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| Johns Hopkins Safety Manual | <i>Policy Number</i> | HSE 008 - A |
| <i>Subject:</i> Addendum A: Respiratory Protection Devices for Airborne Infectious Agents and Aerosolized Hazardous Drugs Protocol | <i>Last Review Date</i> | 09/23/08 |
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Policy

The Johns Hopkins Hospital provides Respiratory Protection Devices (i.e., Powered Air Purifying Respirators (PAPRs) or Suitable Alternatives) for use by staff who have patient care/environmental responsibilities for patients on airborne precautions or patients who are receiving Ribovirin, for the protection of all staff, prevention of disease transmission, and to comply with external regulatory agency requirements.

PAPRs are battery-powered systems that use a small HEPA filter unit to clean ambient air before it is delivered to the wearer. A PAPR system typically includes a blower/filter unit/battery pack (base unit), a headpiece, and a breathing tube that connects the base unit to the headpiece. Suitable alternative devices include N95 Respirators. While this policy refers primarily to PAPRs, it should be understood that suitable alternative devices may also be employed, based on the approval of HSE (Health, Safety, and Environment).

Responsibilities

Office of Occupational Health

Ensure that all hospital staff have been appropriately screened to use the respiratory protection devices (i.e., determine the medical fitness of staff to use the devices via the modified screening tool).

Maintain records on all employees of the medical screening and make available to supervisors/managers as requested.

Provide results of the medical screening of all hospital staff to the Department of Health, Safety, and Environment (HSE).

Refer staff who are unable to use a PAPR to HSE for a suitable alternative device.

Department of Health Safety and Environment (HSE)

Provide orientation session on use of PAPRs for all hospital employees—according to predefined content outline.

Provide PAPR/respiratory protection device training for units/departments on an as-needed (by request) basis—according to pre-defined content outline.

Maintain all PAPR's/respiratory protection devices throughout the institution:

- Inventory and track all devices.
- Perform routine inspection and testing on all devices, replacing filters as needed and maintaining the battery packs for all units that have/use these devices; maintain a log on each unit to reflect these checks.

Provide training for appropriate alternative respiratory protection devices for staff for whom a PAPR is contraindicated and perform appropriate fit-testing, if required.

Maintain an electronic database of all who are medically approved and trained to use specific respiratory protection devices, with date of training. For staff who cannot use PAPR's, the database will also reflect the results of their N-95 fit testing (i.e., size) and—for latex sensitive staff—the specific brand and model number of latex-free N-95's. The database will also provide the zoster titers for all staff who have been tested.

Determine which patient care units should be assigned PAPR devices on a permanent basis, based on defined criteria (e.g., units with negative pressure rooms).

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Hospital Epidemiology and Infection Control

Define clinical indications for use of respiratory protection devices by staff (i.e., isolation precautions, TB, SARS policies).

Provide education and consultation on the indications for respirator use.

Nursing Units

Identify situations in which respiratory protection devices are needed, numbers of staff affected, and numbers of PAPRs and/or N-95s to be ordered and/or maintained. (Follow Appendices for obtaining, storing, maintaining, and using the appropriate respiratory protection devices.)

Ensure proper labeling and storage of the headpieces on the unit.

Ensure that all appropriate staff complete the required orientation and annual education on the use of PAPRs.

Ensure that individual staff members who require an N-95 respirator receive the appropriate training in the use of that device.

Units that maintain PAPRs on a permanent basis will be responsible for following the procedure for “Storing and Maintaining PAPR Devices that are Permanently Located on Patient Care Units/Other Locations.”

Report any problems with the PAPR devices to HSE.

Materials Management

Provide to units the PAPR devices/components as ordered.

Provide N-95 respirators for individual use, as requested. (Size must be specified.)

Monitor expiration dates on the N-95 respirators.

Communicate with HSE about all PAPR devices that are delivered to the units—including the date delivered, number of devices and components delivered, unit, patient room number, and equipment number.

General Information

PAPR Devices:

1. PAPRs consist of the following components:
 - a. Base unit—blower/filter unit/battery pack (ESI # 49416)
 - b. Plastic tubing (ESI # 35866)
 - c. Headpiece (ESI # 5948)
 - d. Battery charging unit
2. Every PAPR base unit will be clearly identified with a permanent label, including an inventory number for the purpose of tracking by HSE.
3. Base units and tubing can be shared/used by multiple people. The headpieces should not be shared among staff, though they can be re-used (by the same individual) for as long as they remain intact, with two exceptions. If being used for SARS patients, the headpieces will be discarded after each use. When being used in the OR’s the headpieces will be discarded at the completion of each case.
4. The headpiece should be labeled with the individual’s name and date with its first use and then cleaned and stored in a plastic bag (e.g., patient belongings bag) between uses.
5. Prior to using a PAPR, all staff must be medically screened—using a modified 3-page survey—by Occupational Health Services. Individuals who are identified as being unable to use a PAPR for any reason should be referred to the HSE Office for guidance in obtaining a suitable alternative protection device.

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6. Prior to using a PAPR, all staff must receive approved training in the proper use of the device and annual review thereafter.
7. The PAPR device does contain a ring of latex in the mask unit—therefore staff who have latex allergies may need to be offered an alternative respiratory protection device. (The use of a PAPR by staff poses no risk to patients with latex allergies.)

N-95 Respirators:

1. N-95 respirators consist of:
 - Cupped disposable mask with two elastic straps, in sizes S—M—L, single person use only
2. Prior to using an N-95 respirator, all staff must be medically screened (as with the PAPR).
3. Staff using an N-95 respirator must also be fit-tested to determine which of the three sizes is appropriate.
4. Prior to using an N-95 respirator, staff must receive approved training in the proper use of the device and annual review thereafter. The initial training for use of the N-95 respirator will be done (and documented) by HSE at the time of fit-testing.
5. Personal N-95 respirators may be used within the same day and should be labeled with the user's name and stored in a plastic bag until discarded. Discard in a biohazard bag at the end of each day of use.

Procedures (see appendices):

1. "Obtaining Respiratory Protection Devices from Materials Management for Short-term Use"
2. "Using Respiratory Protection Devices"
3. "Storing and Maintaining PAPR devices that are Obtained from Materials Management for Short-Term Use"
4. "Storing and Maintaining N-95 Respirators that are Obtained from Materials Management for Short-Term Use"
5. "Storing and Maintaining PAPR devices that are Permanently Located on Patient Care Units"

Communication:

1. This policy will be placed in the Interdisciplinary Clinical Practice Manual on the JHH Intranet site. Paper distributions will be made to the Functional Unit Nursing offices in the event of web access difficulty.
2. Nursing leadership will receive details regarding policy and the responsibilities of nursing staff. Highlights of the policy will be communicated to the nursing staff via the nursing newsletter.
3. Physician notification will occur through Physician Advisors and Residency Training Coordinators. Highlights of the policy will be communicated to the medical staff via the medical staff newsletter.
4. Other departments will receive policy information from their respective supervisors. Highlights of the policy will be communicated to all departments and supervisory staff via the Management Committee.

Orientation and Education:

1. Any education/training in the use of PAPRs/respiratory protection devices will follow a pre-defined content outline, regardless of who is providing the education.
2. For all JHH employees, in JHH orientation, HSE will provide an overview of the PAPR in their Safety class, including a demonstration of the use of the device.
3. An online reference in the use of the PAPR will be made available to all staff (24/7), on the JHH intranet (on the HEIC website).
4. For nursing staff, information on the use of respiratory protection devices will be incorporated in the required annual update education via the web-based education system (i.e., Health Stream).
5. For other staff, HSE will provide live in-services on an as-needed basis.

References

1. OSHA Standard 29CFR1910.134.
2. 3M Technical Data Bulletin: Maintenance and Management of Battery Packs for 3M Powered Air Purifying Respirators (PAPRs)--#144, January 2000. St Paul, MN.
3. Refer also to the following related policies, procedures, protocols:
 - a. Isolation Precautions, <http://www.insidehopkinsmedicine.org/icpm/ifc023isolation.pdf>
 - b. SARS policy, <http://www.hopkins-heic.org/pdf/InPtProtocol.pdf>
 - c. Tuberculosis Control Policy, <http://www.hopkins-heic.org/pdf/ifc013.pdf>
 - d. Cleaning and Disinfection Policy, http://hopkins-heic.org/prevention/clean_dis.html

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Appendix A
“Obtaining Respiratory Protection Devices from Materials Management for Short-term Use”

PAPRs and Device Components:

Nursing unit will call Materials Management—X 5-8357 (Weinberg units will call Weinberg Materials Management—X 2-1453) to request PAPR units. The PAPR components consist of:

- Base unit (blower/filter unit/battery pack) ESI #49416
- Breathing tubing ESI # 35866
- Headpiece (hood) ESI # 5948
- Battery charger for multiple base units

Nursing units that maintain PAPRs on a permanent basis should request only what they need (e.g., headpieces for staff who don’t already have them) and should specify the components and the number needed. All other units should be provided with the standard device components outlined below (5 base units and tubing and 24 headpieces) unless the unit specifies a different quantity.

Materials Management staff will complete a “PAPR Request Form” (will be attached soon). The following information will be documented:

- Floor location
- Patient’s room number
- Equipment number
- Date issued
- CSR personnel who received the call
- Type of device(s) and numbers ordered if other than the “standard”

The standard number of PAPR device components that will be delivered to any nursing unit requesting the system for short-term use will be:

- PAPR base units (blower/filter unit/battery pack)—5
- Breathing tubing—5
- Headpieces—24
- Battery charger—1

Nursing units may request more headpieces, base units, battery chargers, and/or tubing as needed.

When items are delivered to unit, the PAPR Request Form will be signed by a unit staff member, indicating receipt of the above components. One copy will be left on the nursing unit, the original copy will be returned to Materials Management. Materials Management will then fax a copy of the request form (X5-5929) to HSE.

When the PAPRs are no longer needed, it is the responsibility of the nursing unit to surface clean the device components and place them in the designated pick-up area on the unit. HSE staff will pick up the devices when they make their regular unit rounds. Only the PAPRs base units, tubing, and battery chargers will be picked up by HSE. The headpieces are to be cleaned and retained on the nursing units. They can be reused (not a single-use item) for other patients as needed, except with SARS patients and in the OR.

HSE will clean and return the device components to the Central Storeroom.

The above steps should be followed if additional headpieces or replacement of any device components are required by the nursing unit. When calling Materials Management, specify the exact components (and number of each) required.

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N-95 Respirators:

Nursing unit will call Materials Management—X 5-8357 (Weinberg units will call Weinberg Materials Management—X 2-1453) to request N-95 respirators. The respirator consists of a disposable, single-person-use, cupped mask that is available in three sizes—small, medium, and large. The unit must specify the size needed when ordering from Materials Management.

Materials Management will send to the unit 1 box (of 20) of respirators in the size specified.

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Appendix B
“Using Respiratory Protection Devices”

PAPRs:

Donning the PAPR Device Before Entering Airborne Isolation Room

1. The PAPR headpiece and base unit must be completely donned prior to entering an airborne isolation room.
2. Obtain from unit supply:
 - a. Base unit/battery pack
 - b. Breathing tube
 - c. Headpiece (separate one for each staff member needing to use a PAPR)
3. Attach plastic ribbed tubing to the base unit. Unlike the headpieces, the base unit and tubing can be worn and used by multiple staff members.
4. If the tubing is already attached, ensure that it is firmly connected to the base unit/battery pack.
5. Once the tubing is secured, turn the blower on.
6. Place your hand at the opening of the plastic tubing. You should feel a steady stream of air coming from the tubing opening.
7. Listen for the steady whirring of the base unit motor.
8. If you do not feel the airflow or hear the whirring of the motor, replace the base unit and attach it to the charger. Obtain a new base unit and check for airflow and motor function.
9. Once PAPR base unit is successfully checked, turn the unit off.
10. Each staff member who might need to use a PAPR should be given her/his own PAPR headpiece. With a black Sharpie© Marker write/print your name and the date on the outside of the PAPR headpiece above the face shield.
11. Attach the PAPR headpiece to the other end of the plastic ribbed tubing.
12. Attach the base unit (with battery pack) around your waist. Adjust the waist strap to fit comfortably.
13. Turn the PAPR base unit on.
14. Place the PAPR headpiece over your head.
15. Enter the room.

Removal of the PAPR When Leaving Airborne Isolation Room

1. Follow all steps in leaving an isolation room as specified in the isolation precautions policy.
2. In the ante room/outside patient room, don clean gloves (with SARS patient, may need assistant to assist). Remove the headpiece. Disconnect the breathing tube from the headpiece. Remove the base unit from your waist, with the breathing tube attached. Turn off the blower on the base unit.
3. Inspect the base unit, breathing tube, and headpiece for any visible contamination or damage.
4. The PAPR headpiece is a product that may be used repeatedly by the same individual until it is torn, the elastic is no longer taut, or it is grossly soiled.
5. The base unit and the breathing tube should be assessed for any signs of damage. If defective, notify HSE to evaluate the equipment and call Materials Management for a replacement part.
6. The exterior of the base unit, breathing tube, and headpiece should be cleaned with an approved disinfectant towelette if soiled and between uses. Grossly contaminated headpieces should be discarded as a biohazard waste in a red bag and a new one obtained from CSD.
7. Discard gloves and wash hands.
8. Every individual entering the room should have their own designated headpiece labeled with their name. No sharing of headpieces is permitted. Each person entering the patient room should keep his/her PAPR headpiece near the PAPR base units and breathing tubes when not in use.
9. Return the PAPR base unit to the designated location on the unit.

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N-95 Respirators:

Donning the N-95 Respirator Before Entering Airborne Isolation Room

1. Inspect the mask for damage. Discard (in biohazard bag) if it is torn, soiled, or the elastic is no longer taut.
 2. Cup the mask in one hand and hold close to the face.
 3. Position the upper strap at the crown of the head with the other hand.
 4. Position the lower strap at the neck, again with the other hand.
 5. Adjust the mask to ensure that it is fitted to the face.
 6. Adjust the metal clip to fit tight over the bridge of the nose.
 7. Perform a positive and negative fit check each time the mask is donned.
 - a. Positive fit check:
 1. Cup hands tightly over the mask, making sure that the entire mask is covered; then exhale quickly and hard.
 2. Check for any air escaping around the edges of the mask.
 - b. Negative fit check:
 1. Cup hands tightly over the mask, making sure that the entire mask is covered; then inhale quickly and hard.
 2. Mask should collapse. If leakage is detected, reposition the mask and try again.
- If both a positive and negative fit check cannot be achieved successfully, contact HSE and notify the charge nurse/nurse manager.

Removal of the N-95 When Leaving Airborne Isolation Room

1. Follow all steps in leaving an isolation room as specified in the isolation precautions policy.
2. In the ante room/outside patient room, don clean gloves. Remove the mask. Inspect the mask for any visible contamination or damage.
3. The N-95 respirator is a product that may be used repeatedly by the same individual within the same day/shift*. It should be labeled and stored in a plastic bag until discarded. Discard at the end of the day/shift (in a biohazard bag).

***If being used for SARS, the mask must be discarded after each use.**

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Appendix C
 “Storing and Maintaining PAPR Devices that are Obtained from Materials Management for Short-Term Use”

Initiation of PAPR Use with Airborne Isolation

For any situation in which airborne isolation is ordered, PAPR devices must be obtained for use by all appropriate staff—following the “Obtaining PAPRs and Device Components from Materials Management” policy.

All staff who use PAPRs must have been medically screened by Occupational Health and must have received PAPR training according to the pre-defined content outline.

Routine Maintenance

HSE will be responsible for routine maintenance of all PAPR devices, through frequent (twice a month) rounding and inspections of equipment. Battery management will be done centrally by HSE, according to the manufacturer recommendations. Filter replacement will also be done by HSE with the frequency and process recommended by the manufacturer.

Defective equipment should be reported by the nursing unit to HSE and replacement components ordered from Materials Management.

After use, the base unit, tubing, and headpiece* should be cleaned with a diluted bleach solution and returned to the designated location on the unit. Headpieces should be labeled with staff person’s name and stored in a labeled and dated plastic bag.

Discontinuation of Airborne Isolation:

After airborne isolation discontinued, the nursing unit will be responsible for wiping off the PAPR base units and breathing tubes and placing them in the designated location for pick up by HSE or Materials Management. [If HSE picks up the device, they will return it to Materials Management for processing].

Terminal Cleaning and Storage of PAPR Headpiece:

After a headpiece has been assigned to an employee, it should be stored in a labeled, dated plastic bag and placed in the designated location on the unit*. The plastic bag should be clearly labeled with the employee’s name for single-person use only. Headpieces should be inspected prior to each use. They should be discarded if torn or if the elastic is no longer taut.

***If being used for SARS, the PAPR headpiece must be discarded after each use.**

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Appendix D
 “Storing and Maintaining N-95 Respirators that are Obtained from Materials
 Management for Short-Term Use”

Personal N-95 respirators that are to be reused within the same day/shift are to be labeled with the user’s name and stored in a plastic bag until discarded. Discard (in a biohazard bag) at the end of each day/shift of use.

***If being used for SARS, the PAPR headpiece must be discarded after each use.**

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Appendix E
 “Storing and Maintaining PAPR Devices that are Permanently Located on
 Patient Care Units”

Initial and Ongoing Procurement of PAPR Devices

Nursing units will be designated to maintain PAPR devices on a permanent basis, based on pre-defined criteria (e.g., any unit with negative pressure rooms, etc.), with HSE involvement. The number of base units/tubing, battery recharging units, and headpieces to be kept on par will be determined for these units on a unit-by-unit basis. This equipment will be provided by HSE and a complete inventory of devices and location will be maintained in HSE.

Units should call Materials Management for replacement of defective equipment, additional base units/tubing, and additional headpieces. When calling, the specific components and number of each must be specified.

All staff who use PAPRs must have been medically screened by Occupational Health and must have received PAPR training according to the pre-defined content outline.

Routine and Ongoing Maintenance

HSE will be responsible for routine maintenance of all PAPR devices, through frequent (twice a month) rounding and inspections of equipment. Battery management will be done centrally by HSE, according to the manufacturer recommendations. Filter replacement will also be done by HSE with the frequency and process recommended by the manufacturer.

Defective equipment should be reported by the nursing unit to HSE and replacement components ordered from Materials Management.

After use, the base unit, tubing, and headpiece* should be cleaned with a diluted bleach solution and returned to the designated location on the unit. Headpieces should be labeled with staff person’s name and stored in a labeled and dated plastic bag.

Discontinuation of Airborne Isolation:

After airborne isolation discontinued, the nursing unit will be responsible for wiping off the PAPR base unit and breathing tube and placing them in the designated location.

Terminal Cleaning of PAPR Headpiece and Storage:

After a headpiece has been assigned to an employee, it should be stored in a labeled, dated plastic bag and placed in the designated location on the unit*. The plastic bag should be clearly labeled with the employee’s name for single-person use only. Headpieces should be inspected prior to each use. They should be discarded if torn or if the elastic is no longer taut.

***If being used for SARS, the PAPR headpiece must be discarded after each use.**

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Appendix F
Respiratory Protection Starts with YOU!!!
FACT SHEET

For your own safety and protection, when caring for patients on airborne precautions and patients receiving aerosolized Hazardous Drugs such as Ribavirin or Pentamidine, it is essential that you use a respiratory protection device.

At JHH, there are two options for respiratory protection for staff:

- PAPR (Powered Air Purifying Respirators)
- N-95 Respirators



PAPR

The PAPR is the primary device available for use. N-95's are used by staff who cannot use the PAPR for any reason.

What is TRUE for PAPR's and N-95's:

- Require staff to pass medical screening process before being used.
- Filter particulate matter from the air that is breathed.
- Hood/headpiece/mask cannot be shared between users.
- Can be used multiple times by a single user (except for SARS situations).

How are the two devices DIFFERENT?

| <u>Issue</u> | PAPR | N-95 Respirator |
|--|---|---|
| Model | 3M Air MATE | 3M 1860 |
| Contain latex? | Yes (elastic band on headpiece) *Latex-sensitive staff should not use, but there is no danger to patients. | No** |
| Can be worn by persons with beards, facial hair? | Yes | No |
| % of effectiveness when used properly | 96% | 85% |
| | *May consider applying tape over elastic band on headpiece (only component with latex). | ** Some other models and brands may contain latex |

Indications for Use:

1. All staff entering room of, caring for (or transporting*) patients on airborne precautions. This includes patients with TB, Chickenpox, and SARS. Refer to HEIC policy on Isolation Precautions in the ICPM for more detail. *When transporting these patients, the patient must also wear a surgical mask.
2. Staff administering aerosolized hazardous drug to patients. Refer to ICPM protocol on the specific hazardous drug for more detail.

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PAPR's

How to Obtain:

Some units maintain PAPR devices at all times and would only call MDC to obtain additional headpieces as needed. Other units would need to call MDC to request PAPR's any time a patient is placed on airborne precautions or aerosolized hazardous drug is being administered (for short-term use). When MDC is called for these units, they will routinely send up 5 base units and tubing and 24 headpieces (unless unit requests otherwise).

Components of a PAPR:

1. Headpiece (or hood)—single-person use only
2. Connecting tubing—multi-person use
3. Base unit (blower/filter unit/battery pack)—multi-person use
4. Battery charger

Except with SARS patients, the headpieces can be re-used (by the same individual) many times. In the case of SARS, the headpiece must be discarded after each use. The tubing and base unit are cleaned after use and re-used indefinitely.

Using a PAPR:

1. Inspect the headpiece for damage. Discard (in biohazard bag) if it is torn, soiled, or the elastic is no longer taut.
2. Push the slotted end of the breathing tube into the connector in the rear of the headpiece until it snaps into place.
3. Turn the unit on.
4. Pull the headpiece over your head and adjust it so the headband wraps around your head.
5. Pull the elasticized edge of the face seal under your chin and in front of ears.



Make sure that the power unit is on and air is flowing before entering the isolation area.

Cleaning and Storing After Use:

- An approved disinfectant towelette should be used to wipe off the headpiece, tubing, and base unit after each use. (Refer to HEIC Cleaning and Disinfection Policy.)
- Place headpiece in a plastic drawstring bag, labeled with the user name, and place in designated area on the unit.
- Return base unit and tubing to designated area on the unit.

Trouble-shooting Problems:

If the blower does not run when turned on, or there is a low airflow through the device, it may indicate a problem with the battery, filter, or base unit motor. In any of these cases, the device should not be used until it can be checked by HSE. Contact HSE at X5-5918. After hours HSE can be contacted through Centrex at X5-6070. With low airflow, check the connecting tubing to be sure that it is not kinked or damaged and replace as needed.

Nursing units that do not maintain a permanent supply of PAPR devices should return all base units and tubing to MDC once they are no longer needed for patient care.

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N-95 Respirators

How to Obtain:

Since these devices are only used when staff cannot use a PAPR, they are obtained one at a time, only as needed. Call MDC to request an N-95 Respirator, specifying the size required (S-M-L). **Fit testing is required prior to use and annually. This is done by HSE.**

Components of N-95:





Respirator mask in size S, M, or L—single-person use only

Except with SARS patients, the masks can be re-used (by the same individual) many times. In the case of SARS, the mask must be discarded after each use.



Using a N-95:

1. Inspect the mask for damage. Discard (in biohazard bag) if it is torn, soiled, or the elastic is no longer taut.
2. Cup the mask in one hand and hold close to the face.
3. Position the upper strap at the crown of the head with the other hand.
4. Position the lower strap at the neck, again with the other hand.
5. Adjust the mask to ensure that it is fitted to the face.
6. Adjust the metal clip to fit tight over the bridge of the nose.
7. Perform a positive and negative fit check each time the mask is donned.
 - A. Positive fit check:
 1. Cup hands tightly over the mask, making sure that the entire mask is covered; then exhale quickly and hard.
 2. Check for any air escaping around the edges of the mask.
 - B. Negative fit check:
 1. Cup hands tightly over the mask, making sure that the entire mask is covered; then inhale quickly and hard.
 2. Mask should collapse. If leakage is detected, reposition the mask and try again.

| Step #2 | Step #3 | Steps #4 & 5 (correct placement) | Positive & Negative Fit Checks |
|---|---|--|---|
|  |  |  |  |

Cleaning and Storing After Use:

Personal N-95 respirators that are to be reused within the same day are to be labeled with the user's name and stored in a plastic bag until discarded. Discard (in a biohazard bag) at the end of each day of use.

Trouble-shooting Problems:

If both a positive and negative fit check cannot be achieved successfully, contact HSE at X5-5918 and notify the charge nurse/nurse manager. After hours, HSE can be contacted through Centrex at X5-6070.