Adult Patient Interdisciplinary Ventilator Management

Purpose:
To provide safe and efficacious use of mechanical ventilators on patients who require invasive ventilator assistance.

Policy:
This policy provides guidelines for the management of patients requiring invasive mechanical ventilation. All patients on invasive mechanical ventilation are to be cared for in a critical care area or Respiratory Care Unit and to be under the care of one of the following classifications of physicians:

Anesthesiology/Critical Care Physician
Pulmonary/Critical Care Physician
Thoracic/Cardio-thoracic Physician
Trauma/Critical Care Physician

This policy applies to all patients in the Adult Critical Care Units.

Equipment:

1. Mechanical ventilator
2. Manual resuscitation device
3. Suction equipment
4. Oxygen analyzer
5. Two (2) oxygen flowmeters connected to 50 psi gas source
6. Ventilator flow sheet (paper)
7. Electronic Medical Record – for Assessment and Interventions
8. Cuff manometer
9. Closed suction catheter attached to a closed suction system
10. Oral care kit

Procedure:

A. Initiation of invasive mechanical ventilation

Initiation

1. Determination of the successful insertion of endotracheal tube is confirmed by a disposable CO_2 detector or an end-tidal CO_2 monitor, bilateral breath sounds (whenever applicable), chest

radiograph, chest expansion, blood pressure monitor, heart rate, oxygen saturation (SPO_2) or other approved methods. After confirmation, document the depth of insertion.

2. The safe and proper securing of an endotracheal tube requires at least two qualified practitioners Physician (MD), Registered Nurse (RN), and Respiratory Therapist (RCP). The endotracheal tube is held in place by any of the qualified practitioners until the endotracheal tube securement device is in place. Two methods of securement are approved, tape (see #3 below) or commercial device (#4 below).

3. Tape: Apply a skin protective barrier to the cheeks and then secure the ETT with cloth tape – 1 inch wide – using the steps below. For patients with friable skin, a thin hydrocolloid membrane many be placed on the cheeks to protect the skin. Document the ETT position on the left or right side of the mouth, and the depth of insertion measured in centimeters. Use the following method for oral intubations.
    (a) Clean and dry the skin.
    (b) Open and apply approved skin protective barrier film on the affected area.
    (c) Cut at least a 1 – foot length of the cloth adhesive tape.
    (d) Wait until the skin protective barrier film is dry. Wrap each end of the tape around the established endotracheal tube insertion level. If desired, utilize a Y-end technique to provide more stability.
    (e) For all stroke and head injury patients, do not apply tape around the neck as this may decrease venous drainage from the head. Instead, apply tape to both cheeks.
    (f) Evaluate tape every four hours for moisture, adhesion and tube placement. Assess and document skin integrity at that time.
    (g) Rotate ETT side to middle to side when retaping or daily.
4. Commercial device: Follow the manufacturer's guidelines for application and replacement. Commercial devices allow ETT placement rotation. The Respiratory Therapist is primarily responsible for rotation the ETT placement every four hours as part of the routine ventilator check. The RN and Respiratory Therapist are responsible for skin integrity assessment and documentation.

Upon insertion of an artificial airway, either endotracheal tube (ETT) or tracheostomy tube (TT), or after receiving a patient on invasive mechanical ventilation from an external facility, the Advance Practice Nurse (APN), Medical Doctor (MD) or Physician Assistant (PA) will prescribe orders for Mechanical Ventilator Order Protocol.
This protocol has four (4) distinct sections: a) Ventilator Initiation, B) Continuous Ventilator Management, c) Weaning, and d) Extubation/Liberation from the Ventilator. Each section needs to be ordered by the APN, MD or PA. When a particular section is ordered, the corresponding procedures (Table 1) are activated. Registered Nurse (RN) or Respiratory Care Practitioner (RCP) many enter orders except during the Initiate Ventilator Order Phase.

Table 1. List of Phases and Corresponding Procedural Orders in Adult Ventilator

	In-hospital	Out-of-hospital

Management Protocol

Section	Ordered By	Orders (active when phase is selected)	Ordered By
Initiate Ventilator Order	Physician or Representative	initial ventilator settings arterial blood gas (ABG) chest radiograph precautions for ventilator-acquired pneumonia RASS goal (should be ordered with analgesia/sedation	Physician or Representative
Daily Awakening and Readiness to Extubate (DARE)	Physician or Representative	Adjusted vent settings, ABG	Physician or Representative RN RCP
Continuous Ventilator Settings	Physician or Representative	adjusted ventilator settings ABG chest radiograph	Physician or Representative RN RCP
Weaning	Physician or Representative	adjusted ventilator settings ABG chest radiograph trach collar trials	Physician or Representative RN RCP
Extubate / Liberate from the ventilator	Physician or Representative	ABG nasal cannula trach collar mask aerosol mask	Physician or Representative RN RCP

The recommended initial ventilator parameters will be based on but not limited to the list below (Table 2).

	Basic Settings (Useful for most patients)		Open Heart (May also be used in any post—surgery patient)	ARDS	Status Asthmaticus / COPD Exacerbation (May be used in any basic patient as well)	Maintain current ventilator settings
Mode	Assist Control or Assist Control with Automode#	APRV or BiVent or BiLevel	SIMV + PSV	Pressure Control or Assist Control with I:E = 1:1	Pressure-Regulated Volume Control#	
Respiratory Rate	12	*See below for initial Vent settings	10	≤ 35 [ref 5]	8 [ref 9]	
Tidal volume (ml)	6-8 ml/kg PBW*		6-8 ml/kg PBW*	6-8 ml/kg PBW* START AT 6 and increase to 8 as needed [ref 5-6]	6-10 ml/kg PBW*	
Plateau Pressure	≤ 30 cmH2O		≤ 30 cmH2O	≤ 30 cmH2O	≤ 30 cmH2O	
FiO2	100%		100%	100%	100%	
PEEP (cmH2O)	5-10 (start at 10 for surgery & trauma		5	5, see appendix for PEEP/FiO2 tables	0 (ref 9)	
Pressure Support	N/A		6 cmH2O	N/A	6 – 12 if used as standard	
Auto-PEEP (cmH2O)	0		0	0	≤ 5 (ref 9)	
RASS Score	Refer to Guideline for Continuous Analgesia/Sedation in the Critically Ill Adult					

*Predicted body weight (kg): Females = 45.5 + 2.3 [height (inches) – 60]; Males = 50 + 2.3 [height (inches) – 60]

*APRV or BiVent or Bilevel (Initial Settings):

- Initial settings are deduced from "conventional" mode
- Convert the plateau pressure to a P-High
- Usually 1-2 cm of water higher than the plateau pressure
- If more than 35 cm of water pHigh needed, physician needs to evaluate patient
- If starting after initial intubation, begin at 24 – 28 and evaluate clinically

P-Low is always zero

- Produces minimal expiratory resistance → accelerating expiratory flow rates to maximize expiratory flow curve

T-High is set at min 4sec

- Less than 4 sec will affect Paw negatively

T-Low is set between 0.4sec-1.0sec

- Adjusted so that expiratory flow falls to 2/3 of peak expiratory flow.
- Allows for adequate ventilation without full volume loss

Add pressure support to Phigh only (0 pressure support over pLow) of 8cm H20

- Peak pressure is not relevant given diaphragm excursion and dynamic changes

The RCP will gather the necessary equipment and ensure its proper function based on product specific user's manual and corresponding policy and procedure manuals. With the initial ventilator settings ordered, the RCP will place the patient on the mechanical ventilator as prescribed. The RCP will assess patient-ventilator synchrony and patient cardiopulmonary stability. RN or RCP will draw an ABG sample after 20 minutes or no later than 60 minutes to confirm placement of ETT or TT and help the ICU Team assess the cardiopulmonary condition.

The RN will receive an order for the sedation goal of the patient (refer to Guidelines for Continuous Sedation in the Critically Ill Adult).

B. Daily Awakening and Readiness to Extubate (DARE)

The RT and Nurse perform this daily screen/intervention on all ventilated patients (REGARDLESS OF MODE OR SETTINGS). It is to be utilized in conjunction with the sedation clinical practice guideline for ventilated patients. It is to be done every day between 5am-7am and prn.

Assess for sedation and delirium (per analgesia/sedation protocol)

- CAM-ICU
- RASS

Perform a daily Spontaneous Awake Trial (SAT)

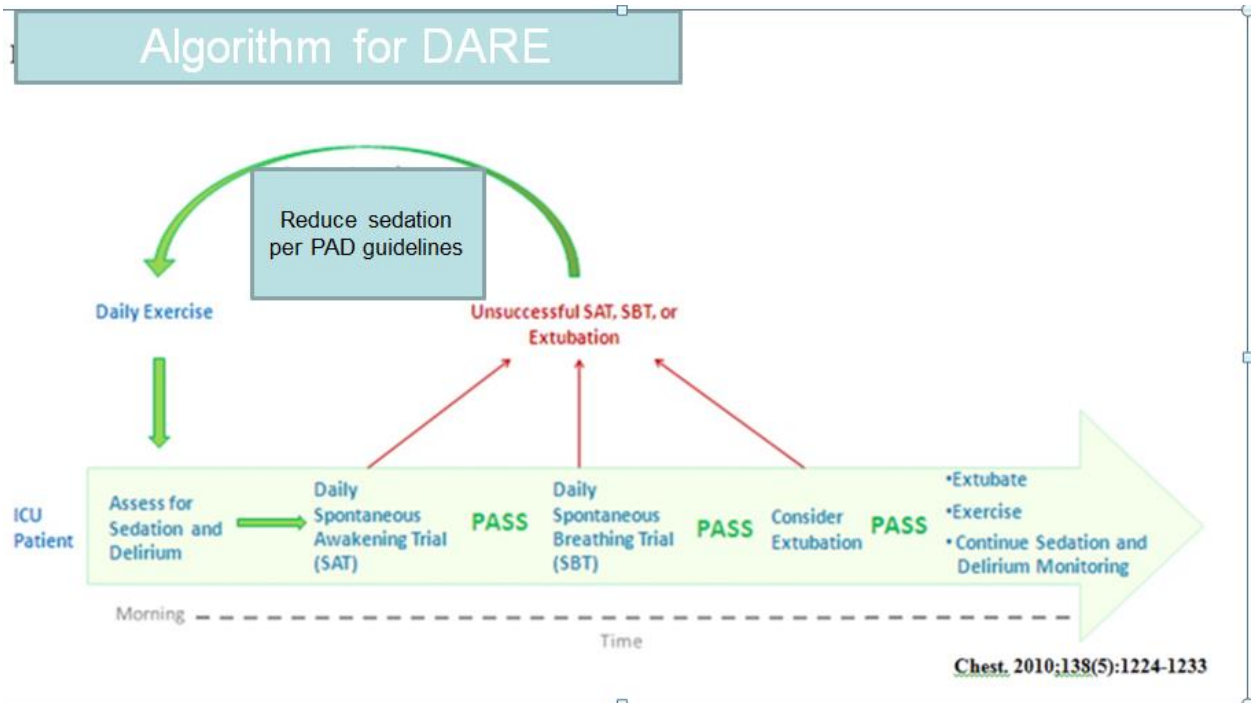
Assess for readiness of SBT:

- Hemodynamics stable, no significant dysrhythmias or tachycardia, with 140, ischemia, or high dose inotropes/vasopressors [re7].
- Minute ventilation less than 10L/min.
- Acid/base status is appropriate:
    - pH>7.25 [ref7], base deficit less than 6
- Fi02 (inspired oxygen) ≤ to 0.50 and PEEP < 10 cm H20 with Pa/FIO2 ratio > 150 [ref7] based on ABG
- Patient is without neuromuscular blockade and is not in status epilepticus.
- Patient is triggering ventilator or will trigger ventilator when set rate is decreased by 50%
- If open abdomen, check with attending surgeon
- If on BiVent, pHigh < 20, and Fi02 < %it spontaneous breaths
- Suspected to be able to protect airway in addition to positive cough and gag reflex
- Lack of copious secretions
- If TBI, GCS must be > 8, no suspected increased ICP and check with attending intensivist

Perform a daily Spontaneous Breathing Trial (SBT) in conjunction with SAT If patient meets above criteria

- PS 5-8 [ref7] cmH20 and Peep 0 cmH20
- To be done for at least 30 min and up to 2 hours
- Monitor for signs of intolerance
    - Chest pain or shortness of breath as well as EKG/telemetry monitor changes
    - Agitation, anxiety, diaphoresis
    - RR> 38 [ref7] for> 5min or less than 6 at any point
    - Sp02 < 90% for > 30 sec
    - HR > 140 or change +/-20% of baseline for > 5min or new HR < 60 at any point
    - Systolic BP > 180 or < 90 or change by 30 for > 5min

See algorithm below for added assistance



If patient passes SBT:

A set of spontaneous breathing parameters (Table 4) will be measured if patient passes. Upon passing all the parameters and the Extubate/Liberate from Mechanical Ventilator phase is ordered, the patient enters the next phase.

If patient passed the spontaneous breathing parameters but without an order to continue to the next phase, place patient on PSV settings between 5 over 5 to 8 over 8, and attempt to obtain an order from APN, MD or PA to extubate or liberate the patient from mechanical ventilator. If patient fails the spontaneous breathing parameters return to the previous ventilator settings, re-enter the Continuous Ventilator Management phase or weaning phase and inform APN, MD or PA.

Table 4. Spontaneous Breathing Criteria

Parameter	Acceptable value
Rapid Shallow Breathing Index (RSBI)	< 105
Negative Inspiratory Force (NIF)	≤ - 15 (NPV of 95-100 [ref 8-9])

*Predicted Body Weight (see Table 2)

C. Continuous Ventilator Management

With the continuous Ventilator Management phase ordered by APN, MD or PA adjustment of ventilator settings will be made based on the ABG and CXR results and or to stabilize cardiopulmonary condition of the patient. Upon recommendation by the APN, MD or PA, other methods to provide effective ventilator settings may be ordered to include Alveolar Lung Recruitment (ALR) maneuver (see Appendix 1), or PEEP titration based on Pa)2/Fi02 (P/F) ratio (see Appendix 2), or advanced modes of ventilation (see Appendix 3). Regular patient assessment and ventilator system check will be conducted by the RCP every four (4) hours with periodic RN assessment as per Nursing Protocol.

D. Weaning

If a patient fails SBT or patient not a candidate for SBT attempt, the weaning phase should be in effect. When the Weaning phase is ordered by the APN, MD or PA and the patient meet the following inclusion criteria (Table 3) procedures for weaning many commence.

Table 3. Inclusion Criteria for Weaning Protocol Inclusion Criteria

1. Patient has normalized acceptable ABG
2. Patient is stable
3. Patient is not on any advanced modes of ventilation
4. Patient is not on a paralytic agent.
5. Patient failed extubation parameter criteria for <3 consecutive days (for $\geq$ 3 consecutive days, see Stable and Recovering weaning protocol.

Ventilator weaning procedures are accomplished by either one or both of the steps below.

<u>Steps in weaning ventilator support for oxygenation</u>

1. For $Fi0)_2$ of less than or equal to 50% proceed to the next step. For $Fi0_2$) of greater than 50%, decrease it to 50% or less while maintaining $Sp0_2$ of greater than or equal to 92% for at least one (1) minute. If $Sp0_2$ is less than 92%, do not proceed to the next step. Return $Fi0_2$ to the previous setting. Consult APN, MD or PA to consider ALT maneuver (see Appendix 1). This step may be performed after the ALR maneuver is ordered and performed or on the next four (4) hours of patient-ventilator assessment.

2. For PEEP level less than or equal to 5 cmH_20 proceed to the next step. For PEEP level greater than 10 cmH_20, decrease PEEP level to less than or equal to 8 cmH20 while maintaining $Sp0_2$ of greater than or equal to 92% for at least five (5) minutes [ref 10]. If $Sp0_2$ is less than 92%, do not proceed to the next step. Return PEEP level to previous setting for at least one [1] hour [re 10] perform PEEP titration down by 2 cmH_2 every two (2) hours until goal of less than or equal to 5 cmH_20 while maintaining $Sp0_2$ of ≥ 92% for at least five [5] minutes is achieved. Consider leaving minimal peep at 8cm H20 if appropriate for the patient.

<u>Steps in weaning ventilator support for ventilation</u>

1. Change mode to Pressure Support Ventilation with pressure support level set to maintain exhaled tidal volume at 5-9 ml/kg of PBW.
2. If patient does not tolerate step 1, consider mixed mode (i.e SIMV/PS, PRVC/PS, or BiVent and reduce machine rate to allow spontaneous breaths. Rate can be reduced by 2 every 4 hours until ready for PSV (see below for Bivent weaning)

***spontaneous breaths reduce diaphragm decondition and posterior/dependent atelectasis due to increase transpleural negative draw**

3. For pressure support level above PEEP of ≤ to 10 cmH20 proceed to the next step. For pressure support level above PEEP of greater than 10 cmH20 to maintain the above exhaled tidal volume, titrate down pressure support level by 2-4 cmH20 per hour as tolerated defined by criteria previously defined in SBT.
4. Set pressure support above PEEP less than or equal to 10 cmH20 for 30 minutes.

Steps in weaning ventilator support for Bivent:

*APRV or BiVent or Bilevel (Weaning):

- Goal is to maintain lung volume
- P-High is reduced 2-3 cm water at a time
- T-High is lengthened in 0.5-2 sec increments AT THE SAME TIME!
    - Drop and stretch: maintains similar mean airway pressure over time, dP/dT, to maintain recruitment
- Once P-High drops to below 20cm of water and T-High has approached 10sec, evaluate as above for SBT. If patient fails SBT:
    - Switch to Pressure Support Ventilation
    - Peep will be set either 2cm H20 below or at prior P-high setting
    - Then follow above algorithm for weaning of ventilator

E. Extubate/Liberate from Mechanical Ventilator

With the Extubate/Liberate from Mechanical Ventilator phase ordered by APN, MD or PA, and the patient passed all spontaneous breathing parameters (Table 4) or patients **who passed the Stable and Recovering Weaning Protocol** (and the ordering provider has entered an order for extubate), and RN and RCP are at the bedside, the patient is now ready to be extubated or liberated from the mechanical ventilator.

Prior to the procedure of extubation/liberation from mechanical ventilator the following checklist needs to be conducted:

Check list:

1. Inform patient of plan to extubate
2. If deemed appropriate, check for cuff leak
3. When applicable, chest tube drainage < 100 ml/hr for the past 3 consecutive hours
4. Tube feeding discontinued 1 hour prior to extubation (RN to assess residuals)
5. In case of a "difficult airway" documentation, notify Anesthesia Department
6. Ensure availability of re-intubation equipment
7. Set-up and prepare for post-extubation care
8. Prepare all necessary equipment for extubation
    a. Personal protective equipment
    b. Resuscitation bag and mask
    c. Suction equipment
    d. Oral airway suction care device
    e. Oxygen flowmeter and modality (nasal cannula, high flow nebulizer, aerosol mask, trach collar mask)
    f. 10 ml syringe
    g. Racemic epinephrine
    h. Bronchodilator

When all items on the checklist have been performed, the following procedure will be performed on the patient.

Preparing the patient for extubation:

1. Place patient on 100% Fi02
2. Suction oropharyngeal and endotracheal secretions
3. Assure stable trend of vital signs

After performing the above procedures, the patient is extubated or liberated from the ventilator and post-extubation care procedures are performed.

Post-extubation care:

1. Place patient on appropriate oxygen/aerosol modality
2. If deemed necessary, obtain ABG ≤ 1 hour post extubation/liberation from the ventilator
3. Mandatory: monitor Sp02 for 6 hours post extubation
4. Encourage Incentive Spirometry (IS): Q1H x 10 repetitions with Sustained Maximal Inflation (SMI) for 5 seconds
5. Document extubation parameters and procedure detail
6. Monitor for stridor (consult APN, MD or PA to consider racemic epinephrine)

This protocol will end after twenty-four (24) hours of post-extubation and or liberation from the mechanical ventilator and patient is stable.

F. Patient Assessment and Mechanical Ventilator System Check

Patient assessment and ventilator system check is to be performed by an RCP at least every four hours or after every parameter change. Patient assessment by RN is determined per Nursing Protocol.

Patient assessment will include but not limited to; breath sounds, chest expansion, blood pressure, heart rate, Pulse oximetry (Sp02), and arterial blood gas, artificial airway – size, type, location. Allow the patient to stabilize on the ventilator, comfort and reassure the patient as necessary. Patient is deemed stable when the following vital signs and other objective measures are observed:

Criteria of a stable patient on invasive mechanical ventilation:

a. Heart rate (HR) ≤ 120
b. Respiratory rate (RR) ≥ 8 ≤ 30
c. Mean Arterial Pressure (MAP) ≥ 60 mmHg d. SP02 ≥ 92%
d. Exhaled Minute Ventilation (VE) 15 liters per minute (lpmf. pH≥ 7.32 ≤ 7.50)
e. PaC02 ≤ 50 mmHg (or 10 mmHg + hypercapneic baseline with normal pH)
f. Temperature ≥ 96 ≤ 101 ◦F
g. Absence of dysrhythmias

Ventilator system check will include but not limited to current ventilator parameter values and patient breathing parameter values (measured or calculated).

G. Stable and Recovering Ventilator Weaning Protocol

An alternative weaning protocol is provided for patients who have failed weaning attempts for the previous three (3) days or greater and with the following inclusion criteria found in Table 5.

Table 5. Inclusion Criteria for Stable and Recovering Ventilator Weaning Protocol

Inclusion Criteria
1. Patient has normalized acceptable ABG 2. Patient is stable 3. Patient's RASS score of $\geq$ -1 $\leq$ 1 (see Guideline for Continuous Sedation in the Critically Ill Adult), or is off sedation 4. Patient is not on any advanced modes of ventilation 5. Patient is not on any paralytic agent. 6. Patient failed extubation parameter criteria for $\geq$ 3 consecutive days

When the patient meets the above criteria and the Weaning Phase has been ordered, weaning process may commence. The following are the steps to weaning:

1. If patient is intubated perform pressure support trial (see procedure below). If patient is on low enough settings to consider repeat SBT, than perform SBT as above. If patient fails SBT, than trial as below:

Pressure support trial procedure:

Change mode to Pressure Support Ventilation with pressure support set at 15 cmH20 or based on the formula: PPeak – (1/3xNIF). Keep patient on this setting for one (1) to three (3) hours as tolerated three times a day. Consider increasing duration of Pressure Support trial and or decreasing pressure level by 2 cmH20 every eight (8) hours as tolerated as defined previously in SBT trial with addition of RR no higher than 25 and continue until PS of 5 is reached [ref 11]. If the patient does not tolerate pressure support trials, put back to the previous ventilator settings.

2. If patient is trached consider pressure support trial or perform trach collar trial as below. When patient is stable and tolerating trach collar trials for greater than or equal to twenty-four (24) hours, consider liberation from mechanical ventilation.

Trach collar trial procedure:

Put patient on a trach collar aerosol set-up for a minimum of 15 minutes to 60 minutes three (3) times a day. Then increase duration for a minimum of one (1) hour to three (3) hours three (3) times a day. Then increase duration for a minimum of one (1) hour to three (3) hours three (3) times a day. Consider increasing duration as tolerated.

Documentation for the Adult Mechanical Ventilation Management Protocol

1. Completely record ventilator system check by filling-out the Mechanical Ventilator flow sheet in paper and electronic format after every patient assessment and ventilator system check. Additional patient assessment documentation will be recorded in the Assessment and Interventions flow sheet.
2. Parameter change (s) made are to be documented (Circled for paper format only) and a completed ventilator system check and patient assessment is to be performed once the change(s) is/are made.
3. ABG's are to documented on the ventilator flow sheet
4. MetHb, NO (ppm)and NO2 (ppm) when INO Vent in use.

Appendix:

1. Alveolar Lung Recruitment (ALR) Maneuver 1,2
    a. Inclusion Criteria
        i. Order by the APN, MD or PA to perform ALR maneuver
        ii. Patient is hemodynamically stable.
    b. Equipment
        i. Servo-I ventilator with the following software upgrades:
    1. Open Lung Tool
    2. End –tidal CO2 monitor
        ii. End-tidal C02 monitor module, cable and disposable adapter
        iii. Blood pressure monitor – a-line (preferred) or automated cuff pressure manometer
    c. Procedure
        i. Verify that the ventilator is a Servo-I with Open Lung Tool and End-tidal CO2 software are installed
        ii. Install and calibrate End-tidal CO2 monitor and disposable adapter
        iii. Set mode to Pressure Control Ventilation with the following settings:
    1. Pressure Control above PEEP = 15 cm H20
    2. PEEP = 15 cmH20
    3. I:E ratio = 1:1
    4. Rate = 20 breaths/minute
    5. Fi02 = 100%
        iv. Recruitment maneuver
    1. Change main screen to the Open Lung Tool software
    2. Monitor the following parameters throughout the procedure
        a. Dynamic compliance
        b. End-tidal C02
        c. Blood pressure monitor – When blood pressure drops by 10% of baseline at any given period of the maneuver, decrease PEEP by 5 cmH20. If this does not correct the blood pressure, ABORT the maneuver and put patient back to previous settings

Time: 0 min	3. Increase PEEP by 5 cmH20 every three (3) breaths. When a drop in dynamic compliance and end-tidal C)2 elimination is observed DONOT PROCEED TO THE NEXT PEEP increment. The current PEEP level signifies that the opening pressure is reached. Maintain at this settings for 1 minute.
Time: 2 min	4. Titrate down PEEP to 20 cmH20 (for opening pressure ≤ 25 cmH20 or 25 cmH20 (for opening pressure > 25 cmH20) for 1 minute.
Time: 3 min	5. Decrease PEEP by 2 to 3 cmH20 every three (3) breaths. When a drop in dynamic compliance and end-tidal CO2 elimination is observed DO NOT PROCEED to the next PEEP decrement. The PEEP level signifies that the closing pressure is reached.
Time: 4 min	6. Change PEEP setting to the previously identified opening pressure for 1 minute for de-recruitment maneuver. 7. Set Optimal PEEP = 2 to 3 cmH20 above the previously identified closing pressure.
Time: 5 min	8. Set Pressure control above PEEP to maintain exhaled tidal volumes of 6 ml/kg of PBW. 9. 9. Indication of successful recruitment is shown in an increase in dynamic compliance. 10. Consider repeating procedure after disconnecting the patient from the ventilator or after endotracheal suctioning.

2. PEEP titration to P/F ratio

Exclusion: Patient is hemodynamically unstable and PEEP is contraindicated (.g. elevated ICP, significant hypotension, on any vasopressors but note that often Peep does not transmit to the mediastinum and decrease cardiac return if it is truly needed to maintain recruitment)

Inclusion: First 4 hours of ventilator initiation and P/F ratio is < 300.

a. If P/F ratio ≥ 300 is not attained at initial settings, increase to PEEP of 10 cm H20 and consult with ICU team.
b. If P/F ratio is ≤ 200, consider utilizing optimal PEEP (see Alveolar Lung Recruitment Maneuver) after consulting with ICU team. Assess ABG after 30 minutes.

Appendix: Peep/Fi02 tables for ARDS ventilation

OXYGENATION GOAL: PaO_2 55-80 mmHg or SpO_2 88-95%
Use a minimum PEEP of 5 cm H_2O. Consider use of incremental FiO_2/PEEP combinations such as shown below (not required) to achieve goal.

Lower PEEP/higher FiO2

FiO_2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7
PEEP	5	5	8	8	10	10	10	12

FiO_2	0.7	0.8	0.9	0.9	0.9	1.0
PEEP	14	14	14	16	18	18-24

Higher PEEP/lower FiO2

FiO_2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5
PEEP	5	8	10	12	14	14	16	16

FiO_2	0.5	0.5-0.8	0.8	0.9	1.0	1.0
PEEP	18	20	22	22	22	24

3. Advanced Modes of Ventilation
    a. Pressure Control Ventilation
    b. High Frequency Oscillatory Ventilation
    c. Mechanical Ventilation with Nitric Oxide Therapy

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