

	Department:  <b>Respiratory Services</b>	Date Originated: July 2012  Date Reviewed/Revised:
<b>PROCEDURE</b>	Topic: <u>Critical Care</u> – Weaning Pathway for Patients Requiring Prolonged Mechanical Ventilation (Respiratory Therapy)  Number: B-00-12-12079	Related Links:

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## APPLICABLE SITES:

Mount Saint Joseph Hospital

### Weaning Pathway for Patients Requiring Prolonged Mechanical Ventilation (Prolonged Ventilation Pathway):

#### Purpose:

The purpose of this pathway is to standardize and streamline the care of patients admitted to MSJH who are being actively weaned from prolonged mechanical ventilatory support.

#### Patient Characteristics:

After discussion with the ICU team, the intensivist will decide which patients are appropriate for this pathway. However, the following characteristics should prompt consideration:

1. Tracheostomy in place with resting FiO<sub>2</sub> less than or equal to 0.50
2. Predominately single system disease (i.e., respiratory) with few other active
  1. medical issues (e.g., active sepsis, arrhythmias, bleeding, unstable angina, severe
  2. acid/base abnormality).
3. Hemodynamically stable
4. Alert enough to be able to participate in care
5. Expected mechanical ventilation of at least 14 days

Patients may transition off and on the pathway depending on the clinical status.

#### Guiding principle:

These patients fall into the category of ‘chronically’ critically ill, and the predominant focus should be on rehabilitation as opposed to reversing acute physiologic derangements. The focus is thus more geared towards a holistic approach to the patient, with special attention to: physical therapy/mobilization, occupational therapy, nutrition, fluid balance, speech, psychologic state, social conditions/discharge planning, and sleep.

#### Specific components of the pathway include:

1. Weekly multidisciplinary meeting (including MD, RT, PT, RN, speech, SW,

nutritionist) Tuesday after rounds. At this time, the plans and progress from the previous week are reviewed, and plans for the next week are formulated.

2. Early consideration of Psychiatric consult if progress potentially impeded by anxiety, depression, or other psychiatric issues
3. Use of RT driven weaning pathway with adequate rest at night
4. Early consultation with PROP (home ventilation) or Pearson (chronic ventilation facility) if weaning subsequently considered improbable depending on discharge plans – consideration for consultation should be discussed at weekly multidisciplinary rounds (See criteria for PROP/Pearson on checklist)
5. Regular Family meetings (preferably at least once per week) including the patient if possible.
6. Physiologic measurements (VC, MIP) every Monday
7. Change frequency of monitoring reflecting the general stability of the patient. (i.e., vital signs to 1 q shift, I/O q day, weights q Monday and Thursday); RT monitoring frequency will remain unchanged during active weaning (daytime), but may be reduced to qshift & PRN at night to promote better sleep environment for patient
8. Chest x-ray 1<sup>st</sup> Monday of every month
9. Change frequency of regular blood work:
  - a. CBC, lytes, BUN, Cr q Monday and Thursday
  - b. Mg, PO<sub>4</sub>, ionized calcium q Monday

### **Respiratory Therapist Driven Weaning:**

While every attempt should be made to adhere to the protocol as described below, it is meant to serve as an overall guide to the weaning process. Given the heterogeneity and complexity of our patient population, the protocol may need to be modified for each particular patient in order to optimize their chances for success. In selected patients, weaning may be able to proceed more quickly, or have to proceed more slowly. This should be decided with the care team as appropriate.

#### **First Day:**

1. Initiate 1 hour spontaneous breathing trial (SBT) on PS=0, PEEP=0; if able to tolerate, proceed to Step 2 (Trach mask –TM- trials).
  - a. If patient has arterial line in situ, obtain ABG before and after SBT
  - b. If no arterial line in situ, place capnograph in line prior to SBT and obtain ABG via puncture for correlation between ETCO<sub>2</sub> & PaCO<sub>2</sub>. Record ETCO<sub>2</sub> before and after SBT.
2. If not tolerated (see Appendix A: Exit Criteria), proceed to PS wean

#### **Step 1: Pressure Support (PS)/PEEP Wean:**

##### **First Day:**

1. For the first day, start at levels of PS and PEEP comfortable for patient (meets normal minute volume, ventilation, blood gases, without significant dyspnea)
2. Reduce PS by 1-2 cm water every 3 hours until Exit Criteria met (see Appendix A); document in chart
3. Once Exit Criteria met, change to resting settings
4. Continue to wean until 2200 and rest overnight

**Subsequent Days (wean PS first, then PEEP):****PS Wean:**

1. Set FiO<sub>2</sub> to 0.10 above resting value
2. Start with last successful PS level from previous day (at 0600-0800h if possible)
3. If tolerates for 4 hours, reduce PS by 1-2 cmH<sub>2</sub>O until Exit Criteria met
4. Wean until 2200 each evening
5. Once able to tolerate PS 0 for 12 consecutive hours, start PEEP wean

**PEEP Wean:**

1. Set FiO<sub>2</sub> to 0.10 above resting values
2. Start at PS=0, last successful PEEP level from previous day(s) (at 0600-0800h if possible)
3. Reduce PEEP level by 1-2 cmH<sub>2</sub>O each day until Exit Criteria met
4. Wean until 2200 each evening
5. Consider more frequent chest x-rays during PEEP wean
6. If patient tolerates 12 consecutive hours on PS=0, PEEP=5, try another SBT (PS = 0, PEEP = 0) the next morning to determine whether TM trials are appropriate  
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7. If patient is not progressing with PEEP wean secondary to lung derecruitment, consider use of Passy-Muir valve (discuss with physician – order required) – refer to Respiratory Therapy Protocol RTD5186 Passy-Muir Valve – Use With Ventilated Patients. PEEP should usually be less than 10 cm water.

**Step 2: Trach Mask (TM) Trials**

1. Set FiO<sub>2</sub> to 0.10 above resting values
2. Start with TM trials (first in the morning 6-8 am if possible), two times per day
8. with at least two hours of rest between trials
3. If patient looks well after 1 hr, extend trial until a maximum of 4 hrs
4. If patient tolerates 4 hour trials two times per day for two consecutive days, start 1
9. trial of extended time (6 hrs/day) gradually increasing to 16 hours per day
5. If tolerates 16 hrs/day for 2 consecutive days, consider overnight TM trial and
10. reassess in the am after discussion with MD
6. Discontinue trial if Exit Criteria met and place on resting settings
7. Consider cuff deflation trials (after discussion with the MD) if more than 4 hrs trach mask tolerated.

**Resting Levels of PS/PEEP:**

During sleep and rest, levels of PS should be sufficient to almost completely unload the respiratory muscles, targeting tidal volume of approximately 6-8mL/kg (ideal body weight) without dyspnea. Measuring respiratory system mechanics, or NAVA may be useful in difficult cases to identify an adequate level of support; assist/control ventilation might also be considered. However, excessive support should be avoided as this may cause hypocapnia, central apneas during sleep, and auto-PEEP.

It is difficult to have criteria on the weaning of resting levels of PEEP; much of this depends on assessment of the patient's mechanics and condition.

**Appendix A:****Exit Criteria of SBT, TM, PS, or PEEP trials:**

1. RR greater than 35/minute or increased by more than 50%
2. SpO<sub>2</sub>/SaO<sub>2</sub> less than 90%

3. HR greater than 140 bpm or increased by 20% over baseline
  4. Systolic BP less 90 mmHg or greater than 180 mmHg
  5. Significant anxiety, agitation, diaphoresis
  6. Change in mental status
  7. Chest Pain
  8. Significant increase in ETCO<sub>2</sub> or PaCO<sub>2</sub>
- One or more criteria present for at least 5 minutes
  - Reconfirm after sedation, pain medication, repositioning, or other interventions prior to exiting protocol & returning to resting settings
  - Exit protocol immediately for marked hypoxemia, hypercapnia, hypotension
  - Place back on resting settings if Exit Criteria met