INTERNATIONAL MARITIME HEALTH ASSOCIATION

WORKSHOP

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THE SHIP'S MEDICAL CHEST
PRESENT ACHIEVEMENTS AND FURTHER PERSPECTIVES

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Introduction

The medical chest carried on board a ship contains medical equipment and medication for use while at sea. The chest forms an essential part of the arrangements for managing any medical emergencies from ill-health or injury that may arise when the ship is distant from shore-based healthcare facilities. The other elements of these arrangements are:

- the training provided for officers in medical first aid,
- a guide to medical diagnosis and treatment
- space and facilities on the ship for those who are injured or unwell
- access to shore based radiomedical or telemedical advice
- arrangements for medical evacuation to shore where feasible
- access to health care facilities on arrival in port.

All these requirements are in international instruments that maritime states are required to comply with through their own legislation and inspection regimes. While there is an international requirement to carry a medical chest there are no formal international instruments that specify its contents. (Appendix 1) However the WHO International Medical Guide for Ships (IMGS) has includes a suggested list of medications and equipment and until recently an indication of the quantities to be carried. Some regions such as the EU and a number of maritime authorities do specify contents.[1] These specifications usually relate to crew size and voyage pattern. Some authorities give detailed lists of what must be carried while others provide indicative lists covering the classes of medication needed and their quantities.

[1] Council Directive 92/29/eec of 31 March 1992 on the minimum safety and health requirements for improved medical treatment on board vessels. Selected examples
(UK) Maritime and Coastguard Agency. MSN 1768. Ships' Medical Stores, 2003.
(NL) Netherlands Shipping Inspectorate. Medische uitrusting aan boord van zeeschepen en vissersvaartuigen/Medical supplies on board Dutch sea-going vessels and fishing vessels, 16 July 2006
(D) Verordnung über die Krankenfürsorge auf Kauffahrteischiffen vom 25.4.1972 (BGBl. I, S. 734), zuletzt geändert durch die Dritte Verordnung zur Änderung der Verordnung über die Krankenfürsorge auf Kauffahrteischiffen vom 5.9.2007. BGBl. I, S. 2221
(Full list of EU member states legal references available from rapporteur on request)

Ro-Ro and passenger ships may carry a ship's doctor or a doctor's bag for use by a competent passenger.[2] There are additional requirements for emergency treatment if a ship carries a dangerous cargo.[3] Ship's lifeboats carry a pack of emergency medication.[4] Medication may also be brought on board by seafarers to treat continuing medical problems. These aspects are not considered here.

Effective emergency treatment

To be effective all the elements underpinning emergency treatment at sea need to be compatible i.e. officer training needs to relate to the medications and equipment carried and radiomedical advice will only be effective if the medications carried on the ship are known to the adviser and meet their therapeutic recommendations. This compatibility can be achieved in a coherent national system but is unlikely to be achieved with crews trained in many different countries and vessels registered with authorities that do not specify the elements of the emergency system in detail.

The flag states that do not have national requirements for the contents of the medical chest have in the past relied on a list that has been provided by WHO in the International Medical Guide for Ships (2nd Edition, 1988).[5] This list provided information on the quantities to be carried on board. It is not a formal international instrument but the Guide is noted as a source of information in the non-statutory part of the relevant ILO Convention. Port State Control Inspectors use the IMGS list as the minimum requirement for medical supplies The medication list is now very out of date and when WHO recently published a new edition of the Guide it included updated lists of recommended medications that were derived from the WHO Essential Medications List and of medical equipment taken from The Inter-agency Emergency Health Kit 2006. While this was a rational approach for the WHO to adopt to ensure that well validated treatments were available it did not take into account the need for remedies for minor ailments at sea – the sort that can impair ability to work without being dangerous, nor did it cover all the medical equipment that was needed in maritime situations. More significantly WHO did not consider that they could specify quantities of medications to be carried as there was a lack of information on use and effectiveness of medications at sea. In the absence of such data WHO considered that quantities should be related to voyage pattern and to political / managerial decisions rather than being stated by WHO. This lack of specification is not causing immediate problems where the flag state of the ship has its own national regulations or guidelines but it has led to great difficulties for maritime pharmacists called on to check and restock medical chests on ships from countries, including many of those with major open ship registries, that have no national lists. Pharmacists cannot continue to work to the outdated list and quantities in the old International Medical Guide, while they have no benchmarks for quantities required from the new one, nor the authority to make consistent decisions on the quantities to supply.

The use of medications and medical equipment at sea

[2] MSC/Circ. 1042 Emergency medical kit/bag and medical consideration on ro-ro passenger ships not normally carrying a medical doctor, London 28 May 2002
[3] Medical First Aid Guide for use in accidents involving dangerous goods. International Maritime Organization, London, 2004.
[4] LSA Code 4.1.5, SOLAS A and B PACK
[5] International Medical Guide for Ships (2nd Edition). World Health Organization, Geneva. 1988. pp 303 – 340.

A rational approach to specifying the contents of the medicine chest would come from the examination of the frequency of use of each item of its contents and from outcome data showing its contribution to saving life, relieving suffering or controlling symptoms that impair fitness to work.

- Treatment and its effects should be recorded in a ship's medical log. Only a few systematic studies of medical log entries have been undertaken.[6]
- Pharmacists know the quantities replaced but are unlikely to know about use or effectiveness on the person treated with the item replaced. They may not always know if replacement is because time expired medications have been destroyed or because of use. No studies are available
- Pharmacists also know what medications and equipment are never used but always replaced because it is time expired. No studies are available.
- Radiomedical advice centres record their advice and there have been some studies on the medication and equipment that they have recommended ships to use.
- Information on treatment given while at sea may be available from healthcare facilities when seafarers are transferred to shore. This sample would be biased in that it would neither include those who recovered fully nor those who died.

In the absence of such information other methods have to be used to determine which items are essential, which desirable, which irrelevant and the quantities to be carried.

Determining medical chest contents in the absence of a good evidence base

Essential items will be those that can save life or relieve major suffering. Onshore data can provide an indication of the probability of certain major life-threatening events and sometimes this may be extrapolated to sea. Very few events, apart from those that by their nature can be multiple (such as infections, accidents and poisoning) are sufficiently frequent to have a more than infinitesimal probability of occurring in more than one person on a single voyage. However the duration for which treatment is needed will relate closely to the time taken for the ill or injured person to reach a location with medical facilities and so quantities could in many cases be based on the person-days treatment for one casualty to reach help during the normal voyage pattern of the ship. This approach has been adopted by IMO in relation to treatment for the effects of dangerous cargoes. Such an approach is rather different from the traditional approach of basing the quantities on the number of seafarers aboard.

The need to carry the items needed to treat relatively common life-threatening emergencies such as pneumonia, a heart attack, acute asthma, an allergic reaction or a seizure is not really in doubt for any ship that is more than a few hours away from medical care. However the need to be prepared for rarer events such as the delivery of a baby or a needlestick injury with body fluid contamination from someone who may be HIV positive can be questioned and here the risk levels tolerated in

[6] Lamshöft MM, Schlaich C. Estimating the risk of communicable diseases aboard cargo ships. In: European Centre for Disease Prevention and Control, ed. European Scientific Conference on Applied Infectious Disease Epidemiology (ESCAIDE) 2008. Abstract book. Berlin, ECDC, 2008:26

other aspects of maritime safety may provide a benchmark for whether such treatments need to be carried.

Many forms of non-serious illness and minor injury can impair a person's ability to perform their duties effectively without creating any danger of a serious outcome. Remedies for problems such as indigestion, colds and coughs and haemorrhoids may be needed both for personal welfare and for the maintenance of an effective crew. International standardisation is largely irrelevant here and culturally accepted and trusted items may be best, provided these are both effective and safe.

Issues posed at the workshop

The workshop identified a number of areas where further action was needed. Some are immediate, while others will need a longer time scale. Participants agreed on those actions which they could take forward and identified others that would need to be initiated by other but to which they could contribute.

1. A rational approach to specifying the contents of medical chests so that the medication carried is effective in safeguarding the lives, health and efficiency of seafarers is needed. It should ensure that likely events can be treated without imposing costs or wastage that is disproportionate to the likelihood of benefits.

> **A risk assessment approach to determining the frequency and severity of an emergency and the importance of any treatments in reducing the probability of serious harm needs to be developed. The risk and benefit levels that could be used to trigger a requirement for specific items to be carried should be identified. A method can be proposed but decisions will be for responsible authorities and social partners.**

2. The contents of medical chests have to be consistent with the other elements of the system for handling medical emergencies at sea. They need to be sufficiently similar internationally to ensure that the variety of crewing arrangements, voyage patterns and advisory services that exist do not impair effective treatment.

> **International guidelines on the contents of a medical chest and the quantities recommended need to be developed by international agencies to supplement the requirement to carry one. National maritime/health authorities should introduce regulations or guidelines on medical chest contents and quantities that are compatible with the proposed international ones.**

3. The knowledge base that should underpin decisions on the contents of the medical chest is lacking and needs to be improved. Studies of supply patterns, medical logs and radiomedical advice can all contribute, but only in the long term.

> **Studies on the use and beneficial effects of medical chest contents need to be funded and undertaken.**

4. There is an immediate need for a benchmark list of the quantities required in the medical chest to be available to maritime pharmacists for recommended use on ships of those flags that do not have national requirements.

A subgroup of workshop participants has agreed to produce such a list that is based on the medications in the 3rd Edition of the International Medical Guide but which includes quantities and is modified to reflect medications and equipment known to be needed at sea that are excluded from the essential medicines and emergency health kit lists of WHO. This list should be produced in the next two months, recognising that while it has no legal status, it could form the basis for a pharmacist to issue a certificate confirming compliance with the list.

5. The workshop has identified a number of the items to be considered when any international instrument is prepared or when flag states decide to produce regulations or guidance (including 1 and 2 above).

A subgroup of workshop participants is being created to develop these items and the way in which they can be usefully considered into a 'toolkit' to aid responsible authorities in the development of instruments, regulations or guidance. The group could also consider the need to create an expert international group that can remain in existence and continue to make recommendations on changes to the medication and equipment to be carried by ships. It is proposed that this group will complete its work in mid 2009 and that a further workshop will be held to review progress and any problems that have arisen. This will take place during the International Symposium on Maritime Health in Goa during September 2009.

6. International agencies (WHO, ILO, IMO) social partners (ITF, ISF), maritime sector organisations, national maritime authorities and maritime health associations and practitioners need to be aware of these proposals and to comment and advise on their development.

This report will be copied to relevant organisations and made publicly available.

7. Following the workshop the WHO Collaborating Centres for the Health of Seafarers have agreed on submitting, as part of the WHO Global Plan of Action 2009-2012, a project named "Medical care onboard ships: Creating a framework towards an evidence-based revision of the International Medical Guide for Ships 3rd ed.". The collaborating partners are Hamburg, Bergen and IMHA.

Appendix 1: International instruments relating to ship medical chests

The Maritime Labour Convention 2006 will consolidate provisions already in several earlier conventions. The text below comes from the 2006 Convention.

Regulation 4.1

1. Each member shall ensure that all seafarers on ships that fly its flag are covered by adequate measures for the protection of their health and that they have prompt and adequate medical care whilst working on board.

4. The requirements for on-board health protection and medical care set out in the Code include standards for measures aimed at providing seafarers with health protection and medical care as comparable as possible to that which is generally available to workers ashore.

Standard A 4.1

3. Each member shall adopt laws and regulations establishing requirements for on-board hospital and medical care facilities and equipment and training on ships that fly its flag.

4. National laws and regulations shall as a minimum provide for the following requirements:
(a) all ships shall carry a medicine chest, medical equipment and a medical guide, the specifics of which shall be prescribed and subject to regular inspections by the competent authority; the national requirements shall take account of the type of ship, the number of persons on board and the nature, destination and duration of voyages and relevant national and international recommended medical standards.
(b) [Requires doctor if more than 100 persons and voyages of more than three days]
(c) [Requires training in medical first aid]
(d) [Requires radiomedical service]

Guideline B 4.1

4. The medicine chest and its contents, as well as the medical equipment and medical guide carried on board, should be properly maintained and inspected at regular intervals, not exceeding 12 months, by responsible persons designated by the competent authority, who should ensure that the labelling, expiry dates and conditions of storage of all medicines and directions for their use are checked and all equipment functioning as required. In adopting or reviewing the ship's medical guide used nationally, and in determining the contents of the medicine chest and medical equipment, the competent authority should take into account international recommendations, including the latest edition of *The International Medical Guide for Ships* and other guides mentioned in paragraph 2 of this guideline. [These cover first aid for accidents involving dangerous goods, training and signals as well as national guides]

Appendix 2: summary of presentations

Note: aspects covered in the main report are not repeated here.

1. The Ship's medicine chest. Dr Heikki Saarni, Finland

The requirements for medical care aboard were identified and the requirements to meet these reviewed. The inevitability of medical emergencies has to be accepted and planned for, especially those that are most likely to occur. Some can be treated onboard but others will need to be stabilised and then transferred ashore for definitive treatment. Treatment aboard often has to be given in the absence of a clear diagnosis and the response to treatment may be an important indicator of the nature of the condition present. An effective regulatory framework with auditing is needed to ensure that the required medications are carried, that they are in date and correctly stored. There are currently problems with incompatibility between different national requirements and because ship operators may see the supply of medical stores as an unwelcome cost rather than an essential element of safety and health at sea.

2. Medical care onboard ship and international regulations. Dr Bernd-Fred Schepers, Germany

The frequency of medical emergencies at sea can be reduced by: provision of fitness examinations for seafarers; maritime occupational health services, and port health services. At sea training, medical guides, the medical chest and access to radiomedical advice all assist with emergency management. All these aspects are to an extent regulated internationally. Taking Germany as an example there is a single Ordinance that covers medical care on seagoing vessels and this is regularly updated. Revision of the requirements for the contents of ships' medical chests involves teamwork by a pharmacologist, a radiomedical adviser, a port health physician, all chaired by a physician from the maritime authority. The same group also has the skills needed to update the national ship medical guide.

3. Responsibilities of different parties for medicine chests. Dr Tim Carter, UK

The effectiveness of decision taking on medical chest contents should be based on: the nature and frequency of illness and injury at sea; the scope for remedial treatment and its benefits in terms of reduction in morbidity and mortality, and the need to provide effective symptom relief as well as cure. The regulatory framework places responsibilities on the ship operator to maintain medications and equipment, while the master or an officer has responsibility for day to day use and for seeking external assistance as required. Training for officers needs to relate to the medical stores carried and to the likely pattern of disease and injury. Training and stores both need to be such that radiomedical advice can be sought in an effective way and that the treatments which are likely to be recommended by the advisers are available on the vessel. The performance of all these elements needs to be co-ordinated and optimised in minimise the harm from medical emergencies at sea.

4. Changing the IMGS medicine chest. Dr Leslie Olson, WHO.

The new International Medical Guide for Ships uses the WHO essential medicines list as its basis. These medications have the best efficacy for high priority illnesses, are easiest and safest to give and have the longest shelf life without refrigeration. The IMGS did not list required quantities of medicines because there is no data on illness patterns. The quantities need to be based on consideration of risks and costs, a political and social judgement, and it would have taken considerable resources to derive a valid basis for recommending quantities. In WHO policy terms any changes going beyond use of the currently listed treatments in IMGS (for instance on choice of medication, treatment of additional conditions or specification of quantities) would require a WHO Guideline. WHO has new procedures for Guideline production that aim to safeguard the independence and validity of guidelines bearing the WHO title. In the case of additional medications a bid to include them in the essential medications list would be needed. It is likely that any future revisions of IMGS will come within the new guideline procedures and these will have to be taken into account before the project is initiated.

This presentation led to a wide ranging discussion on the future role of WHO and its Guidelines in maritime health, especially as these have sometimes been produced jointly with other UN bodies such as ILO and IMO. There was general recognition that the new procedures would make joint projects more difficult and this might lead to new arrangements, where WHO is not so directly involved, being developed. As Dr Olson was not a WHO staff member he was not able to advise on the priority that WHO would give to maritime health issues in future, but he agreed that the development of practical guidance and recommendations was likely to be more complicated in future and that compared with other health topics the maritime sector did not rank highly.

5. Medical care onboard in the 21st century. Dr Marileen Biekart, Netherlands

The presentation was based on experience leading an earlier IMHA working group on medical chest contents for inclusion in IMGS 3. In the event this work did not form part of IMGS 3 as published. Key aspects that informed the work of the group were: treatment often starts without a diagnosis; there is often no second chance to get the treatment right; treatment is given by trained lay persons who will not have experience of a wide range of medical emergencies; simple routes of administration using widely available, low cost and easily stored medications are preferred. Controlled drugs should be avoided where possible because of the extra duties of accountability and the potential for problems in foreign ports.
Medications need identification codes. These should be linked to the medical guide and become international to aid replenishment of stocks and radiomedical advice. ‘Consult a doctor before use’ medications need to be clearly distinguished from others carried.
There is not, and is not likely to be, a sound evidence base for medication use at sea. Provision and indications for use have to be informed by experience in daily maritime health practice.

6. Past experience and further recommendations. Dr Rob Verbist, Belgium

The ideal would be a common set of medications used in all maritime countries with clear indications for used and a well validated manual for the laymen who have to use them while at sea. This ideal is still distant, however within the EU there has been a common regulatory framework since 1992. One of the problems with the EU list has been that some 30% of medications change every ten years and the regulatory system does not keep up with this. What is needed is a way of developing a 'maritime friendly list' that is kept regularly updated and reflects good current practice while at the same time minimising cost and wastage. Such developments would need a wide range of stakeholders to accept that an expert led group could undertake this task on an international basis and be given the support to do so. In discussion it was pointed out that one of the difficulties would be to get individual flag states to rapidly adopt such a list. There were also important cultural issues such as access to favoured remedies for common minor symptoms and the reliance on a range of herbal medications on in some countries that were not considered to be essential in other cultures.

7. Norvirus and Rotavirus testing. Dr Andreas Nicolou, Greece

Test arrangements are available to enable rapid diagnosis of norvirus infections. Vessels need to carry specific swabs and transport media to secure such diagnosis. The inclusion of these in ship medicine chests was recommended. Already a number of cruise companies carry them as rapid diagnosis can simplify port health clearance and clarify liability for outbreaks of GI infection.

8. Medical chests: the view of the ship owner. Mr Nickolaos Patiris, Greece

The different requirements of passenger and cargo ships were considered. Passenger vessels have relatively frequent port visits and the ability to re-stock medical chests at each port can determine the stocks carried and hence the cost. By contrast cargo vessels make longer voyages but carry far fewer people. Hence the amount of medication to be carried should be determined by the amount needed to treat a case until the next port of call.

9. Port inspection and evaluation of medical chests. Dr Clara Schlaich, Germany

Several sets of national and regional regulations require a competent person to inspect the contents of the medical chest, normally once a year. The competent person is variously identified as a doctor, a pharmacist or the ship's master. In some jurisdictions controlled drugs have additional inspection requirements. Information about inspection in the port of Hamburg, where there is a well documented medically led inspection, regime was

presented and has been accepted for publication.[7] German flag ships are inspected according to national regulation and the results are passed to relevant authorities. Foreign flag ships are inspected under the International Health Regulations (IHR). The two central principles of the inspection are to determine if there is a threat to the public health and if maritime safety is reduced. Inspections form an important setting for giving advice on crew health requirements but where defects in medicine chests are found there are commonly a wide range of other safety and hygiene problems and enforcement action may be taken. For foreign flag ships this can be limited as it has to be based on the public health considerations of the IHR.
There is a local campaign to ensure that vessels carry strong analgesics, normally morphine, and that these are secure and fully accounted for. It has been found that morphine is often not carried because of perceived problems with security and port clearance.

10. The view of the clinical pharmacologist. Dr Corinne Idnani, India

The choice of medicines carried needs to take account of interactions between a medication and other medications, foods, lifestyle, disease and genetic variables. The purpose of medication use at sea is to protect or restore the health of seafarers so harmful interactions need to be recognised and avoided. Many of the medications needed at sea are over the counter (OTC) preparations and these may be brought onboard by seafarers. Their use can interfere with the effectiveness of other medications in the medicine chest, hence questions should be asked about use of OTCs before giving additional treatment for an illness at sea. The metabolism of medications needs to be considered in terms of interactions, speed and duration of effects, route of administration and adverse reactions. In practice it is essential to ensure that the ill seafarer actually takes the medication and that while they are on it a steady lifestyle that avoids interactions from smoking, alcohol etc, is maintained. The lack of adequate diagnosis at sea means that special care needs to be taken to avoid providing medications that cause specific adverse effects if they are given for the wrong condition.

11. Medical chests in Russian flag ships. Dr Ilona Denisenko, Russia.

Polypharmacy is common in the Russian healthcare system and seafarers are used to medications that contain several ingredients. Some of the commoner ones include barbiturates and similar medications that no longer form the basis for good medical practice. The medicine chests on Russian vessels are not well regulated and often contain a range of proprietary multi-component medicines. This causes problems when advising on the management of medical emergencies at sea.

[7] Schlaich C. Medical chest: Present achievements and further perspective from the view of the Port Health Authority: Inspection and Evaluation of the Medical Chest. The Herald for Maritime Medicine; ISSN 0049-6804

12. Radiomedical service view on medicine chests. Karin Westlund, Sweden.

The Swedish radiomedical service receives 400-500 calls per year. 81% are from Swedish registered ships. The results of a study of service use were presented. This looked at which sorts of case were most challenging and the adequacy of the medication available. In practice it was often difficult for the officer to find medications that were in the chest and this was complicated because some companies carried additional medications that the RMA was not aware of. For infections the antibiotic favoured by the RMA was not always available but there was usually a suitable substitute.
The following medications were recommended (sometimes more than one for a case) for the 201 cases where it was indicated in 2007:

Analgesics 62	Inhalations 6
Antibiotics 53	Oxygen 4
Antipyretics 23	Morphine 3
Antihistamines 8	Other injections 1
Anti hypertensives 5	Local eye treatment 21
Corticosteroids 7	

Seven other categories 30

A survey of responsible ships' officers identified the following needs

- Alternatives to intravenous medication
- Use of product name rather than generic
- Use of simpler terminology
- Suppositories as alternative to injections
- Defibrillator and pulse oximeter onboad

The predominance of infections and the choice of antibiotics as well as limitations in the training of ships' officers in medication use were two relevant findings.

13. Strategy and tactics for medicine chest development. Bas Rikken, Netherlands.

The basic principle for health care at sea should be to aim for the same standards as on land, while recognising the limitations of what is possible and using other preventive methods to reduce risks. Periodic revisions of national and international medication lists do not achieve this aim and some form of international standing committee on medication for use at sea is needed. This needs to be professionally led but accountable to stakeholders. Both ILO and WHO have been involved in the past and could take a lead if they chose to. However in reality unless IMHA as the body representing maritime health professionals takes a lead it is unlikely that anyone else will. IMHA should be encouraging others to participate but if they do not do so the development of a professional view for others to consider is a necessary first step.

14. The role of the international maritime pharmacist. Dr Nicholas Ioannidis, Greece.

The role of the maritime pharmacist is not well understood by doctors, ship operators or officers. Because of variations in requirements between flag states pharmacists keep databases that enable them to readily fill the needs of a wide range of ships, hence they have to stock a variety of medications and try to avoid substitution whenever possible. Where no flag state specification exists they have followed the WHO guidance in IMGS 2 but now that they have no indicative list with quantities on it they face problems with ship operators who wish to minimise the costs of medication supply. This is a major problem given that there is no longer any international basis that they can cite for the quantities that they supply to ships.
In discussion it was pointed out that the deficiency lies with those flag states that do not produce a list of required medical stores, rather than with WHO. The problems of language and variable medication names in different countries were raised and there was agreement that generic names and strengths in English should be required on all preparations supplied for use at sea. The use of an internationally agreed standard coding system to uniquely identify each medication and item of medical equipments would aid correct use and would facilitate and speed up ordering, on board dispensing and stock control as well as increasing the clarity with which radiomedical advice could be given.

15. Discussions and conclusions. Dr Nebojsa Nickolic, Croatia. Dr Tim Carter, UK.

The key points are given in the main report.