APPLYING FAILURE MODE AND EFFECTS ANALYSIS (FMEA) TO PREVENT USE OF CONTAMINATED VENTILATORS IN ICU

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DESCRIPTION

The prevention of nosocomial respiratory infections continues to be one of safety initiatives at Humber River Health (HRH). The use of contaminated ventilators is one of the sources for spreading nosocomial respiratory infectious diseases, affecting the well-being of patients and the quality of healthcare delivery. HRH's Registered Respiratory Therapy (RRT) team in collaboration with the Quality and Patient Safety (QPS) team, conducted a FMEA to identify potential failure modes for ventilator cleaning process in Intensive Care Unit (ICU). This initiative aimed at preventing the incidences of contaminated ventilators use by implementing the mitigation strategies action plan.

OBJECTIVE

To identify gaps in current ventilator cleaning process through identification and prioritization of failure modes.

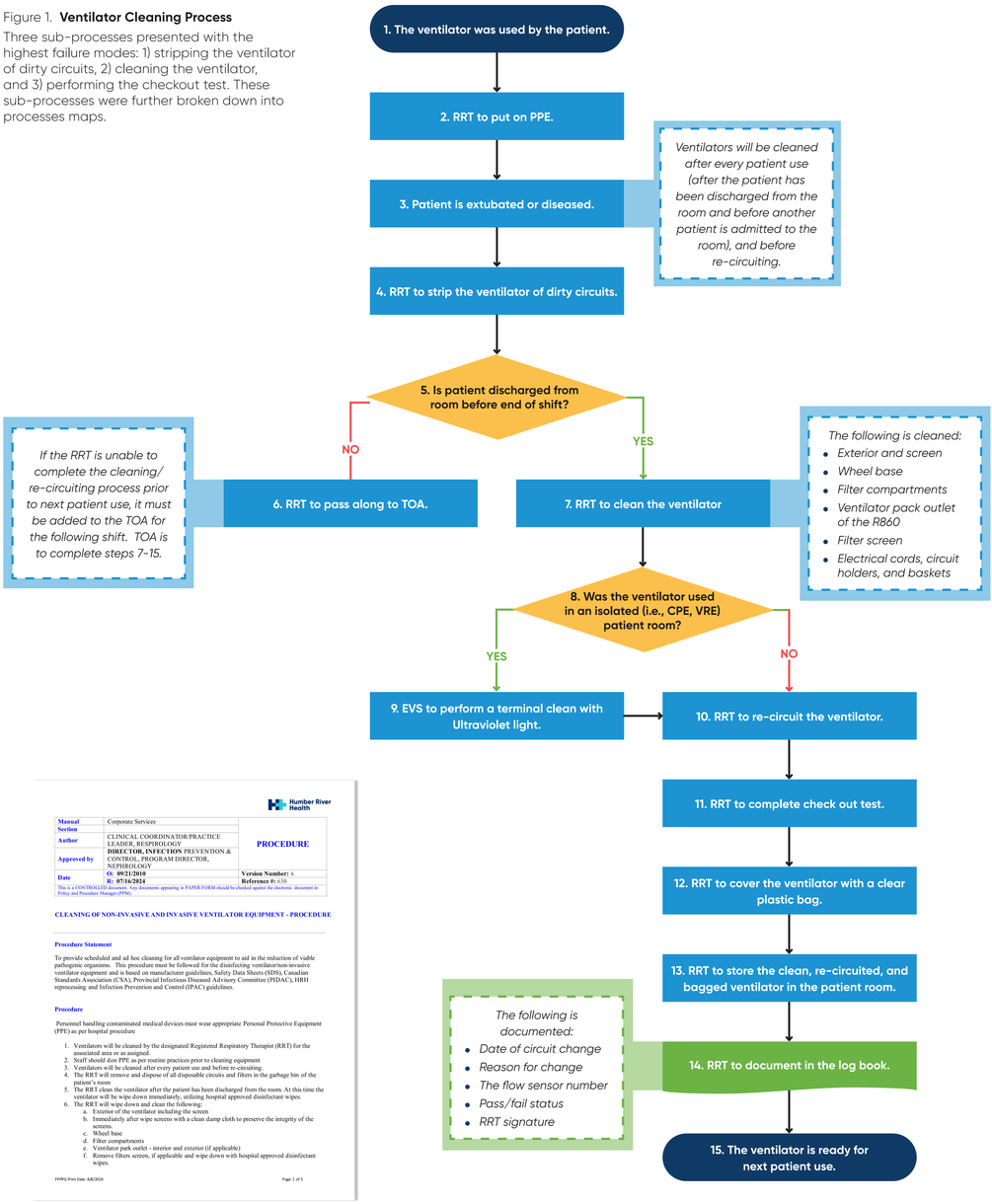
ACTIONS TAKEN

The RRT and QPS teams collaborated by utilizing a FMEA approach to identify strategies to reduce the use of contaminated ventilators. Actions taken by the working group included:

- Engaged with stakeholders to outline all steps using process mapping
- Identified potential failure modes and causes
- Assessed the impact of potential failure modes
- Re-designed the ventilator cleaning process, and updated policies and procedures
- Identified action plans to address the current challenges and barriers experienced in the ICU
- Ongoing audits to ensure sustainability of practices with the department

Figure 1. **Ventilator Cleaning Process**

Three sub-processes presented with the highest failure modes: 1) stripping the ventilator of dirty circuits, 2) cleaning the ventilator, and 3) performing the checkout test. These sub-processes were further broken down into processes maps.



Humber River Health

Manual Section	Corporate Services	PROCEDURE
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CLEANING OF NON-INVASIVE AND INVASIVE VENTILATOR EQUIPMENT - PROCEDURE

Procedure Statement

To provide scheduled and ad hoc cleaning for all ventilator equipment to aid in the reduction of viable pathogenic organisms. This procedure must be followed for the disinfecting ventilator/non-invasive ventilator equipment and is based on manufacturer guidelines, Safety Data Sheets (SDS), Canadian Standards Association (CSA), Provincial Infectious Diseased Advisory Committee (PIDAC), HRH reprocessing and Infection Prevention and Control (IPAC) guidelines.

Procedure

Personnel handling contaminated medical devices must wear appropriate Personal Protective Equipment (PPE) as per hospital procedure

1. Ventilators will be cleaned by the designated Registered Respiratory Therapist (RRT) for the associated area or as assigned.
2. Staff should don PPE as per routine practices prior to cleaning equipment
3. Ventilators will be cleaned after every patient use and before re-circuiting.
4. The RRT will remove and dispose of all disposable circuits and filters in the garbage bin of the patient's room
5. The RRT clean the ventilator after the patient has been discharged from the room. At this time the ventilator will be wipe down immediately, utilizing hospital approved disinfectant wipes.
6. The RRT will wipe down and clean the following:
   a. Exterior of the ventilator including the screen
   b. Immediately after wipe screens with a clean damp cloth to preserve the integrity of the screens.
   c. Wheel base
   d. Filter compartments
   e. Ventilator park outlet - interior and exterior (if applicable)
   f. Remove filters screen, if applicable and wipe down with hospital approved disinfectant wipes.

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Figure 2. **Cleaning of Non-Invasive and Invasive Ventilator Equipment Procedure**

Updated policy and procedure manual on the cleaning of non-invasive and invasive ventilator equipment procedure.

SUMMARY OF RESULTS

Stakeholders identified failure modes in the ventilator cleaning process, and prioritized interventions to enhance patient safety. The process maps were developed to illustrate the current ventilator cleaning process and identify potential failure modes. The action plans were developed after prioritizing the failure modes to address gaps:

- Creation of education packages for staff
- Auditing logbook for compliance
- Updating documentation in Meditech
- Label development to identify clean ventilators

Since the completion of FMEA, RRT team is in process of implementing the action plan.

LESSONS LEARNED

Utilizing FMEA for the ventilator cleaning process helps to identify opportunities to prevent the use of contaminated ventilators and enhance patient safety outcomes.