Author's response to reviews

Title: Surveillance study of vector species onboard passenger ships. Risk factors related to infestations

Authors:

Varvara A Mouchtouri (mouchtourib@med.uth.gr)
Rimma Anagnostopoulou (ranagnost@med.uth.gr)
Anna Samanidou-Voyadoglou (asaman@otenet.gr)
Kalliopi Theodoridou (ktheod@med.uth.gr)
Chrissi Hatzoglou (chatz@med.uth.gr)
Jenny Kremastinou (jkrem@nsph.gr)
Christos Hadjichristodoulou (xhatzi@med.uth.gr)

Version: 2 Date: 25 January 2008

Author's response to reviews: see over
Larissa January 25, 2008

To: Scott Edmunds PhD
   Senior Assistant Editor
   BMC-series Journals
   Tel: +44 (0)20 7631 9921
   Facsimile: +44 (0)20 7631 9923
   e-mail: editorial@biomedcentral.com
   Web: http://www.biomedcentral.com/

Ms. Ref. No.: 1584429612162698
Title: Surveillance study of vector species onboard passenger ships. Risk factors related to infestations
BMC Public Health

Dear Editor,

We are pleased to submit a revised manuscript for your consideration. We have made every effort to modify our manuscript according to the reviewers comments and to the journal style.

Below please find a point-by-point response to the comments provided.

Yours faithfully,

Christos Hadjichristodoulou, MD, PhD
Assistant Professor
Medical Faculty
Department of Hygiene and Epidemiology
22 Papakyriazi Street
41222 Larissa
Greece
Tel: +30 2410 – 565259
Fax: +30 2410 – 565259
E-mail: xhatzi@med.uth.gr
Reviewer: Andrew Tatem
Reviewer's report:

General
The paper presents a useful study which I recommend for publication. A few things need to be clarified first though.
- We would like to thank the reviewer for the very useful comments and for helping us to improve the manuscript.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

The english needs checking throughout.
- We corrected the spelling and grammar mistakes throughout the document.

The introduction does not really match what is actually studied & misleads. e.g. discussions of invasive species, but in this study no attempt is made to assess whether species found may invade new areas or have already invaded or are just being transported between regions where they are native already.
- We would like to thank the reviewer for the very useful comment. We modified the introduction section and we added a paragraph regarding invasions in the discussion section.
In the introduction, first we mention the role of mechanical transmission of pathogens by insects and then we only mention in two sentences the importance of invasions. The paragraph in the introduction section (page 4, lines 8-19) was modified as follows:
Vectors on board ships can cause harm in different ways. They may cause illness on board ships, and this may happen through the consumption of food containing human enteropathogens, mechanically transmitted by flies or cockroaches. Stored food products aboard ships may be damaged or contaminated by live or dead insects, faeces, odours, webbing or cast skins. Furthermore, vectors such as mosquitoes may be introduced, and established in areas in which they have not previously been found [1,2] and where vector borne diseases can spread. There are at least five reported cases of port malaria among people who had no recent travels or blood transfusions, but worked or lived close to harbours in Italy, France, Belgium and Israel [3-6]

In addition, we added the following paragraph in the discussion section regarding invasions of species in Greece:
Unfortunately, we were not able to study possible invasions of species found aboard ships to the destinations. This required knowing the species that are native or not in many different regions in Greece, but there are not enough data available for all these regions. It is possible that most of the species found such as German cockroaches, house flies, fleas and bedbugs are just being transported between regions where they are native already.

P9 - the use of complaints data is very biased data and little discussion exists of this. e.g. very few people will complain about mosquitoes, but they may be onboard and a public health threat to passengers and new
areas. Mice onboard may give rise to many complaints, but pose no health threat.
We would like to thank the reviewer for giving us the opportunity to enrich the discussion section. We added the following paragraph in the discussion section:

In order to collect information on pest species which can be found on board ships generally, we used complaints data from the archives of Public Health Authorities. This was used to have an indication of the pest species and not to make any conclusions about the nuisance caused by them or the frequency of their presence and the size of their population on board. Very few people will complain about mosquitoes or other biting insects, but they may be on board and a public health threat to passengers and new areas.

In the discussion please try and come up with some estimates of per-ship incidences/rates - this would be informative to readers as it is unclear how many ships these data are from.

We modified the paragraph in the discussion section in order to give information on how many ships these data are from as follows:
Our study suggests that about 50% of the 21 ferries surveyed were infested with *Blattella germanica* and the majority of them had not great infestation. One ship was highly infested; another 4 ships were moderately infested, while 6 ships had low infestation.

In the discussion also discuss invasion to link back to the intro - which species found were non-native to the destinations?
We would like to thank the reviewer for the very useful comment. We believe that it is not safe to make any conclusions regarding invasions of species because most of them can be found in many different regions of Greece and there is a lack of systematic studies on the subject. We added the following paragraph in the discussion section:
Unfortunately, we were not able to study possible invasions of species found aboard ships to the destinations. This required knowing the species that are native or not in different regions, but there are not enough data available for all these regions. It is possible that most of the species found such as German cockroaches, house flies, fleas and bedbugs are just being transported between regions where they are native already.

Table 3 - no discussion of these pesticides in the paper exists - add this or remove from table.
We would like to thank the reviewer for giving us the opportunity to clarify this. We mentioned the following paragraph in the discussion section:
Even thought two pesticides were positively associated with cockroach infestations, we cannot draw any conclusions for their effectiveness. We were not able to evaluate the method of application of these pesticides (locations and frequency of application etc), or to examine other factors such as pesticide resistance.

Table 4 - Please add in a column of how many ships of each type were included.
A column was added as suggested by the reviewer.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Ferries with cockroach infestations</th>
<th>Ferries without cockroach infestations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of ferries</td>
<td>Median (IQR)</td>
</tr>
<tr>
<td>Ship age</td>
<td>11</td>
<td>30 (25-31)</td>
</tr>
<tr>
<td>Days since last disinsection</td>
<td>11</td>
<td>40 (39-84)</td>
</tr>
<tr>
<td>Number of beds</td>
<td>11</td>
<td>308 (193-630)</td>
</tr>
<tr>
<td>Days since last Exception</td>
<td>7</td>
<td>138 (34-141)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deratting Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship length (m)</td>
</tr>
<tr>
<td>Gross tonnage</td>
</tr>
<tr>
<td>Passenger capacity</td>
</tr>
<tr>
<td>Number of decks</td>
</tr>
</tbody>
</table>

---

**Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)**

**P4** - A reference is needed for the statement of ferries becoming an increasingly popular form of travel - this is certainly not the case across northern europe, where airlines are taking over.

We would like to thank the reviewer for giving us the opportunity to clarify this point. Some ports in Greece registered an increase of the number of passengers according to the EU statistics; even though there is a general decrease in the total number of passenger movements. To clarify this point, we converted the sentence as follows:

Ferries serve as a means of transport on regular itineraries from one place to another and are becoming an increasingly popular form of travel in Greece. Among the EU ports, Piraeus registered an increase (+3.4%) of the number of passengers traveled in 2005 (Giuliano Amerini. Maritime transport of goods and passengers 1997-2005. Statistic in focus. EUROSTAT. European Communities, 2007).

**P4** How do ferries provide conditions suitable for survival/growth of insect pops? They are not their natural habitat conditions.

We would like to thank the reviewer for giving us the opportunity to clarify this. We modified this section as follows:
Ferries provide conditions suitable for the survival and growth of insect populations. Even though they are not the natural habitat conditions for many arthropod species, there are a variety of harborage areas and when sanitation measures are not adequately taken food sources are available for many synanthropic insects such as flies, cockroaches and ants. Inaccessible spaces including behind and below equipment, in voids and ducting, and even between bulkheads and deckheads, are difficult in treatment once infested. In addition, standing water at different areas of the ship open spaces like lifeboat covers, bilges, scuppers, awnings, gutters, and air treatment plants can hold insect larvae.

P5 - You discuss the spread of ectoparasites from one person to another, but undertake no measurement of this, and provide no reference for it.
We would like to thank the reviewer for giving us the opportunity to clarify this. We added the following paragraph:

Historically, typhus fever was one of the diseases responsible for the high death rate among the crowded prison ships in the New York harbour during the American Revolution. Overcrowding, bad hygiene and lack of ventilation made a ship an ideal environment for typhus, which was passed on by lice (Minooee and Rickman, 1999). In recent years, scabies outbreaks, a disease caused by mites, have been reported on board cruise ships (personal communication, EU SHIPSAN Partnership, September 2007).

P5 - how do port itineraries increase ship infestations? explain this with references.
We would like to thank the reviewer for the useful comment. To our knowledge no studies exist on the examination of port itineraries in relation to ship infestation. In order to clarify this, we modified the paragraph as follows:

Various itineraries in ports of different countries, where no vector control measures are applied may increase the possibility of ship infestations. To our knowledge no studies exist on the examination of port itineraries in relation to ship infestation. Port areas are of high risk for infestations as, a large number of different types of ships arrive, load or unload cargoes originating from all over the world. In addition, great quantities of food are transferred and stored in storage areas of ports, while containers stacked in docks provide harbourage places for pests.

P6 - If invasion threat is to be studied, surely you need to also get data on route and frequency of travel.
We would like to thank the reviewer for the useful comment. As shown in Table 3, there was no statistically significant difference among the itinerary and ship infestations:

<table>
<thead>
<tr>
<th>Itinerary</th>
<th>N</th>
<th>Infested (%)</th>
<th>Number</th>
<th>Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North-East Aegean</td>
<td>5</td>
<td>(83.3)</td>
<td>6 (40.0)</td>
<td>2.08 (1.01-4.26)</td>
</tr>
<tr>
<td>Cyclades</td>
<td>5</td>
<td>(55.6)</td>
<td>6 (50.0)</td>
<td>1.11 (0.49-2.50)</td>
</tr>
</tbody>
</table>

The frequency of travel does not differ significantly among ships, as distances are short and frequent for all ships.

We added the following comment in the discussion section:
Our findings suggest that ship itineraries do not show any association with ship infestations. This would be unlikely to happen because many ferries had the same destinations and similar itineraries, while the frequency of travel did not differ among them.

**P6 - a map of the routes surveyed would be useful to the reader.**
We would like to thank the reviewer for this suggestion. We believe, since most of the itineraries are within national waters and often the same for different ships it would be confusing for the reader and difficult to optically follow a map of routes.

**P12 - you compare your data to those from China, but this is a very different area with different climate, shipping practices etc.**
We thank the reviewer for this comment. Since there is no other published paper to reference, our intention was not to show any comparison, but to just mention data that exists from China. We removed the sentence regarding cockroaches.

**P14 - you discuss the WHO guide, but this is international, and your study is almost all national movements.**
We would like to thank the reviewer for giving us the opportunity to clarify this. Since the majority of the ships we studied sailed within national waters, we reduce the reference to the IHR, but we think it is important to mention a few things about this. According to the WHO guide to ship sanitation, the guide is intended to be used as a base for the development of national approaches for all types of ships. We modify this part of the discussion as follows:
The revised International Health Regulations (2005) is the global community’s new legal framework against acute public health risks that can spread internationally. The importance of vector borne diseases transmission through ships on international voyages has been recognized under these Regulations, and provisions for vector borne diseases control have been included regarding competent port authorities, ship operators, and designated national authorities. Countries should establish programmes to control vectors at ports where ships on an international voyage arrive or depart [23]. The 2004 draft of the Guide to ship sanitation of the World Health Organization includes aspects regarding design, construction and operational control measures for insects and rodents, as well as rat proof construction. It is intended to be used as a base for the development of national approaches to controlling the hazards on ships, as well as providing a framework for policy making and local decision making. Adherence to the requirements of the revised International Health Regulations (2005) and to guidelines of the WHO Guide to Ship Sanitation is expected to contribute to eliminate the presence of vectors at ports and on board ships.

Discretionary Revisions (which the author can choose to ignore)

**What next?:** Accept after minor essential revisions

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published
Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:
I declare that I have no competing interests
Reviewer: Nikolic Nebosja  
Reviewer’s report:  
- Minor Essential Revisions  
Very interesting finding is that authors didn't found significant rodent presence on board ships. It would be important to present the dates of the last derratization.  
We would like to thank the reviewer for the comments. We tried to give an indication on the dates since the last derratization in table 4:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Ferries with cockroach infestations</th>
<th>Ferries without cockroach infestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of ferries</td>
<td>Median (IQR)</td>
<td>No of ferries</td>
</tr>
<tr>
<td>Days since last Exception</td>
<td>7 (138 (34-141)</td>
<td>8 (79.5 (33-126))</td>
</tr>
</tbody>
</table>

Deratting Certificate

The results show that in the 7 ferries with cockroach infestations, the median number of days since the last derratization was 135, while in the 8 ferries which didn't have infestations, the median was 79.5 days. Since there was no statistically significant difference between these categories, we didn’t discuss this, but if the reviewer would like to include a separate table with the dates, we can do this.

Level of interest
-----------------
- An article of importance in its field â## there are very few articles on that subject on merchant ships and almost none on the ferry ships  
What next?: Accept after minor essential revisions  
Level of interest: An article of importance in its field  
Quality of written English: Needs some language corrections before being published  
Statistical review: No, the manuscript does not need to be seen by a statistician  
Declaration of competing interests:  
'I declare that I have no competing interests'