Mechanical ventilation is use of a machine to assist with the work of breathing.

Mechanical ventilators are frequently used for conditions that cause either low oxygen levels (such as pneumonia) or high carbon dioxide levels (such as chronic obstructive pulmonary disease).

**What Is Noninvasive Mechanical Ventilation?**
Noninvasive mechanical ventilation involves use of a machine that delivers oxygen and removes carbon dioxide through an external device (such as a face mask). This type of ventilation is most commonly used for patients with mild to moderate difficulty breathing due to an acute or chronic medical condition. Patients with an acute illness who require noninvasive ventilation need monitoring in the hospital to ensure their breathing difficulty does not worsen.

**What Is Invasive Mechanical Ventilation?**
Invasive mechanical ventilation involves placement of an endotracheal tube through a patient’s mouth or nose into the trachea (the upper part of the airway that leads to the lungs). The endotracheal tube is connected to a machine that delivers a prespecified amount of oxygen and volume of air, along with a set number of breaths per minute. These are adjusted according to a patient’s levels oxygen and carbon dioxide levels. Patients with an acute illness who require invasive mechanical ventilation should be monitored in an intensive care unit.

**Which Patients Need Invasive Mechanical Ventilation?**
Invasive mechanical ventilation is required for patients who are critically ill and have low blood levels of oxygen (hypoxemia) or high blood levels of carbon dioxide (hypercapnia). It is also used for patients in a coma who need airway protection to prevent aspiration (inhalation of oral secretions into the lungs) and for most patients undergoing general anesthesia during surgery.

**Other Treatments Used With Invasive Mechanical Ventilation**
In addition to treatment of the underlying condition that requires respiratory support, patients undergoing invasive mechanical ventilation often need sedative and pain medication because the endotracheal tube is uncomfortable and may provoke anxiety. Patients who are receiving mechanical ventilation are unable to eat or drink, so a feeding tube is frequently passed through the nose or mouth into the stomach to provide nutrition.

**Removal of Invasive Mechanical Ventilation**
A ventilator is removed after a patient’s acute medical condition improves and usually after successful completion of a trial of spontaneous breathing while the endotracheal tube is still in place. Duration of invasive mechanical ventilation depends on a number of factors, including a patient’s acute and chronic illnesses and baseline level of strength.

 Patients who undergo invasive mechanical ventilation for more than a week may need a tracheostomy (a surgical incision in the neck through which an airway tube is placed), which may allow patients to gradually wean off the ventilator. Other patients who are unable to breathe without the assistance of invasive mechanical ventilation may opt (themselves or through family members) to have the ventilator removed and allow natural death to occur.

Patients with advance directives stating they do not want life support with invasive mechanical ventilation should not receive this intervention.