NORTHERN NEVADA ADULT MENTAL HEALTH SERVICES

POLICY AND PROCEDURE

SUBJECT: WATERBORNE DISEASE PREVENTION PLAN

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I. PURPOSE

The purpose of this policy is to establish a plan for the management of systems aimed at preventing waterborne diseases such as Legionnaires.

II. POLICY

It is the policy of Northern Nevada Adult Mental Health Services (NNAMHS) to strive to provide a safe and healthful environment for consumers, employees, and visitors. This is accomplished by implementing proper engineering controls, following infection control procedures, using personal protective equipment when engineering controls are not feasible and by maintaining systems to prevent adverse outcomes.

III. PROCEDURE

See attached management plan.
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NORTHERN NEVADA ADULT MENTAL HEALTH SERVICES MANAGEMENT PLAN FOR THE PREVENTION OF NOSOCOMIAL LEGIONNAIRES' AND OTHER WATERBORNE DISEASES

SECTION 1.0 PURPOSE

It is the policy of Northern Nevada Adult Mental Health Services (NNAMHS) to strive to provide a safe and healthful environment for consumers, employees, and visitors. This is accomplished by implementing proper engineering controls, following infection control procedures, using personal protective equipment when engineering controls are not feasible and by maintaining systems to prevent adverse outcomes.

The Centers for Disease Control and Prevention (CDC), The Occupational Safety and Health Administration (OSHA), the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE), the American Institute of Architects' Academy of Architecture for Health (AIA), the Association for Professionals in Infection Control and Epidemiology (APIC), and the American Society for Healthcare Engineering (ASHE), all recognize the importance of controlling or preventing infections due to waterborne pathogens, particularly *Legionella* spp., in healthcare facilities. The purpose for this management plan is to provide direction (policy, procedures and guidance) to prevent nosocomial Legionnaires' disease and other waterborne diseases. Controlling waterborne diseases involves a team approach involving infection control, clinical staff, maintenance, and engineering personnel. NNAMHS must use a team approach to address this issue.

SECTION 2.0 RESPONSIBILITIES

2.0.1 INFECTION CONTROL PRACTITIONER

The infection control practitioner (ICP) is responsible for monitoring operations to ensure compliance with these infection control policies and procedures. The ICP should keep tabs on surveillance for pneumonia and monitor laboratory results for *Legionella* spp. The ICP will report to the Infection Control and Environment of Care Committee on his/her findings regarding non-compliance. Leadership (the Agency Director) is responsible for addressing areas of non-compliance with these policies and ensuring that corrective measures are taken.

2.0.2 SUPERVISORS

The Agency Director is responsible for the safety and health of all consumers, staff, and visitors. The department heads and first line supervisors are responsible for ensuring all healthcare facility policies and procedures for Infection Control and Environment of Care are followed. Department heads are also responsible for providing the ICP with information necessary to the determination that compliance is being met. The first line supervisor is responsible for the training and competency of staff involved in following these policies and procedures.

SECTION 2.0.3 EMPLOYEES

All employees are responsible for following all healthcare policies and procedures for their area of care. Employees shall only perform duties for which they are competent. Employees who are unsure of the practices they need to safely and perform effectively their responsibilities need to contact their supervisor for additional training.

SECTION 3.0 WATERBORNE PATHOGENS AND DISEASES

Legionellosis has been defined as an illness with two clinical forms. It is a collective term describing infection produced by the bacteria *Legionella* spp. commonly found in natural and man-made aquatic environments. Serious illness can result from exposure to certain *Legionella* spp. This illness is commonly referred to as Legionnaires' disease. Severity ranges from a mild cough and low fever to rapidly progressive pneumonia and coma. Early symptoms include malaise, muscle aches, and slight headache. Later symptoms include high fever 105° F, a dry cough, and shortness of breath. Gastrointestinal symptoms may include vomiting, diarrhea, nausea, and abdominal pain. The incubation period for this illness is 2 - 10 days. Risk factors for consumers acquiring this illness include age, smoking history, underlying disease, and compromised immunity. NNAMHS facilities provide care to consumers who may have one or several of these risk factors (e.g., consumers on steroids, end stage renal disease, chemotherapy patients, age, smoking history, etc.) Fatality rates for Legionnaires' disease have averaged about 15% during outbreaks. It is difficult to diagnose Legionnaires' disease both clinically and radiographically from pneumonia caused by other agents. Diagnosis may be confirmed by one of several laboratory tests (refer to CDC, Part I. *Issues on Prevention of Nosocomial Pneumonia,* 1994).

The other less severe clinical illness caused by *Legionella* spp. is known as "*Pontiac Fever*." This illness presents itself as a flu-like illness without pneumonia. The incubation period for this illness is within 48 to 72 hours. This disease lasts up to five days but does not require hospitalization.

A number of other microorganisms have been identified as waterborne and moisture-associated pathogens. These organisms include, but are not limited to *Pseudomonas, Amoebae, Aspergillus*, and *Acinetobacter*.

Following the preventive procedures listed below in Section 5, can control many of these organisms, and reduce the risk of disease to consumers.

SECTION 4.0 MODES OF TRANSMISSION

The primary mechanism of entry for Legionnaires' disease is believed to be the inhalation of water aerosols contaminated with *Legionella* spp. The most frequently identified sources for exposure in hospitals includes cooling towers, showers, faucets, respiratory therapy equipment, and room-air humidifiers. Decorative fountains and misters have also been implicated as sources of exposure. Factors known to enhance colonization and amplification of *legionellae* in man-made water environments include temperatures of 77-108° F, stagnation, scale, and sediment, and the presence of certain free-living aquatic amoebae that are capable of supporting intracellular growth of *legionellae*.

In addition to water contaminated by *Legionella* spp, examples of transmission by other waterborne diseases may occur by contact with droplets, direct consumption of ice or water, and by the use of tap water in medical procedures.

SECTION 5.0 PRIMARY PREVENTION

The following practices shall be followed, where applicable, for the prevention of nosocomial *Legionnaires*' disease and other waterborne diseases.

A. Physicians shall be educated to heighten their suspicion for cases of nosocomial Legionnaires' disease and to use appropriate methods for its diagnosis.

B. Laboratory staff shall be capable or have the means available (e.g., reference laboratory) to adequately culture for and identify *Legionella* spp. and other waterborne bacteria

C. Active surveillance shall be in place to maintain a high index of suspicion for the diagnosis of nosocomial Legionnaires' disease, especially in consumers who are at high-risk for acquiring the disease.

D. Where applicable and feasible, cooling towers shall have drift eliminators installed. Cooling towers must be treated regularly with an effective biocide during periods of operation. The cooling tower must be maintained in accordance with current manufacturers' recommendations. It is recommended to regularly alternate the biocides using oxidizing and non-oxidizing biocides to avoid the selection and growth of resistant strains of microbes. For additional information on biocides, see ASHRAE Guideline 12-2000. The coldwater basin must be cleaned to prevent the build-up of biofilms, slime, dirt, and algae. If air intake ducts are within 100 feet of a cooling tower being decontaminated, the air ducts shall be closed. When the tower is shut down for a lengthy time (e.g., winter), it should be cleaned before start-up. Adequate maintenance records shall be kept.

E. Where applicable, conduct weekly inspections on cooling towers to identify and fix leaks, check for corrosion, deterioration, and blockages, and ensure other equipment (fans, motors & pumps) are operating properly.

F. Evaporative air coolers shall be regularly inspected and maintained in accordance with current manufacturers' instructions.

G. All new tanks and piping shall be disinfected with chlorine prior to start-up. Where feasible, dead end piping shall be avoided. In existing facilities, all dead end piping should be identified. Piping that serves consumers at risk for *Legionella* spp. should either be replaced where feasible or a scheduled flushing of the stagnant water should be initiated.

H. Drip pans on all heating, ventilation, and air conditioning (HVAC) units drain well and shall be kept clean. Ductwork should be designed so that water from condensation and other sources does not accumulate. Drain lines should include a trap and air break so that contaminated water is not drawn back into the system. If humidification is considered for a HVAC system, it is recommended that steam humidification be used. Refer to *AIA Guidelines for Design and Construction of Hospital and Health Care Facilities, 2001*, for additional information on humidification.

I. Dust control methods shall be in effect during construction and renovation. Reference should be made to the facility's construction/renovation infection control policy.

J. Ensure decorative fountains, where available, are cleaned on a routine basis and regularly disinfected. Decorative fountains shall not be located in consumer care areas.

K. Eyewash stations shall be flushed weekly.

L. Ice machines in the kitchen of Building 25 and Building 26 shall be cleaned and sanitized on a regular maintenance schedule every 6 months by an outside service established through the Food Service Contractor. Ice machines on the inpatient units are cleaned and sanitized on a weekly basis and documented on the monthly Refrigerator Log. Guidelines have been published in the American Journal of Infection Control (*Sanitary care*

and maintenance of ice-storage chests and ice-making machines in health care facilities, AJIC 1998; 26:111-2). These guidelines shall be followed.

M. Water lines and fixtures. Washers and gaskets made of natural rubber should be avoided. Neoprene or other synthetics should be used if available for purchase. Heavily scaled faucets and showerheads shall be replaced. Faucet aerators and shock absorbers (water hammer arrestors) should be avoided. Water shall be treated to prevent the accumulation of scale. Where the choice of replacement piping is being considered, copper should be chosen over other materials. Copper resists legionellae colonization. Steel is recommended where copper cannot be used. Plastics are considered the worst for preventing *legionellae*. Plumbing contractors (to the extent possible) should extend recirculation lines to the point farthest from the supply; run hot piping above cold piping to prevent warming of cold water; ream pipe ends to remove burrs and apply pipe compound only to male threads; and run all lines at a slight fall to make draining the system easier to reduce air locks.

N. Hot water generators and cold-water storage tanks. Minimize cool zones in hot water tanks. If temperatures vary, consider relocating supply and return taps, installing a top-to-bottom circulating pump or insulating the underside of the vessel. Hot water tanks should be drained periodically to remove the accumulation of scale (evaluate quarterly at first to determine if scale is present; if little or no accumulation, increase time for de-scaling). Tanks should be flushed with a chlorine solution after de-scaling. Cold-water storage tanks should be cleaned and rinsed with a chlorine solution at least once a year.

SECTION 6.0 SECONDARY PREVENTION - RESPONSE TO CASE

The following actions shall be taken where there is a single case of laboratory-confirmed, definite nosocomial Legionnaires' disease (laboratory-confirmed legionellosis that occurs in a patient who has been hospitalized continuously for > 10 days before onset of illness) is identified, or if two or more cases of laboratory-confirmed, possible nosocomial Legionnaires' disease (laboratory-confirmed infection that occurs 2-9 days after hospital admission) occur within 6 months of each other.

A. Conduct an epidemiologic and environmental investigation to determine the source. The CDC, in *Guidelines for Prevention of Nosocomial Pneumonia*, 1997, recommends several important steps in the epidemiologic investigation. "First, microbiologic and medical records should be reviewed. Second, active surveillance should be initiated to identify all recent and ongoing cases of legionellosis. Third, potential risk factors for infection (including environmental exposures such as showering or use of respiratory-therapy equipment) should be identified by creating a line listing of cases, analyzing the collected information (by time, place, and person), and comparing case-consumers with appropriate controls. Fourth, water samples should be collected from environmental sources implicated by the epidemiologic investigation and from other potential sources of aerosolized water. Fifth, subtype matching between *legionellae* isolated from patients and environmental samples should be conducted. This last step can be crucial in supporting epidemiological evidence of a link between human illness and a specific source."

B. If there is evidence of transmission of Legionnaires' disease, an environmental investigation to determine the source(s) of *Legionella* spp. shall be initiated. Collect water samples from potential sources of aerosolized water. Information on how to collect these samples can be found in the OSHA Technical Manual (see SECTION 8.0, REFERENCES AND RESOURCES).

C. If a source of infection is identified by epidemiological and environmental investigation, promptly decontaminate it.

D. If the water-system is implicated, decontaminate the heated-water system by either superheating (flushing for at least 5 minutes each distal outlet of the system with water at 165° F or by hyper chlorination (flushing for at least 5 minutes all outlets of the system with water containing > 10 mg/L free residual chlorine). Where hot water is used, post signs and inform staff of the danger for scalding injury to consumers, staff, or visitors. Clean hot-water storage tanks and water heaters to remove accumulated scale and sediment. Maintain hot potable water at outlet to 122° F or if possible, chlorinate heated water to achieve 1-2 mg/L free residual chlorine at the tap in hospitals housed patients who are at high risk for nosocomial legionellosis.

   If possible, maintain cold water at outlet at 68° F. Restrict immunocompromised consumers from taking showers, and use only sterile water for their oral consumption until *Legionella* spp. becomes undetectable. For high-risk consumers, remove showerheads and faucet aerators monthly for cleaning and disinfecting.

E. If cooling towers or evaporative condensers are implicated, decontaminate the cooling-tower system. Consult with the manufacture of

the unit to determine if they have a recommended method for decontamination. In the absence of manufacturer recommendations, the CDC *Guidelines for Prevention of Nosocomial Pneumonia*, Appendix D (Procedure for Cleaning Cooling Towers and Related Equipment), should be consulted. A copy of these procedures can be downloaded from the CDC website. See SECTION 8.0 REFERENCES AND RESOURCES. Also, ensure that all workers are wearing appropriate personal protective equipment (PPE) and have been trained on the hazards of this job.

F. Assess the efficacy of the implemented measures in reducing or eliminating *Legionella* spp. by samples for culture at 2-week intervals for 3 months. If *Legionella* spp. is not detected during 3 months of monitoring, collect cultures monthly for another 3 months. If *Legionella* spp are detected in one or more cultures, reassess control measures, modify accordingly, and repeat decontamination process.

G. Keep records of all control measures including maintenance procedures of environmental test results for cooling towers and potable-water systems.

SECTION 7.0 WORKER SAFETY

Workers involved in decontamination procedures shall receive training on legionellosis and safety precautions. All OSHA regulations should be followed (e.g., Hazard Communication, Personal Protective Equipment, Respiratory Protection, etc.) The ASHRAE *Legionellosis: Position Paper, the CDC's Guideline for the Prevention of Nosocomial Pneumonia,* Appendix D, and the OSHA Technical Manual, Section III, Chapter 7, have additional information on this topic. Basic protective equipment to be used should be based on the hazardous chemicals used to treat the equipment (e.g.,

cooling tower) and if there is a risk of aerosolized water containing *Legionella* spp. Protective equipment may include full-length protective clothing, boots, gloves, goggles, and a full-or half-face respirator that is effective against the chemicals being used and a HEPA filter to protect against pathogenic microorganisms.

SECTION 8.0 REFERENCES AND RESOURCES

Occupational Safety and Health Administration. A number of reference documents are available off the OSHA web site (www.osha.gov). Go to site index under L (Legionnaires disease). Links are available for several CDC guidelines including *Guidelines for Prevention of Nosocomial Pneumonia, Legionnaire' Disease - Issues on Prevention of Nosocomial Pneumonia, and Recommendations for Prevention of Nosocomial Legionnaires' Disease*. Also, on the home page go to the Library section. Go into this Library section. Scroll down to the section OSHA Technical Manual. Go into this section. Go to Section III, Chapter 7, and link on to Legionnaires disease.

Centers for Disease Control and Prevention: go into the CDC web page at www.cdc.gov. Go to their Health Topics index. Go to Legionellosis. Go to Additional information for CDC guidelines and to obtain a copy of *ASHRAE 12-2000, minimizing the Risk of Legionellosis Associated with Building Water Systems*. To obtain this download, go into the website for Baltimore Aircoil and go to "Free Downloads". This ASHRAE document is an excellent reference document.

A copy of the book Legionellae *Control in Health Care Facilities, A Guide for Minimizing Risk*, by Matthew Freije, is available for purchase at www.hcinfo.com or by calling 1-800-801-8050.

A copy of the publication Waterborne Pathogens- Compliance with JCAHO Requirements can be obtained off of the web site for the American Society for

Healthcare Engineering. This site can be accessed at http://www.ashe.org/ahj/waterborne.html.

A copy of the publication *Guidelines For Design and Construction of Hospital and Health Care Facilities* can be purchased from the American Institute of Architects by calling 1-800-242-3837 or through ASHE at http://www.ashe.org/publications/index.html.

A copy of the ASHRAE document *Legionellosis: Position Paper* , is available at ASHRAE web site. This site can be accessed at www.ashrae.com. Go to search and type in "Legionellosis: Position Paper".

A copy of the book *Bioaerosols, Assessment and Control*, a publication of the American Conference of Governmental Industrial Hygienists (ACGIH), is an excellent reference on various bioaerosols including legionellosis. A copy of this book can be purchased through the ACGIH at www.acgih.org or by calling 1-513-742-6163.

Numerous links to organizations (ADA, CDC, EPA, FDA, USAF) addressing Dental Unit Water Lines are available from the Organization of Safety & Asepsis Procedures (OSAP) by going to www.osap.org/issues/pages/water