Measles on a cruise ship: links with the outbreak in the Philippines

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Citation style for this article:

Mandal S, Ramsay M, Brown K. Measles on a cruise ship: links with the outbreak in the Philippines. *Euro Surveill.* 2014;19(15):pii=20774. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20774>

Article submitted on 07 April 2014 / published on 17 April 2014

To the editor:

In their recent article, Lanini et al. describe an outbreak of measles on a cruise ship in the Mediterranean during February 2014 involving 27 cases (21 crew members, four passengers, two unknown) [1]. The article reported measles sequence data which appear to attribute the outbreak to measles cases in United Kingdom. We discuss this and several omissions from the article which are critical in our understanding of the source of transmission and the appropriateness of interventions on the cruise ship.

Firstly, as all reported cases clustered in time, the outbreak appears to have the characteristics of a point source from a single (unidentified) index case. The identical B3 strain sequences obtained from 10 cases support this hypothesis. Considering the incubation period of measles, the index case was likely symptomatic in week 6 (4–10 February 2014).

Secondly, the outbreak strain (MVs/Tonbridge. GBR/5.14) was identical to that identified by Public Health England (PHE) in an English resident who had clearly been infected in the Philippines. This individual was infectious during their return flight, but diagnosed only after arrival in England. In contrast to what might be inferred from Lanini et al., these epidemiological and microbiological findings are consistent with the cruise ship outbreak being linked to the ongoing outbreak in the Philippines [2] and not due to indigenous measles in the United Kingdom. Following a successful measles catch-up campaign in England in 2013 in response to high numbers of confirmed measles cases, measles activity in England has declined [3,4] and has remained low during 2014. From 1 December 2013 to the beginning of April 2014, however, PHE has received 13 reports of measles in persons returning from the Philippines, where there is a large outbreak affecting the National Capital Region (Manila) and other parts of the country [2]. Of these 13 reported cases in English residents, 12 have been confirmed and nine have been genotyped by the Virus Reference Department at PHE. The sequences comprise four closely related B3 strains.

PHE is aware of several additional cases epidemiologically linked to cases who travelled to Philippines, in household contacts or acquired during air travel (on a flight or at an airport). We were surprised that the association between the cruise ship outbreak and the outbreak in the Philippines was not discussed by the authors, particularly considering that most cases were in crew members, 71% of the 968 crew members were from Asia, and three cases were reported in Filipino staff [1].

Thirdly, we expected the authors to discuss the likely susceptibility to measles of passengers based on their age, not only vaccination history. There were 3,352 passengers on board of whom 86% were nationals of the European Union; the median age of passengers was 41 years (range: six months to 93 years). The relative paucity of passenger cases (4/27) compared to crew cases (21/27) and the large passenger denominator most likely reflects the reduced susceptibility to measles of the passengers due to past immunisation or past infection, particularly if many were older adults. It would have been useful, therefore, to describe age-specific attack rates. An age-based risk assessment may have led to a more proportionate response in reassuring older passengers and avoiding unnecessary vaccination in those likely to be immune. Of course, intensity and frequency of contact is likely to be a factor in transmission and one could hypothesise that crew-to-crew and passenger-to-passenger contact were more likely than crew-to-passenger interactions; however, since measles is of such high infectivity, susceptibility to infection is likely to have been the major factor in transmission. Attack rates are not given by the authors, but with the information available we estimate this to be 0.6% overall, 2.2% in crew members and 0.1% in passengers, suggesting that overall susceptibility was low.

In summary, the rapid communication by Lanini et al. [1] illustrates the effectiveness of rapid cross-border coordination and control measures which are critical for highly infectious communicable diseases such as

measles. However, it did not sufficiently draw out the key epidemiological characteristics of the population at risk, taking into account historic and geographic variation in disease incidence and vaccination coverage. In the absence of this information readers are not able to understand the reason for the outbreak, the risk of such outbreaks recurring and the best ways to prevent them in the future.

Conflict of interest

None declared.

Authors' contributions

S Mandal contributed to the concept and drafted the letter. M Ramsay contributed to the concept and edited the letter. K Brown contributed to the concept, supervised the sequencing, and edited the letter.

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