

University of Pittsburgh Safety Manual	EH&S Guideline Number: 05-019	
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RESEARCH WITH *NEISSERIA MENINGITIDIS*

There have been 16 fatal laboratory-acquired *Neisseria meningitidis* infections reported in the literature. These Guidelines were designed to establish a system of information and safeguards that must be followed at the University of Pittsburgh when working with live *N. meningitidis*.

1. SCOPE

- 1.1. **Agent** – *N. meningitidis* is a bacterium best known as a cause of meningitis and meningococemia.
- 1.2. **Incidence** – Major cause of infectious morbidity and mortality globally, and is responsible for epidemics in Africa and in Asia. In the United States, 1000 to 2600 cases of *N. meningitidis* infection occur annually; most cases are sporadic.
- 1.3. **Sequelae** – Meningococcus is spread person to person through the exchange of saliva and other respiratory secretions. Case-fatality rate even with treatment is 10-15%; and 11-19% of survivors suffer permanent sequelae, which can include limb amputation, deafness, and renal insufficiency.
- 1.4. **Vaccine** – Three meningococcal vaccines are licensed in the United States, one polysaccharide vaccine (MPSV4) and two conjugate vaccines. One of the conjugate vaccines uses diphtheria toxoid as the protein carrier (MCV4-DT) and the other uses CRM₁₉₇ (MCV4-CRM) as the protein carrier. All three vaccines cover meningococcal serogroup A, C, W-135, and Y strains but not serogroup B strains, which are a common cause of meningococcal disease in the United States. In general, conjugate vaccines are preferred over polysaccharide vaccine. However, MCV4-DT is licensed only for persons 2 through 55 years old and MCV4-CRM for persons 11-55 years old. Vaccine effectiveness for the included serogroups is generally considered to be about 75%-90%. For adults, a single dose of vaccine is required with a second dose 5 years later among persons who remain at high risk. For information on the most commonly reported adverse events for MCV4-DT, MCV4-CRM, and MPSV4 and the medical contraindications, which include, depending on the vaccine, and allergic reaction to previous vaccine administration or vaccine components, see the Vaccine Information Sheet.
- 1.5. **Chemoprophylaxis** – Antibiotic chemoprophylaxis with rifampin, ciprofloxacin, or ceftriaxone is available for the prevention of meningococcal disease following known high-risk exposures. Laboratory personnel with high-risk exposure,

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regardless of immunization status, should contact Employee Health Services at 412-647-3695 immediately for evaluation for the need for chemoprophylaxis.

1.6. Laboratory Hazards and Communicability

1.6.1. Use of *N. meningitidis* is restricted to Biosafety Level 2 or Animal Biosafety Level 2 (BSL-2/ABSL-2) facilities with strict adherence to BSL-2/ABSL-2 engineering practices and personal protective equipment. All work with live *N. meningitidis* organisms must be done in a biosafety cabinet.

1.6.2. *N. meningitidis* can be transmitted in a laboratory setting through needlesticks, droplet exposure to the mucous membranes and poor adherence to biosafety precautions. Many of the cases of laboratory transmission have occurred while working with live *N. meningitidis* on an open bench. Use of a certified biological safety cabinet is required for manipulation of *N. meningitidis*.

1.7. **Employees at Risk-** Handling of the *N. meningitidis* agent and/or research animals experimentally infected with *N. meningitidis* creates the highest risk of exposure and potential infection. Due to the presence of engineering controls, personal protective equipment and work practices, employees entering areas where *N. meningitidis* is utilized are at less risk of infection.

2. GUIDELINES

2.1. All Principal Investigators (PI's) using *N. meningitidis* must be registered with the Biosafety Officer/EH&S. A registration document may be obtained from the website www.ehs.pitt.edu.

2.2. Biosafety Level 2 practices, containment equipment and EH&S-approved BSL2/ABSL2 facilities are required for all activities involving the use or manipulation of *N. meningitidis* and infected animals. Handling of *N. meningitidis* must be conducted in a biosafety cabinet.

2.3. Laboratories shall be inspected by EH&S at least annually to verify appropriate BSL-2 containment, practices and research protocol updates.

2.4. All individuals who directly handle a) cultures or b) animals contaminated or infected with non-attenuated *N. meningitidis* strains that infect humans must be medically screened by Employee Health Services for contraindications to *N.*

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meningitidis exposure and/or *N. meningitidis* vaccine. Vaccination is required for individuals seeking to handle *N. meningitidis* or infected animals at the University of Pittsburgh. Vaccination is provided at no cost to the employee at Employee Health Services.

2.5. Occupational Health Requirements

2.5.1. Evidence of vaccination for *N. meningitidis* is required for all individuals before handling *N. meningitidis* cultures or *N. meningitidis* infected animals at the University of Pittsburgh. This requirement shall be stated in respective job descriptions for University personnel.

2.5.2. For persons entering research facilities using *N. meningitidis* at the University of Pittsburgh but are not directly handling *N. meningitidis* agents or animals, the *N. meningitidis* vaccine is available at no cost by contacting Employee Health Services.

2.6. Individuals refusing or having a medical contraindication to the *N. meningitidis* vaccine as determined by the Employee Health Services will be prohibited from handling *N. meningitidis* or infected animals at the University of Pittsburgh. The determination of all prohibited tasks will be made by the employee's supervisor in consultation with the Department of Environmental Health and Safety.

2.6.1. Staff members refusing or having a medical contraindication to the *N. meningitidis* vaccine shall be referred to their supervisor. The supervisor in consultation with the Office of Human Resources (and if necessary EH&S and Employee Health Services) will examine the feasibility of other duties for the employee that do not involve handling of *N. meningitidis*.

2.6.2. Faculty members refusing or having a medical contraindication to the *N. meningitidis* vaccine shall be referred to the respective department chair or dean. The supervisor in consultation with the Office of Human Resources and the Office of the Provost (and as necessary EH&S and Employee Health Services) shall determine other duties for the faculty member that do not involve handling of *N. meningitidis*.

2.7. Visitors are not permitted to handle *N. meningitidis* or infected animals at the University of Pittsburgh unless they have demonstrated proficiency at BSL-2 practices and have documented evidence of vaccination.

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- 2.8. It shall be the responsibility of the Principal Investigator and/or individuals responsible for control of access to a *N. meningitidis* facility to assure that individuals with potential *N. meningitidis* exposure are enrolled in the occupational health requirements of this Guideline, and are vaccinated before initial handling of *N. meningitidis*.
- 2.9. Laboratory personnel must wear personal protective equipment when handling these agents to include at a minimum a lab coat, face mask (unless working in a biosafety cabinet) and liquid barrier gloves. Personnel entering BSL2 containment facilities must abide by the garbing requirements for the specific facility as established by EH&S. Refer to the University of Pittsburgh Safety Manual Section V, Policy 05-003 for more details on Biosafety level 2 requirements.