



Canadian Agency for
Drugs and Technologies
in Health

RAPID RESPONSE REPORT: SUMMARY WITH CRITICAL APPRAISAL



TITLE: Prophylactic Treatment for Contacts of Patients with Invasive Meningococcal Disease on Sports Teams: A Review of the Clinical Effectiveness, Cost-Effectiveness, and Guidelines

DATE: 10 February 2015

CONTEXT AND POLICY ISSUES

Invasive meningococcal disease (IMD) is a potentially life-threatening infectious disease caused by the Gram-negative aerobic diplococcus, *Neisseria (N.) meningitidis*.¹⁻⁴ In Canada, IMD is endemic, but the mean incidence has been stable at 0.6 per 100,000 during the period of 2002-2008.⁵ Transmission of *N. meningitidis* occurs through respiratory droplets or direct contact with nasopharyngeal secretions while the usual incubation period is 3 to 4 days (range: 2 to 10 days).³⁻⁵ Up to 10% of people can be transient asymptomatic nasopharyngeal carriers of *N. meningitidis*, but fewer than 1% will go on to develop IMD;²⁻⁵ nasopharyngeal colonization is necessary for most cases of IMD to develop.⁶ A case is considered contagious in the 7 days preceding symptoms until 24 hours after the onset of antibiotic treatment.^{2,3,5} Despite appropriate treatment, however, IMD can be fatal in 9% to 12% of cases.⁴

To limit the spread of IMD, chemoprophylaxis with or without immunoprophylaxis is offered to contacts with the goal of eliminating *N. meningitidis* from the nasopharynx of contacts within the case's network.¹ Contacts with on-going exposure to the case usually require both chemoprophylaxis and immunoprophylaxis; typically, these include the case's household contacts, anyone who shares sleeping arrangements with the case, people who have had direct contact with oral or nasal secretions of a case with their nose or mouth, or children and staff in childcare facilities.³ Contacts who have had transient exposure to the case require chemoprophylaxis only; typically, these include health care workers who had unprotected contact with infected patients, passengers on public transportation sitting in close proximity to the case or who had direct exposure to the case's respiratory secretions.³

The exposure risk that arises from playing on a sports team (e.g., hockey) presents some unique challenges in the event a team member becomes diagnosed with IMD. Members of a sports team typically share water bottles, locker room facilities, and travel together; in addition, players may come into direct contact with oral and nasal secretions during the course of play.

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Although guidance for identifying contacts and mitigating secondary infection of IMD is available for the general population^{2,3,5,7,8} and educational settings,⁹ it is unclear whether, or to what extent, such guidance is applicable to the sports setting, particularly as it has been suggested that meningitis in athletes is more often of a viral than bacterial etiology.¹⁰ There is also some concern about the possible extension of prophylactic treatments to inconsequential contacts, potentially introducing needless treatment-related harms such as adverse effects, destruction of natural flora, development of antimicrobial resistance,¹ and excess costs.

The purpose of this review was to assess the evidence of the clinical effectiveness and cost-effectiveness of prophylactic treatment for contacts of patients with invasive meningococcal disease (IMD) who are members of sports teams, and to identify and appraise any relevant evidence-based guidelines.

RESEARCH QUESTIONS

1. What is the clinical effectiveness of prophylactic treatment for contacts of patients with invasive meningococcal disease (IMD) who are members of sports teams?
2. What is the cost-effectiveness of prophylactic treatment for contacts of patients with IMD who are members of sports teams?
3. What are the evidence-based guidelines regarding prophylactic treatment for contacts of patients with IMD who are members of sports teams?

KEY FINDINGS

No relevant literature was identified pertaining to the clinical or cost effectiveness of prophylactic treatment for contacts of patients with invasive meningococcal disease (IMD) who are members of sports teams. Similarly, no evidence-based guidelines specific to sports settings were identified from the literature search. An evidence gap exists in the setting of sporting activities, not only in the clinical and cost-effectiveness of prophylactic treatment, but also in whom to treat prophylactically.

METHODS

Literature Search Methods

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2015, Issue 01), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2005 and January 13, 2015.

Rapid Response reports are organized so that the evidence for each research question is presented separately.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria	
Population	Individuals potentially exposed to a case of IMD through sports
Intervention	IMD prophylaxis of all potential significant contacts (e.g., players, coaches, officials)
Comparator	No prophylactic treatment
Outcomes	<ul style="list-style-type: none"> • Clinical effectiveness (e.g., decrease in spread of IMD, safety) • Cost-effectiveness • Evidence-based guidelines
Study Designs	<ul style="list-style-type: none"> • HTA/systematic review/meta-analysis • Randomized Controlled Trials (RCTs) • Non-RCTs • Economic evaluations • Guidelines

Exclusion Criteria

Articles were excluded if they did not meet the selection criteria outlined in Table 1, were duplicate publications, were referenced in a selected systematic review, or were published prior to 2005.

SUMMARY OF EVIDENCE

Quantity of Research Available

A total of 237 citations were identified in the literature search. Following screening of titles and abstracts, 213 citations were excluded and 24 potentially relevant reports from the electronic search were retrieved for full-text review. Seven potentially relevant publications were retrieved from the grey literature search. Of these potentially relevant articles, all 31 publications were excluded because they did not meet the inclusion criteria. Appendix 1 describes the PRISMA flowchart of the study selection. Additional studies of potential interest that did not meet the selection criteria are provided in Appendix 2.

Summary of Findings

No relevant literature on the clinical or cost effectiveness of prophylactic treatment for contacts of patients with invasive meningococcal disease (IMD) who are members of sports teams was identified. Similarly, no evidence-based guidelines specific to sports settings were identified.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING

No relevant clinical evidence or guidelines on the prophylactic treatment of contacts of patients with invasive meningococcal disease (IMD) who are members of sports teams was identified.

There is an evidence gap in the specific setting of sporting activities, whether recreational or elite, not only in the clinical and cost-effectiveness of prophylactic treatment, but also in whom to treat prophylactically.

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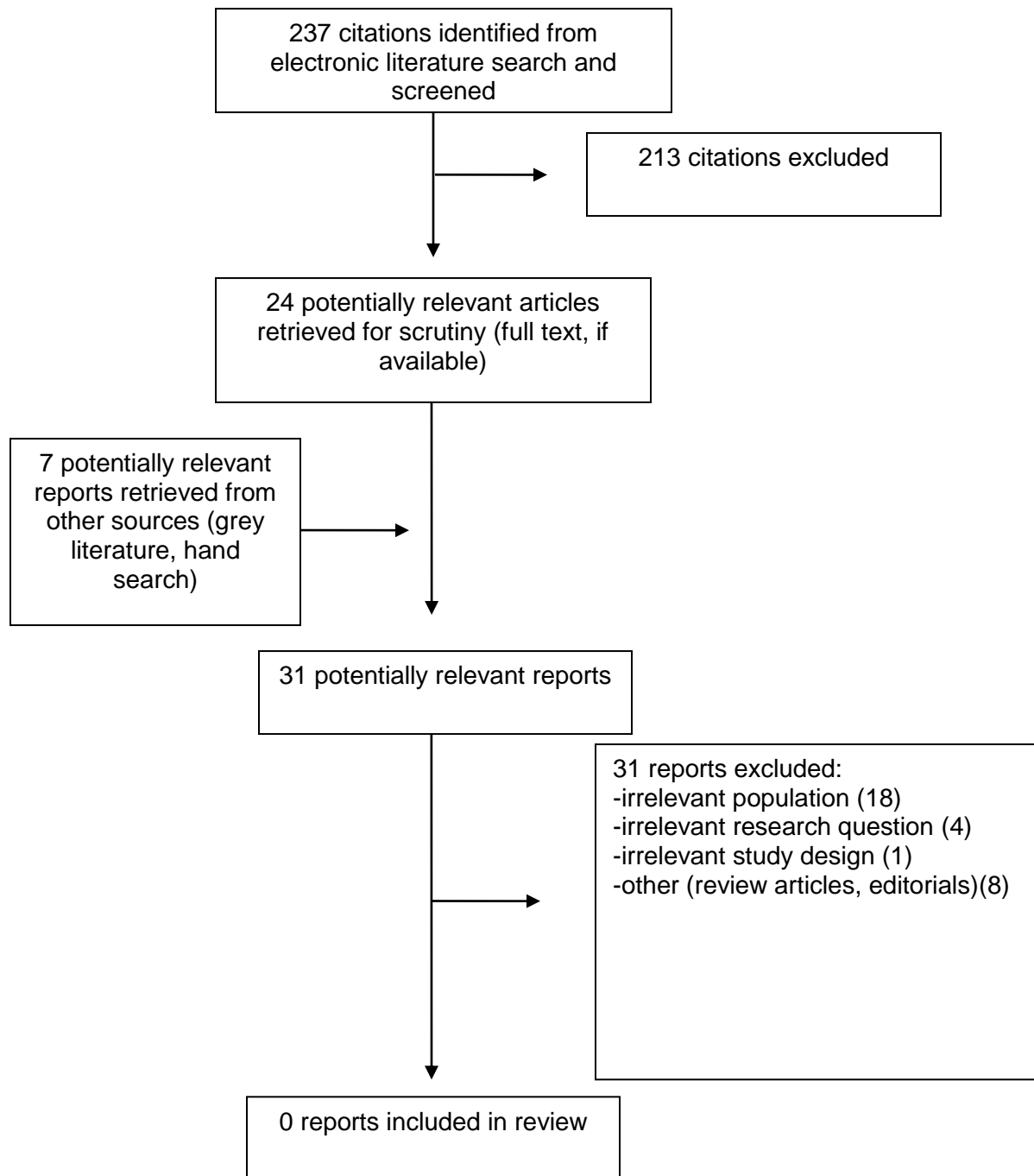
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APPENDIX 1: Selection of Included Studies



APPENDIX 2: Additional References of Potential Interest

Non-sporting guidelines:

Invasive meningococcal disease CDNA national guidelines for public health units [Internet]. Canberra: Communicable Diseases Network Australia; 2014. [cited 2015 Jan 27]. Available from: [http://www.health.gov.au/internet/main/publishing.nsf/Content/0A31EEC4953B7E6FCA257DA3000D19DD/\\$File/IMB-Oct2014.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/0A31EEC4953B7E6FCA257DA3000D19DD/$File/IMB-Oct2014.pdf)

Case report:

Cummiskey J, Borrione P, Bachil N, Ergen E, Pigozzi F. Report of a serious reportable communicable disease at a major sporting event. J Sports Med Phys Fitness. 2008 Jun;48(2):125-8.

Non-systematic reviews:

Gärtner BC, Meyer T. Vaccination in elite athletes. Sports Med [Internet]. 2014 Oct [cited 2015 Jan 15];44(10):1361-76. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4171584>

Luke A, d'Hemecourt P. Prevention of infectious diseases in athletes. Clin Sports Med. 2007 Jul;26(3):321-44.

Descriptive epidemiologic studies:

Karpinos AR, Rizzone KH, Cribbs SP, Roumie CL. Low proportion of high school senior athletes receiving recommended immunizations. Phys Sportsmed. 2014 May;42(2):71-9.

Grosset-Janin A, Nicolas X, Saraux A. Sport and infectious risk: a systematic review of the literature over 20 years. Medecine et Maladies Infectieuses. 2012 Nov;42(11):533-44.