerse it at a depth of 20 cm (7.9 in), move it horizontally to fill with water. A free space should be left on the top in order to allow space for an ease mixing. Cap the bottle and cover the cap with aluminium foil. Place it inside the heat insulating container and transfer it to the lab.
4	Testing should be done as soon as possible after sample collection. It should be done the same day. Heat insulating containers should be used for the transfer of samples to the lab in order to keep the temperature constant. If the time between sampling and testing exceeds six hours then the samples should be kept at a temperature of 5 °C (41 °F) utilising ice cubes.

Annex 22: Suggestions for corrective actions to be taken in case of water quality parameters out of limits in recreational water facilities

Corrective actions

- Engineering parts of pools should be checked and tested for proper operation.
- Filter media should be checked.
- Chemical or microbiological tests should be repeated carefully.
- Apply filter backwashing.
- Change filters media if it is thought to be appropriate.
- Renew water if it is practicable.
- Adjust water chemistry by the addition of appropriate chemicals (in case of manual addition of chemicals, the pool should remain closed until dilution of chemicals is assured and water quality has returned to desired standards).
- Apply shock dosing in case of microbiological contamination. That means that disinfectant dosage is increased up to 20 or 50 mg/L for few hours while the pool is not in use by bathers.
- For accidental faecal release or vomit an emergency plan should be ready and should meet or exceed the sample in Annex 20 (page 264).
- If remediation actions taken are not effective then an independent consultant may be requested to investigate the problem.

Annex 23: Examples of health advisory signs for recreational water facilities

SWIMMING POOL SIGNS — suggestions for content

Annex 24: Requirements for the determination and assessment of risk of hazardous chemical agents [Council Directive 98/24/EC]

The employer must determine whether any hazardous chemical agents are present at the workplace and assess any risk to health and safety arising from their presence, taking into consideration:

- their hazardous properties;
- information on safety and health provided by the supplier; relevant safety data sheet in accordance with Regulation (EC) No 1907/2006
- the level, type and duration of exposure;
- the circumstances of work involving such agents, including their amount;
- any national occupational exposure or biological limit values;
- the effect of preventive measures taken or to be taken;
- the conclusions to be drawn from any health surveillance already undertaken.

Risks to the health and safety of workers at work involving hazardous chemical agents shall be eliminated or reduced to a minimum by:

- the design and organisation of systems of work at the workplace;
- the provision of suitable equipment for work with chemical agents and maintenance procedures which ensure the health and safety of workers at work;
- reducing to a minimum the number of workers exposed or likely to be exposed;
- reducing to a minimum the duration and intensity of exposure;
- appropriate hygiene measures;
- reducing the quantity of chemical agents present at the workplace to the minimum required for the type of work concerned;
- suitable working procedures including arrangements for the safe handling, storage and transport within the workplace of hazardous chemical agents and waste containing such chemical agents.

Where the nature of the activity does not permit risk to be eliminated by substitution, the following protection and prevention measures must be taken, listed in order of priority:

- design of appropriate work processes and engineering controls and use of adequate equipment and materials so as to avoid or minimise the release of hazardous chemical agents;
- application of collective protection measures at the source of the risk such as adequate ventilation and appropriate organisational measures;
- where exposure cannot be prevented by other means, application of individual protection measures including personal protective equipment.

The employer must ensure that workers and/or their representatives are provided with:

- the results of the risk assessment;
- full information on the hazardous chemical agents present at the workplace;
- training and information on the appropriate precautions and on the personal and collective protection measures that are to be taken;
- access to any safety data sheet provided by the supplier.

The information must be properly provided and updated to take into account any occurring changes in the meantime.

Annex 25: Background information for influenza

The influenza virus can be spread from person to person, or via indirect transmission from the environment to an individual. When an infected person coughs or sneezes they release droplets containing virus particles. Transmission to a susceptible host may occur when a droplet makes contact with conjunctiva or mucous membranes through a direct cough or sneeze, through inhaling air containing droplet nuclei or from physical touch with an infected individual. The virus can also be transferred from surfaces contaminated by droplets to mucous membranes of the eyes, nose and mouth (Weber and Stilianakis, 2008). Recent publications highlighted the importance of airborne transmission in indoor environments (Chen et al., 2009; Chen and Liao, 2010; Chen and Liao, 2008; Shaman and Kohn, 2009; Weber and Stilianakis, 2008).

In the event of ILI on board a passenger ship, the main threat is related to those passengers and crew who are at higher risk of developing complications from influenza and in whom the disease might be life threatening. Elderly people are at risk for developing complications when infected by seasonal flu and therefore, prompt diagnosis is important among elderly passengers (World Health Organization, 2009). On one cruise ship that was the site of an outbreak of influenza, an investigation revealed that 77.4 % of the 1448 passengers were 65 years of age or older and 26.2 % had chronic medical problems (Anon., 1997).

Outbreaks of seasonal influenza have occurred on board passenger ships in recent years, as well as cases of the pandemic (H1N1) 2009 influenza (Russell, 2009). From 1997 to 2005, nine confirmed outbreaks of influenza linked to ships have been published in the scientific literature. The infectious agent in 7 out of the nine was Influenza A virus and in one Influenza B. A total of 898 cases have been reported including passengers and crew, and two of them were fatal. The attack rate ranged between 0.5 to 37 % (Anon., 1999a; Anon., 1999b; Anon., 1987; Anon., 1998; Brotherton et al., 2003; Christenson et al., 1987; Ferson et al., 2000; Ferson and Ressler, 2005; Miller et al., 1998; Miller et al., 2000; MMWR, 2001). Because on passenger ships a large number of people gather together, they can provide an important environment for the spread of influenza from person to person or indirect transmission (e.g. contaminated surfaces) (Kak, 2007; Wilson, 2003). During a cruise or ferry voyage, passengers and crew may be from many nations, spend much of their time indoors and can intermingle. Shipboard activities and events such as dining, games, and movies increase the chance of flu transmission between passengers and also among the crew (Miller et al., 2000). If a large number of crew members fall ill and are unable to perform their duties, the safety of sailing might be affected. Ill passengers will have their holidays spoilt.

Epidemics of influenza affect Europe and the rest of the northern hemisphere during the winter season. The southern hemisphere has a similar epidemic period in its winter months (June to October). In the tropics influenza transmission may be all year round, with no seasonal pattern. As there is usually only a small variation between one year's epidemic strain and that of the following year, it is possible to produce a vaccine for the coming influenza season with a good chance that it will be protective for seasonal influenza caused by influenza A or B strains which are the same as previous years or have minor variation only. Many people may have some immune protection from exposure in previous years. Pandemics occur when a strain of influenza appears which is very different to proceeding years and for which most of the population have little or no immunity to.

This allows the virus to spread around the world. At the beginning of a pandemic, the severity of symptoms and at-risk groups will be unknown, and there will be no available vaccine.

Influenza virus characteristics – Environmental persistence

- RNA virus, family Orthomyxoviridae
- Enveloped virus
- Droplet particles (10 µm) settling from a height of 1.5 m (5 ft) in about eight minutes (Weber and Stilianakis, 2008)
- Influenza A virus can survive:
  - on hard, nonporous surfaces (e.g. stainless steel, hard plastic) for 24-48 hours (Bean et al., 1982),
  - on porous materials (e.g. cloth, paper) for < 8-12 hours in ambient temperatures (Bean et al., 1982).
- Virus persistence on surfaces increases up to 72 hours when those surfaces are moist or wet (Barker et al., 2001).
- Dried influenza virus can remain stable on the hands for < 5 minutes (Bean et al., 1982).
- Infectious virus can be transferred to hands from nonporous surfaces for at least 2-8 hours during periods of heavy viral shedding in respiratory secretions (Bean et al., 1982).
- Transfer of viable influenza A virus from paper tissue to hands was only possible for 15 minutes, but transfer from stainless steel to hands for 24 hours (Bean et al., 1982).

Reference list

Anon. (1987). Outbreak of influenza-like illness in a tour group--Alaska. MMWR Morb Mort Wkly Rep 36(42): 697-8, 704.

Anon. (1997). Update: influenza activity - United States, 1997-98 season. MMWR Morb Mort Wkly Rep 46(46): 1094-1098.

Anon. (1988). Leads from the MMWR. Acute respiratory illness among cruise-ship passengers--Asia. JAMA 259(9): 1305-1306.

Anon. (1999). Influenza on a cruise ship in the Mediterranean. Commun Dis Rep CDR Wkly 9(24): 209, 212.

Barker J., Stevens D. and Bloomfield S.F. (2001). Spread and prevention of some common viral infections in community facilities and domestic homes. J Appl Microbiol 91: 7-21.

Bean B., Moore B.M., Sterner B., Peterson L.R., Gerding D.N. and Balfour H.H., Jr. (1982). Survival of influenza viruses on environmental surfaces. J Infect Dis 146(1): 47-51.

Brotherton J.M., Delpech V.C., Gilbert G.L., Hatzi S., Paraskevopoulos P.D. and McAnulty J.M. (2003). A large outbreak of influenza A and B on a cruise ship causing widespread morbidity. Epidemiol Infect 130(2): 263-271.

Centers of Disease Control and Prevention. (2001). Influenza B virus outbreak on a cruise ship--Northern Europe, 2000. MMWR Morb Mort Wkly Rep 50(8): 137-140.

Chen S.C., Chio C.P., Jou L.J. and Liao C.M. (2009). Viral kinetics and exhaled droplet size affect indoor transmission dynamics of influenza infection. Indoor Air 19(5): 401-413.

Chen S.C. and Liao C.M. (2008). Modelling control measures to reduce the impact of pandemic influenza among schoolchildren. Epidemiol Infect 136(8): 1035-1045.

Chen S.C. and Liao C.M. (2010). Probabilistic indoor transmission modeling for influenza (sub)type viruses. J Infect 60(1): 26-35.

Christenson B., Lidin-Janson G. and Kallings I. (1987). Outbreak of respiratory illness on board a ship cruising to ports in southern Europe and northern Africa. J Infect 14(3): 247-254.

Ferson M., Paraskevopoulos P., Hatzi S., Yankos P., Fennell M. and Condylios A. (2000). Presumptive summer influenza A: an outbreak on a trans-Tasman cruise. Commun Dis Intell 24(3): 45-47.

Ferson M.J. and Ressler K.A. (2005). Bound for Sydney town: health surveillance on international cruise vessels visiting the Port of Sydney. Med J Aust 182(8): 391-394.

Kak V. (2007). Infections in confined spaces: cruise ships, military barracks, and college dormitories. Infect Dis Clin North Am 21(3): 773-784.

Miller J., Tam T., Afif C., Maloney S., Cetron M., Fukata K., Klinov A., Hall H., Kertesz D. and Hochin J. (1998). Influenza A outbreak on a cruise ship. Can Commun Dis Rep 24(2): 9-11.

Miller J.M., Tam T.W., Maloney S., Fukuda K., Cox N., Hockin J., Kertesz D., Klimov A. and Cetron M. (2000). Cruise ships: high-risk passengers and the global spread of new influenza viruses. Clin Infect Dis 31(2): 433-438.

Rice E.W., Adcock N.J., Sivaganesan M., Brown J.D., Stallknecht D.E. and Swayne D.E. (2007). Chlorine inactivation of highly pathogenic avian influenza virus (H5N1). Emerg Infect Dis 13(10): 1568-1570.

Russell A. (2009). Border health on the Pacific Dawn. Aust Nurs J 17(2): 29.

Shaman J. and Kohn M. (2009). Absolute humidity modulates influenza survival, transmission, and seasonality. Proc Natl Acad Sci USA 106(9): 3243-3248.

Weber T.P. and Stilianakis N.I. (2008). Inactivation of influenza A viruses in the environment and modes of transmission: a critical review. J Infect 57(5): 361-373.

Wilson M.E. (2003). The traveller and emerging infections: sentinel, courier, transmitter. J Appl Microbiol 94 Suppl: 1S-11S.

World Health Organization. (2009). Interim WHO Technical advice for case management of pandemic (H1N1) 2009 on ships - Draft.

Annex 26: Model health questionnaires for screening persons before embarkation

CRUISE LINES INTERNATIONAL ASSOCIATION, INC.

Public Health Questionnaire

Must be completed by ALL persons age 18 and above boarding the vessel - one form per adult

Date: _____

Ship: _____

Cabin No: _____

Name: _____

Names of all children under the age of 18 travelling with you.

1. _____ 3. _____

2. _____ 4. _____

To assist us in preventing the spread of ***Communicable Diseases*** *during your cruise, we require you to answer the following questions:*

1. Do you, or any person listed above, have any **ONE** of the following symptoms: **Fever or Feverishness, Cough, Runny Nose or Sore Throat OR** has anyone been **in contact with a confirmed InfluenzaA(H1N1) case?**

☐ **Yes** ☐ **No**

2. Within the **last 2 days**, have you or any person listed above developed any symptoms of **Diarrhea or Vomiting?**

☐ **Yes** ☐ **No**

If you answer "Yes", you will be assessed free of charge by a member of our shipboard medical staff. You will be allowed to travel, unless you are suspected to have an illness of international public health concern.

I certify that the above declaration is true and correct and that any dishonest answers may have serious public health implications.

Signature: _____

Thank you CLIA Rev7

Public Health Questionnaire

Must be completed by ALL persons age 18 and above boarding the vessel - one form per adult

Date: _____

Ship: _____

Cabin No: _____

Name: _____

Names of all children under the age of 18 travelling with you.

1. _____ **3.** _____

2. _____ **4.** _____

To assist us in preventing the spread of *Communicable Diseases during your cruise, we require you to answer the following questions:*

1. Do you, or any person listed above, have a Fever or Feverishness PLUS any ONE of the following additional symptoms: Cough, Runny Nose or Sore Throat?

☐ Yes ☐ No

2. Within the last two days, have you or any person listed above developed any symptoms of Diarrhoea or Vomiting?

☐ Yes ☐ No

If you answer "Yes", you will be assessed free of charge by a member of the shipboard medical staff. You will be allowed to travel, unless you are suspected to have an illness of international public health concern.

I certify that the above declaration is true and correct and that any dishonest answers may have serious public health implications.

Signature: _____

Thank you

Annex 27: Examples of informative leaflet for the pandemic A(H1N1) 2009 influenza virus

What is Influenza A(H1N1)?

The present influenza A(H1N1)v virus is a new virus subtype of influenza affecting humans, which contains segments of genes from pig, bird and human influenza viruses in a combination that has never been observed before anywhere in the world. New viruses are often the result of a re-assortment of genes from two other viruses (swap of genes). This A(H1N1)v virus is the result of a combination of two swine influenza viruses that contained genes of avian and human origin.

How does it spread?

By inhalation of the air that contains droplets from infected people who cough or sneeze,

OR

By transferring the virus directly by hand or from surfaces contaminated by droplets to mucous membranes of the eyes, nose and mouth

What can I do to help prevent disease spreading?

- **Avoid close contact with sick people!**
- **Wash or clean your hands frequently!**

Washing or disinfecting your hands thoroughly will help protect you from viruses.

- Wash your hands thoroughly with soap and water, especially after you cough or sneeze.
- You should wash your hands for at least 20 seconds each time.

Liquids or gels are more effective than alcohol-soaked tissues.

- **Avoid touching your eyes, nose or mouth!**

Viruses are often spread when a person touches something that has been contaminated and subsequently touches their eyes, nose or mouth.
(source: European Center for Disease Prevention and Control, ECDC)

How will I know if I have it?

Symptoms of influenza A(H1N1) in humans are usually similar to regular human seasonal influenza symptoms:

- Fever
- Respiratory symptoms such as cough or runny nose
- Sore throat
- Possibly other symptoms such as

– Body aches (particularly muscle pain)
– Headache
– Chills
– Fatigue
– Vomiting or diarrhoea (not typical for influenza but reported by some of the recent cases of the new influenza)

In some cases, severe complications could occur even in normally healthy persons who become infected with the virus.

What should I do if I have it?

- **Report immediately**
- **Stay at your cabin**
- **Seek Medical advice at your cabin**
- **Immediately dispose of your used tissue in a waste bin**

Higher Risk Groups

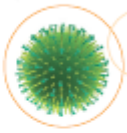
Some people are at higher risk of complications from flu. They may require additional treatment or monitoring. This group includes children under 3, pregnant women and people with heart failure, chronic lung disease, diabetes and kidney disease or people receiving cancer treatment.

What should I do after I return?

In case you develop fever (38°C, 100°F or more) and influenza-like symptoms (such as a runny nose, sore throat, cough, fatigue, general body pains) within seven days of your return from travel, you should rapidly seek medical attention by telephone, informing the persons you consult about your recent travel, in accordance to your national health authorities' recommendations.

What you need to know about Influenza

Prototype Product
Produced for demonstration purpose only. Messages and design may need to be adapted for different national contexts.



What is Influenza?

Seasonal influenza – or 'flu' – is caused by a virus which infects the respiratory system (nose, throat, bronchi and sometimes lungs). It is a communicable infection spread from person to person via large droplets from the coughs and sneezes of an infected person (direct) or by indirect contact.

How do you catch influenza?

Influenza (the flu) spreads from person to person in the following ways: in droplets from an infected person coughing and sneezing and indirect contact when droplets or secretions from the nose and throat settle on objects (including hands) which then are touched by other people who touch their own mouth or nose. Occasionally influenza is spread through finer droplets called aerosols, though this is uncommon.

How do you know you have influenza?

Individuals are most infectious soon after they develop symptoms and, although they can continue to excrete viruses for up to five days after the onset of symptoms (7 days in children), the amount of virus and hence the infection risk drops steadily. The disease can be anything from mild to very severe: someone suffering from the flu can experience anything from only few symptoms to becoming seriously ill.

Symptoms

Common symptoms include:

runny or stuffy nose	headache	tiredness
fever	cough	diarrhoea *
body aches	sore throat	vomiting *

* more common among children than adults

It is most important to stay home and away from others when you begin to develop symptoms.

To avoid getting influenza:

Wash your hands regularly [and especially before eating]

Cover your mouth and nose with a tissue when you sneeze

Dispose of tissues properly

If you do not have a tissue available, cover your mouth and nose

Stay at home when you are ill

What is an influenza epidemic?

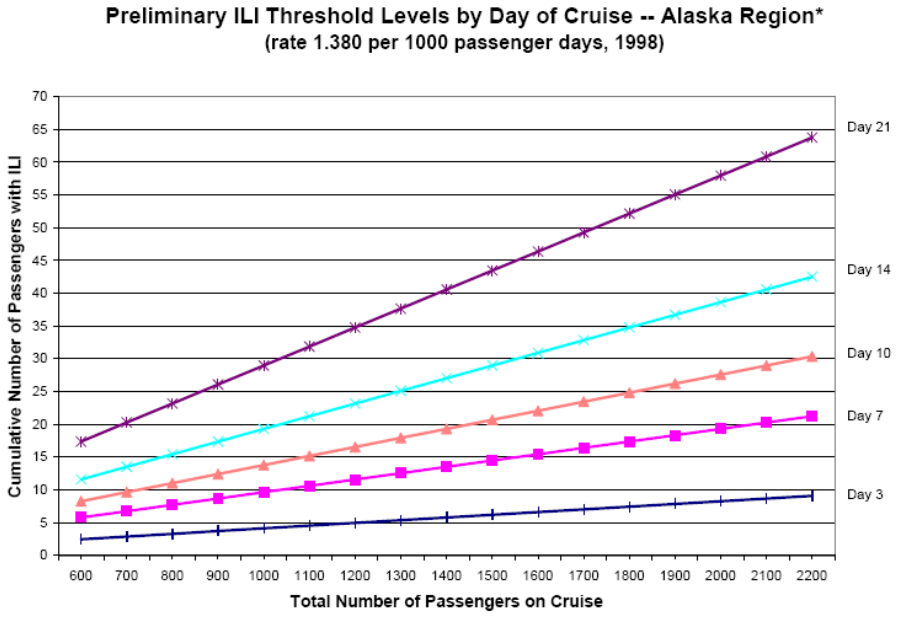
Influenza rapidly spreads around the world in seasonal epidemics. Due to its high contagiousness, it is commonly thought that seasonal influenza affects 5-15% of the global population every year. Influenza imposes a considerable burden in the form of health-care costs and lost productivity.

Who deals with influenza in Europe?

In addition to national authorities, the European Union has a specialised agency dealing with the prevention of communicable diseases such as influenza, the European Centre for Disease Prevention and Control (ECDC). ECDC's mission is to identify, assess and communicate current and emerging threats to human health posed by infectious diseases.

Annex 28: Example of calculating the ILI and GI threshold levels of an outbreak

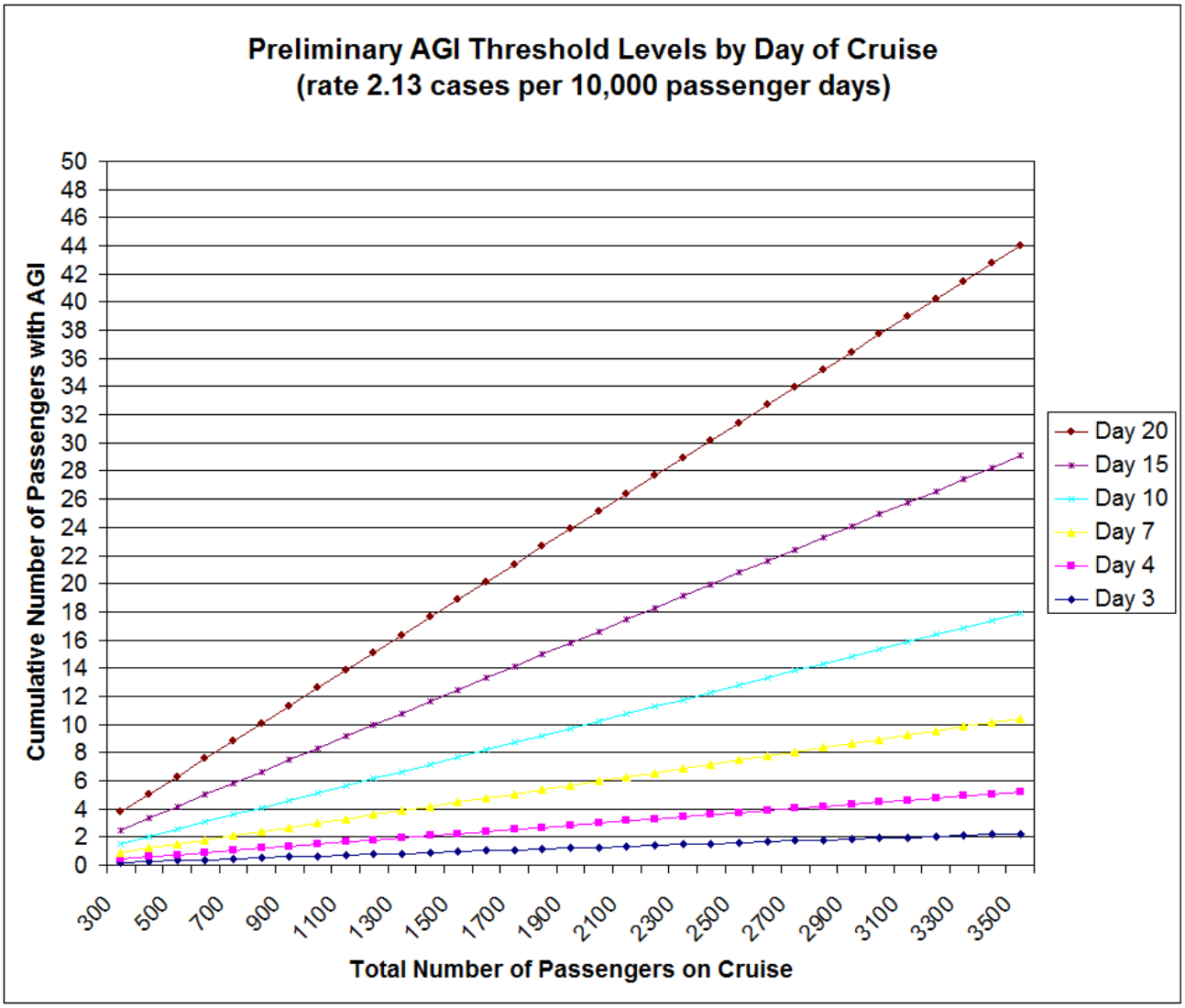
The following diagram presents an example of calculating the ILI threshold levels of an outbreak. Data from an outbreak occurred on a cruise in the Alaska region were used (Centers for Diseases Control and Prevention, 1999).



ILI threshold levels by day of cruise (Centers for Diseases Control and Prevention, 1999).

1. Determine the total number of passengers on the cruise (horizontal axis).
2. Determine the day of the cruise (right side of graph).
3. On the graph, plot the point of intersection of the total number of passengers on the cruise and the line indicating the cumulative number of passengers with ILI by day of cruise, for the cruise day of interest.
4. Read the number of passengers with ILI on the left vertical axis. This is the level at or above which an influenza outbreak is likely occurring.

Thresholds for GI outbreaks



*AGI: Acute Gastrointestinal Illness

Reference list

Thresholds for the early detection of evolving gastroenteritis outbreaks in cruise ships. (2015). EU SHIPSAN ACT Partnership. Unpublished data.

Centers for Diseases Control and Prevention. (1999). Preliminary Guidelines for the Prevention and Control of Influenza-Like Illness Among Passengers and Crew Members on Cruise Ships.

Annex 29: Examples of preventive measures for gastroenteritis infections including norovirus

Ship companies	Issue pre-embarkation health questionnaire or health advice. Isolate ill passengers in their cabins. Isolate ill crew, if necessary by separation as a group from those who are well (cohorting). Close off potentially contaminated areas until cleaned and disinfected Educate passengers concerning transmission. Restrict activities of exposed food handlers who have had contact with cases. Restrict health care personnel in contact with infected persons. Provide PPE (aprons, gloves) for health care personnel caring for and others in contact with affected persons. Protect self-service areas (and all open food) and self-service utensils. Use dissolvable laundry bags and designated machines for laundry from affected people. Provide sanitary diaper/nappy changing in child care areas. Ensure safety of potable water sources and production/distribution. Ensure safe sewage disposal and deal quickly with any blockages or backflow issues. Close recreational water areas during outbreaks.
Passengers	Wash hands after using the toilet. Wash hands before eating or entering a food service area. Shower before using recreational water facility. Postpone travelling if ill.
Crew	Cabin crew to report body fluid spillages. Cleaning teams trained and supervised. Wear PPE such as gloves and gowns when cleaning. Clean and disinfect all surfaces in repeated contact with human hands on a routine basis. Clean and disinfect all surfaces and objects soiled by vomit or faeces immediately. Exclude ill crew (with relevant symptoms) from working. Exclude exposed food handlers from contact with food. Minimise or eliminate bare hand contact with food. Cook all foods, especially shellfish, to the recommended core temperatures and times. Thoroughly wash all vegetables and fruit before preparation. Decontaminate and wash leafy vegetables and berries.

Annex 30: Example of hazard analysis in prevention of gastroenteritis transmission on board ship

HACCP

A systematic analysis of the chain of infection should identify the key elements which permit transmission and what measures can be put in place. These key links in the chain that must be broken are called "critical control points". The HACCP process is a familiar one in food hygiene and is equally appropriate here. Those links in the chain that are not deemed critical are still important, and interventions should be made to the extent possible, but the focus on the critical control points must not be lost.

- Presence of an infected person
- Poor personal hygiene
- Environmental surfaces and objects contaminated by faeces or vomit
- Aerosolised norovirus from vomit
- Food handler who is ill, or excreting microorganisms asymptomatically, handling food with bare hands
- Contaminated raw foods, e.g. shellfish, salads, berries
- Contaminated drinking water
- Contaminated recreational water, e.g. pools and spa
- Contaminated ice
- Cross-contamination of foods by infected consumer
- Inadequate cooking of shellfish or meat or fish
- Waste
- Disease going unnoticed
- Shore excursions

For a fuller account of GI prevention, see Guideline II of the manual.

Annex 31: Disinfectants

Disinfectants used routinely and in outbreaks need to be effective against a range of bacteria and viruses. This annex is focusing on disinfectants used to inactivate norovirus. At present, disinfectants cannot be tested against norovirus directly as it cannot be grown in tissue culture. Therefore, surrogates for norovirus are used to test the efficacy of disinfectants. Any guidance on disinfectants and disinfection procedures are based on extrapolation of test results conducted using surrogates to norovirus. Feline Calicivirus sp. (FCV), Murine Norovirus (MNV) and coliphage MS2 have been used as a surrogate for norovirus in laboratory studies. Recent studies suggest use of more than one surrogate virus to test the efficacy of disinfectants since FCV is significantly less resistant to disinfection than the other surrogates and additionally it has different physicochemical properties than human norovirus. Nevertheless, disinfectants are considered effective when giving at least 4 log reduction in viral titre (99.99 %).

Chlorine bleach

High concentrations of sodium hypochlorite (1,000-5,000 mg/L) are effective against a wide range of bacteria and viruses and have been shown to be effective against MNV, FCV and coliphage MS2. A concentration of 5,000 mg/L sodium hypochlorite solution with approximately four minutes contact time is considered necessary to inactivate the virus. If 1,000 mg/L sodium hypochlorite solutions are used on clean surfaces, then the contact time must be at least 10 minutes. Hypochlorite solutions lose effectiveness on standing therefore freshly reconstituted solutions (used within 24 hours after preparation) are essential in outbreak settings. CDC advise that if the concentration is doubled to 2,000-10,000 mg/L, then the sodium hypochlorite solutions can be prepared and stored for up to 30 days.

Disinfection procedures with chlorine bleach

Before disinfection with chlorine bleach, cleaning with detergent and warm water to remove all organic matter is necessary. Moreover, it should be noted that chlorine gas could be released when chlorine disinfectants are applied directly to urine. The process for cleaning surfaces after a body fluid spillage is given in item 7.1.8 in part A of the manual. Products with combined detergent/disinfection (sodium hypochlorite solution) properties used as a "one-step" process have not been proved to be as effective as the two-step process of cleaning and disinfection.

Other chemical disinfectants

Biocidal products used on board the ships sailing in EUMS must comply with the terms and conditions of the authorisation stipulated in accordance with Article 22(1) and the labelling and packaging requirements laid down in Article 69 of Regulation (EU) No 528/2012. Disinfectants must be used in compliance with the following terms and conditions as specified in the labelling and manufacturer instructions:

- the uses for which the biocidal product is authorized;
- directions for use, frequency of application and dose rate;

- the expiry date relevant to normal conditions of storage;
- the period of time needed for the biocidal effect;
- the interval to be observed between applications of the biocidal product or between application and the next use of the product treated, or the next access by humans or animals to the area where the biocidal product has been used.

The list of products approved in the US for use against norovirus can be found on the website of the US Environmental Protection Agency, List G: EPA Registered Hospital Disinfectants Effective Against Norovirus (Norwalk-like virus), October 29, 2014 (http://www.epa.gov/oppad001/list_g_norovirus.pdf).

Physical disinfection

Chlorine bleach can damage textiles. As an alternative means for norovirus inactivation, thermal disinfection can be applied in clothes and linen, as described in paragraph 7.6 in part A of the manual. Carpets and furnishings that cannot be laundered can be cleaned with detergent and warm water and then with steam.

Other virucidal disinfectants

The efficacy of quaternary ammonium compounds (QUAT) and triclosan against non-enveloped viruses has not been demonstrated. Alcohol-based disinfectants may be used to control bacteria but are generally not very effective against viruses such as norovirus/FCV. As such, their use as a surface disinfectant is not recommended. Hydrogen peroxide, iodine-based disinfectants, glutaraldehyde-based disinfectants and chlorine dioxide has been reported as being an effective disinfectant against FCV, but are of limited practical use due to toxicity or discolour properties or practical difficulties in their use.

Reference list

Centers for Disease Control and Prevention. Updated norovirus outbreak management and disease prevention guidelines. MMWR Recomm.Rep. 2011;60(RR-3):1-18.

European Centre for Disease Prevention and Control. Prevention of norovirus infection in schools and childcare facilities. Stockholm: ECDC; 2013.

Hoelzer K., Fanaselle W., Pouillot R., Van Doren J.M., Dennis S. (2013). Virus inactivation on hard surfaces or in suspension by chemical disinfectants: systematic review and meta-analysis of norovirus surrogates. J Food Prot. 2013 Jun;76(6):1006-16.

Park G.W., Sobsey M.D. (2011). Simultaneous comparison of murine norovirus, feline calicivirus, coliphage MS2, and GII.4 norovirus to evaluate the efficacy of sodium hypochlorite against human norovirus on a fecally soiled stainless steel surface. Foodborne Pathog Dis. 2011 Sep;8(9):1005-10.

Annex 32: Cleaning and disinfection procedures for dealing with potentially contaminated surfaces

Training and supervision of cleaning staff

Isolation of contaminated areas. On passenger ships, any public area in which a body fluid spillage has occurred which has caused contamination by vomit or faeces should be closed or cordoned off immediately and access prevented until it has been cleaned and decontaminated with an appropriate virucidal disinfectant (Annex 31, page 281). The residuals should be covered as quickly as possible after the incident. Once cleaned and disinfected, the area should be ventilated and, where possible, not opened for public access for at least 1-2 hours after cleaning.

Gloving. Proper usage of gloves is needed when cleaning up vomit or faeces. Care should be taken when removing them, with thorough hand washing carried out afterwards, preferably followed by using alcohol-based hand gel. If gloves are contaminated and used for multiple tasks, contamination will spread easily. Gloving by food service workers helps to prevent any faecal transmission to ready-to-eat foods, but is not a substitute for good hand hygiene.

Removing norovirus. The most effective way of removing norovirus from surfaces is to wash with detergent before applying disinfectant. Washing alone cannot sufficiently reduce the number of viral particles to a safe level. The surface should then be disinfected with a product effective against viruses.

Types of disinfectants. A list of disinfectants said to kill norovirus and the disinfection procedure is shown in Annex 31 (page 281).

Water quality. On board ships, the water used for chemical dilution and cleaning must be the same quality as the drinking water. Problems arise with quaternary ammonia compounds used in water with calcium or magnesium hardness above 500 mg/L. Poor quality water with contaminants such as iron, hydrogen sulfides and dissolved solids limit the action of disinfectants and cleaners. It is critical that the water be as free of organic solids as possible.

Clothes and wastewater. The area should be cleaned and disinfected using separate clothes and buckets for cleaning and disinfection. Clothes that have been used for cleaning or disinfection of contaminated areas must be destroyed or incinerated. Wastewater from cleaning must be disposed of as sewage.

Toilets. Fixtures and fittings in toilet areas should be cleaned and disinfected with 5,000 mg/L sodium hypochlorite solution, or a suitable equivalent virucidal disinfectant. Floors and other hard horizontal surfaces should be cleaned and disinfected within an 8-metre radius of contamination. Mop heads, if reused, should be laundered in hot water and heat-dried on the hottest setting, or discarded, as described in paragraph 7.6 in part A of the manual.

Frequency of cleaning. During an outbreak, public toilets should be cleaned at least once an hour when in use.

Steam cleaning. Steam cleaning is claimed to be an effective method of cleaning soft surfaces such as carpets and curtains during outbreaks. However, steam cleaning is questionable as a

disinfection method alone as it is difficult to reach high enough temperatures within soft furnishings. It may be that it has a role combined with other measures. If detergents are used, application must be done with a clean disposable cloth.

Soft furnishings. Chairs and sofas, as well as wall coverings and window treatments, should be thoroughly disinfected with suitable virucidal disinfectant after all visible contaminants have been removed. Allowing them to air dry in the sun is beneficial, if possible. Soiled mattresses should be steam cleaned or discarded. Contaminated carpets should be steam cleaned and treated with a suitable virucidal disinfectant. Furnishings and other soft surfaces within an 8-metre radius of known points of contamination should be cleaned and disinfected as above.

Laundry. The laundry coming from known cases, or any soiled laundry during an outbreak, should be considered to be infectious. Laundry workers must use universal precautions when handling laundry during an outbreak. Laundry should be transported to the laundry area in separate trolleys/carts in sealed bags designated as bio-waste. Ideally, dissolvable alginate laundry bags should be used for all items from the cabins of affected people as they can be placed in washing machines without opening. Once in the laundry, they must be laundered and handled separately from other items. The hottest water should be used and the highest machine dryer setting should be used, as described in paragraph 7.6 in part A of the manual. Soiled laundry suspected of being contaminated must not be sorted or come in contact with any surfaces in the laundry. Any (non-alginate) bags labelled as bio-waste, should be emptied directly into the washers. A suitable detergent should be used in the washing machine, e.g. accelerated potassium peroxymonosulfate.

Food service. Using the above principles, carefully remove all vomit and clean the area. Disinfect the food preparation area with designated virucidal disinfectant. Destroy all exposed foods and any foods prepared by the infected worker.

Leisure facilities. Facilities such as deckchairs should not be overlooked.

Recreational water facilities. If contaminated, these should be drained, cleaned with detergent, then disinfected with a suitable virucidal disinfectant before refilling.

Annex 33: Suggested content of an Outbreak Management Plan (OMP)

1. ***Basic epidemiological information***
2. ***Purpose and scope of the OMP***
3. ***Establishment of on board incident team***
   - 3.1. Compositions
   - 3.2. Duties and responsibilities
4. ***Outbreak management procedures***
   - 4.1. Response phases
     - 4.1.1. Definitions of response phases (e.g. green, amber red, etc.)
     - 4.1.2. Criteria for defining an outbreak
     - 4.1.3. Criteria for defining a case
       - 4.1.3.1. Clinical support for diagnosis
     - 4.1.4. Criteria for defining an outbreak is over
   - 4.2. Monitoring
   - 4.3. Communication and education of crew and passengers
     - 4.3.1. Non outbreak situation
     - 4.3.2. Outbreak situation
   - 4.4. Hygiene procedures (cleaning, disinfection, response to accidental faecal, vomit or blood releases, use of PPE, etc.)
   - 4.5. Notification procedures within the company and with competent authorities
   - 4.6. Documentation and record keeping
     - 4.6.1. GI log
       - 4.6.1.1. GI questionnaire
     - 4.6.2. Recording forms
     - 4.6.3. MDH
   - 4.7. Instructions on OMP per crew member post: Instruction per crew member position for both non-outbreak situation and during an outbreak situation.

     Example of a list of instruction to be included in the OMP for each crew member post:

Crew Position \ Tasks	Education	Documentation	Communication	Monitoring	Reporting	Embarkation	Dissembarkation	Isolation	Medical Facility
Master	x		x						
Group Coordinator/ Event Coordinator	x	x							
F&B Director	x	x			x				
Chief Engineer	x	x		x					
HR Manager	x								
Hotel Manager	x	x	x		x				
Doctor	x		x	x	x			x	x
Staff Captain	x	x	x	x					

5. ***Update and modification of OMP***

Annex 34: Epidemiology of gastrointestinal illness on board passenger ships

A study of gastrointestinal disease surveillance data collected by the VSP reported that from 2001 to 2004, the background (non-outbreak) incidence of reported acute gastroenteritis on cruise ships was 3.25 passengers per cruise (48,206/14,842). The outbreak-associated case incidence was 85 passengers per cruise (6,747 outbreak cases per 79 outbreak associated cruises). The combined outbreak and non-outbreak incidence rates of gastroenteritis per 100,000 passenger days among 14,842 cruises were higher on cruises more than seven days long than on cruises of 3 to 7 days. Among 71 outbreak-associated cruises, the overall incidence rate was 4.8 outbreaks per 1,000 cruises and 3.8 outbreaks per 10,000,000 passenger days (Cramer et al., 2006).

A review of infirmary data from four cruise ships has shown that gastrointestinal illnesses account for less than 10 % of all visits by passengers to ships' infirmaries (Peake et al., 1999).

The likelihood of contracting gastroenteritis on an average seven-day cruise at sea is less than 1 % (Cramer et al., 2006).

The majority of the reported outbreaks to the VSP were attributed to norovirus infection, according to the website database (http://www.cdc.gov/nceh/vsp/surv/GIlist.htm#2001); however, foodborne disease outbreaks also occur. In a review of outbreaks of foodborne diseases associate with passenger ships from 1975 to 2003, 41 out of a total of 50 outbreaks, (82 %) were due to bacterial pathogens (Rooney et al., 2004b). The principle pathogen was *Salmonella*, which caused more than one-quarter of the outbreaks. Other agents were enterotoxigenic *E. coli*, *Shigella*, *Vibrio cholera*, *Staphylococcus aureus*, *Clostridium perfringens*, *Trichinella*, and *Cyclospora*. Factors associated with the outbreaks included inadequate temperature control, infected food handlers, contaminated raw ingredients, cross-contamination, inadequate heat treatment and onshore excursions. Seafood was the most common food vehicle implicated in outbreaks (Rooney et al., 2004b).

Waterborne outbreaks also occur on passengers ships. A review reported that from 1970 to 2003 there were 21 reported outbreaks of gastroenteritis associated with ships of all types whose probable or possible cause was waterborne. Of these, 12 were positively identified as having water or ice as a source. The majority of outbreaks were associated with passenger ships (18/21, 86 %) (Rooney et al., 2004a). Enterotoxigenic *E. coli* was the principal pathogen and was involved in one-third of the outbreaks. Other pathogenic agents were *Salmonella, Shigella*, *Cryptosporidium* and *Giardia lamblia* (Rooney et al., 2004a).

Reference list

Cramer E.H., Blanton C.J., Blanton L.H., Vaughan G.H. Jr., Bopp C.A. and Forney D.L. (2006). Epidemiology of gastroenteritis on cruise ships, 2001-2004. Am J Prev Med 30(3): 252-257.
Peake D.E., Gray C.L., Ludwig M.R. and Hill C.D. (1999). Descriptive epidemiology of injury and illness among cruise ship passengers. Ann Emerg Med 33(1): 67-72.
Rooney R.M., Bartram J.K., Cramer E.H., Mantha S., Nichols G., Suraj R. and Todd E.C. (2004a). A review of outbreaks of waterborne disease associated with ships: evidence for risk management. Public Health Rep 119(4): 435-442.
Rooney R.M., Cramer E.H., Mantha S., Nichols G., Bartram J.K., Farber J.M. and Benembarek P.K. (2004b). A review of outbreaks of foodborne disease associated with passenger ships: evidence for risk management. Public Health Rep 119(4): 427-434.

Annex 35: Background information on Legionnaires' disease and *Legionella* spp.

How water systems on ships can be colonised by *Legionella* spp.

Legionella species can be found as free-living organisms, associated with biofilms or they can live and multiply inside protozoa such as amoebae. Aquatic environments such as ponds, ground waters, wells, rivers and wet soil are natural sources of legionellae and they are also found in artificial environments such as hot and cold domestic water systems. Water containing legionellae may be loaded from ports to the ship. Legionellae can colonise internal surfaces of water system and at appropriate warm temperatures (20-45 °C, 68-113 °F) they can proliferate, creating colonies with high numbers of bacteria. A biofilm is the accumulation of microorganisms, covered by a protective layer and attached to the water system surface. The presence of a biofilm within the internal surfaces of a water system provides nutrients and shelter to the *Legionella* bacteria, encouraging growth and colonisation. Parts of the biofilm may be released, contaminating the water and creating additional colonies in other parts of the system.

Outbreaks on passenger ships

Recognised risk factors for Legionnaires' disease include being of an older age group (> 50 years) and many people on passenger ships belong to this age group (1997a; Peake et al., 1999).

Between 1996 and 2006, more than 32 incidents of ship associated Legionnaires' disease have been reported worldwide, involving 72 cases and eight fatalities. The majority of cases occurred on board ships sailing within European waters (Mouchtouri et al., 2007).

The number of outbreaks and cases reported in the literature is an underestimate of the true incidence of the disease. As with hotels, outbreaks and cases associated with ships, especially ferries, are difficult to detect because the incubation period of 2-10 days or more means that passengers may have dispersed widely, including to different countries, before developing symptoms.

To detect Legionnaires' disease outbreaks, surveillance on board the ship, as well as by an international surveillance scheme such as the European Legionnaires' Disease Surveillance Network (ELDSNet) are necessary.

Characteristics of the microorganism

Studies have shown that:

- Naturally occurring *L. pneumophila* survived and multiplied in water at temperatures between 25 °C (77 °F) and 45 °C (113 °F), with an optimal temperature range of 32-42 °C (90-108 °F) (Yee and Wadowsky, 1982).
- At temperatures above 70 °C (158 °F) *Legionella* are destroyed almost instantly (Dennis et al., 1984; Dennis and Lee, 1988)
- *Legionella* have been isolated from environmental sources ranging from a pH of 2.7 to 8.3 (Sheehan et al., 2005).
- 0.1 mg/L of free chlorine kills 99 % of *L. pneumophila* within 40 minutes (at 21 °C (70 °F), pH 7.6).
- *Legionella* survived inside amoebal cysts treated with 50 mg/L free chlorine (Kilvington and Price, 1990).
- A specific clone of *Legionella pneumophila* sg1 was able to survive for 17 years in a hospital water distribution system, despite several hyperchlorination applications (Garcia et al., 2008).
- *Legionella* have been found in saline water and therefore there is a risk for contamination of water systems operating with sea water (Heller et al., 1998).

Reference list

Dennis P.J., Green D. and Jones B.P. (1984). A note on the temperature tolerance of Legionella. J Appl Bacteriol 56(2): 349-350.

Dennis P.J. and Lee J.V. (1988). Differences in aerosol survival between pathogenic and non-pathogenic strains of Legionella pneumophila serogroup 1. J Appl Bacteriol 65(2): 135-141.

Garcia M.T., Baladron B., Gil V., Tarancon M.L., Vilasau A., Ibanez A., Elola C. and Pelaz C. (2008). Persistence of chlorine-sensitive Legionella pneumophila in hyperchlorinated installations. J Appl Microbiol 105(3): 837-847.

Heller R., Holler C., Sussmuth R. and Gundermann K.O. (1998). Effect of salt concentration and temperature on survival of Legionella pneumophila. Lett Appl Microbiol 26(1): 64-68.

Kilvington S. and Price J. (1990). Survival of Legionella pneumophila within cysts of Acanthamoeba polyphaga following chlorine exposure. J Appl Bacteriol 68(5): 519-525.

Mouchtouri V.A., Nichols G., Hadjichristodoulou C. and EU SHIPSAN project Partnership. (2007). State of the Art Report.

Peake D.E., Gray C.L., Ludwig M.R. and Hill C.D. (1999). Descriptive epidemiology of injury and illness among cruise ship passengers. Ann Emerg Med 33(1): 67-72.

Sheehan K.B., Henson J.M. and Ferris M.J. (2005). Legionella species diversity in an acidic biofilm community in Yellowstone National Park. Appl Environ Microbiol 71(1): 507-511.

Yee R.B. and Wadowsky R.M. (1982). Multiplication of Legionella pneumophila in unsterilized tap water. Appl Environ Microbiol 43(6): 1330-1334.

Annex 36: Chlorine disinfection procedures of water tanks and distribution system (EWGLI 2011)

Chlorine is used for the treatment of hot and cold water systems. As the bactericidal action of the chlorine is pH sensitive and decreases rapidly at values above 7, the pH of the water will have to be monitored and may need adjustment. In systems that are colonised the chlorine residual will be used up quickly; it is, therefore, essential that monitoring of distal points in all parts of the system be carried out to ensure there is an effective concentration of free chlorine available.

Shock hyperchlorination

This must be carried out in water at a temperature below 30 °C (86 °F), with a single addition of chlorine to the water to obtain concentrations of free residual chlorine of 20-50 mg/L throughout the installation, including distal points. For calculating the sodium or calcium hypochlorite dose required to obtain specific residual chlorine, Table 19 can be used. After a contact period of at least two hours with 20 mg/L of chlorine or at least one hour with 50 mg/L of chlorine, the water is drained. Fresh water is then drawn into the installation until the level of chlorine returns to the concentration of 0.2 mg/L and not more than 5.0 mg/L.

Continuous chlorination

This is achieved by the continuous addition of chlorine, usually in the form of calcium hypochlorite or sodium hypochlorite. Residual levels of chlorine can vary depending on the quality of the water, the flow, and the amount of the biofilm in the system. However, the residual disinfectant must be between 1 and 2 mg/L. The chlorine may not inactivate legionellae in areas in the water distribution system where there are stagnation or circulation problems. Although continuous chlorination has been used as a means of control in hot water systems, it is difficult to maintain the required levels of chlorine as it volatilises off from hot water. In addition, chlorine is corrosive and this effect is increased with raised temperatures.

Table 19: Dose of sodium hypochlorite required to achieve a target residual chlorine concentration for each litre of water

Target residual chlorine concentration (mg/L)	Dose (in mL) of sodium hypochlorite with active chlorine concentration 12.5 % / 14 % / 15 % to be added per each litre of water to be disinfected		
	12.5 %	14 %	15 %
1	0.008	0.007	0.001
2	0.016	0.014	0.003
3	0.024	0.021	0.007
4	0.032	0.029	0.013
5	0.040	0.036	0.020
10	0.080	0.071	0.027
20	0.160	0.143	0.033
50	0.400	0.357	0.067

Reference list

European Working Group for Legionella Infections. (2011). EWGLI Technical Guidelines for the Investigation, Control and Prevention of Travel Associated Legionnaires' disease.

Annex 37: Thermal disinfection procedures of hot water tanks and distribution system (EWGLI 2011)

Thermal shock

Thermal shock treatment at 70-80 °C (158-176 °F) for relatively short periods has been used both for emergency disinfection and as part of long-term control programmes. However, recolonization can frequently occur rapidly, even within a couple of weeks. This method carries an increased risk of scalding and must be carefully managed to avoid the risk. It is no longer recommended as part of a long-term control programme.

Thermal disinfection is carried out by raising the temperature of the whole of the contents of the hot water storage heater to 70-80 °C (158-176 °F) then circulating this water throughout the system for up to three days. To be effective, the temperature at the hot water storage heater should be high enough to ensure that the temperatures at the taps and appliances do not fall below 65 °C (149 °F). Each tap and appliance should be run sequentially for at least five minutes at the full temperature, and this should be measured. For effective thermal disinfection, the water system needs to be well insulated.

It is essential to check that during the procedure, the temperature of the water in distal points reaches or exceeds 65 °C (149 °F).

At the end of the procedure, samples of water and sediment should be collected at distal points of the installation and examined for *Legionella*. If the result is unsatisfactory, the procedure must be repeated until documented decontamination is achieved. Following decontamination, microbiological checks must be repeated periodically.

Thermal treatment has the advantage that no special equipment is required so that the procedure can be carried out immediately, provided there is sufficient heat capacity in the system. However, the procedure requires considerable energy and manpower and is not normally practical for large systems but may be suitable for small systems. It will not disinfect downstream of thermostatic mixer valves unless the valves can be overridden, and so is of limited value where such valves are installed. There is a severe risk of scalding at these temperatures. Although the numbers of *Legionella* may be reduced, recolonization of the water system can occur from as little as a few weeks after treatment, particularly if it has not been accompanied by other remedial measures (EWGLI, 2011).

Constant maintenance of the temperature between 55-60 °C (131-140 °F)

At 60 °C (140 °F) it takes approximately two minutes to inactivate 90 % of a population of *L. pneumophila.* The effectiveness of maintaining the circulating temperature at 60 °C (140 °F) has been demonstrated both in hospitals and in hotels. Hot water installations maintained at temperatures above 50 °C (122 °F) are less frequently colonised by *Legionella*.

Circulating water at 60 °C (140 °F), such that the temperature at each outlet reaches at least 50 °C (122 °F) and preferably 55 °C (131 °F) within one minute of opening the outlet, is the method most commonly used to control *Legionella* in hot water distribution systems.

Although raising the temperature to a constant 60 °C (140 °F) has consistently been shown to control outbreaks it does not necessarily eliminate *Legionella* from the system but controls them at a level that prevents further cases. Provided there is sufficient heating capacity, it is relatively easy to implement and is easy to monitor continuously. It is important that the temperature of the return on each loop of the system is monitored as well as the tap and flow temperatures. It has the possible disadvantage of increasing energy consumption and there is an increased risk of scalding. Where thermostatic mixer valves are installed to reduce scalding risk, they must be subjected to a programme of planned monitoring and maintenance.

Reference list

European Working Group for Legionella Infections. (2011). EWGLI Technical Guidelines for the Investigation, Control and Prevention of Travel Associated Legionnaires' disease.

Annex 38: Personal Protective Equipment

Persons exposed to water sampling, cleaning or other procedure should wear suitable respiratory protective equipment. This can be a powered filter and hood, European Class TH3 (assigned protection factor of 40) or a power assisted filter and close fitting full face mask, TM3 (assigned protection factor 40). It should be borne in mind that the filter on these systems is liable to get wet, and consequently, resistance to air can increase with consequent discomfort to the operator (EWGLI, 2011).

Alternatively, a hood or full-face mask fed with breathing quality compressed air may be used. The preferred equipment is a full-face close fitting airline mask with a positive pressure demand valve, under a hood or helmet protecting the rest of the head. The air supply should come from an oil-free compressor drawing air through a filter from a location well upwind of any jetting operation, or through cylinder supplies of compressed air. Further information on respiratory protective equipment can be obtained from Respiratory Protective Equipment at Work — a Practical Guide (HSE 2005).

Reference list

European Working Group for Legionella Infections. (2011). EWGLI Technical Guidelines for the Investigation, Control and Prevention of Travel Associated Legionnaires' disease.

Health and Safety Executive. (1998). The selection, use and maintenance of respiratory protective equipment: A practical guide HSG53 (Second edition) HSE Books ISBN 0 7176 1537 5.

Annex 39: Legionnaires' disease case investigation questionnaire

Name of person completing the form
Date reported
Ship name
Cabin number
Date on ship

Possible diagnosis:
Legionnaires' disease
Pontiac fever

Personal details
Sex Male ❒ Female ❒
Surname
Forename
Date of birth
Home address

Post code/zip code
Phone No.
Occupation
Nationality

Clinical history of case

Date of onset of symptoms:.....

(malaise, fever, respiratory symptoms, diarrhoea)

Did this patient have pneumonia? Yes ❒ No ❒ Unknown ❒

What were the other main clinical features?.....

.....

Has the patient had a recent organ transplant? Yes ❒ No ❒ Unknown ❒

Was the patient immunosuppressed for other reasons? Yes ❒ No ❒ Unknown ❒

If "yes", please give details:.....

Please give details of any other underlying condition: .....

Possible points of exposure to *Legionella* on the ship

In the 2 weeks before the onset of symptoms (please include dates where possible), did the patient:

Visit a whirlpool spa on board? Yes ❒ No ❒ Unknown ❒

If "yes", please give details (did you use the spa or spend time near it?) If there were multiple spas, which one was used? .....

.....

Use a whirlpool spa anywhere else? Yes ❒ No ❒ Unknown ❒

If "yes", please give details:.....

.....

Use a shower? Yes ❒ No ❒ Unknown ❒

If "yes", was it: at cabin? ❒ communal? ❒ elsewhere? ❒

Attend a dentist unit? Yes ❒ No ❒ Unknown ❒

If "yes", please give details:.....

.....

Use a nebuliser? Yes ❒ No ❒ Unknown ❒

If "yes", please give details:.....

.....

Spend any time near building works when ashore? Yes ❒ No ❒ Unknown ❒

If "yes", please give details:.....

.....

Spend any time near fountains on board the ship or when ashore? Yes ❒ No ❒ Unknown ❒

If "yes", please give details:.....

.....

Visit a public building when ashore? Yes ❒ No ❒ Unknown ❒

If "yes", please give details:.....

.....

Suspected travel associated infection other than the ship

If the patient has been away from home (other than on this ship) in the 2 weeks before the onset of symptoms of legionellosis, please give details:

Country	Town or resort	Other Ferries/ Cruise ships / hotels*	Date of state From	To

*including number of cabin/room

Company's details (including name of company/hotel/ship):.....

.....

Suspected Hospital acquired infection

Was the patient in hospital or did they visit someone in hospital for any time in the 2 weeks before the date of onset of symptoms?

Admitted to hospital ❒ Visited hospital ❒ Date of admission/visit ❒

Diagnosis on admission:.....

Type of ward or unit in which patient was resident/ a visitor (including number if known):
.....

If the patient was transferred from another hospital, please give details

Name of hospital before transfer:.....

Date of stay: From ..... to .....

Suspected employment associated infection

These questions apply to any work carried out in the 2 weeks before the onset of symptoms

Has the patient worked with water/water storage systems? Yes ❒ No ❒

If "yes", please give details:.....

.....

Has work involved/been located near cooling towers*? Yes ❒ No ❒ Unknown ❒

If "yes", please give details:.....

.....

(*cooling towers include commercial water cooling systems used in air conditioning plants)

Did the patient had the feel of exposure to a spray of water droplets on his/her face from fountains/cooling towers/water from water storage systems? Yes ❒ No ❒

If "yes", please give details:.....

.....

Legionella microbiology results

Did specimens collected from patient and tested for *Legionella*? Yes ❒ No ❒

If Yes, please specify method of examination and results: .....

Annex 40: Sampling guidelines (EWGLI 2011)

Safety measures

PPE should be provided as described in Annex 38 (page 292).

Sampling the ship's water systems

Sample sites should be chosen to be representative of the whole water system. The water storage and piping plans should be consulted prior to selecting the sample points.

Distribution of sites to be sampled:

1. Systemic

- Incoming cold water to the ship including any water tank
- Hot water leaving the water heater
- Circulating hot water returning to the heater

2. Basic

- The outlet nearest to the entry of the hot water into the facility
- The most distal sites within the hot and cold distribution systems
- The cabin(s) where the infected guest(s) was/were accommodated
- The samples points in recreational water facilities

3. Supplementary

- Cabins on different decks to be representative of the different loops of the distribution systems
- Temperature monitoring is an important factor in the risk assessment process to determine appropriate sampling points. For example, samples taken from the warmest point in a cold water system, or the coolest part of a hot water system, are likely to pose the greatest risk of legionellae growth, and survival of legionellae.
- Areas where there has been stagnation; for example a closed deck of cabins

How to sample

Collect one-litre samples in sterile containers containing sufficient sodium thiosulphate pentahydrate to neutralise any chlorine or other oxidising biocide. Measure the temperatures using a calibrated thermometer, placed in the middle of the water stream after the sample has been collected.

Systemic points

If possible, samples should be collected from the water softener if fitted, in the boiler room from the discharge valves of the hot water flowing from the heater to the other parts of the ship, return

water and cold water feed to the heater. If hot water storage heaters/buffer vessels are installed, samples from the sludge drain valves should also be collected. If there are no suitably representative sample points of the water in the heater, i.e. the water flowing from the heater and the flow returning to the heater, this fact should be recorded. If expansion vessels are incorporated these should be sampled if possible.

Basic and supplementary points

Hot water

Collect the water discharging from the tap immediately after it is switched on. This "immediate" sample will be representative of the colonisation of the outlet and most representative of the risk to the user. Continue to run the tap until 60 seconds has passed and then measure the temperature.

If you wish to determine if the water feeding the outlet from the main cold water feed or circulating hot water system is colonised it is necessary to collect a sample from a tap after it has been flushed and disinfected. Run the tap for one minute, clean and disinfect the outside and inside of the tap spout with a 1 % solution of sodium hypochlorite or 70 % ethanol, leave it for at least one minute and then flush the outlet to remove residual disinfectant. Without adjusting the flow, collect the "post-flush water sample" which represents the water feeding the outlet.

Swabs — sample the inner walls of showerheads and their handles with a sterile cotton swab using a rotating motion. Sample shower hoses at the point where it is attached to the fitting. Swabs should be transported in 0.5-1.0 mL of the same residual water, sterile water or sterile Pages Saline.

Sieves on mixer valves — remove the sieves and swab and culture any deposit within them.

Cold water

Collect an immediate sample as for the hot water, then leave the water running until it has flowed for two minutes in total and then measure the temperature of the flowing water. Finally, a post-flush sample may be collected if required in the manner described above. When the water temperature in the system is ≤ 20 °C (68 °F), the number of samples can be reduced.

Water closet cisterns

These should not be overlooked as potential sources of infection as they can become heavily colonised if the ambient temperature is high or the water closet is used infrequently e.g. disabled toilets often have restricted use. Collect water samples directly from the cistern using a clean sterile container. Swabs from the cistern at the waterline are also useful.

Spa pools

One litre samples of water should be collected from the pool and, where fitted, the balance tank. In some investigations water from the pool has yielded few *Legionella* at the time of sampling although filter material and biofilm from inside the pipes contained large quantities of *Legionella*. This probably reflected the type and positioning of the biocide treatment and zones within the piping where the biocidal effect did not penetrate adequately. Therefore, it is also important to

inspect the air and water circulation pipes and hoses for the presence of biofilm containing *Legionella*. Biofilm samples should be collected with swabs from the inside of some sections of these pipes. It is sometimes possible to do this by removing a jet but quite often sections of pipe will have to be cut out to gain adequate access.

Air washers and humidifiers

Collect samples of at least 200 mL directly from the source.

Decorative fountains, water features and irrigation systems

Collect samples of at least one litre, if possible from the warmest part of the system.

Sample transport and laboratory processing

Samples must be kept at less than 18 °C (64.6 °F) and more than 6 °C (42.8 °F) and protected from direct light. Water and swabs should be processed within 48 hours (ideally within 24 hours) of collection (ISO 11731). If the direct membrane filtration method is to be used for the analysis then the samples (including hot water samples) should be transported at a temperature of 2 to 8 °C (35.6 to 46.4 °F) (ISO 11731-2). Do not freeze samples.

During the sampling, all details that may help the implementation of possible remedial measures should be recorded. For example, obvious pressure and temperature drops or rises in the water circuits, the presence of iron sediment or sludge, the condition of aerator and taps, the occurrence of scale, and the presence of various rubber and plastic attachments. The presence of biocide (time and date dosed) and type of biocide and other control factors dependent on the system e.g. pH levels, appearance of the water, etc. should be recorded.

WARNING: It is important to follow the sampling procedure as incorrectly collected samples makes interpretation of the results difficult.

Example of a sampling schedule for ships

Equipment/Facility	Sampling frequency
Representative water outlets of every water distribution loop of hot and cold water system (cabins, staterooms, pantries, washrooms, window and deck washing taps, etc.)	Every six months (or every three months if water temperature is not maintained within the acceptable operational limits)
Reverse osmosis plants	Every year (one per unit)
Evaporators	Every year (one per unit)
Bunkering	Every year (one per unit)
Softeners	Every year(one per unit)
Mineralizers	Every six months (one per unit)
Potable water tanks	Every year (one per unit)
High pressure washing tanks	Every year(one per unit)
Cartridge filters (potable water system)	Every six months (one per unit)
Sand filters (potable water system)	Every six months (one per unit)
Pumps	Every year (one per unit)
Heaters	Every six months 2 per unit (1 leaving and 1 returning to the heater)
Technical water tank	Every year

Laundry water tank	Every year
Public swimming pools (if water temperature is > 25 °C and fitted with water features creating aerosols)	Every six months (one per unit)
Public hot tubs/spas	Every three months (one per unit) (see Table 9)
Individual spas in staterooms	Every year (one per unit)
Decorative water features	Every six months (one per unit)

Annex 41: Contact tracing form

Ship name: IMO number: Voyage number: Dates From: To: Pages …….of……..

Case's first name and ID number	**Contact name**	**Age** (yrs)	**Sex**	**Pax / Crew**	**Type of contact** (family, friend, cabin, social, work, etc.)	**Last exposure date** (dd/mm/yy)	**Prophylaxis given** (vaccination, Immunoglobulin)	**Remarks***

* Remarks could include any relevant information to the current outbreak such as lab specimen taken

Annex 42: Case definitions for measles, rubella and varicella

Commission Decisions 2008/426/EC and 2009/539/EC include the following case definitions

MEASLES (Measles virus)

Clinical criteria:

Any person with fever

AND

- Maculopapular rash

AND at least one of the following three:

- Cough
- Coryza
- Conjunctivitis

Laboratory criteria:

At least one of the following four:

- Isolation of measles virus from a clinical specimen
- Detection of measles virus nucleic acid in a clinical specimen
- Measles virus specific antibody response characteristic for acute infection in serum or saliva
- Detection of measles virus antigen by DFA in a clinical specimen using measles-specific monoclonal antibodies

Laboratory results need to be interpreted according to the vaccination status. If recently vaccinated, investigate for wild virus.

Epidemiological criteria:

An epidemiological link by human to human transmission

Case classification:

A. Possible case

Any person meeting the clinical criteria

B. Probable case

Any person meeting the clinical criteria and with an epidemiological link

C. Confirmed case

Any person not recently vaccinated and meeting the clinical and the laboratory criteria

RUBELLA (Rubella virus)

Clinical criteria:

Any person with sudden onset of generalised maculo-papular rash
AND
At least one of the following five:

- Cervical adenopathy
- Sub-occipital adenopathy
- Post-auricular adenopathy
- Arthralgia
- Arthritis

Laboratory criteria:

Laboratory criteria for case confirmation:

At least one of the following three:

- Isolation of rubella virus from a clinical specimen
- Detection of rubella virus nucleic acid in a clinical specimen
- Rubella virus specific antibody response (IgG) in serum or saliva

Laboratory criteria for probable case:

- Rubella virus specific antibody response (IgM)

Laboratory results need to be interpreted according to the vaccination status.

Epidemiological criteria:

An epidemiological link by human to human transmission

Case classification:

A. Possible case

Any person meeting the clinical criteria

B. Probable case

Any person meeting the clinical criteria and with at least one of the following two:

- An epidemiological link
- Meeting the laboratory criteria for a probable case

C. Confirmed case

Any person not recently vaccinated and meeting the laboratory criteria for case confirmation

Varicella is not included in the list of EU list of diseases for Surveillance (Commission Decision of 28/IV/2008). Therefore currently each country is not bound to a standard case definition. The EUVAC.NET proposal (EUVAC.NET 2010) for a case definition and classification for the surveillance of varicella at EU level is given in the box below.

VARICELLA (Varicella virus; Chicken pox)

Clinical criteria:

Any person with sudden onset of generalised maculo-papular rash

Laboratory criteria:

At least one of the following three:

- Isolation of varicella virus from a clinical specimen
- Detection of varicella virus nucleic acid in a clinical specimen
- Detection of specific varicella virus IgM antibody by specific IgM antibody response

Laboratory results need to be interpreted according to the vaccination status.

Epidemiological criteria:

An epidemiological link by human to human transmission

Case classification:

A. Possible case

N/A

B. Probable case

Any person meeting the clinical criteria

C. Confirmed case

Any person not vaccinated and meeting the clinical and the laboratory criteria or with an epidemiological linked to a confirmed or probable case of varicella or herpes zoster

In case of recent vaccination: Any person with identification of wild-type varicella zoster virus

Reference list

EUVAC.NET. (2010). Surveillance of Varicella and Herpes Zoster in Europe. Copenhagen, Statens Serum Institut.

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