

1 Introduction

1.1 Ships and Public Health

Over one hundred outbreaks of infectious diseases were reported to be associated with ships between 1970 and 2000 (WHO 2001). Reported outbreaks included legionellosis, typhoid fever, salmonellosis, viral gastroenteritis, enterotoxigenic *E coli* infection, shigellosis, cryptosporidiosis and trichinosis. Naval, cargo and cruise vessels have all been affected often with serious operational and financial consequences.

These reported outbreaks represent just a small proportion of the total disease burden attributable to ship-acquired disease. For every notified and reported case listed in outbreak reports, there are likely to be orders of magnitude more cases that go unreported.

Ships can have significance to public health beyond just their role in ship-acquired infection. For example, ships can transport infected humans and other vectors, such as mosquitoes and rats, between ports and, therefore, act as a means of international disease transfer.

If proper control measures are not in place, ships are particularly prone to disease outbreaks. Ships are isolated communities with crowded living accommodation, shared sanitary facilities and common food and water supplies. Such conditions are favourable to the spread of infectious diseases. The inevitable publicity that breaks out along with a disease outbreak aboard ship can seriously impact financially on the ship owners and those relying on use of the ship for transport or leisure.

Becoming ill aboard ship can be particularly dangerous because the ship may be isolated from modern medical centres. Furthermore, once an outbreak has been reported aboard ship it may not be permitted to dock. It is estimated that 1.2 million seafarers are employed on general cargo vessels. Many spend months at sea, sometimes in remote regions of the world. Cargo ships on long voyages are isolated communities. Good sanitation conditions on vessels are crucial both to the health of seafarers and to the shipping industry's ability to attract and retain competent employees.

Historically ships have played an important role in transmitting infectious diseases around the world. The spread of cholera pandemics in the nineteenth century was thought to be linked to trade routes and facilitated by merchant shipping. Efforts to control human disease on ships, can be traced back to the Middle Ages when in 1377, Venice and Rhodes denied access to ships carrying passengers infected with the plague and the term "quarantine" was coined. On arrival travellers were detained in isolation for 40 days before they were allowed to proceed to their final destination. Overcrowding on ships, filth and lack of personal hygiene were often associated with epidemics of typhus fever. Preventive measures, such as quarantine, delousing, and maintaining personal cleanliness by use of soap, were gradually adopted, and the incidence of typhus decreased.

1.2 International Health Regulations

The International Sanitary Regulations were developed in 1951 to prevent the spread of six infectious diseases – cholera, plague, yellow fever, smallpox, typhus and relapsing fever. These regulations were revised and renamed the International Health Regulations (IHR) in 1969.

The purpose of the International Health Regulations is, and remains, as being: “to provide security against the international spread of disease while avoiding unnecessary interference with international traffic”.

The IHR were amended in 1973 and 1981. The diseases now subject to these regulations were reduced to three: plague, yellow fever and cholera. In 1995 the World Health Assembly called for the regulations to be revised. The target date for submission of the revised IHR to the World Health Assembly is May 2005 and a draft revision has been completed dated 12 January 2004 (WHO 2004).

Since the IHR applies to world traffic, ships, aircraft, other conveyances, travellers and cargos are its primary considerations for arrivals. Ships and aircraft are discussed specifically in their own “Guides”. The Guides provide a summary of the health basis behind the IHR and help to bridge the gap between the regulation, as a legal document, and the practical aspects of implementation of appropriate practices.

1.3 WHO Guide to Ship Sanitation

In 1967, the World Health Organization published a *Guide to Ship Sanitation* (The Guide) which was subjected to minor amendments in 1987. The Guide was directly referenced in the IHR (Article 14) and its purpose was to standardise the sanitary measures taken in relation to ships to safeguard the health of travellers and to prevent the spread of infection from one country to another.

The 1967 Guide was based on the results of a survey of 103 countries and represented a synthesis of best national practice at the time. It covered potable water supply, swimming pool safety, waste disposal, food safety and vermin control. Before publication it was circulated to the International Labour Organization (ILO) and a number of other international agencies for comment. The Guide supplemented the requirements of the IHR 1981 and was the official global reference for health requirements for ship construction and operation.

Since 1967 a number of specific guidance documents, conventions and regulations have evolved that provide full accounts of the design and operational detail relating to ships and take sanitation into consideration. To some extent these have made the purpose of the original Guide outdated and the purpose of this revised Guide is different. The Guide is now only referenced in the current draft of the revised IHR (WHO 2004) as a footnote.

The primary aim of the revised *Guide to Ship Sanitation* is to present the public health significance of ships in terms of disease and to highlight the importance of applying appropriate control measures. The guide is intended to be used as a basis for the development of national approaches to controlling the hazards that may be encountered on ships, as well as providing a framework for policy making and local decision making. The guide may also be used as reference material for regulators, ship operators and ship builders, as well as a checklist for understanding and assessing the potential health impacts of projects involving the design of ships.

1.4 Structure of the Guide

The Guide is structured into three sections and 12 chapters as follows:

- I. General Introduction, setting the GSS in their legal context, considering the International Health Regulations and describing the relationship to other documents and regulations and standards.
 - Chapter 1. Introduction.

- II. Technical chapters, divided according to exposure and dissemination pathways, describing the health basis for the management of each pathway and then providing an overview of the technical aspects.
 - Chapter 2. Water Safety.
 - Chapter 3. Food Safety.
 - Chapter 4. Swimming and Spa Pools.
 - Chapter 5. Waste Management and Disposal.
 - Chapter 6. Legionnaires' Disease.
 - Chapter 7. Persistent Infectious Agents.
 - Chapter 8. Disease Vectors.

- III. User-targeted chapters, divided according to the main categories of those responsible, directly or indirectly, for ship sanitation and highlighting their responsibilities.
 - Chapter 9. Port Health – Disease Surveillance and Outbreak Management.
 - Chapter 10. Port Health – Management of Inspections, Audit and Reporting.
 - Chapter 11. Ship Design and Construction.
 - Chapter 12. Ship Operation Responsibilities: Ship Owner, Operator, Engineer, Master and Surgeon.

1.5 Development of the Guide

The Guide has been developed through a series of iterative drafting and peer review. This has included international workshops, the first being held in Miami, Florida, 1-3 October 2001 and the second in Vancouver, Canada, 8-10 October 2002. Draft material was presented and comments were captured and collated to reach a consensus on structure and content. Finally, a series of international consultations were held and the current draft of the Guide has been prepared for these consultations.

1.6 References

WHO (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. WHO/SDE/WSH/01.4

WHO (2004) Intergovernmental Working Group on the Revision of the International Health Regulations. Working Paper 12. 2003. 12 January 2004.