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Invasive Meningococcal Disease in Men Who Have Sex With Men

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Since August 2010, 22 cases of invasive meningococcal disease (IMD) among men who have sex with men (MSM) have been reported to the New York City Department of Health and Mental Hygiene (NYC DOHMH) (1). Seven of these men died. The mean age was 34 years, 50% were African American, and 55% were infected with HIV. Among the 12 patients with HIV infection, the median CD4 count was 525×10^9 cells/L and 70% of patients had a viral load level less than 200 copies per milliliter within 90 days of IMD diagnosis. In 2012, meningococcal incidence among NYC MSM was 50-fold greater than the age-adjusted rate for the general population. All isolates were serogroup C, and most were indistinguishable by pulsed-field gel electrophoresis. The current outbreak strain is also related to a serogroup C outbreak that occurred in 2006 among Brooklyn drug users and their close contacts. In response, the NYC DOHMH is recommending meningococcal vaccination for all NYC MSM who are HIV-positive or HIV-negative and have engaged in “intimate contact with a man met through an online Web site, digital application or at a bar or party” (1). In Los Angeles, 4 cases of IMD among MSM have been reported since December 2012.

Over the past decade, IMD declined to an all-time low in the United States (0.3 to 0.6 cases per 100 000 persons). Outbreaks account for only 2% of the total meningococcal disease burden (2, 3). Approximately 10% of the general population has nasopharyngeal colonization with meningococcus but rates vary with age, peaking in adolescents and young adults when colonization can be as high as 37% (4). Transmission occurs through prolonged direct contact with upper respiratory secretions from colonized or infected individuals. Risk factors for acquiring *Neisseria meningitidis* include smoking, close living quarters, bar patronage, and kissing (5). In a small percentage of exposed individuals, *Neisseria meningitidis* invades the nasopharyngeal mucous membrane and, within days, leads to bloodstream or central nervous system infection. Early clinical signs of IMD are nonspecific but may include an influenza-like illness with severe myalgias, signs of sepsis, and a petechial rash. Herrick’s famous adage from 1919 that “no other infection so quickly slays”

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remains true today. Death within 24 hours of onset of symptoms is common, and the case-fatality ratio for IMD in the United States is 10% to 15% and is 3-fold greater in outbreaks (3). Considering the current NYC outbreak, important questions about meningococcal transmission and disease control remain unanswered.

Why does this infection affect the MSM population? Past epidemiologic studies in MSM found high carriage of oropharyngeal *N. meningitidis* (43%) and 2% rectal and 1% urethral colonization rates (6). Previous IMD outbreaks among MSM occurred in Toronto in 2001 and in Chicago in 2003 for a combined total of 12 cases, with a case-fatality rate of 42% (7). Subsequent molecular typing of these 2 outbreak strains revealed that they were distinct but had a common multilocus sequence type (ST-11) associated with virulence. Future case-control and molecular epidemiologic investigations will be critical to understanding the specific risk behaviors and the host-pathogen factors promoting transmission inside, but apparently not outside, the MSM community.

Is HIV an independent risk factor for meningococcal disease? Increased susceptibility to *Pneumococcus*, another encapsulated bacterium is a well-described complication of HIV. Studies of sporadic meningococcal disease from the United States and South Africa found a 10- to 20-fold increased risk for IMD associated with HIV infection compared with the age-adjusted population IMD incidence, but other African studies during meningococcal epidemics did not find an association (8, 9). One potential concern in this population is vaccine immunogenicity. Although not studied in HIV-positive adults, quadrivalent meningococcal conjugate vaccine in HIV-positive adolescents with a CD4 percentage greater than 15 is immunogenic (10). Two doses significantly improved response durability in this study population. Given a biologically plausible mechanism to account for increased risk and the continued occurrence of outbreaks among HIV-infected MSM, we believe the Advisory Committee on Immunization Practices should formally evaluate routine meningococcal vaccination in HIV-infected adults because this is not currently recommended.

How should clinicians respond? During previous MSM outbreaks in Toronto and Chicago, public health officials responded rapidly with targeted vaccination campaigns that together reached 18 000 persons. Since 4 October 2012, NYC DOHMH has promoted vaccination via physician communication, advertisements on social networking mobile phone applications and Web sites used by MSM and many of the IMD cases, free vaccine administration at NYC DOHMH's sexually transmitted disease clinics, and vaccination events at MSM bars. To date, more than 11 000 people have been vaccinated and no new cases have been reported since February 2013. Community-based organizations in Los Angeles have taken a similar approach. However, vaccine coverage may be suboptimal because of challenges in reaching the populations most at risk, particularly African American MSM who may not self-identify as gay or be engaged in medical care. Primary care providers have faced barriers to vaccine delivery, including high procurement costs, limited reimbursement, and varying insurance requirements. Coverage has improved with increased media attention and clarification that insurers are mandated to cover the immunization under New York State law, but the experience highlights the logistic challenges in effectively implementing new vaccine recommendations for adults.

Providers should be aware of the recent meningococcal cases in NYC and Los Angeles, assess their patients' risk, and discuss the outbreak with their MSM patients. Suspected meningococcal cases should be reported promptly to local health departments, where patients should have an epidemiologic investigation that accounts for sexual history and determines HIV status. Several city and state health departments, including Massachusetts, Rhode Island, San Francisco, San Diego and Toronto, have recommended that MSM

traveling to NYC be vaccinated. Travel recommendations are particularly important because of the upcoming Gay Pride events in NYC from 28 to 30 June 2013, with attendance expected to be as high as 1 million people. By analogy, mass gatherings, such as the hajj (the annual religious pilgrimage in Saudi Arabia), have been associated with meningococcal outbreaks, and vaccination is now required for pilgrims.

Parallels have been drawn between this meningococcal outbreak and the initial reports of HIV cases in 1981 from Los Angeles and NYC. Obvious and important differences included the availability of a vaccine and acquired immunity to meningococci in a large proportion of the adult population. However, the lessons learned from the previous HIV epidemic suggest that a successful response requires the coordinated efforts of public health authorities, the government, clinicians, researchers, the pharmaceutical industry, the media, and the community. Improved understanding of the microbiologic, genetic, epidemiologic, and immunologic determinants of IMD will be necessary to prevent future outbreaks and to identify and reach those at risk.

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