

# Postgraduate Certificate

## Advances in Mechanical Ventilation





## Postgraduate Certificate Advances in Mechanical Ventilation

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/medicine/postgraduate-certificate/advances-mechanical-ventilation](http://www.techtute.com/us/medicine/postgraduate-certificate/advances-mechanical-ventilation)

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# 01

# Introduction

The high hospital mortality rate associated with respiratory failure requires specialized personnel with extensive knowledge and management of this pathology, since it is also one of the most frequent. The most recent advances in Mechanical Ventilation have enabled a new unparalleled landscape for treating these conditions, so specialists must keep themselves up to date in the field to know the latest technologies and developments at their disposal. This TECH program delves precisely into this issue, with topics devoted to conventional oxygen therapy, non-invasive mechanical ventilation and high-flow therapies with nasal cannulas.





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*Discover the latest advances in  
Mechanical Ventilation in the wake of  
the Coronavirus pandemic”*



Current developments and research regarding all types of respiratory conditions have triggered advances in mechanical ventilation, especially given the recency of the coronavirus pandemic.

Within this framework of action, specialists must have the highest level of training to deal with the most complex respiratory conditions in a current and up-to-date manner. In addition to delving into technological developments, the program provides specialists with the most vigorous discoveries in the pathophysiology of respiratory insufficiencies, as well as clinical diagnosis and prevailing imaging tests.

Therefore, students will find in this program the most cutting-edge research on the indications and contraindications of non-invasive mechanical ventilation, as well as the latest clinical applications of high-flow nasal cannula therapy. This course is therefore an excellent opportunity to acquire up-to-date specialized knowledge on the subject matter.

Moreover, TECH knows how complicated it can be to balance this kind of academic activity with professional and personal responsibilities. For this reason, TECH offers the program in an innovative, completely online format. Specialists will have access to all the educational material from the first day, allowing them to download it and study it at their own pace and convenience.

This **Postgraduate Certificate in Advances in Mechanical Ventilation** contains the most complete and up-to-date academic program on the market. Its most notable features are:

- ◆ Practical cases presented by experts in Pulmonology
- ◆ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ◆ Practical exercises where the self-assessment process can be carried out to improve learning
- ◆ Special emphasis is placed on innovative methodologies in the approach to respiratory insufficiencies
- ◆ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ◆ Access to content from any fixed or portable device with an Internet connection



*This program will provide you with the most up-to-date and comprehensive knowledge you are looking for to update on the latest Advances in Mechanical Ventilation”*

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*Don't sacrifice your personal or professional life on other programs that can't be adapted to your needs”  
At TECH, you decide how to take on the entire course load, wherever and whenever it best suits you”*

The program's teaching staff includes professionals from sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive training programmed to train in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic year. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Incorporate into your daily practice the most modern approach to the most frequent respiratory failure in any area of Pulmonology.*

*Get up to date with the most modern ventilation mode, including NAVA, IVAPS and AVAPS.*



# 02

# Objectives

The program objective is to provide professionals with the most updated knowledge in everything related to Mechanical Ventilation, including topics that address current research on respiratory failure. The purpose is to update specialists on the most urgent pulmonological topics and issues, especially in the wake of the coronavirus pandemic.







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*You will have at your disposal a whole team of professionals ready to offer you the best possible personalized support and guidance”*



## General Objective

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- ◆ Provide an update on the latest scientific evidence available in published guidelines, scientific articles and systematic reviews
- ◆ Address the fundamental aspects in treating pulmonary pathologies
- ◆ Update knowledge of the most frequent pathologies in Pulmonology

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*You will learn the latest developments in monitoring patients being treated with Non-Invasive Ventilation, and the procedures to follow in special emergency situations”*







## Specific Objectives

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- ◆ Understand the pathophysiology and classification of respiratory failure and learn the keys to diagnosis for clinical practice
- ◆ Provide knowledge based on the best available evidence on the different treatment options for respiratory failure, including the application and contraindications of both NIV and HFO in acute and chronic respiratory failure
- ◆ Delve deeper into the main ventilatory modalities and asynchronies during NIMV
- ◆ Delve into the main features and clinical benefits of high-flow oxygen therapy

03

# Course Management

This Postgraduate Certificate is directed by a highly prestigious teaching team in the area of Pulmonology. Their experience at the head of this department in renowned hospitals gives a special character to the syllabus, since specialists will deal with real case studies that contextualize all the theory taught. This is a quality guarantee for the entire syllabus and, consequently, the entire program.





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*You will be supported by professionals who know your updating needs, providing you with all the possible materials to do so”*



## International Guest Director

Dr. Franck Rahaghi is one of the most prolific international figures in the field of **Pneumology**. Noted for his leadership in quality and medical care, as well as his commitment to clinical research, he has held several important positions at Cleveland Clinic, Florida. Notable among them are his roles as **Chairman of Quality, Medical Director of the Department of Respiratory Care and Director of the Pulmonary Hypertension Clinic**.

Thanks to his studies and continuous preparation in this discipline, he has made several contributions in the **rehabilitation of patients with various respiratory pathologies**. These contributions and permanent academic improvement have allowed him to assume other responsibilities such as the position of **Head of the Department of Pulmonary Education and Rehabilitation**. In addition, he is a member of the Internal Review Committee, responsible for **supervising the correct execution of research and clinical trials** (Activated Protein C and IFN gamma-1b) inside and outside the aforementioned health institution.

In his solid preparation, he has established care links with centers of excellence such as the **Rockefeller University Hospital in New York**, as well as the Internal Medicine programs at the **University of Illinois at Chicago and the University of Minnesota**. He also studied at the **Department of Interventional Pulmonary Pulmonology and Pulmonary Hypertension at the University of California-San Diego**. He has also participated in important academic projects as an instructor in Genetic Medicine.

Dr. Rahaghi has authored and co-authored numerous articles published in renowned scientific journals in the medical field. Among the most recent and significant studies he has unveiled are his researches on the **impact of COVID-19 on the respiratory health of patients**, specifically on its effects in **controlling Pulmonary Hypertension**.

His other fields of interest include **Scleroderma, Sarcoidosis AATD and ILD/IPF**. He is also a consulting member of MedEdCenter Incorporated, a non-profit corporation dedicated to **providing educational materials focused on pulmonary pathologies**. An initiative from where he is committed to promote the education of patients and physicians through new technologies.



## Dr. Rahaghi, Franck

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- Medical Director, Department of Respiratory Care, Cleveland Clinic Hospital, Florida, USA
- Director of the Pulmonary Hypertension Clinic attached to the Cleveland Clinic Hospital, Florida, USA.
- Bachelor of Science (BS), Bioengineering and Biomedical Engineering from the University of San Diego.
- Master's Degree in Health Sciences/Administration at UC Berkeley

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*Thanks to TECH you will be able to learn with the best professionals in the world"*

## Management



### Dr. Jara Chinarro, Beatriz

- ◆ Acting Chief of the Pulmonology Service Puerta de Hierro University Hospital
- ◆ Degree in Medicine and Surgery, Complutense University Madrid
- ◆ MIR Pulmonary Specialist
- ◆ Specialist in sleep disorders, CEAMS



### Dr. Ussetti Gil, Piedad

- ◆ Emeritus Advisor in the Pulmonology Department, Puerta de Hierro University Hospital, Majadahonda
- ◆ Degree in Medicine and Surgery, Central University of Barcelona
- ◆ Specialist in Pulmonology
- ◆ Executive Master's Degree in Healthcare Leadership ESADE
- ◆ Honorary Professor in the Medicine Department, Autonomous University of Madrid



## Professors

### Dr. Izquierdo Pérez, Ainhoa

- ◆ Specialist Physician in Pulmonology, Puerta De Hierro University Hospital
- ◆ Degree in Medicine, University of Alcalá de Henares
- ◆ Master's Degree in Clinical Medicine UCJC, Camilo José Cela University
- ◆ Master's Degree in EPID, Catholic University of Murcia

### Dr. Zambrano Chacón, María de los Ángeles

- ◆ Resident Intern, Pneumology Department, Jiménez Díaz Foundation University Hospital
- ◆ Degree in Medicine, Central University of Venezuela
- ◆ Master's Degree in Infectious Diseases and Antimicrobial Treatment from CEU Cardenal Herrera University
- ◆ Workshop on Pneumological Emergencies, Jiménez Díaz Foundation

# 04

## Structure and Content

The structure and contents of this program respond to the most innovative pedagogical methodology in the academic world, since TECH uses the best educational technology available to develop its programs. Thanks to *Relearning*, specialists will update all their knowledge in a natural and progressive way, without requiring a great effort or an excessive investment of study time.







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*You will gain access to a program full of practical aids, teaching guides and interactive summaries that will help you in studying the contents”*

## Module 1. Respiratory Failure: Non-Invasive Mechanical Ventilation High-Flow Oxygen Therapy

- 1.1. Respiratory Failure
  - 1.1.1. Pathophysiology-Specific (Partial, Global, Postoperative or Hypoperfusion / Shock)
    - 1.1.1.1. Onset-Time-Specific (Acute, Chronic and Accutely Chronic)
    - 1.1.1.2. Alveolar-Arterial Gradient-Specific (Normal or Elevated)
    - 1.1.1.3. Pathophysiological Mechanisms
  - 1.1.2. Oxygen Partial Pressure Decrease
    - 1.1.2.1. Shunt Presence
    - 1.1.2.2. Ventilation/Perfusion Imbalance (V/Q)
    - 1.1.2.3. Alveolar Hypoventilation
    - 1.1.2.4. Diffusion Alteration
- 1.2. Diagnosis
  - 1.2.1. Clinical symptoms
  - 1.2.2. Arterial Blood Gas Analysis Interpretation
  - 1.2.3. Pulse Oximetry
  - 1.2.4. Imaging Tests
  - 1.2.5. Others: Respiratory Function Tests, ECG, Blood Work, etc.
  - 1.2.6. Respiratory Failure Etiology
  - 1.2.7. Respiratory Failure Treatment
    - 1.2.7.1. General Measures
    - 1.2.7.2. Oxygen Therapy, NIV and HFO (See Subsequent Sections)
- 1.3. Conventional Oxygen Therapy
  - 1.3.1. Acute Oxygen Therapy Indications
  - 1.3.2. Chronic Home Oxygen Therapy Indications
  - 1.3.3. Administrative Systems and Sources
  - 1.3.4. Oxygen Sources
  - 1.3.5. Special Situations: Flying
- 1.4. Non-Invasive Mechanical Ventilation (NIMV)
  - 1.4.1. Physiopathological Effects
    - 1.4.1.1. On the Respiratory System
    - 1.4.1.2. On the Cardiovascular System
  - 1.4.2. Components
    - 1.4.2.1. Interfaces
    - 1.4.2.2. Interphase Complications: Skin Lesions, Leaks, etc.
    - 1.4.2.3. Accessories
  - 1.4.3. Monitoring
- 1.5. Indications and Contraindications for NIMV
  - 1.5.1. Acute Phase
    - 1.5.1.1. Urgent Situations prior to Diagnostic Certainty
    - 1.5.1.2. Acute Hypercapnic Respiratory Failure (Acute COPD, OHS Patient Decompensation, Respiratory Center Depression, etc.)
    - 1.5.1.3. De Novo Hypoxemic ARF / ARDS / Immuno-Compromised
    - 1.5.1.4. Neuromuscular Diseases
    - 1.5.1.5. Postoperative Care
    - 1.5.1.6. Weaning and Extubation
    - 1.5.1.7. Patients Ordered Not to Intubate
  - 1.5.2. Chronic Phase
    - 1.5.2.1. COPD
    - 1.5.2.2. Restrictive Diseases (Chest Wall, Diaphragm, Neuromuscular, etc.)
    - 1.5.2.3. Palliative Care
  - 1.5.3. Contraindications
  - 1.5.4. NIMV Failure
- 1.6. Basic Concepts of NIMV
  - 1.6.1. Ventilator Respiratory Parameters
    - 1.6.1.1. Trigger
    - 1.6.1.2. Cycles
    - 1.6.1.3. Slope
    - 1.6.1.4. Inspiratory Positive Airway Pressure (IPAP)
    - 1.6.1.5. Expiratory Positive Airway Pressure (EPAP)
    - 1.6.1.6. Pressure Support
    - 1.6.1.7. Positive End-Expiratory Pressure (PEEP)
    - 1.6.1.8. Inspiration / Expiration (I/E) Ratio
  - 1.6.2. Respiratory Curves Interpretation

- 1.7. Predominant Ventilation Modalities
  - 1.7.1. Pressure Limits
    - 1.7.1.1. Continuous Positive Airway Pressure (CPAP)
    - 1.7.1.2. Bilevel Positive Airway Pressure (BiPAP)
  - 1.7.2. Volume Limits
  - 1.7.3. New Modalities: AVAPS, IVAPS, NAVA, Autotrack
- 1.8. Main Asynchronies
  - 1.8.1. Leakage-Induced
    - 1.8.1.1. Self-Cycling
    - 1.8.1.2. Prolonged Inspiration
  - 1.8.2. Ventilator-Induced
    - 1.8.2.1. Short Cycle
    - 1.8.2.2. Double Trigger
    - 1.8.2.3. Ineffective Effort
  - 1.8.3. Patient-Induced
    - 1.8.3.1. AutoPEEP
    - 1.8.3.2. Reverse Trigger
- 1.9. High-Flow Nasal Cannula Therapy (HFNCT)
  - 1.9.1. Components
  - 1.9.2. Clinical Effects and Action Mechanisms
    - 1.9.2.1. Oxygenation Improvement
    - 1.9.2.2. Dead Space Flushing
    - 1.9.2.3. PEEP Effect
    - 1.9.2.4. Decreased Respiratory Work
    - 1.9.2.5. Hemodynamic Effects
    - 1.9.2.6. Comfort
- 1.10. Clinical Applications and Contraindications for Tenofovir Alafenamide (TAF)
  - 1.10.1. Clinical Applications
    - 1.10.1.1. Acute Hypoxemic Respiratory Failure / ARDS / Immunocompromised
    - 1.10.1.2. Hypercapnic Respiratory Failure in COPD
    - 1.10.1.3. Acute Heart Failure and Acute Pulmonary Edema
    - 1.10.1.4. Surgical Setting: Invasive (Fibrobronchoscopy) and Postoperative Procedures
    - 1.10.1.5. Pre-Oxygenation before Intubation and Post-Extubation Respiratory Failure Prevention
    - 1.10.1.6. Palliative Patients
  - 1.10.2. Contraindications
  - 1.10.3. Complications



*Thanks to TECH's use of the best pedagogical methodology, the course load is much more manageable, allowing you to pass the Postgraduate Certificate without setbacks"*

05

# Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.







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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*



## At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in the physician's professional practice.

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*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

*Professionals will learn through real cases and by resolving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*





At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.





This program offers the best educational material, prepared with professionals in mind:



#### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





#### Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



#### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



#### Classes

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



#### Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.



# 06 Certificate

The Postgraduate Certificate in Advances in Mechanical Ventilation guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.





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*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”*



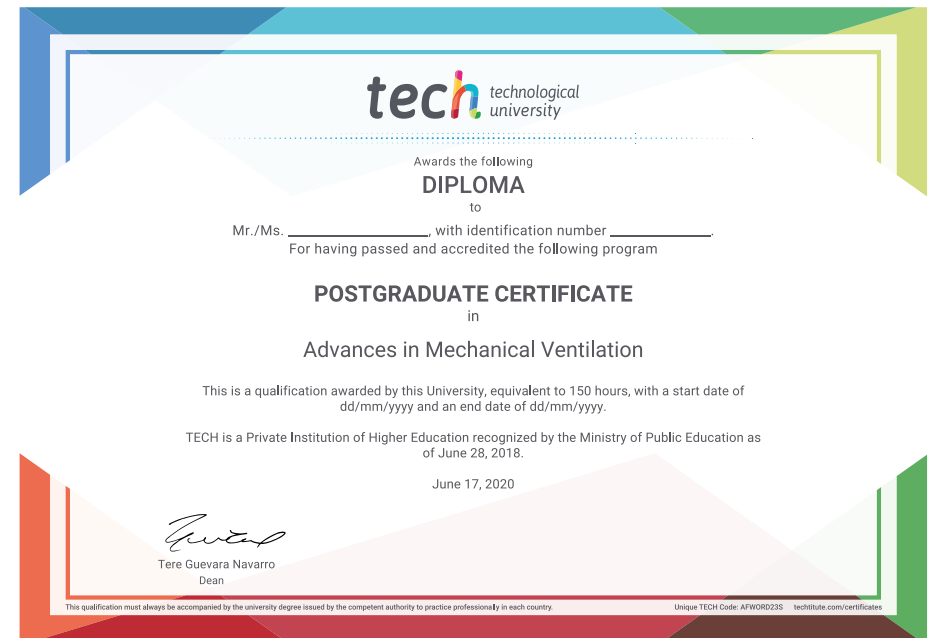
This **Postgraduate Certificate in Advances in Mechanical Ventilation** contains the most complete and up-to-date scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery\*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations and professional from career evaluation committees.

Title: **Postgraduate Certificate in Advances in Mechanical Ventilation**

Official N° of hours: **150 h.**



\*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
development language  
virtual classroom

**tech** technological  
university

**Postgraduate Certificate**  
Advances in Mechanical  
Ventilation

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

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## Advances in Mechanical Ventilation

