

Management of an international outbreak of norovirus on board a cruise ship

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Background: Managing an outbreak of gastroenteritis on board a cruise ship while minimising disruption to passengers' enjoyment is difficult. This can be more complex with international cruises. We describe epidemiological investigation and control of an outbreak of Norovirus on an international cruise around the British Isles and the Netherlands managed through an international multi-agency incident control team.

Methods: A cohort study was conducted using information from lists routinely collected by the cruise ship to assess the possible sources of exposures.

Results: A total of 191 of the 1,194 passengers (16%) and 5 crew (1%) became ill with gastrointestinal symptoms. Norovirus was identified through PCR at one of the ports of call. Attack rate was higher among passengers staying in the main deck (RR 3.41, 95% CI 1.47- 7.94), which houses both passengers' cabins and leisure facilities (e.g. shops). Also, passengers who went on one of the organised coach tours where there were symptomatic passengers were at increased risk of infection (RR 2.14, CI 1.51-3.03).

An international multi-agency Outbreak Control Group, involving port health authorities and public health agencies in the ports of call, was convened to oversee control measure and advice the incident management team on board the ship. This allowed continuity, ensuring that port health officers inspecting the ship at each port were aware of what had been previously recommended and could monitor progress.

Conclusion: Controlling outbreaks on board a cruise can be complex when the ship moves from one country to another and the leadership of the investigation changes. To ensure that an outbreak is appropriately managed, multinational outbreak control groups are needed with one agency taking the lead throughout the outbreak. International agreement between public health authorities in different countries is needed.

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Medical Tourism Research: A Systematic Review

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Background: Medical tourism, foreign travel for the purpose of seeking medical treatment, is an important new development in healthcare. Medical tourism is a world-wide, multibillion dollar phenomenon that is expected to grow substantially in the next 5-10 years. To provide a foundation for future investigations, a systematic review was conducted to identify and evaluate current data on medical tourism and associated health impacts.

Methods: PubMed, EMBASE and Medline databases and the World Wide Web were searched to identify studies of medical tourism from 1990-2009 containing data.

Results: 44 studies were identified. 75% (n=33) were reports on complications associated with medical tourism for: commercial organ transplantation (n=30), cosmetic surgery (n=1), dental care (n=1), and fertility treatments (n=-1). There were 9 (20%) surveys of travelers and/or medical tourism providers, and 2 (4%) business studies. Methodologies used were primarily retrospective record reviews (75%) and interview surveys (23%). Studies of commercial organ transplantation reviewed 2506 cases, primarily kidney (92%) and liver (8%) transplants. China and India were the most frequent transplant destinations. Studies' results suggest an apparent increase in "transplant tourism" from 1990-2009, and higher incidence of post-operative tissue rejection and severe infectious complications among transplant tourists compared to other transplant patients. These studies are limited by lack of denominator data for transplant tourism, exclusive focus on complications, survivorship bias, and the possibility that transplant tourists may not be representative of all medical tourists. Business studies calculate widely varying estimates of the frequency of medical tourism, ranging from 60,000-750,000 medical travelers annually. These studies are limited by variability in the definitions and methodologies used to study medical tourism. Survey studies are limited by little or no data on treatment(s) received, reasons for seeking foreign healthcare, or treatment outcomes.

Conclusion: Current epidemiological data on medical tourism are limited. Basic questions such as the prevalence of medical tourism and associated complication rates have not been established. Important directions for future research include: developing consistent definitions, and conducting prospective studies of demographics, motivations, treatment outcomes, and cost benefits to better understand the healthcare implications of medical tourism.

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