



HEALTH HOLDING

HAFER ALBATIN HEALTH  
CLUSTER  
MATERNITY AND  
CHILDREN HOSPITAL

<b>Department:</b>	Infection Prevention and Control Department		
<b>Document:</b>	Multidisciplinary Policy and Procedure (MPP)		
<b>Title:</b>	Negative Pressure Room and High-Efficiency Particulate Air (HEPA) filter Monitoring		
<b>Applies To:</b>	Patient Care Areas		
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## 1. PURPOSE:

- 1.1 To provide instructions on the monitoring and maintenance of the negative pressure rooms or airborne infection isolation room (AIIR) to the Nursing Services, Utilities and Maintenance (U&M) Department, and Infection Preventionist (IP).

## 2. DEFINITONS:

- 2.1 Negative pressure room or AIIR is defined as a single-occupancy patient-care room used to isolate persons with a suspected or confirmed airborne infectious disease. AIIRs provide negative pressure in the room (so that air flows under the gap into the room) with a pressure differential of  $>-2.5$  Pa (Pascal) or  $>-0.01$ " water gauge; an air flow rate of  $>12$  air changes per hour (ACH) for renovation or new construction; and direct exhaust air from the room to the outside of the building; or recirculation of air through a HEPA filter before returning to circulation.
- 2.2 High-Efficiency Particulate Air (HEPA) filter is an air filter that removes  $>99.97\%$  of particles  $>0.3\mu\text{m}$  at a specified flow rate of air. HEPA filters may be integrated into the central air handling systems, installed at the point of use above the ceiling of a room, or used as portable units.

## 3. POLICY:

- 3.1 For the safety of healthcare workers, patients, and visitors, negative pressure rooms occupied by patients requiring airborne isolation must be checked daily.
- 3.2 Activation of the alarm system when negative pressure ventilation fails: Visible red flashing lights and/or audible sound comes from the monitor
- 3.3 Maintenance Log: Used for keeping records of all malfunctions of negative pressure room monitors. The log should be kept in the ward and be accessible to all staff. Forms must be completed whenever the alarm system is activated.
- 3.4 Providing the facility's infection control department with a copy of all the daily, weekly and monthly follow-up records by the departments nursing and the maintenance department, as well as the maintenance record for isolation rooms by the maintenance department.

## 4. PROCEDURE:

- 4.1 Routine Monitoring of Negative Pressure Rooms
  - 4.1.1 Airborne Infection Isolation Rooms (AIRS) are under negative pressure (minimum  $-2.5$  Pascal) with air totally exhausted to outside (100%) through High-Efficiency Particulate Air (HEPA) filters. The exhaust air ducts are independent of the building exhaust air system.
  - 4.1.2 Continuous monitoring of negative pressure to ensure that AIRS are  $(-2.5)$  all the time.
  - 4.1.3 Totally air exhausted to outside (100%) through High-Efficiency Particulate Air (HEPA) filters.

- 4.1.5 Conduct and document monthly checks on all negative pressure rooms for air pressure and air changes. All documentation must be forwarded to an environmental health section of the Infection & Prevention Control (IP&C) Department.
- 4.1.6 Regular monitoring of negative pressure difference of AIRs.
  - 4.1.6.1 Daily when in use (i.e., a patient is isolated inside).
  - 4.1.6.2 Weekly when not in use (i.e., no patient is isolated).
  - 4.1.6.3 Monthly check by biomedical personals.
- 4.1.7 Negative pressure rooms in use: Nursing staff must:
  - 4.1.7.1 Conduct visual checks for the direction of air flow (using flutter strips) on all rooms where patients are in airborne isolation for query and confirmed airborne transmissible diseases (e.g., Pulmonary Mycobacterium tuberculosis, measles, chicken pox) when patients are in this room
  - 4.1.7.2 Prior to admitting patients needing airborne isolation, check and ensure that negative pressure rooms are functioning well. For those designated isolation rooms without monitor, call U&M to check if the room is maintaining its negative pressure.
  - 4.1.7.3 Follow the procedure of this policy in any room that fails inspection.
  - 4.1.7.4 All documentation must be sent to the IP&C Department.
- 4.2 Negative Pressure Ventilation Failure
  - 4.2.1 Unit staff must respond to negative pressure failure.
  - 4.2.2 Nursing staff will:
    - 4.2.2.1 Place a surgical mask on the patient in airborne isolation.
    - 4.2.2.2 Keep the door closed at all times.
    - 4.2.2.3 Notify the Utilities & Maintenance (U&M) Department of the location and problem
    - 4.2.2.4 Notify IP&C during the regular work week by paging the IP that is covering the unit/area
      - 4.2.2.4.1 If an event occurs at night or on weekend, IP&C will be notified on the next working day.
    - 4.2.2.5 Document all information on the Negative pressure room or AIR Maintenance Log form
    - 4.2.2.6 Notify IP&C regarding the findings and required follow-up.
  - 4.2.3 U&M staff must respond immediately to the area and
    - 4.2.3.1 Assess whether the room(s) is/are maintaining negative pressure.
    - 4.2.3.2 Communicate their findings to the Nurse Manager or designee.
    - 4.2.3.3 Document their findings on the Negative Pressure Room Maintenance Log form.
  - 4.2.4 Nursing staff
    - 4.2.4.1 If U&M declares the occupied room is no longer maintaining negative pressure, follow these steps:
      - 4.2.4.1.1 For patients who are in airborne isolation (for pulmonary MTB, chicken pox, measles or hemorrhagic fever), contact IP&C immediately
        - 4.2.4.1.1.1 The patient must be transferred to another negative pressure room immediately.
        - 4.2.4.1.1.2 Put a surgical mask on the patient before transporting
        - 4.2.4.1.1.3 U&M can then proceed with repairs.
      - 4.2.4.1.2 If the patient is not in isolation:
        - 4.2.4.1.2.1 The patient can be moved to another room.
        - 4.2.4.1.2.2 U&M can proceed with repairs.
      - 4.2.4.1.3 If the room is unoccupied, then U&M can proceed with repairs immediately.
  - 4.2.5 The IP&C Department will:
    - 4.2.5.1 Assess the patient/situation with regard to infectious risk
    - 4.2.5.2 Provide infection control recommendations based on the risk assessment to minimize transmission of the disease.
    - 4.2.5.3 Document all information on the Negative Pressure Room Maintenance Log form and patient chart (as required).

- 4.2.5.4 Complete any follow-up with the unit staff and the maintenance log form is kept in the Infection Prevention and Control Department.
- 4.3 Monitoring the environmental conditions of negative-pressure insulation rooms:
  - 4.3.1 Temperature and humidity are monitored in the following ways:
    - 4.3.1.1 Nursing Department: (Temperature, humidity) is monitored and recorded in isolation rooms on a daily basis according to the form attached. See appendix 7.1
    - 4.3.1.2 Nursing Department: In the event of deviation from the specified engineering specifications (set point), contact the maintenance department to request a correction.
- 4.4 Monitor the pressure difference of the negative room:
  - 4.4.1 The negative pressured difference is monitored from the pressure meter:
    - 4.4.1.1 Daily: in the event of a having a patient, performing visual checks of the direction of airflow (using flap strips) in all rooms (Responsibility of the Nursing Department).
    - 4.4.1.2 Weekly: In the absence of a patient (Maintenance department responsibility).
  - 4.4.2 In the event of deviation from the specified engineering specifications (set point), a maintenance request should be submitted to the maintenance department. (Responsibility of the Nursing Department).
  - 4.4.3 In the event of failure to maintain the negative pressure of the isolation rooms, an audible sound emits from the screen and flashing red lights appear: In the event of a patient, the hospitals evacuation plan is applied to transport the patient. Then a maintenance request is raised by Department's nursing, in the absence of a patient, a maintenance request shall be submitted to the maintenance department by the nursing staff.
- 4.5 Ventilation:
  - 4.5.1 Most ventilation rates for healthcare facilities are expressed as (ACH: Air Cycle Change / Hour), air flow rate (12 ACH) air change per hour as a minimum (negative isolation room) and for each time flow rate the ventilation system needs to sterilize air directing the exhaust air from the room to outside the building high-efficiency molecular airfilter (HEPA)is an air filter that removes 99.97% of the particles 0.3 micrometers at a specific airflow rate HEPA filters can be integrated into central air handling, the sensors of the ACH are connected to the air inlet (supply) and the main air outlet of the room with the building monitoring system or the departmental control panel.
    - 4.5.1.1 1) (ACH) is monitored and recorded from the control panel:
      - 4.5.1.1.1 Daily: Each room every 24 hours(Responsibility of the Nursing Department).
      - 4.5.1.1.2 Monthly: Once (maintenance department) 1) In the event of deviation from the specified engineering specifications (set point), a maintenance request should be submitted to the maintenance department. (Responsibility of the Nursing Department).
- 4.6 Maintenance of passive-pressure insulation rooms: (Liability of the maintenance department of the facility)
  - 4.6.1 Unit Package:
    - 4.6.1.1 Coordination with the head of the department for any preventive maintenance (PPM) workers to determine the appropriate time and duration of work.
    - 4.6.1.2 After the completion of the work, there should be coordination with the cleaning supervisor to clean the site.
    - 4.6.1.3 The department head supervise the completion of the works and the operation of the airconditioning unit.
  - 4.6.2 AHU air handling unit filters:
    - 4.6.2.1 Coordination with the head of the department to determine a suitable time to change the filter
  - 4.6.3 HEPA filters
    - 4.6.3.1 All HEPA filters are changed from 6 to 12 months, depending on the visual inspection or the manufacturer's recommendations and they can be changed in the same steps as changing the AHU filters with confirmation using appropriate personal protective

equipment measures in coordination with the infection control department of the facility and disposal as medical waste.

- 4.7 Cleanliness of negative pressure isolation rooms:
  - 4.7.1 Creating a daily cleaning schedule in coordination between infection control and site support services department.
  - 4.7.2 Providing approved materials and supplies for cleaning of the isolation room.
  - 4.7.3 Using proper personal protective equipment during work, in coordination with the nursing department
  - 4.7.4 Ensure that workers have cleansed their hands before entering the isolation rooms.
  - 4.7.5 The presence of a nursing staff during the cleaning process for guidance.
  - 4.7.6 After the completion of the work, ensure that the workers have cleansed their hands.

## **5. MATERIALS AND EQUIPMENT:**

- 5.1 **Forms and Records:**
  - 5.1.1
- 5.2 **Materials and Equipment**
  - 5.2.1
  - 5.2.2

## **6. RESPONSIBILITIES:**

- 6.1 Maintenance Department- Monitoring of the building management system.
- 6.2 Nursing Department- Monitoring of negative pressure room.

## **7. APPENDICES:**

- 7.1 Negative pressure room monitoring form
- 7.2 HEPA filter monitoring form

## **8. REFERENCES:**

- 8.1 Ministry of Health. Maintenance of Negative-Pressure Isolation Rooms April 2021 - Final.pdf
- 8.2 GCC. Infection Prevention and Control Manula. 3<sup>rd</sup> Edition 2018.  
file:///C:/Users/SPawar/Downloads/The-GCC-Infection-Prevention-and-Control-Manual-3rd-Edition.pdf

9. APPROVALS:

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7.1 Negative pressure room monitoring form

UNIT: \_\_\_\_\_ ISOLATION ROOM NO. \_\_\_\_\_ Month / Year: \_\_\_\_\_

DATE	PRESSURE Measured -2.5 PASCAL	MOISTURE Relative Humidity 30-50% RH (MAX)	TEMPERATURE 22-24°C	AIR CHANGES PER HOUR (ACH) ≥12 ACH	REMARKS	STAFF SIGNATURE
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NOTE:  
 ◊ DAILY CHECK IF THERE IS PATIENT.  
 ○ WEEKLY CHECK, IF NO PATIENT.

Always check and record the negative pressure room with air conditioning open.

7.2 HEPA filter monitoring form

Month Year: \_\_\_\_\_

Date	FUNCTIONAL DESCRIPTION (MENTION THE COLOR)	CHECKED BY	STAFF SIGNATURE
1			
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FUNCTIONAL DESCRIPTION (GRE=FUNCTIONING, YELLOW= NEED TO CHANGE FILTER, RED=NOT WORKING)