VENTILATOR MODES
STUDY GUIDE

Reference Guide and Practice Questions
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Are you ready to learn about the modes of mechanical ventilation? I sure hope so because that is what this study guide is all about.

Inside of this cheat sheet, we’ve listed out all the ventilator modes that you need to know as a Respiratory Therapist or student.

Not to mention, we’ve also included some helpful practice questions as well.

So if you’re ready to get started, let’s go ahead and dive right in. 😊

First and foremost, let’s discuss what a ventilator mode even is.

**What is a Ventilator Mode?**

A ventilator mode is a way of describing how the mechanical ventilator assists the patient with inspiration. The characteristics of a particular mode controls how the ventilator functions.

Understanding the different ventilator modes is one of the most important aspects of mechanical ventilation.

**Primary Control Variables:**

In mechanical ventilation, there are two primary control variables:

1. Volume Control
2. Pressure Control
**Volume Control**

Volume Control means that you can set (or control) the patient’s tidal volume.

So with a set tidal volume and a set respiratory rate, this means that there is a known minute ventilation. This is good when it comes to making adjustments to achieve a desired PaCO2.

One of the negative aspects of using Volume Control is that, since the tidal volume is preset, if the patient’s lung compliance were to decrease, this could result in high peak pressures.

Another drawback of Volume Control is patient-ventilator dyssynchrony.

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**Pressure Control**

Pressure Control means that you can set (or control) the patient’s pressure in order to achieve a desired tidal volume.

As with Volume Control, a Pressure-Controlled tidal volume and set rate can help you reach a desired PaCO2.

The main disadvantage of using Pressure Control is the patient’s tidal volume can potentially be unstable if there are changes in the patient’s lung compliance or airway resistance.

So again, Volume Control and Pressure Control — those are the two control variables.

When initiating mechanical ventilation on a patient, once you select the control variable, now you can choose the actual operational mode that determines the pattern of breathing for the patient.
In mechanical ventilation, there are two primary ventilator modes:

1. Assist/Control (A/C) Mode
2. Synchronous Intermittent Mandatory Ventilation (SIMV) Mode

**Assist/Control (A/C) Mode**

In this mode, a minimum number of preset mandatory breaths are delivered by the ventilator but the patient can also trigger assisted breaths. The patient makes an effort to breathe and the ventilator assists in delivering the breath.

With that said, this mode of ventilation does not allow the patient to take spontaneous breaths. In this mode, the operator can set either a controlled pressure or a controlled volume.

The sensitivity control can be adjusted to make it easier or harder for the patient to initiate a breath.

**When to Use Assist/Control?**

This mode is most often used when mechanical ventilation is first initiated for a patient because this mode provides full ventilatory support.

That is also one of the advantages of using Assist/Control because it keeps the patient’s work of breathing requirement very low.

One of the major complications of Assist/Control is hyperventilation, which results in respiratory alkalosis. This is the result of too many breaths given to the patient, whether patient-triggered or machine-triggered.
Synchronous Intermittent Mandatory Ventilation (SIMV) Mode

In this mode, the ventilator delivers a preset minimum number of mandatory breaths. However, it also allows the patient to initiate spontaneous breaths in between the mandatory breaths.

This mode also allows the operator to set either a controlled pressure or a controlled volume.

When to Use SIMV?

The primary indication for SIMV is when a patient needs partial ventilatory support. That is because, since the patient can take spontaneous breaths, that means they can contribute to some of their minute ventilation.

SIMV is a mode that is used for weaning as well.

Advantages of Using SIMV:

- Since the patient is able to take spontaneous breaths, it helps to maintain their respiratory muscle strength and avoid muscular atrophy.
- It distributes tidal volumes evenly throughout the lung fields, which reduces V/Q mismatching.
- It helps to decrease the patient’s mean airway pressure.

As a Respiratory Therapist (or student), SIMV and Assist/Control are the two ventilator modes that you should be most familiar with.

However, it’s also important to develop an understanding of the spontaneous modes and the secondary modes of mechanical ventilation as well.
Keep in mind that, in order to use any of the following modes, the patient must be breathing spontaneously.

**Continuous Positive Airway Pressure (CPAP)**

In CPAP, or continuous positive airway pressure, a continuous pressure that is above atmospheric pressure is maintained throughout the breathing cycle.

The patient must be breathing spontaneously to be in this mode because no mandatory breaths are given. This is a useful mode for weaning patients off of the ventilator.

**Pressure Support Ventilation (PSV)**

A mode of mechanical ventilation in which the patient's spontaneous breaths are supported by the ventilator during the inspiratory phase of breathing. As the patient triggers a breath, the ventilator assists by adding pressure to make breathing easier.

The level of pressure is preset by the operator, so you have control over how much support you give the patient. For example, the higher the level of pressure support that is set, the easier it will be for the patient to take a breath.

In PSV, the breaths are time-cycled and pressure-limited.

PSV is often used to help the patient overcome the airway resistance that is caused by the endotracheal tube.
For example, let's say there is a patient who needs to be weaned from the ventilator that is in the SIMV mode. If their endotracheal tube size is too small, the airway resistance would be increased which would make weaning difficult.

That's when PSV would come in handy to help the patient overcome the airway resistance so that they can be extubated.

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**Volume Support (VS)**

A mode of mechanical ventilation in which the ventilator delivers a supported breath to help the patient reach a set tidal volume. This mode is totally dependent on the patient's effort, meaning that, the machine varies the inspiratory pressure support level with each breath in order to achieve the target volume.

This mode is not quite as common as some of the others, but it’s often used to wean patients from anesthesia.
Now that we’ve covered the primary and spontaneous modes of ventilation, now let’s go through the unconventional ventilator modes. These are sometimes referred to as the secondary modes of ventilation.

1. Control Mode Ventilation (CMV)
2. Airway Pressure Release Ventilation (APRV)
3. Mandatory Minute Ventilation (MMV)
4. Inverse Ratio Ventilation (IRV)
5. Pressure Regulated Volume Control (PRVC)
6. Proportional Assist Ventilation (PAV)
7. Adaptive Support Ventilation (ASV)
8. Adaptive Pressure Control (APC)
9. Volume-Assured Pressure Support (VAPS)
10. Neurally Adjusted Ventilatory Assist (NAVA)
11. Automatic Tube Compensation (ATC)
12. High-Frequency Oscillatory Ventilation (HFOV)

Control Mode Ventilation (CMV)

It’s a mode where the ventilator delivers a preset tidal volume at a set time-triggered frequency. Basically, the ventilator controls both the rate and tidal volume which means that it’s in total control of the minute ventilation.

This mode should only be used on patients who are fully sedated and have been administered neuromuscular blocking agents.

That is also the biggest hazard of using this mode because, since the patient is fully dependent on the machine for ventilation and oxygenation, it could be devastating if they were to become disconnected.
Airway Pressure Release Ventilation (APRV)

A mode of mechanical ventilation in which two levels of continuous positive airway pressure are applied with an intermittent release phase for spontaneous breaths. This mode is often recommended to improve oxygenation and treat refractory hypoxemia.

Other indications for APRV include an Acute Lung Injury (ALI), Acute Respiratory Distress Syndrome (ARDS), and Severe Atelectasis.

Settings for APRV:

- High Pressure
- Low Pressure
- High Time
- Low Time

Mandatory Minute Ventilation (MMV)

This is a feature of some ventilators that causes an increase in the mandatory breaths that are delivered when the patient’s spontaneous breathing level becomes inadequate.

So basically, if the patient’s spontaneous breathing decreases, the ventilator compensates in order to make sure that a safe minimal minute ventilation is delivered.

MMV is often an additional function of the SIMV mode and is intended to prevent hypercapnia.
**Inverse Ratio Ventilation (IRV)**

This is a mode that uses an inverse I:E ratio to improve oxygenation and gas exchange. It’s been shown to decrease shunting, improve V/Q mismatching, and decrease deadspace ventilation.

IRV is commonly recommended for patients with Acute Respiratory Distress Syndrome (ARDS).

This mode causes auto-PEEP (intrinsic PEEP) which is actually what helps improve the patient’s oxygenation and reduce shunting.

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**Pressure Regulated Volume Control (PRVC)**

A mode of mechanical ventilation that provides volume-controlled breaths with the lowest pressure possible. It does so by altering the flow and inspiratory time. This mode is used to keep the peak airway pressure at the lowest possible level.

This mode is volume-cycled and can be patient triggered-or time-triggered.

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**Proportional Assist Ventilation (PAV)**

This is a mode of mechanical ventilation where the machine uses variable pressure to provide pressure support for a patient's spontaneous breaths. The level of pressure support is adjusted depending on the patient's work of breathing.
PAV is either pressure-triggered or flow-triggered, and the breathing cycle ends once the patient’s volume or flow demands are met.

One thing to keep in mind about this mode is that, if the patient’s lungs show rapid improvement, overdistention or barotrauma could occur because too much pressure would be delivered.

**Adaptive Support Ventilation (ASV)**

A mode of ventilation that changes the number of mandatory breaths and pressure support level according to the patient’s breathing pattern.

**Adaptive Pressure Control (APC)**

A pressure-controlled mode that utilizes a closed-loop control of the pressure setting in order to maintain a minimum delivered tidal volume.

With that said, in this mode, the delivered tidal volume will vary depending on the patient’s lung compliance.

**Volume-Assured Pressure Support (VAPS)**

A mode of ventilation that provides a stable tidal volume by incorporating inspiratory pressure support ventilation along with conventional volume-assisted cycles. It’s only available on certain ventilators.
This mode can cause a prolonged inspiratory time, so patients with an obstructive disease should be monitored closely in order to prevent air trapping or other cardiovascular effects.

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**Neurally Adjusted Ventilatory Assist (NAVA)**

A ventilator mode that uses the patient's electrical activity of the diaphragm to guide the functionality of the ventilator.

A catheter with electrodes is positioned in the patient's esophagus at the level of the diaphragm, and that is how the electrical activity is picked up from the phrenic nerves. Then, the ventilator uses this information to ventilate the patient.

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**Automatic Tube Compensation (ATC)**

While not technically a ventilator mode, this is a setting on some ventilators that offsets and compensates for the airflow resistance that is imposed by the endotracheal tube or artificial airway.

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**High-Frequency Oscillatory Ventilation (HFOV)**

A type of mechanical ventilation that delivers very small tidal volumes at an extremely fast rate which minimizes the chances of a lung injury.

This mode has been shown to improve oxygenation in severe cases, such as with refractory hypoxemia.
Adjusting the Setting in HFOV:

- **Ventilation** – can be increased by increasing the Amplitude (Power) or by decreasing the frequency.
- **Ventilation** – can be decreased by decreasing the Amplitude (Power) or by increasing the frequency.
- **Oxygenation** – can be increased by increasing the Mean Airway Pressure setting or by increasing the FiO2.
- **Oxygenation** – can be decreased by decreasing the Mean Airway Pressure setting or by decreasing the FiO2.

This mode is also indicated to provide mechanical ventilatory support in neonates with conditions such as congenital diaphragmatic hernia, diffuse alveolar disease, and pulmonary hypoplasia.
1. What are 5 examples of ventilator modes?
CMV, A/C, IMV, SIMV, and CPAP

2. What type of pressure ventilation involves normal respirations, chest cuirass, and an iron lung?
Negative pressure

3. Positive pressure ventilators can be ____ vs ____ controlled.
Pressure, Volume

4. What are 2 examples of nonconventional ventilator modes?
HFOV and APRV

5. How does positive pressure ventilation create transairway pressure?
By increasing airway opening pressure above the alveolar pressure.

6. List the modes of positive pressure ventilation from the most support to the least support:
CMV, A/C, IMV, SIMV, CPAP

7. What is an advantage of a volume-controlled mode?
It ensures minimal minute ventilation.

8. What are some disadvantages of a volume-controlled mode?
The pressure is variable, there is a possibility of barotrauma/volutrauma, and the volume is limited by the high pressure alarm.

9. What is an advantage of a pressure-limited mode?
There is less risk of barotrauma.

10. What are some disadvantages of pressure-controlled modes?
It doesn’t ensure minute ventilation, and the tidal volume is variable.

11. What two things are variable in pressure-controlled modes? Volume (dependent on a set pressure) and Flow.

12. What are the four types of triggers? Time, Patient, Pressure, and Flow.

13. What control is used to adjust the patient’s inspiratory effort? Sensitivity

14. What are the two types of sensitivity controls? Pressure and Flow

15. How does a pressure trigger work? The ventilator senses a drop in pressure below the baseline and senses the patient’s negative inspiratory effort.

16. Which trigger type is more sensitive, pressure or flow? Flow

17. How does a flow trigger work? When a patient initiates a breath, base flow returning to the ventilator is reduced, thus triggering an inspiration.

18. What is Controlled Mandatory Ventilation? A mode that is time-triggered, gives machine breaths, and is volume or pressure cycled.

19. What are the indications for CMV? The need to control minute ventilation completely. Also, the need to control chest expansion completely, for example, for a patient with flail chest.

20. What are some complications of CMV?
The patient is totally ventilator dependent, alarms are essential, you may be unable to assess weaning, and seizures may interrupt the delivery of a breath.

21. What are some indications for A/C mode?  
The patient needs full ventilatory support, the need to support a high minute ventilation with low oxygen consumption, and the need for sedation after intubation.

22. What are some advantages of A/C mode?  
Decreased work of breathing. The patient controls the respiratory rate, therefore the minute ventilation.

23. What are some complications of A/C mode?  
Hyperventilation (i.e., respiratory alkalosis), pain/anxiety/CNS disease, Biot's or Cheyne-stokes respirations.

24. What is the IMV mode?  
It was the first widely used mode that allowed partial ventilatory support, facilitates weaning, and increases respiratory muscle strength. It is not widely used today.

25. What are some complications of IMV?  
Breath stacking, which is a spontaneous effort immediately followed by a mechanical breath, which leads to an increased PIP; barotrauma; and cardiac compromise.

26. What is barotrauma/volutrauma?  
A lung injury that occurs from hyperinflation of the alveoli past the rupture point. It usually occurs at a PIP > 50 and a Pplat > 35.

27. What is the synchronization window?  
It is the time interval just prior to time triggering in which the ventilator is responsive to the patient’s spontaneous breath.

28. What are some indications for SIMV?
If the patient needs partial ventilatory support, and if the patient can actively contribute to their minute ventilation.

29. What happens if the rate is set high in SIMV mode?
This can provide total support (SIMV with no spontaneous rate is essentially the same as A/C).

30. What happens if the rate is set low in SIMV mode?
It facilitates weaning, strengthens respiratory muscles, decreases mean airway pressure making spontaneous breaths have a lower peak pressure than mandatory.

31. What are some complications of SIMV?
A low rate can increase the patient’s work of breathing causing muscle fatigue/failure.

32. What mode has a positive baseline pressure continuously applied to the circuit and airway during both inspiration and expiration?
CPAP

33. In this mode, the ventilator delivers a time-triggered breath and allows the patient to breathe at their own tidal volume between mechanical breaths?
SIMV

34. In this mode, the ventilator delivers a set tidal volume or pressure at a time-triggered rate but the patient can trigger a mechanical breath above the preset rate?
Assist/Control

35. In this mode of ventilation, the patient cannot trigger a mechanical or spontaneous breath so there is no negative deflection on graphics?
Controlled Mandatory Ventilation (CMV). The patient must be sedated or paralyzed. It is not as commonly used.
36. In order for this mode to be used, the patient must be spontaneously breathing, have adequate lung function to maintain normal PaCO2, and not be at risk for hypoventilation? CPAP

37. What does pressure support do?
It augments spontaneous tidal volume, decreases spontaneous respiratory rate, and reduces the patient’s work of breathing.

38. How does pressure support decrease the patient’s spontaneous respiratory rate?
An increased volume decreases the need for a high respiratory rate in order to achieve the required minute ventilation. Also, it decreases deadspace ventilation.

39. What is the desired respiratory rate?
Less than 25.

40. What is tidal volume dependent upon with a pressure support mode?
It is dependent on the set inspiratory pressure, lung compliance, and airway resistance.

41. What makes flow variable in pressure support?
It’s dependent upon the flow needed to maintain the plateau pressure.

42. What would be considered CPAP with pressure support?
BiPAP

43. CPAP with no pressure support would be considered what?
CPAP

44. How do you manage pressure support?
Begin with 5-10 and increase in increments of 3-5.
45. You should titrate pressure support according to what 3 things?
(1) Spontaneous tidal volume of 5 – 7 ml/kg of IBW. (2) Respiratory rate of less than 25. (3) A decrease in work of breathing.

46. Is PEEP considered a standalone mode on ventilation?
No

47. What are some effects of PEEP?
They recruit alveoli, increase FRC (oxygenation), increase alveolar surface area (gas diffusion), and increase compliance.

48. What are some complications of PEEP?
Cardiac compromise, increased intrathoracic pressure, decreased venous return, decreased cardiac output and blood pressure.

49. What is an indication for PEEP?
Refractory hypoxemia

50. How do you manage PEEP?
The physiologic normal setting of PEEP is 5 cmH2O. Then you can increase in increments of 3 – 5 while also watching the patient's blood pressure. You should decrease to the previous level or zero to lower blood pressure. You can treat low blood pressure with volume expansion or vasopressors, then increase PEEP again while continuing to monitor.

51. What is the definition of compliance?
It is the volume change per unit of pressure.

52. Inverse ratio ventilation is volume controlled or pressure controlled?
Pressure controlled

53. During breathing, a long inspiration and a short expiration causes what?
Air trapping, auto PEEP, and prevents alveolar collapse.

54. **What is Auto-PEEP?**
Air trapping that occurs when there is an incomplete expiration.

55. **How does IRV prevent alveolar collapse?**
The critical opening pressure is reduced, the pressure needed for ventilation is less, and it improves ventilation.

56. **What are some complications of IRV?**
Barotrauma, requires paralysis sedation, and cardiovascular compromise.

57. **When is mandatory minute ventilation activated?**
When the patient’s spontaneous breathing is less than minimum set minute ventilation. When this occurs, the ventilator increases ventilation.

58. **The method of increased ventilation with MMV varies upon what?**
The ventilator model (some increases respiratory rate, some tidal volume, and some pressure support).

59. **What should the minute ventilation be set to achieve?**
A satisfactory PaCO2

60. **What are some advantages of MMV?**
It promotes spontaneous breathing, it requires minimal support but protects against hypoventilation and respiratory acidosis, and it permits weaning but compensates for apnea.

61. **What are some disadvantages and complications of MMV?**
It doesn’t protect against deadspace breathing. A high respiratory rate with a low tidal volume means the patient is breathing above minute ventilation (MMV remains inactive but PaCO2 increases, respiratory acidosis).
62. What does pressure control generate?
A flow in order to increase the airway pressure to a preset pressure limit.

63. When is inspiration terminated in Pressure Control?
When the preset I-Time is reached.

64. What are some indications for pressure control?
Low lung compliance, high PIP during volume ventilation, (PIP > 50, Pplat > 35), and ARDS.

65. What are some advantages of pressure control?
PIP is reduced while maintaining adequate oxygenation and ventilation. Also, there is a reduced risk of barotraumas.

66. How do you manage pressure control?
The PIP is set to achieve a desired tidal volume unless the patient is allowed to become hypercapnic in the interest of limiting PIP. Tidal volume and minute ventilation must be carefully monitored.

67. What is APRV?
A mode of ventilation that stands for: Airway Pressure Release Ventilation.

68. What happens during inspiration in APRV?
Positive airway pressure augments spontaneous breathing (High CPAP level, reduces WOB, Increases MAP to increase O2, allows spontaneous inspiration at any point during the breath-elevated pressure delivery).

69. What happens during exhalation with APRV?
Positive pressure is periodically released to allow exhalation (brief 1 – 2 seconds), decreases FRC and allows for exhalation and the release of CO2.

70. APRV is inappropriate for what kind of patients?
Those at risk for an inadequate spontaneous respiratory rate.

71. **APRV can resemble IRV when?**
The expiratory pressure release time is less than the spontaneous effort.

72. **Why is APRV a beneficial alternative to IRV?**
Because it does not require paralytics.

73. **Describe APRV:**
It is time-triggered but the patient is allowed to breathe spontaneously at any time; it is mandatory and spontaneous pressure limited; it is time-cycled with a preset I-time.

74. **Describe HFOV:**
It reduces the risk of lung destruction by keeping alveoli open at a constant pressure, oscillates very rapidly (high respiratory rate at small volumes); early intervention is key.

75. **How do you manage oxygenation with HFOV?**
Adjust the mean airway pressure, FiO2, and alveolar recruitment.

76. **How do you manage ventilation with HFOV?**
Adjust the amplitude, Hertz, % I-time, cuff deflation, and permissive hypercapnia.

77. **What is Amplitude in HFOV?**
It is the change in stroke volume and the force delivered by the piston.

78. **What are the trigger variables for VC/AC CMV?**
Pressure, time, and flow

79. **What are the limit variables for VC/AC CMV?**
Volume and flow
80. What are the targeted variables for VC/AC CMV?
Volume

81. What are the cycle variables for VC/AC CMV?
Volume

82. What are the trigger variables for VC/SIMV?
Time, volume, and pressure

83. What are the limit variables for VC/SIMV?
Volume

84. What is Controlled Mandatory Ventilation (CMV)?
It is used in sedated, apneic, or paralyzed patients. All breaths are triggered, limited, and cycled by the ventilator. The patient has no ability to initiate their own breaths. If a patient tries to take a breath while in the CMV mode it is reported to sound like sucking on an empty bottle.

85. What is Synchronized Intermittent Mandatory Ventilation (SIMV)?
It is an assisted mechanical ventilation synchronized with the patient’s breathing. The ventilator senses the patient taking a breath then delivers the breath. Spontaneous breathing by patient occurs between the assisted mechanical breaths which occurs at preset intervals. If the patient fails to take a breath, the ventilator will provide a mechanical breath.

86. When is SIMV preferred?
When the patient has an intact respiratory drive.

87. How is SIMV similar to CPAP and BIPAP?
Because they are all spontaneously triggered by patient.

88. How does Assist/Control Ventilation work?
The trigger for delivery of a breath can be either by the patient or by elapsed time.

89. What is the preferred mode for patients with respiratory distress?
Assist/Control Ventilation

90. What mode supports every breath whether its initiated by the patient or ventilator. Also, this mode delivers a full tidal volume regardless of the patient’s respiratory effort or drive?
Assist/Control Ventilation

91. This mode can be used in ARDS, paralyzed, or sedated patients?
Assist/Control Ventilation

92. During Assist/Control ventilation, what can happen to an anxious patient?
They can trigger the ventilator to hyperventilate which leads to breath stacking or auto-PEEP.

93. Which mode of mechanical ventilation can provide a precise I:E ratio?
Control Mode Ventilation (CMV)

94. What mode can make it easier for the patient to overcome the resistance of the ET tube and is often used during weaning because it reduces the work of breathing?
Pressure Support Ventilation

95. Describe Pressure Support Ventilation:
It supports ventilation during inspiration. The patient determines tidal volumes, rate, and minute volume. It requires consistent respiratory effort by the patient.

96. What is a component of CPAP/BPAP?
They are both spontaneously triggered by the patient.

97. What does CPAP stand for?
Continuous Positive Airway Pressure

98. What mode uses continuous positive pressure to maintain a continuous level of PEEP and uses mild air pressure to keep the airway open?
CPAP

99. What does BiPAP stand for?
Bilevel Positive Airway Pressure

100. What mode uses alternating levels of PEEP to maintain oxygenation, commonly used in pneumonia, COPD, and asthma?
BiPAP
As a bonus, we wanted to give you access to a few sample TMC Practice Questions on the topic of mechanical ventilation.

1. A 63-year-old female patient is intubated and receiving mechanical ventilation in the pressure controlled A/C mode. If the patient’s compliance were to decrease, which of the following would you expect to occur?
   A. Her delivered volume will decrease
   B. Her peak pressure will increase
   C. Her inspiratory time will increase
   D. Her PEEP level will decrease

To get this one correct, you must have a basic understanding of lung compliance. You also have to take into account that the ventilator is in the pressure control mode, which means that the pressure is pre-set.

If there is a decrease in lung compliance when the ventilator is operating in the pressure control mode, the machine will continue delivering a constant pressure. But, since the lungs don’t expand as much when there is decreased compliance, it reaches the set pressure limit much faster. That means that there will be a decrease in the delivered tidal volume.

In this case, the inspiratory time will decrease and the PEEP levels should not be affected.

The correct answer is: A. Her delivered volume will decrease
2. A 176 lb male patient is intubated and receiving volume control A/C ventilation with the following settings: FiO2 of 40%, Rate of 12/min, and Tidal Volume of 550 mL. An ABG was analyzed and the following results were obtained:

<table>
<thead>
<tr>
<th>ABG Results</th>
<th>Ventilator Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH 7.39</td>
<td>Spontaneous Tidal Volume 180 mL</td>
</tr>
<tr>
<td>PaCO2 37 mmHg</td>
<td>Spontaneous Rate 37/min</td>
</tr>
<tr>
<td>HCO3- 23 mEq/L</td>
<td>Vital Capacity 550 mL</td>
</tr>
<tr>
<td>PaO2 107 mmHg</td>
<td>MIP/NIF -12 cm H2O</td>
</tr>
</tbody>
</table>

Which of the following would you recommend?
A. Place the patient on a 40% T-piece and monitor closely  
B. Switch the patient to SIMV at a rate of 5/minute  
C. Place the patient CPAP and monitor closely  
D. Maintain the current ventilator settings and re-evaluate later

To get this one right, you must be able to interpret the patient's ABG results and make the appropriate changes to the ventilator settings. You will likely see several questions in this format on the TMC Exam.

The first thing you should note is that the values of the ABG results are all within the normal ranges. Then you can look at the bedside measurements.

The patient has a fast spontaneous breathing rate, a low spontaneous tidal volume, a low vital capacity, and a low MIP/NIF. All of these findings indicate that this patient is not ready for a spontaneous breathing trial and should not yet be weaned. So it's best to maintain the current setting and re-evaluate the patient at a later time.

All of the other answer choices demonstrate some type of weaning, so we can rule them out right away.
The correct answer is: D. Maintain the current ventilator settings and re-evaluate later

3. A 68-year-old male patient with COPD is receiving volume control SIMV with the following settings:
   - Tidal volume 480 mL
   - Rate 12/min
   - Pressure support 10 cm H2O
   - PEEP 5 cm H2O

   During a spontaneous breathing trial via T-tube, the patient's breathing rate increased drastically which required that he be placed back on the ventilator. Which of the following would you recommend during the next breathing trial?
   - A. Increase the sedation dosage
   - B. CPAP with pressure support via ET tube
   - C. CPAP without pressure support via ET tube
   - D. Extubate and provide BiPAP via full face mask

   To get this one correct, you needed to be familiar with SBTs and the process of weaning from mechanical ventilation.

   There are 3 primary ways to perform an SBT:
   - Simple T-piece without ventilatory support
   - CPAP mode without pressure support
   - CPAP mode with pressure support

   Using CPAP with pressure support during an SBT can help the patient overcome the extra work of breathing that is imposed by the ET tube. It also helps to increase tidal volumes and prevent tachypnea. None of the other answer choices are indicated in this case, so you know that the correct answer has to be B.

   The correct answer is: B. CPAP with pressure support via ET tube
Well, How’d You Do?

These were just a few example practice questions so that you can get an idea of what to expect on the TMC Exam.

Mechanical Ventilation is definitely the most important section of the exam, which means that it’s important to spend a lot of time mastering this topic. Going through practice questions is a great way to do just that!

The practice questions that we provided for you here were actually taken straight from our TMC Test Bank.

It’s one of our bestselling products where we break down hundreds of practice questions that cover every topic you need to know for the TMC Exam.

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So there you have it!

You now have access to everything you need to know about the modes of mechanical ventilation.

**Now it’s up to you to learn this information.**

I definitely recommend going through all the modes several times until the information sticks. Your future self will thank you, especially once it’s time to take the board exams.

No worries, I have faith in you!

Keep working and studying hard and you will be just fine. Thank you so much for reading all the way to the end.

I wish you the best of luck on your journey, and as always, breathe easy my friend. 😊
References


