Michigan Department of Licensing & Regulatory Affairs (LARA)

Guidelines for use of Portable Air Filtration Systems in Health Care Facilities

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The Minimum Design Standards for Health Care Facilities in Michigan, published in 1998 and formally adopted by legislation in 2002 require Emergency Departments in Section 7.9.D22 to provide at least one negative pressure airborne infection isolation room. Those health care facilities that do not already have such a room in their ED should seriously consider renovation or new construction to provide one. In the interim, facilities may benefit from the use of a portable HEPA filter unit equipped with the proper fittings/ducting to exhaust air from a selected room to create the required negative pressure environment.

Placement of Portable Air Filtration Unit to Create a Temporary Negative Pressure Airborne Infection Isolation Room

- A portable HEPA device will not create a negative pressure room unless it can be discharged directly to the outside. For flexibility, it is possible that a number of negative pressure hoods could be purchased and installed so that the unit could be placed in any of the rooms so equipped to create a negative pressure isolation room. This would require access to an outside wall or the roof for discharge of the air from the unit. It would probably not be practical to set up more rooms than you had HEPA units available. When the portable HEPA device is connected in this way, return air grilles must be sealed off.

- A standard 10 x 15 x 9 examination room would probably be ventilated at a rate of 100-150 cfm (4-6 ACH). Trying to connect a HEPA unit which discharges at a rate of 625 cfm into a return duct to create a negative pressure room would pressurize the return duct and result in blowback into adjacent rooms. This would not be acceptable.

- If an exhaust hood is not available, for the short term, consider closing off both supply and return from the room into which the portable HEPA is placed. This will not result in a pressurized room (either positive or negative) but should minimize the airflow into the corridor or surrounding space.

- If an air handler serving the area has an economizer mode that is capable of 100% outside air, manually switch to this mode to provide exhaust from all of the rooms served by the AHU. This would avoid recirculation of the air from a room with an infectious patient into other areas. The HEPA would provide additional air changes within the room, and would remove some of the infectious material. This must be coordinated with the facility engineer to ensure the design of the air handling system will accommodate such conditions without adverse effects (such as freezing coils).

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Placement of the Unit in Any Area (triage room, ED waiting room, ED exam room, etc) for Temporary Emergencies or Continuous Air Scrubbing

Placement of the unit in any area (triage room, ED waiting room, ED exam room, etc) must be done in consideration of the following:

- The unit must not create an obstruction that would interfere with the proper delivery of health care.

- The unit should be placed so as maximize air mixing for better air scrubbing effectiveness (unless circumstances prevail that dictate a more controlled air flow). With any airflow device the direction of air flow must be from clean to less clean to minimize the spread of contamination. [For example, if the unit was placed in an ED waiting room and several victims walked in contaminated with some hazardous/infectious powder, it would be imprudent to have the unit air flow cause greater mixing of the powder. The following three bullet points address related issues.]

- The unit should be placed as close to the expected source of the contamination as possible to increase effective capture of the infectious/hazardous agents. Capture ability decreases with the square of the distance from the intake, so the distance from the patient has an impact on the ability to filter out droplet nuclei.

- The unit should normally be placed so that it does not draw contaminated air past the breathing zone of the caregivers.

- The air flowing out of the unit must not be directed in a way that would cause discomfort to patients, visitors and staff.

Other Considerations

1. The use of the portable filtration unit within the facility should be guided by a written policy that is created using information in these guidelines and should be customized specific for the hospital with appropriate reviews and approvals from infection control, administration, maintenance, and the departments in which the units will be used.

2. The portable air filtration unit should not be plugged into a power strip or extension cord. The unit should require standard single phase 110/120 volts and should be plugged into an electrical receptacle on a circuit having an amp rating adequate for the unit's power draw. It is highly recommended that an emergency power outlet be made available for the unit.

3. If the portable air filtration unit has adjustable air flow, the air flow should be selected that is appropriate to the size of the room to give the desired air changes per hour. Unless other considerations (such as noise, discomfort of blowing air, etc) prevail, the unit should normally be run at the highest fan setting since this will provide the maximum filtration and air changes per hour. In smaller rooms the recommended minimum 12 air changes per hour may be achieved at a lower fan setting. Under these conditions, the users may opt to lower the fan settings.

Note: Since these units may be used on a continuous basis to simply scrub the air to help remove contaminants, it is understood that they may be used in areas that are not designed to the ideal that have neither negative pressure nor 12 air changes per hour.

4. Portable air filtration units require proper preventive maintenance for their effective continued operation.

- The procedure should specify recommended personal protective equipment (PPE) when performing maintenance on the unit.

- The maintenance procedure should be performed in an area safely away from any patient locations. It is recommended that it be done in some maintenance location that has appropriate ventilation including negative pressure, designated for such activities. The area should be a contained area and easily leaned/decontaminated.

- Based upon manufacturer's recommendation and any additional suggested protocol from facility maintenance, a standard routine maintenance procedure should be developed for the unit. Such maintenance should include items such as (but not limited to)

    a. changing of pre-filters (on a schedule or as needed per magnehelic gauge) Be sure to include details on "bag out" protocol and proper disposal of filters. Since these filters might be contaminated, they should be treated as medical waste and handled with appropriate PPE.

    b. operational check for proper operation

    c. interior cleaning of unit if needed (without disturbing seal on HEPA filter)

    d. changing of UV lamp per manufacturer recommendation (based on hrs of use)

    e. general safety check (electrical & mechanical)

    f. lubrication where needed (Note: fans, etc should have sealed bearings and should not require lubrication)

5. The HEPA unit must be leak tested and certified. This should be done initially and every time the HEPA filter is changed. The frequency of changing the HEPA filter should be based upon manufacturer's recommendation (e.g. annually or when indicated by the manometer (differential pressure gauge) across the HEPA filter.

6. The portable filtration unit should be monitored regularly (e.g. weekly) for leaks. This can be done by simply having designated staff monitor the pressure drop across the filter by checking the gauge.

Facilities contemplating use of the portable air filtration devices as described above are welcome and encouraged to contact the engineering staff of the MDLARA Health Facilities Engineering Section (HFES) for further assistance with their particular installation. We can be reached at 517- 241-3408.