

Policy Name: Infant Negative Pressure Hood

Effective Date: 07/01/2020

Review History: 07/01/2020; 7/06/2020 (Duke OESO); 7/17/2020

Policy Primary: DUH Medical Director Respiratory Care Services

Status: Pending

Final Approval:

Glossary:

Term:

Definitions:

Infant oxyhood: a 10 in. x10 in. x10 in. plastic hood used to provide supplemental oxygen or aerosolized mist

T-connector: A plastic device used to connect airway tubing; fashioned in the shape of a 'T'

Viral air filter: An in-line device used to isolate viral particles from the airflow; typically used on the expiratory limb of exhaust tubing; filtering efficiency equal to or exceeding 99.99%.

Airflow tubing: a variable length of plastic tubing approximately 1 inch in diameter used to connect various respiratory and ventilator devices.

Vacuum canister: Device used to connect vacuum lines from the patient to main hospital vacuum whose purpose is to prevent liquids from contaminating vacuum lines.

In-line vacuum gauge: A device used to variably set wall suction ranging from zero mmHg to a maximum of 200 mmHg. Vacuum typically set at ranges between 80-120 mmHg

PUI: Person Under Investigation pending confirmation of COVID status; in this context, for infants weighing less than 5 kg

LPM: Liters Per minute

ACH: Air Changes Per Hour

Level:

Personnel:

Competencies/Skills:

RT; RN; MD; ANP

Required Resources: Hospital vacuum source; in-line viral air filter (equal to or exceeding 99.99 %); airflow tubing; vacuum canister; in- line vacuum gauge; T-connector; infant oxyhood; 15 mm adapter; nipple adapter (as used with HFOV)

Policy Statement:

PURPOSE: To describe the guidelines for the creation of a temporary infant negative pressure environment for the management of PUI pending Covid screening results

LEVEL: Dependent (Requires MD/NNP order to initiate)

INDICATIONS:

- Diseases/disorders/clinical histories where COVID exposure is suspected and a temporary negative pressure environment is required

NOTES:

- RCPs would be the primary personnel responsible for setting up the device
- Personnel placing their hands within the infant oxyhood to provide clinical care must wear gloves, isolation gown, and mask. A face shield must also be worn when the device is used in the DUH neonatal intensive care nursery or when intubating the patient.
- All materials used to create this temporary negative pressure environment are considered 'single use' and should be disposed in a manner consistent with current hospital policy.

NOT RECOMMENDED FOR USE IN PATIENTS WITH:

- Active pulmonary hemorrhage
- Nasal or mask airflow exceeding 4 LPM
- Concomitant delivery of therapeutic aerosols
- Patient weight is 5 kg or greater
- Known Covid +ve patients
- Newborns born to known Covid +ve parents

PERSONNEL RESPONSIBILITY:

- **MD/NNP**
 - Fellow, MD, or NNP have the responsibility for assuring that the patient is appropriate for the device and meets criteria for use
 - Generates order for negative pressure infant hood
 - Until a specific order for the temporary negative pressure infant hood is created in Epic, the order may be created as an RCP communication order

- **RCP**

- Obtains supplies needed for negative pressure hood
- Sets up negative pressure hood device
- Together with nursing, verifies that the wall suction is set at 100 mmHg
- Maintains all existing respiratory support devices including high flow nasal canula or mask (not to exceed 4 LPM); SIMV (any LPM flow); HFV (any LPM).

- **RN**

- Continues routine monitoring the infant's progress following application of the negative pressure hood
- Notify MD/ANP/RCP of any adverse events post placement of negative pressure hood

EQUIPMENT:

- Quantity 1: Infant oxyhood (10 in. x10 in. x10 in. ; approximately 16 liters)
- Quantity 1: T-connector
- Quantity 1: 15mm adapter
- Quantity 1: Nipple adapter (as used with HFOV)
- Quantity 1: Viral air filter (equal to or exceeding 99.99%)
- Quantity 1: Airflow tubing (1 inch)
- Quantity 1: Vacuum canister
- Quantity 1: Wall vacuum gauge

PRIOR TO ADMINISTRATION IN ICN

- Identify infant as a PUI
- MD/Mid-level provider to notify RT/RN of intention to manage with negative pressure infant hood pending COVID test result
- Determine need for multiple vacuum devices
- Obtain necessary equipment of review set-up and use with bedside personnel

METHODS OF ADMINISTRATION

- **Negative Pressure Infant Hood Set Up**
 - **Open and set up a 10 in. x10 in. x10 in. Oxyhood**
 - **Insert either end of the 1 inch air tubing into the end port of the hood**
 - **Affix the T-Connector to the 1 inch air tubing extending inside the hood**



- **Attach the in-line viral filter (equal to or exceeding 99.99%) to the other end of the 1 inch air tubing**
- **Attach the in-line viral filter to the vacuum canister using the nipple adapter**



- **Set wall suction to negative 100 mmHg**

- **Verify suction by gently occluding both open ends of the T connector inside the hood with gloved hands**
- **Place negative pressure hood over the head of the PUI and arrange the front plastic apron over the front of the patient**



- **The seams should be in close contact with the bedding but do not need to be occlusive**
- **Closure of the top port of the negative pressure hood is optional**
- **Medical personnel providing direct patient care must wear gloves, isolation gown, and mask. When performing an intubation, a N95 mask should be worn by all participating providers. In addition, face shield must also be worn when the device is used in the DUH neonatal intensive care nursery or when intubating the patient.**

FAQ:

- **Are you still able to work with the tent in place or does it have to be removed?**

Airway suctioning of the intubated patient via the in-line suction device can be done under the front 'skirt' of the hood without hood removal. Rotation of the infant, oral suctioning, line checks can be performed in a similar manner. To avoid multiple re-entries, clinical procedures should be 'grouped' where possible. In an emergency (e.g., re-intubation), the hood should be rotated 180 degrees with the skirt opening over the back of the head with continuance of the negative airflow within the hood during the procedure. All clinical personnel assisting or performing an intubation within the temporary negative pressure infant hood are required to don: gloves, isolation gown; face shield and a N95 mask

- **How do you dispose of the device's materials after use?**

This device, as described, is intended for single patient use. *“Medical waste (trash) coming from healthcare facilities treating COVID-2019 patients is no different than waste coming from facilities without COVID-19 patients. CDC’s guidance states that management of laundry, food service utensils, and medical waste should be performed in accordance with routine procedures.”* - CDC Guidelines, Coronavirus Disease 2019

- **Is this full-body or just the head/upper half of the patient?**

The hood encompasses the head; the front skirt will extend onto the infant's upper torso.

- **Is there concern about CO₂ buildup---was this investigated? Additionally, will we have to worry about creating an O₂ enriched environment if the patient is on O₂?**

When the negative pressure hood is set up with 100 mmHg suction running through the vacuum canister, there is approximately 60 ACH. This rate exceeds the CDC guideline for negative pressure environments of 12 ACH. In this configuration, 100% O₂ running at 4 LPM results in a 30% FIO₂. With respect to CO₂ build-up, the Oxyhood is nominally used with a 15 LPM gas flow when used for the delivery of oxygen or aerosols without CO₂ retention. When attached to 100 mmHg wall suction, the negative pressure hood creates an airflow of 16 LPM.

- **What are the air exchange requirements for a negative pressure environment?**

According to CDC guidelines: the requirements for new construction negative pressure rooms should exceed 12 ACH. The negative pressure infant hood completes one air change (16 liters) per *minute* or about 60 ACH.

- **What type of suction will be used?**

Hospital wall suction set at 100 mmHg.

- **Do you have any specifications for the in-line filter?**

Use a 99.99% Pediatric-neonatal electrostatic filter (Covidien, in Duke stock), but any in-line air filter equal to or exceeding 99.99% may be substituted.

- **Other Limitations of the device?**

Maintaining a negative pressure environment during transport would be difficult. To minimize spread of droplets during transport, consider leaving the hood in place to reduce droplet exposure through the transporting environment unless moving the patient in a transport isolette. The hood does not form an occlusive seal around the infant's head and the volume within the hood is more than 15 fold the average minute ventilation of newborn infants, as a result, short-term transports to another room should be reasonable.

- **Are there any special requirements?**

The negative pressure hood environment requires a dedicated vacuum source. Separate vacuum resources should be made available as needed (e.g., airway suctioning; chest tube suction; repleg tube suction, etc).

REPORTABLE CONDITIONS:

Any adverse conditions associated with the use of the device should be reported to the Charge nurse; Fellow and mid-level provider. In an addition, a report should also be sent to the DUHS Safety Reporting System (SRS).

COMPLICATIONS AND ASSOCIATED CONDITIONS

Reduced access to the patient is a necessary complication of the device and appropriate steps taken to manage the patient while inside the temporary infant negative pressure hood.

MANAGING COMPLICATIONS DURING ADMINISTRATION:

If unable to deliver effective care while under the hood, removal of the hood after donning appropriate PPE may be required

ASSESSMENT OF OUTCOME:

Routine clinical monitoring

DOCUMENTATION:

RCP and RN may document in the “O2 Therapy/O2 device” area using the “Comment” field until a dedicated field is created

REFERENCES**Citations:**

1. For Air | Background | Environmental Guidelines | Guidelines Library | Infection Control: <https://www.cdc.gov/infectioncontrol/guidelines/environmental/background/air.html#>
2. For disposal of materials: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/faq.html>

Policies: New

Authoritative Source: CDC Environmental Guidelines for Infection Control

Additional References: None

Company:

Entities:

DUH; DRH