THE
University of Vermont
MEDICAL CENTER

Pulmonary and Critical Care Medicine Fellowship Training Brochure

The Pulmonary and Critical Care Medicine division is proud to welcome you into our fellowship training program. The University of Vermont has a long tradition of training outstanding academic and clinical pulmonary physicians and intensivists. Our alumni are spread throughout the country in academia, private practice, and industry.

Today marks the real beginning of your career. You can anticipate that your training will be exciting, mentally stimulating, intriguing and challenging. We hope that you will find it to be as personally and professionally rewarding as we have. Stretch your mind and body with us, and you will be well served for your future. The faculty is committed to your education and to you as an individual.

Anne E. Dixon, M.D
Professor of Medicine
Director, Pulmonary and Critical Care Medicine Unit

Garth W. Garrison, MD
Associate Professor of Medicine
Program Director, Pulmonary and Critical Care Medicine Fellowship Program

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Assistant Professor of Medicine
Pulmonary and Critical Care Medicine Fellowship Program

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Assistant Professor of Medicine
Pulmonary and Critical Care Medicine Fellowship Program

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Introduction

Enclosed in this notebook you will find the outline of your 3-year curriculum and general guidelines for your entire fellowship program. This book should serve as a reference point and as a place to keep your personal documentation.

It is expected that each fellow attend all conferences that are listed on the monthly-published calendar. Twice yearly individual evaluations of fellow performance will be conducted by the program director. You will also be expected to evaluate the faculty and the training program. Over the three-year period of training, fellows will be expected to have increasing responsibility for patient care and involvement in administrative tasks.

Pulmonary/Critical Care Fellows are expected to exhibit the highest level of professionalism at all times.

Research is a core component to the training program. Each fellow must identify a research mentor early in the program and develop a substantive research project. A careful evaluation process will also guide the research aspect of the program.

Please review the entire contents of this notebook and refer to it as needed throughout your training.

Division of Pulmonary and Critical Care Medicine

The Division of Pulmonary and Critical Care Medicine exists within the University of Vermont Medical Center and the University of Vermont College of Medicine. Clinicians currently see outpatient pulmonary consults at the University of Vermont Medical Center (formerly called Fletcher Allen Hospital) in Burlington, Vermont and Central Vermont Medical Center in Berlin, Vermont. These clinical sites serve a large catchment area including much of Vermont and upstate New York.

The Division of Pulmonary and Critical Care Medicine is academically focused combining high level patient care with nationally recognized research. The division is closely aligned with the Vermont Lung Center, which is an interdepartmental research center focused on lung biology and lung disease. Faculty within the division of Pulmonary and Critical Care and the Vermont Lung Center have been funded by numerous grants multiple NIH RO1, and a Airways Clinical Research Center Award. A NIH NHLBI T32 research training grant is available to fund trainees

Relationship with the Department of Medicine

The director of the Pulmonary and Critical Care Medicine Unit, Dr. Anne Dixon, reports to the physician Leader of the Medicine Health Care Service/Chairman of the Department of Medicine, Dr. Polly Parsons. The status of clinical services, research programs, faculty development including promotion and educational activities are reviewed on a regular basis.

The level of performance of the trainees in Pulmonary and critical Care Medicine is reported to the Chair of the Department of Medicine on an annual basis. She is required to sign all forms indicating satisfactory performance, completion of training, and eligibility for subspecialty certification. All offers of appointment for new trainees are issued jointly by the Chair of Medicine as well the Pulmonary and Critical Care Medicine program director. The Chair of Medicine is directly involved in faculty performance evaluations, advancement and assignment of responsibilities.

Relationship with the Internal Medicine Training Program

The Director of the Internal Medicine Residency Program, Mark A. Pasanen, MD is directly involved in planning Pulmonary and Critical Care Medicine training activities, preparing for periodic review and recertification of the training program, and developing a coordinated educational program with residents in Internal Medicine. The Director of the Pulmonary and Critical Care Medicine Unit, Dr. Anne Dixon, and the fellowship training program, Drs. Garrison and Suratt work closely with Dr. Pasanen to coordinate teaching and learning opportunities for trainees, including organizing core curriculum lectures for the Internal Medicine residents provided by the Pulmonary and Critical Care

Medicine faculty and trainees and key didactic lectures on Pulmonary and Critical Care Medicine topics.

The Director of the Pulmonary and Critical Care Medicine training program also establishes guidelines for trainees when they are in supervisory roles, such as supervising residents in technical procedures in the ICU.

Current Pulmonary and Critical Care Medicine Faculty

	Administrative Tasks	Areas of Interest
Gilman Allen, MD	Director, Adult Critical Care Services Director, MICU Chair, Patient and Family Centered Care Committee Chair, Hospital Committee on Interdisciplinary Rounding Councilor, UVM chapter AOA	Respiratory Mechanics Acute Lung Injury Ventilator-Induced Lung Injury ICU Quality-based Research
Jason Bates, PhD	Bioengineering core of Vermont Lung Center	Monitoring of lung function in patients and animals Automatic control of ventilatory support Mechanical determinants of bronchial responsiveness
Ryan Clouser, DO	Associate MICU director Critical Care Quality Committee MICU Core workgroup Resident Eval Committee Medicine Residency Program Evaluation Committee Infectious Disease committee	Critical Care Medicine Neurocritical Care Shock/ Resucitation Airway Management
Suzie Decapua, PA		ILD
Anne Dixon, MD	Director of Division Director of Clinical Research Board member, UVMMG Member, UVMMG patient care and ops committee	Asthma Obesity and Lung Disease Chronic Obstructive Pulmonary Disease General Pulmonary and Critical Care Medicine
Susan Dunning, MD	Director, Vermont Regional Sleep Center	Sleep Apnea Sleep Disorders Chronic Respiratory Failure
Joshua Farkas, MD		Critical Care Clinical ultrasonography Mechanical ventilation
Garth Garrison, MD	Fellowship program director Lung cancer TDT leader Internal Medicine AI director	General Pulmonary and Critical Care Medicine Lung Cancer EBUS

Charles Irvin, PhD	Research Committee Vermont Lung Center	Asthma Pulmonary Physiology Animal Models of Lung Disease
David Kaminsky, MD	Clinical Competency Committee Program Evaluation Committee PFT Lab Clinical Director Research Committee Quality Committee Associate Chair, IRB	Pulmonary Physiology General Pulmonary and Critical Care Medicine Asthma Small Airways Physiology
Matt Kinsey, MD	Director, Adult Bronchoscopy	Pulmonary Disease Interventional Pulmonary procedures Lung cancer
Laurie Leclair, MD	Adult CF Program Director, UVMMC CF Center Director- Cardiovascular, Respiratory and Renal Course – Medical Student-Year 2 Member-College of Medicine Faculty Development Committee	Adult Cystic Fibrosis (CF) Medical Student Education Resident/Fellow Education Faculty Development Curriculum Development utilizing cutting edge educational techniques
Prema Menon, MD	Program Evaluation Committee Faculty Engagement Committee	General Pulmonary and Critical Care Medicine End of Life Care Communication in the ICU
Polly Parsons, MD	Chair of Internal Medicine	General Pulmonary and Critical Care Medicine Acute Lung Injury
Matthew Poynter, PhD	Associate Director, Vermont Lung Center Co-Director, Multidisciplinary Training in Lung Biology T32	Pulmonary Innate and Adaptive Immunity Molecular Biology Methodology Immunoassay Methodology Animal Models of (Lung) Disease Impact of Nutritional Interventions on Immune Function
Abe Sender, PA	Director, Pulmonary Clinic	CF
Renee Stapleton, MD	Fellowship Research Committee Clinical Competency Committee Resident Research Committee Chair	Nutrition in Critical Care Acute Lung Injury End of Life Care General Pulmonary and Critical Care

Benjamin Suratt, MD	Associate Chief of PCCM Associate Program Director, PCCM Vice Chair of Medicine for Academic Affairs Clinical Competency Committee, PCCM Education Committee, PCCM Faculty Development Committee, DOM Faculty Development Committee, COM Research Committee, DOM Research Committee, COM RPT Committee, DOM RPT Committee, COM Research and Education Committee, UVMMG	Clinical interests: General Pulmonary and Critical Care Medicine Cancer Survivorship ARDS Research Interests: Pulmonary inflammatory response to infection and injury Obesity and the metabolic syndrome Cancer Survivorship
Charlotte Teneback, MD	Clinical Operations Committee Medical director, pulmonary rehabilitation Associate director, adult CF program	Adult Cystic Fibrosis (CF) Pulmonary rehabilitation General Pulmonary and Critical Care
Sarah Wagner, NP		Interventional pulmonary
Daniel Weiss, MD, PhD		General Pulmonary and Critical Care Medicine Acute Lung Injury Gene and Cell Therapies for acute and chronic lung disease Methods of gene and cell delivery to lung Ex vivo lung bioengineering

Pulmonary and Critical Care Fellowship Program

Fellow Selection

The Pulmonary and Critical Care Medicine Division participates in the National Resident Matching Program (NRMP). Applications are submitted through Electronic Residency Application Service (ERAS). All applications are reviewed by the Fellowship Committee. Selected applicants are invited for on-site interviews. Both faculty and current fellows participate in the interview process. All interviewed candidates are reviewed at a meeting by the Pulmonary and Critical Care Medicine faculty. At that meeting the applicants are chosen and ranked for the NRMP. There are 2 positions per year offered.

Program Goals and Objectives

The Pulmonary and Critical Care Medicine (PCCM) Fellowship Training Program is designed to provide advanced training to fellows to allow them to obtain competency in the specialty of PCCM with sufficient expertise to act as specialist consultants. This training is provided by both didactic instruction and direct patient care under the direct supervision of expert faculty in the division of PCCM. Didactic instruction is provided in all areas of PCCM as outlined in the specific topic areas required by the ACGME. Direct patient care is provided in a facility that allows state of the art care of both inpatients and outpatients and in a community with a broad range of medical conditions. Through these activities, the fellowship training program provides the environment and resources to allow trainees to obtain competence in the six areas of Patient Care, Medical Knowledge, Professionalism, Interpersonal Communication, Practice-Based Learning and Systems-Based Practice, as specified by the ACGME. In addition, the faculty also provides an environment of inquiry and scholarship that involves research, writing and teaching. Critical to the success of the program is a formal structure for frequent feedback and evaluation of performance. At the completion of training, trainees will be prepared to take their board certification exams in both Pulmonary Medicine and Critical Care Medicine, and to practice PCCM in either academic or community settings.

GOAL ONE

Fellows will demonstrate knowledge of physiology, pathophysiology, diagnosis, and therapy of problems pertinent to Pulmonary and Critical Care Medicine.

Objective 1: (Pulmonary Medicine knowledge areas)

Fellows will learn pathophysiology and how to diagnose and manage patients with obstructive lung diseases, including:

- Asthma
- Emphysema

- Chronic bronchitis
- Bronchiectasis
- Cystic fibrosis

Fellows will learn pathophysiology and how to diagnose and manage patients with interstitial and inflammatory lung diseases, including:
- Sarcoidosis
- Idiopathic pulmonary fibrosis
- Pneumoconiosis, including:
    - Asbestosis
    - Silicosis
- Pulmonary hemorrhagic disorders, including:
    - Granulomatosis with polyangiitis (Wegener's disease) and other vasculidities
    - Anti-GBM disease (Goodpasture's Syndrome)
- Collagen-vascular diseases
- Cryptogenic Organizing Pneumonia (COP)
- Eosinophilic granuloma
- Allergic bronchopulmonary mycosis (ABPM)
- Hypersensitivity pneumonitis
- Drug-induced lung disease
- Pulmonary alveolar proteinosis

Fellows will learn pathophysiology and how to diagnose and manage patients with occupational and environmental lung diseases.

Fellows will learn pathophysiology and how to diagnose and manage patients with pulmonary vascular diseases, including:
- Deep venous thrombosis (DVT)
- Acute pulmonary embolism
- Recurrent pulmonary embolism
- Chronic thromboembolic disease
- Primary pulmonary hypertension
- Secondary pulmonary hypertension

Fellows will learn pathophysiology and how to learn and diagnose and manage patients with lung infections, including:
- Community-acquired pneumonia
- Nosocomial pneumonia
- Lung abscess
- Aspiration pneumonitis
- Tuberculosis, including tuberculous infection and active tuberculosis
- Nontuberculous mycobacterial infections
- Fungal infections of the lung

Fellows will learn pathophysiology and how to diagnose and manage patients with pulmonary manifestations of Acquired Immune Deficiency Syndrome (AIDS) and other immunodeficiency diseases.

Fellows will learn physiology, pathophysiology, and how to manage patients who have undergone lung transplantation.

Fellows will learn pathophysiology and how to diagnose and manage patients with pulmonary neoplasms, including:
- Benign neoplasms of lung
- Small cell cancer of lung
- Non-small cell cancer of lung
- Paraneoplastic syndromes of lung cancer
- Malignancies metastatic to lung

Fellows will learn pathophysiology and how to diagnose and manage patients with disorders of the pleura, including:
- Pleuritis
- Pleural effusion
- Empyema
- Fibrothorax
- Mesothelioma, benign and malignant

Fellows will learn pathophysiology and how to diagnose and manage patients with disorders of the mediastinum, including:
- Mediastinitis
- Mediastinal tumor

Fellows will learn pathophysiology and how to diagnose and manage patients with chest trauma, including:
- Rib fracture
- Flail chest
- Pneumothorax, simple and tension
- Pulmonary contusion
- Foreign body aspiration

Fellows will learn pathophysiology and how to diagnose and manage patients with acute lung injury due to inhalation and radiation, including:
- Chemical pneumonitis
- Radiation pneumonitis

Fellows will learn pathophysiology and how to diagnose and manage patients with developmental abnormalities and congenital disorders, including:
- Azygous fissure
- Pulmonary sequestration

Fellows will learn pathophysiology and how to diagnose and manage patients with genetic disorders, including:
- Cystic fibrosis

- Alpha-1-proteinase inhibitor deficiency

Fellows will learn pathophysiology and how to diagnose and manage patients with respiratory failure, including:
- Acute respiratory distress syndrome (ARDS)
- Acute and chronic respiratory failure in obstructive or restrictive lung disease
- Neuromuscular respiratory drive disorders

Fellows will learn pathophysiology and how to diagnose and manage patients with hypersomnia and sleep disorders, including:
- Sleep disordered breathing
- Obstructive sleep apnea syndrome
- Nocturnal hypoxemia secondary to COPD
- Nocturnal hypoxemia secondary to CHF
- Periodic leg movement syndrome (PLMS)
- Narcolepsy
- Insomnia

Objective 2: (Critical Care Medicine knowledge areas)
Fellows will learn pathophysiology and how to diagnose and manage patients with disorders which can cause patients to become critically ill, including:
- Cardiovascular disorders
- Respiratory disorders
- Renal disorders
- Gastrointestinal disorders
- Genitourinary disorders
- Neurologic disorders
- Endocrine disorders
- Hematologic disorders
- Musculoskeletal disorders
- Disorders of the immune system
- Infectious diseases
- Obstetric and gynecological disorders
- Anaphylaxis and acute allergic reactions
- Trauma

Fellows will learn pathophysiology and how to diagnose and manage patients with disorders secondary to critical illness, including:
- Electrolyte and acid-base disorders secondary to critical illness
- Metabolic, nutritional, and endocrine effects of critical illnesses
- Hematologic and coagulation disorders secondary to critical illness
- Pharmacokinetics, pharmacodynamics, drug metabolism, and drug excretion in critical illness

Fellows will learn pharmacology and clinical use of paralytic agents.

GOAL TWO:

Fellows will demonstrate practice skills necessary to diagnose and manage problems pertinent to Pulmonary and Critical Care Medicine.

Objective 1: (Pulmonary Medicine practice skills)

Fellows will learn how to obtain a thorough and orderly history relevant to pulmonary problems, including:

- Dyspnea, on exertion and at rest
- Cough and expectoration
- Wheezing and stridor
- History of known pulmonary diseases
- Occupational history and history of exposures
- History of past TB skin tests
- History of past chest roentgenograms
- History of previous surgical procedures

Fellows will learn how to perform a thorough and systematic physical examination relevant to pulmonary problems, and will learn to recognize and understand the significance of pulmonary and extrapulmonary signs of pulmonary diseases, including:

- Abnormal patterns of breathing, including:
- Kussmaul breathing
- Cheyne-Stokes breathing
- Thoracic-diaphragmatic dyscoordination
- Abnormal chest and diaphragm movement
- Use of accessory respiratory muscles
- Chest wall abnormalities, including:
- Kyphosis
- Scoliosis
- Pectus excavatum
- Pectus carniatum
- Straight back
- Barrel chest
- Ankylosis
- Adventitious lung sounds

Fellows will learn how to interpret laboratory data relevant to pulmonary problems, including:

- Sputum cultures and microscopic examination for bacteria, mycobacteria, fungi, and Legionella
- Sputum cytology
- Oxygen saturation (by pulse oximeter)
- Arterial blood gas (ABG)
- TB skin test
- Skin test for delayed hypersensitivity

- Sweat chloride test
- Pleural fluid analysis, including cytology, chemistry, Gram's stain, and culture for bacteria, fungi, and mycobacteria
- Transthoracic needle aspirate and biopsy
- Lung biopsy

Fellows will learn how to interpret physiologic data relevant to pulmonary problems, including:
- Pulmonary function tests
- Simple spirometry
- Spirometry before and after bronchodilator
- Inhalation challenge studies
- Lung volumes
- Diffusing capacity
- Exercise tests
- Sleep studies

Fellows will learn how to interpret radiologic imaging studies relevant to pulmonary problems including:
- Chest roentgenogram
- Fluoroscopy of the chest
- Bronchogram
- Computerized axial tomography (CT) of chest
- Radionuclide lung (V/Q) scan
- Non-invasive leg studies
- Compression ultrasonography
- Impedance plethysmography (IPG)
- Pulmonary arteriogram

Objective 2: (Critical Care Medicine practice skills)
- Fellows will learn how to obtain a thorough and orderly history on critically ill patients in an efficient and expedient manner.
- Fellows will learn how to perform and thorough and systematic physical examination on critically ill patients in an efficient and expedient manner.
- Fellows will learn how to interpret laboratory data relevant to critically ill patients.
- Fellows will learn how to interpret radiologic data relevant to critically ill patients.

GOAL THREE:

Fellows will demonstrate technical skill necessary to use specialized equipment and perform specialized procedures used to diagnose and manage problems pertinent to Pulmonary and Critical Care Medicine.

Objective 1: (Technical skills with specialized equipment)

Fellows will learn the indications, contraindications, complications, and proper use of specialized equipment for managing patients with pulmonary and critical care problems, including:

- Management of airway
    - Conscious Sedation
- Establishment of airway
- Maintenance of open airway in nonintubated, unconscious, paralyzed patients
- Oral and nasotracheal intubation
- Management of breathing and ventilation
- Ventilation by bag or mask
- Mechanical ventilation using pressure-cycled, volume-cycled, and negative pressure mechanical ventilators
- Use of reservoir masks and CPAP masks for delivery of supplemental oxygen, humidifiers, nebulizers, and incentive spirometry
- Weaning from mechanical ventilation
- Respiratory care techniques
- Management of pneumothorax
- Maintenance of circulation
- Oxygen saturation by pulse oximeter
- Arterial blood gas analysis
- Basic and advanced cardiopulmonary resuscitation
- Cardioversion
- Pulmonary function tests
    - Simple spirometry
    - Spirometry before and after bronchodilators
- Inhalation challenge studies
- Lung volumes
- Diffusing capacity
- Exercise tests
- Calibration and operation of hemodynamic monitoring and recording systems, including utilization, zeroing, and calibration of transducers, and use of amplifiers and recorders.
- Parenteral nutrition

Fellows will learn to analyze specialized data pertaining to Pulmonary and Critical Care problems, including:
- Cardiac output determinations by thermodilution and/or other techniques
- Evaluation of oliguria
- Management of massive transfusions
- Management of hemostatic defects
- Interpretation of antibiotic levels and sensitivities
- Monitoring and assessment of metabolism and nutrition
- Calculation of oxygen content, intrapulmonary shunt, and alveolar-arterial gradients
- Pharmacokinetics

Objective 2: (Technical skills performing specialized procedures)
Fellows will learn the indications, contraindications, complications, and proper technique for performing procedures relevant to pulmonary and critical care problems, including:
- Sputum induction

- Sputum Gram's stain
- TB skin tests
- Skin tests for delayed hypersensitivity
- Arterial puncture for arterial blood gas (ABG)
- Insertion of arterial catheter
- Insertion of central venous catheter
- Insertion of pulmonary artery balloon floatation catheter
- Thoracentesis
- Pleural biopsy
- Endotracheal intubation (oral and nasal)
- Flexible fiberoptic bronchoscopy, including:
- Bronchial washing
- Bronchial brushing
- Collection of samples with protected bronchial brush
- Bronchoalveolar lavage
- Endobronchial biopsy
- Transbronchial biopsy
- Transbronchial needle aspiration
- Insertion of thoracostomy (chest) tube
- Pleural sclerosis
- Use of ultrasound in central line placement and thoracentesis

Fellows will learn the indications, contraindications, and complications of, and may gain practical experience in performing, other procedures relevant to Pulmonary and Critical Care problems, including:
- Pericardiocentesis
- Transvenous pacemaker insertion
- Peritoneal dialysis
- Peritoneal lavage
- Aspiration of major joints
- Percutaneous needle aspiration and/or cutting lung biopsy
- Use of ultrasound in bedside echo
- Endobronchial laser therapy
- Intracranial pressure monitoring

GOAL FOUR:
Fellows will demonstrate ability to apply knowledge, practice skills, and technical skills to diagnose and manage patients with problems pertinent to Pulmonary and Critical Care Medicine.

Objectives (Clinical application of knowledge and skill)
Fellows will learn how to diagnose and manage patients with symptoms and signs of pulmonary disease, including:
- Dyspnea
- Cough

- Hemoptysis
- Solitary pulmonary nodule
- Lung mass
- Localized pulmonary infiltrate
- Diffuse pulmonary infiltrates
- Atelectasis
- Pleural effusion
- Pneumothorax

GOAL FIVE:
Fellows will demonstrate ability to provide cognitive and technical advice and expertise as a consulting Pulmonary and Critical Care Physician.

Objectives (Providing consultation, use of consultation)
Fellows will learn the basic constructs of the referral-consultant relationship for managing or co-managing the care of patients with pulmonary problems or patients who are critically ill.

Fellows will learn when to refer patients for procedures to be performed by a thoracic surgeon or other specialist, including:
- Thoracoscopy
- Open lung biopsy
- Mediastinoscopy
- Lung resection
- Lung transplant
- Pleural decortication
- Rib resection and open pleural drainage
- Tracheostomy
- Radiation therapy of lung

GOAL SIX:
Fellows will demonstrate knowledge of how the care of problems pertinent to Pulmonary and Critical Care Medicine fit into patients' overall health plan.

Objectives (Attitudes, values, and habits about long-term care)
Fellows will learn the importance of preventive medicine techniques in the long-term management of patients with pulmonary problems, including:
- Smoking cessation
- Influenza vaccine
- Pneumococcal vaccine

Fellows will learn the long-term impact of treating patients who are severely and critically ill.

GOAL SEVEN:
Fellows will demonstrate attitudes, values, and habits of a dedicated academic subspecialist in Pulmonary and Critical Care Medicine.

Objectives: (Life-long attitudes, values, habits and contributions)

- Teaching: Fellows will learn to take an active role in teaching common problems pertinent to Pulmonary and Critical Care Medicine to medical students, residents, and practicing physicians in CME programs.
- Management of resources and services: Fellows will learn to monitor and supervise special services relevant to
- Pulmonary and Critical Care Medicine, including:
- Pulmonary function laboratories
- Respiratory care services
- Respiratory physical therapy and rehabilitation services
- Intensive Care Units

Societal considerations: Fellows will learn the impact of pulmonary and critical care illnesses on society, including:

- The ethical, economic, and legal aspects of pulmonary and critical illnesses, including:
    - Smoking
    - Asthma
    - Chronic obstructive pulmonary disease (COPD)
    - Occupational lung diseases
    - Sleep disorders
    - Occupational Safety and Health Administration (OSHA) regulations and universal precautions, and protection of health care workers.
    - Personal impact of pulmonary and critical illnesses on patients and patients' families.

Coping skills: Fellows will learn constructive coping skills for physicians and other health care professionals who care for chronically ill pulmonary patients and for critically ill patients.

Educational Processes

Training sites and locations

All training is scheduled to occur at the University of Vermont Medical Center in Burlington, Vermont. The hospital is a 562 bed facility serving a large predominantly rural catchment area including portions of upstate New York and much of Vermont. The hospital is a Level 1 trauma center with 21 bed medical intensive care and surgical intensive care units. Fellows may elect to participate in additional experiences outside the institution with Program Director and UVMMC GME approval.

Within the hospital, training experiences include:

- Pulmonary ambulatory center - *ACC building 5th floor, East Pavilion*
  - General pulmonary clinic
  - Pulmonary subspecialty clinics
    - Cancer clinics
      - Lung nodule clinic
      - Interventional Pulmonary Clinic
      - Cancer survivorship clinic
    - Interstitial lung disease clinic
    - Pulmonary hypertension clinic
    - Cystic fibrosis clinic
    - Pulmonary rehabilitation clinic
- Pulmonary medicine consultation service - *UVM Medical Center*
- Medical Intensive Care Unit - *McClure Building, 4th floor*
- Surgical Intensive Care Unit - *McClure Building, 3rd floor*
- Bronchoscopy suite/medical procedures unit - *ACC building, 3rd floor, West Pavilion*
- Pulmonary physiology lab - *ACC building 5th floor, East Pavilion*
- Vermont Regional Sleep Center - *University Health Center*

Typical block schedule for clinical and research rotations

	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
3rd Yr Fellows												
G3-1		MICU	SICU			PULM SUB		CONSULT 1ST TO 14TH		MICU		
G3-2	MICU	PULM SUB		SICU				CONSULT 15TH-28TH	MICU			
2nd Yr Fellows												
G2-1				MICU			MICU		SICU	CONSULT		
G2-2					MICU	SICU		MICU	CONSULT			
1st Yr Fellows												
G1-1	MICU	CONSULT	MICU	CONSULT	PULM PHYS	CONSULT	CONSULT 16TH-31ST	PULM SUB	SLEEP	SICU	CONSULT	MICU
G1-2	CONSULT	MICU	CONSULT	PULM PHYS	CONSULT	MICU	CONSULT 1ST-17TH	SICU	PULM SUB	SLEEP	MICU	CONSULT

Research months (15)

ICU training months (10; 7 MICU, 3 SICU)

Pulmonary training months (9)

Typical schedule for weekly conferences

	Monday	Tuesday	Wednesday	Thursday	Friday
07:45 AM to 8:45 AM					
08:15 AM to 9:15 AM		VLC Basic Research Conference (When not in MICU)			Medicine Grand Rounds (8:00 am – 9:00 AM)
11:30 AM to 12:00 PM					
12:00 PM to 1:00 PM				PCCM Grand Rounds *ILD Conference every other month	PCCM Fellows Core Lecture Series
1:00 PM to 2 PM	Multidisciplinary Lung Cancer Conf		MICU / SICU combined rounds (when in MICU)		

Attendance at **all** Thursday and Friday conferences is **Mandatory**. Faculty will be asked to hold clinical fellows pagers for Thursday and Friday Conferences.

Regional and National Meetings

Northern New England Fellows Conference each Spring. The Fellows' Conference is attended by fellows and faculty from Maine Medical Center, Dartmouth Medical Center, UVM, Albany Medical Center and Bay State Medical Center. Fellows from each of the institutions present cases with formal didactic discussions and selected fellows present their research.

National Meetings: Fellows are encouraged to submit abstracts for presentation at national meetings. Typically, fellows in their 2nd and 3rd years will attend the American Thoracic Society Individual research mentors are responsible for supervising this activity (e.g., ACCP each Fall and ATS each Spring).

Training Requirements

The training program is accredited by the American Council on Graduate Medical Education (ACGME). The training requirements are compliance with ACGME guidelines for Pulmonary and Critical Care (Internal Medicine).

1. Clinical Training Requirements

- Total training time of at least 33 months (3 years minus vacation/personal days)
- A minimum of 9 months of inpatient and outpatient Pulmonary Medicine
- A minimum of 9 months of critical care medicine
    - A minimum 6 months MICU
    - A minimum 3 months non-MICU critical care (SICU)
- 3 years of weekly continuity care clinic – ½ day per week

2. Scholarly Requirements

- Active participation resulting in publication or abstracts presented at national meetings.
- Participation in a quality improvement project

ACGME program requirements in Pulmonary and Critical Care can be found at:
https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/156_pulmonary_critical_care_2017-07-01.pdf

ACGME common program requirements (approved 6/2018, implementation date 7/1/2019):
http://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRFellowship2019.pdf

Duty Hours

Duty hours are defined as all clinical and academic activities related to the residency program, i.e., patient care (both inpatient and outpatient), administrative duties related to patient care, the provision for transfer of patient care, time spent in-house during call activities, and scheduled academic activities such as conferences. Duty hours do not include reading and preparation time spent away from the duty site.

- **Duty hours must be limited to 80 hours per week**, averaged over a four-week period, inclusive of all in-house call activities.
- **In-house call must occur no more frequently than every third night** (this cannot be averaged over a 4 week period). Continuous on-site duty, including in-house call, must not exceed 24 consecutive hours. Trainees may remain on duty for up to 4 additional hours to participate in didactic activities, transfer care of patients, conduct outpatient clinics, and maintain continuity of medical and surgical care as defined in Specialty and Subspecialty Program Requirements. No new patients, as defined in Specialty and Subspecialty Program Requirements, may be accepted after 24 hours of continuous duty.
- Residents must be provided with **1 day in 7 free from all educational and clinical responsibilities**, averaged over a 4-week period, inclusive of call. One day is defined as one continuous 24-hour period free from all clinical, educational, and administrative activities.
- Adequate time for rest and personal activities must be provided. This should consist of a 10 hour time period provided between all daily duty periods and 14 hours after in-house call.

On-call policies and expectations

All fellows take in-house call, typically taking over at 5 pm and finishing duties by 7 am the next morning. During the week, all fellows are required to leave by 11 am (24+4 hr ACGME rule). On Saturday, call is from 7 am to 7 am on Sunday.

The overnight MICU team consists of an on-call fellow, a night float attending, and a night float internal medicine resident. On-call fellows oversee both the MICU and the inpatient pulmonary consult service, including inpatients with CF. The fellow will be responsible for answering telephone messages from patients cared for in the Pulmonary clinic. Transfers from other facilities and phone consults from outside providers are handled by the in-house attending. Fellows will be expected to see and evaluate all patients admitted to either service overnight and present the patient to the attending physician. Fellows, in conjunction with the night float resident, are expected to have developed a differential diagnosis, diagnostic plan, and treatment plan prior to case presentation. In the second and third year of training, fellows will be given more autonomy in decision making but still are expected to inform the attending physician on call of any admissions or significant changes in a patient's status. The attending supervises all procedures performed by the fellow or resident overnight.

Overnight call schedule

Call frequency

Year	Call frequency/month	Weekend calls/month
1st Year	5-6	2
2nd Year	5	2
3rd Year	4	Variable

Hospital Holidays (treated as weekends)

1st Year	Xmas, New Years
2nd Year	Thanksgiving, July 4th
3rd Year	Labor, Memorial

Miscellaneous considerations:

1) Overnight call should not be scheduled the night before continuity clinic
2) If consult fellow is post call, patients will have already been seen with notes completed by fellow prior to 11 am and attending can round by self/with remaining team (residents/med students)

3) To minimize time away from research, 1st year fellows on rotation in the PFT lab and/or on surgical ICU may also be called as back-up for a post-call fellow.
4) In-Service Exams – Every May there is an in-service exam for all fellows. The on-call fellow is excused at 10 PM the preceding night.
5) Northern New England Fellows Conference - On-call fellow to be excused by midnight the night prior to allow travel

Sunday night call

In April 2018, the PCCM on-call policy was amended.

On Sunday, call is from 7 am until daily work is completed (approximately 5 PM) after which the fellows will take call from home. The faculty will cover the fellow pager (not personal pager) during this time and the faculty will determine need for fellow to return to the hospital. Examples of situations where fellow should return to the hospital include: multiple complex admissions, bronchoscopy to be performed, admission of patient with significant educational value. If the fellow remains in-house and clinically engaged after midnight, the fellow will leave by 11 am on Monday morning, otherwise the fellow may remain until end of day on Monday.

Fatigue management

The program director and the faculty continuously monitor the demands of call in their programs and make scheduling adjustments as necessary to mitigate excessive service demands and/or fatigue.

The Pulmonary and Critical Care Medicine Unit follows the “Fatigue Management Policy and Duty Hour Policy” provided by the Office of Graduate Medical Education. The Fellow call schedules are specifically designed to adhere to duty hours requirements. However, in the event that a fellow become overly fatigued or needs relief from their current duties on the basis of duty-hours, the Fellow will receive backup coverage from either the Resource Attending or another Fellow.

Supervision

Inpatient services

On both of the inpatient services (MICU and Pulmonary Consult), an attending physician rounds with the trainees seven days a week. An attending physician is in-house and available 24 hours a day, 7 days a week to supervise the trainees including weekends and overnight call. The trainees notify the attending of all admissions and consults. Each patient seen by a trainee is seen by the PCCM attending. This oversight includes the presentation of the patient by the trainee including past medical records, history, physical and laboratory data, and review of all pertinent radiographs. The data are then corroborated at the bedside with the trainee including key historical and physical exam items. The differential diagnosis and approach to diagnostic testing and treatment are reviewed. All active patients are reviewed in detail regarding clinical course, new problems, results of diagnostic testing, and response to therapy on daily follow-up rounds.

Ambulatory clinics

Each Fellows clinic is staffed by an attending physician from the faculty. To allow the trainees to be supervised by a number of attendings to maximize their learning experience while balancing the patients need for continuity of care, attendings rotate each week. The continuity clinic runs the length of the training program and fellow trainees attend this clinic regardless of their other service activities. Faculty do not attend clinic when they are assigned to the MICU. This allows fellow attention to be focused on their clinic patients while providing adequate ICU oversight.

Weekday	Clinic	Clinic Attendings
Tuesday	1st Year Fellows	Charlotte Teneback, MD Renee Stapleton, MD Garth Garrison, MD
Wednesday	2nd Year Fellows	Gilman Allen, MD Anne Dixon, MA BM BCh Benjamin Suratt, MD
Thursday	3rd Year Fellows	David Kaminsky, MD Prema Menon, MD MaryEllen Antkowiak, MD

Clinical and Research Mentors

Each fellow is assigned a faculty member from the Pulmonary and Critical Care Medicine Unit to be their mentor at the beginning of the first year of fellowship. These mentors are responsible, in conjunction with all the faculty, for the well-being of their assigned fellow. In addition, a faculty member involved in research will also be assigned during the first year in order facilitate the fellow choosing a faculty mentor for research and a research project during their 2nd and 3rd years. The fellow will choose a research mentor at the beginning of the second year of fellowship. These mentors are responsible for guiding the research careers of their fellows

Graded Responsibility

An important part of the training program is the development of skills that will be important in the practice of medicine after fellowship. These include developing professional relations with colleagues and staff, refining teaching and presentation skills, fostering independent decision making, and understanding administrative aspects of Pulmonary and Critical Care Medicine. To develop those skills, graded levels of responsibility have been designed into the curriculum.

Teaching responsibilities

Fellows will develop skills in teaching. In the first year of training, this will include active participation in teaching rounds and didactic lectures. In the second year, fellows will be expected to give one major teaching conference to attendings and housestaff. In the third year, fellows will be expected to assist in the teaching curriculum for first and second year fellows including organizing lectures and conferences

Patient care

In general, fellows will increase their ability to perform patient care activities with decreasing direct involvement by faculty over time. Specific areas with increasing responsibility occur with procedural training and MICU service.

Procedures – Trainees will assume graded levels of responsibility in performing invasive procedures based on faculty evaluations. Fellows will observe the proper technique for a specific procedure. Fellows will then perform the procedure under direct supervision. Based on faculty approval, fellows will be permitted to instruct and supervise other trainees under the direct supervision of a faculty member.

Medical Intensive Care Unit (MICU) Service – Fellows develop increased autonomy during the 2nd and 3rd years and will play a leading role in running rounds.

Practice management

Additional opportunities to gain knowledge in managerial aspects of Pulmonary and Critical Care Medicine can be provided and may include participation on hospital QA committees, the nutrition services committee, and the hospital pharmacy committee. Fellows may also participate in the management of aspects of the pulmonary division including bronchoscopy services, outpatient services, and sleep clinic.

Vacation and Leave

Residents/Fellows are entitled to at 3 weeks (a week equals 5 work days plus 2 weekend days) of paid time off for vacation per GME academic year. An additional 5 work days may be taken per year as 'personal days' as needed for medical visits, postgraduate interviews, sick days. 5 days per year can be taken to attend academic conferences. Paid time-off does not need to be used if presenting at an academic conference. Paid time off is dispersed annually and does not roll over to subsequent years.

- **Requests for vacation must be submitted to the program coordinator a minimum of 8 weeks in advance**. Approval by the Program Director as well as the attending physician of the service rotation being missed or research mentor is needed. The requests are to be submitted through the New Innovations system. It is the fellow's responsibility to notify the clinic scheduling staff of the anticipated dates of vacation a minimum of 8 weeks prior to the missed clinic date(s) to allow flexibility in rescheduling patients.
- Vacation may be taken during the following rotations only:
  - Pulmonary physiology
  - Sleep
  - Pulmonary subspecialty
  - Research
- Vacation should not exceed 1 week blocks during 1st year unless approved by the Program Director
- Vacation should not exceed 2 week blocks during 2nd and 3rd year unless approved by the Program Director
- Vacation should not be taken during the last 2 weeks of June, unless approved by the Program Director

Maternity and extended leave

UVMMC adheres to the federal Family and Medical Leave Act (FMLA) and Vermont's Parental and Family Leave Law (VPFL). Fellows are eligible to take 12 weeks per year in the event of the following:

- The birth and subsequent care of a newborn
- Placement of a child for adoption or foster care
- Care for a spouse, child, parent, or parent-in-law with a serious health condition
- The fellow's own serious health condition

This guaranteed leave is unpaid. However, there are mechanisms to continue salary support in some circumstances. Fellow may elect to take a portion or all of their yearly 3 weeks of vacation + personal days during this time. Additionally, 8 the fellow may be eligible for salary support for the additional 8 weeks under the UVMMC short-term disability benefit. Vacation time is granted annually; this does not accumulate year-to-year.

Taking extended leave may impact graduation date from the program. 33 months of

training (clinical + research) are required by ACGME. Depending on the fellow's evaluation and performance, up to 4 weeks of this may be waived by the Program Director.

Fellows are not responsible for any on-call activities during time that they are on leave. However, on-call responsibilities will continue during any training extension. Fellows may choose, with the consent of their co-fellows, to take the anticipated calls during a training extension throughout the year prior to the start of the new academic year in July.

In a typical situation, a fellow who take 12 weeks off for maternity leave or other qualifying event and who uses 4 weeks of vacation/personal days during that time will be required to extend training by 8 weeks (although 4 weeks of training may be waived). During these 8 weeks of training extension, there would be approximately 7-8 call shifts anticipated which could be taken throughout the academic year prior to July with the agreement of the fellow's co-fellows although this is not required.

UVMMC GME Policies

For details on official GME policies including dispute resolution, discipline/dismissal, moonlighting see the appendix. Updated information can be found at: https://www.uvmhealth.org/gme/pages/applying/gme-policy-and-procedure-manual.aspx

Moonlighting policy

The PCCM Unit follows the Moonlighting Policy Outlined by the UVMMC GME Policy and Procedure Manual. In general, moonlighting is discouraged. A proposal for moonlighting must be approved by the Program Director and the Research Mentor. It is the individual fellow's responsibility to ensure proper licensing, work authorization and malpractice coverage for such activities. All moonlighting hours must be included in the ACGME duty hour limits. Moonlighting may only be performed during the 2nd and 3rd years of fellowship during non-clinical rotations. Moonlighting may not interfere with any clinical, didactic or research responsibilities. All moonlighting hours must be reported in writing to the Program Administrator (Christine Farnham). The fellow's performance will be monitored during moonlighting periods and permission to moonlight may be withdrawn if such activity is interfering with the fellow's responsibilities and performance in the fellowship training program.

Evaluation

Fellows are evaluated according to the ACGME core competencies and their associated milestones. Evaluations are performed by each attending at the end of a rotation. Evaluations of clinic performance are conducted quarterly. Evaluations that incorporate additional staff input (360-evaluations) are conducted annually.

These evaluations are submitted and collated electronically. The evaluations are reviewed semi-annually by the Clinical Competency Committee. This committee synthesizes the information and generates a summary score on each of the ACGME milestones. The results are available to the fellow and are reviewed at each semi-annual meeting with the program director.

In addition, all fellows have the opportunity to evaluate each attending on a monthly basis.

Annual evaluations of the program are conducted with both the faculty and trainees. The results of these annual program evaluations are discussed at a division meeting that is conducted generally in late May or early June.

GENERAL COMPETENCIES	**List Evaluation Tools Used or In Development by the Program**						
Patient Care	PT Satisfaction Surveys-Clinic	Procedure Logs	Bronchoscopy Evaluation Forms	OCE (Observe Clinical Exam)	360^0 Evaluations - Clinic	Chart Review	Monthly Evaluation of Clinical Competence
Medical Knowledge	APCCMPD in-training Exam	PCCM On-line	PA Catheter Review (ACCP)	Fellows Didactic Questions	Chart Review		Monthly Evaluation of Clinical Competence
Interpersonal & Communication Skills	Patient Satisfaction Surveys-Clinic	360^0 Evaluations - Clinic	OCE (Observe Clinical Exam)				Monthly Evaluation of Clinical Competence
Professionalism	360^0 Evaluations - Clinic	Standard Monthly Evaluation Forms	OCE (Observe Clinical Exam)	HIPPA Guidelines			Monthly Evaluation of Clinical Competence
Practice-Base Learning	Portfolios (dictations from clinic OCE, Conference Presentations)	Record Reviews: Asthma Guidelines (PFT Rotation) low tidal volume ventilation second year project	Chart Review	Clinical Conferences	Journal Club		Monthly Evaluation of Clinical Competence
Systems-Based Practice	360^0 Evaluations - Clinic	Portfolios (dictations from clinic OCE, Conference Presentations)	Consultation Service	Chart Audits (E & M)			Monthly Evaluation of Clinical Competence \

ACGME Milestones for Subspecialty Training

Patient care
PC1: Gathers and synthesizes essential and accurate information to define each patient's clinical problem
PC2: Develops and achieves comprehensive management plan for each patient
PC3: Manages patients with progressive responsibility and independence
PC4a: Demonstrates skill in performing and interpreting invasive procedures
PC4b: Demonstrates skill in performing and interpreting non-invasive procedures and/ or testing
PC5: Requests and provides consultative care

Medical Knowledge
MK1: Possesses clinical knowledge
MK2: Knowledge of diagnostic tests and procedures
MK3: Scholarship

Systems Based Practice
SBP1: Works effectively within an interprofessional team
SBP2: Recognizes system error and advocates for system improvement
SBP3: Identifies forces that impact the cost of health care, and advocates for and practices cost-effective care
SBP4: Transitions patients effectively within and across health delivery systems

Problem-Based Learning and Improvement
PBLI1: Monitors practice with a goal for improvement
PBLI2: Learns and improves via performance audit
PBLI3: Learns and improves via feedback
PBLI4: Learns and improves at the point-of-care

Professionalism
PROF1: Has professional and respectful interactions with patients, caregivers, and members of the interprofessional team
PROF2: Accepts responsibility and follows through on tasks
PROF3: Responds to each patient's unique characteristics and needs
PROF4: Exhibits integrity and ethical behavior in professional conduct

Interpersonal and Communications Skills
ICS1: Communicates effectively with patients and caregivers
ICS2: Communicates effectively in interprofessional teams
ICS3: Appropriate utilization of health records

ACGME milestones document link:
https://www.acgme.org/Portals/0/PDFs/Milestones/InternalMedicineSubspecialtyMilestones.pdf

Procedural competency

Fellows in Pulmonary and Critical Care Medicine are expected to be competent to do the following procedures independently without the supervising physician being physically present at the time the procedure is done:

- Lumbar Puncture
- Thoracentesis (This will include proper use of ultrasound for guidance)
- Paracentesis
- Arterial Line Placement
- Central Line Placement (This will include proper use of ultrasound for guidance of catheters placed in the IJ position)
- Pulmonary Artery Catheter Insertion
- Intubation of the airway
- Critical Care Ultrasound

Documentation of competency from the Director of the Internal Medicine Residency Program that the fellow graduated from will be accepted for the following procedures:

- Lumbar Puncture
- Thoracentesis (This will include proper use of ultrasound for guidance)
- Paracentesis

For the following procedures, five of each procedures will need to be supervised and evaluated by UVM PCCM faculty:

- Arterial Line Placement
- Central Line Placement (including IJ, subclavian, and femoral locations, including proper use of ultrasound for guidance of catheters placed in the IJ position)
- PA Catheter Insertion
- Intubation of the Airway
- Critical Care Ultrasound
- Fiberoptic Bronchoscopies and Biopsies
- Tube Thoracostomy
- Endobronchial ultrasound

Evaluation and Feedback:

Procedure evaluation forms for all supervised procedures will be kept on file. Fellows are responsible for maintaining procedure logs that document all procedures. These documents will be reviewed in annual meetings with the Program Director.

Clinical rotations

Pulmonary Continuity Clinic (weekly)

Goal
To provide education and training in the care of ambulatory patients with pulmonary diseases.

Objectives
To learn the evaluation and management of new outpatient consults. This will include learning the longitudinal management of patients with a variety of pulmonary diseases as the patient's primary pulmonary physician. In addition, fellows will learn skills in communication with referring physicians as a subspecialty consultant.

These goals and objectives will be based on the 6 ACGME competencies, as specified for each competency below:

Patient Care: Fellows will learn how to take care of ambulatory patients with a wide variety of pulmonary disorders, especially in the outpatient setting. In year 2 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of procedures, decision making, and communication with patients, their families and other health care professionals involved in the care of the patient. In year 3 of training, fellows will be functioning near or at the level of the attending in terms of overall care of the patient, while still under the supervision of the faculty.

Medical Knowledge: Fellows will develop a basic knowledge of the pathophysiology of pulmonary diseases and the current treatment approaches to these diseases. In year 2 of training, fellows will acquire more advanced knowledge of pathophysiology and disease states, and understand and utilize resources to gain additional knowledge. In year 3, fellows will be fully versed in sufficient knowledge of pulmonary medicine, especially as it pertains to outpatient medicine, that they may be prepared to sit for their board examinations.

Professionalism: Fellows will interact with their patients and with the clinic support staff in a professional and polite manner. They will respect patient privacy and autonomy and be sensitive to the diversity of patients' backgrounds. In the second year of training, fellows will be expected to improve their professionalism by acquiring team leadership skills and the ability to manage conflict resolution. They will also develop time management skills, especially to assist them in balancing their clinical duties and their research activities. By the third year the fellows will have developed an independent professional style.

Communication and Interpersonal Skills: Fellows will communicate clearly and completely with patients and clinic support staff regarding all aspects of patient care.

They will also learn how to appropriately communicate by dictated letter and telephone with referring physicians regarding their assessment and advise regarding the patient. In the second year, fellows will develop increasing experience and skill at teaching colleagues through effective communication and delivery of useful information. In the third year of training, fellows will be adept at efficient and complete communication with colleagues and patients, especially as this pertains to outpatient medicine.

Practice-Based Learning: Fellows will develop a working knowledge of the current standards of care of patients based on guidelines and review of the medical literature. They will participate in Quality Assurance projects that seek to optimize and improve patient care. In year 2, fellows will increasingly identify and acknowledge their own limitations in knowledge and skills and work towards improving them. In year 3, fellows will continue to hone their skills in reading and interpreting the medical literature, advance their learning through participating in seminars and conferences, and improve the quality, efficiency and cost-effectiveness of care through participation in quality assurance programs.

System-based Practice: Fellows will learn to use the medical information systems available to them in clinic, including the electronic medical record (PRISM), and radiology systems, and ultimately the electronic medical record (PRISM) as it becomes implemented in the clinic. They will also learn about other systems available to assist and participate the care of their patients, such as social work services, respiratory therapy, visiting nurses, home oxygen companies and hospice services, when appropriate. In year 2, fellows will improve their skills at use of consultative services, as well as awareness and implementation of cost-effective health care strategies. In year 3, fellows will be fully aware of and gain further experience in utilizing the health care related services and resources available to them to provide the most cost-effective and high quality care of their patients in the outpatient setting.

Educational Experience

Fellows will attend a weekly “Fellow’s Clinic” during their entire fellowship. This clinic provides the fellow with the opportunity to evaluate new outpatient consults, to see patients following discharge from the hospital, and to see patients who require continued follow-up over an extended period of time as their primary pulmonary physician.

Each patient will be discussed with the assigned pulmonary teaching attending. The discussion will provide direction in developing differential diagnoses, directing patient management, and illustrating educational points. In addition, it is expected that fellows will do outside reading relevant to the patient’s problems. A prepared log of the patients each fellow sees will be kept by the fellow and organized by problem category.

Fellows will be expected to present cases at the monthly outpatient case conference as assigned.

Fellows will assume increasing responsibility as they progress from the first to the

second to the third year of fellowship for decision making and follow-up regarding the care of their patients in clinic, under attending supervision. First year fellows will only dictate follow-up notes for the first 6 months, but by the second 6 months they will be dictating all notes.

Evaluation and Feedback

Fellow presentations will be critiqued informally by faculty members present at the time of presentation. This will include feedback on content and presentation. Written evaluation will occur biannually, in January and June, by the faculty members assigned to the clinics. Also on an annual basis, the trainees will provide written evaluation of faculty assigned to their clinic. Annually, the program director will formally review this educational program with the fellows and the faculty. Fellows will be expected to submit outpatient logs at this evaluation.

Fellows will be formally evaluated for Pulmonary Consultation Skills (see Section 3 - Evaluation Process) at the end of the first year of training in the outpatient clinic. This will be conducted by a designated faculty member.

Fellows will be evaluated with respect to the 6 competencies using tools appropriate to the clinic, as shown in the table of tools. Attendings will meet with fellows at the end of January and June to review the evaluation.

General Guidelines

The fellows' clinic occurs one half day per week at the Ambulatory Care Center, 5th Floor, University of Vermont Medical Center. Fellows are expected to attend this clinic above all other responsibilities unless on vacation, attending a meeting or the clinic has been cancelled. It is the fellows' responsibility to coordinate their clinic and communicate with the office staff. Each fellow will see 1-2 new patients and 3-5 follow-up patients per clinic. The assigned teaching attending will review history and physical exam findings with the fellow. The fellow will then finalize testing and treatment plans with the patient. Internal action sheets provided with each patient will coordinate plans with the clinic staff. The fellows are expected to follow up on all aspects of patient care including tests and communication with referring physicians in a timely fashion, and to communicate the results and care plan decisions with the teaching attending

One fellow will be assigned to read the daily PFT's for the outpatient clinic. This will be reviewed with an assigned attending. All of the fellows are encouraged to participate in the PFT review exercise.

Forms for documenting new patient and follow-up visits will be attached to each chart. Fellows are responsible for documentation as it applies to their patients. Current institutional documentation requirements necessitate that the attending physician dictates a note to the referring physician as well as the chart record.

Some patients will require diagnostic bronchoscopies or thoracenteses/pleural biopsies. These must be scheduled in advance and performed with an attending physician. The

secretarial staff can assist fellows in scheduling these procedures. It is the responsibility of the fellow to assist in coordinating these procedures.

Medical Intensive Care Unit (MICU) Rotation

Goal

To provide training and education in the care and management of critically ill medical patients.

Objectives

To provide direct, hands-on experience in caring for critically ill patients. To provide education and experience in performing and supervising procedures necessary for the practice of critical care medicine. To provide experience and knowledge in managing an intensive care unit.

These goals and objectives will be based on the 6 ACGME competencies, as specified for each competency below:

Patient Care: Fellows will provide compassionate and appropriate care of patients with critical illness or consulted upon because of acute deterioration in clinical stability or status. They will become adept at all basic invasive procedures required in the care of the critically ill patient, including, but not limited to central venous access, arterial blood monitoring, pulmonary artery catheter placement and data interpretation, intracranial pressure monitoring, mechanical ventilation, thoracentesis, paracentesis, lumbar puncture and chest tube insertion. In year 2 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of procedures, decision making, running rounds, and communication with patients, their families and other health care professionals involved in the care of the patient. In year 3 of training, fellows will be functioning near or at the level of the attending in terms of overall care of the patient, while still under the supervision of the faculty.

Medical Knowledge: Fellows will develop a sound knowledge of the basic physiological principles that underlie critical illness. They will understand the appropriate work-up and management of a wide variety of diseases that result in critical illness. They will learn about diagnostic testing, critical care monitoring, including troubleshooting of mechanical ventilatory and pressure monitoring systems, and critical care therapeutics, both pharmaceutical and non-pharmaceutical (e.g., mechanical ventilation, IABP and other devices). They will understand, in particular, the appropriate role of subspecialty consultation. Fellows will also learn about end of life issues and gain experience in working with psychiatrists, social workers, palliative care specialists and the hospice team. Fellows will learn about caring not only for the critically ill patient but also supporting their family at the time of illness. In year 2 of training, fellows will acquire more advanced knowledge of pathophysiology and disease states, and understand and utilize resources to gain additional knowledge. In year 3, fellows will be fully versed in sufficient knowledge of pulmonary and critical care medicine that they may be prepared to sit for their board examinations.

Professionalism: Fellows will interact with their patients and with the hospital support staff and other colleagues in a professional and polite manner. They will respect patient privacy and autonomy and be sensitive to the diversity of patients' backgrounds. They will be particularly sensitive to the needs of their patients' family and loved ones. In the second year of training, fellows will be expected to improve their professionalism by acquiring team leadership skills and the ability to manage conflict resolution. They will also develop time management skills, especially to assist them in balancing their clinical duties and their research activities. By the third year the fellows will have developed an independent professional style

Communication and Interpersonal Skills: Fellows will communicate clearly and completely with patients, families and hospital support staff regarding all aspects of patient care. They will also learn how to appropriately communicate by dictated letter and telephone with referring physicians regarding their assessment and advise regarding the patient. . In the second year, fellows will develop increasing experience and skill at teaching colleagues through effective communication and delivery of useful information. In the third year of training, fellows will be adept at efficient and complete communication with colleagues and patients, especially as this pertains to in-hospital care of patients.

Practice-Based Learning: Fellows will develop a working knowledge of the current standards of care of patients based on guidelines and review of the medical literature. They will participate in Quality Assurance projects that seek to optimize and improve patient care. In year 2, fellows will increasingly identify and acknowledge their own limitations in knowledge and skills and work towards improving them. In year 3, fellows will continue to hone their skills in reading and interpreting the medical literature, advance their learning through participating in seminars and conferences, and improve the quality, efficiency and cost-effectiveness of care through participation in quality assurance programs.

System-based Practice: Fellows will learn to use the medical information systems available to them in the hospital, including the electronic medical record system (PRISM) and radiology systems. They will learn how to effectively use their subspecialty colleagues who provide consultation services. They will also learn about other systems available to assist and participate the care of their patients, such as social work services, respiratory therapy, visiting nurses, home oxygen companies and hospice services, when appropriate. In year 2, fellows will improve their skills at use of consultative services, as well as awareness and implementation of cost-effective health care strategies. In year 3, fellows will be fully aware of and gain further experience in utilizing the health care related services and resources available to them to provide the most cost-effective and high quality care of their patients in the hospital setting.

Educational Experience

Fellows will rotate on the MICU service as outlined in the general schedule. Fellows will actively participate in all aspects of the care of patients on the medical ICU service. This should include but is not limited to medical management, procedures, family meetings,

communication with referring physicians, and bed management issues. All admissions will be seen by the fellow and subsequently discussed with the attending physician. Fellows will document a complete history and physical examination in the hospital chart for each new admission. As training advances, fellows will take on increasing responsibilities for patient care in the MICU.

Fellows in their first year of training will attend 2 MICU Quality Assurance Committee meetings. In the second year, fellows will develop a QA project to be completed by the third year of training. Fellows will present the results to the MICU QA committee and to the Pulmonary/Critical Care Faculty.

In the third year of training, fellows will complete a one month rotation as the “Acting Attending” for the MICU service. The fellow will have complete responsibility for the MICU management under the guidance of an attending physician. This will serve the specific goal of preparing fellows for their final step beyond fellowship training and into a practicing physician.

Evaluation and Feedback

Fellows will be informally critiqued on case management and performance of invasive procedures while rotating on the MICU service.

Fellows will be formally evaluated each month. Fellows will evaluate their educational experience on the MICU rotation and the attending faculty each month.

The program director will formally review this educational program semiannually with the fellows and the faculty.

Fellows will be evaluated with respect to the 6 competencies using tools appropriate to the MICU rotation, as shown in the table of tools. Attendings will meet with fellows at the end of the rotation to review the evaluation.

General Guidelines

McClure 4 intensive care is a combined medical and cardiac intensive care unit. The 21-bed unit is under the joint direction of a cardiology and a pulmonary/critical care faculty member. The key components to the health care team is the staff of nurses, respiratory therapists and others who are highly trained and experienced in ICU care. The unit is committed to the team approach to ICU care. Communication is of utmost importance.

Admission Policy – MICU - All admissions to the MICU (regardless of origin) must be approved by the MICU attending physician. Emergency admissions from the regular floor should be seen by the senior resident prior to transfer. A call schedule for the MICU service is listed on the unit and is known to the hospital operator. The charge nurse must be informed by the senior resident or fellow of all patient admissions and transfers. Daily Rounds, Responsibilities, and Codes - Formal rounds begin at 9 AM. All Fellows are expected to have evaluated their patients and collected pertinent data prior to the beginning of rounds. Fellows are expected to attend morning check-in rounds at 7:00

AM and to have done the same pre-round evaluation and to supervise the residents in initiating daily care plans and weaning from mechanical ventilation. X-rays will be reviewed in the Radiology Department as part of attending rounds from 9 – 11:30 AM. Daily progress notes should be completed in a timely fashion. Fellows will round with the social work team at 8:30 am.

Afternoon rounds are conducted at 4PM daily. Evening sign out will occur at 7:00 pm daily. Follow up on daily progress and diagnostic tests are reported at this time. These rounds are an important part of effective ICU communication and planning for the on-call team.

Residents and fellows are expected to attend all critical care conferences. Residents and fellows are excused for any continuity clinic duties related to the training program.

The MICU team also is responsible for directing in house code-calls. The senior resident should be in charge of running the code with the assistance of the fellow. Fellows should assume responsibility for airway management at all codes.

The resident physicians write all orders. Transfer and discharge orders are written by the MICU service and should be written before 9 AM. Transfer notes (admission and discharge) for MICU patients are the responsibility of the respective services.

Procedures - Procedures will be performed and documented as outlined in the Procedure Training and Documentation section. Fellows are expected to actively supervise and teach residents in procedure training.

Conferences -Fellows are expected to attend the weekly critical care conference. This conference provides the didactic teaching curriculum as outlined above. In addition fellows will be expected to attend and participate in the monthly Pulmonary and Critical Care Journal Club. Fellows will also be expected to assist with didactic teaching conferences for residents rotating on the critical care service. Fellows are expected to attend the Department of Medicine Morbidity and Mortality conferences one Friday a month at 9AM when MICU patients are presented. The Chief Medical Resident will notify the Fellows of the date of this conference.

Pulmonary Consult Rotation

Goal

To teach fellows basic and advanced skills in diagnosing and managing hospitalized patients with simple and complex pulmonary illnesses.

Objectives

To assist fellows in improving their ability to examine inpatients with pulmonary disorders at the bedside. To teach fellows to effectively communicate clinical and administrative information to colleagues, nurses, and students. To teach fellows to coordinate and integrate information derived from pulmonary function testing, radiographic studies, bronchoscopy, and other pulmonary and non-pulmonary tests in assessing individual pulmonary inpatients. To assist fellows in enhancing skills in communicating with medical professionals, and with patients and their families through verbal and written communication. To teach fellows to administer an inpatient consultation service that provides effective, appropriate and timely service in a teaching hospital setting.

These goals and objectives will be based on the 6 ACGME competencies, as specified for each competency below:

Patient Care: Fellows will provide compassionate and appropriate care of inpatients with pulmonary disease or referred for consultation because of respiratory related disorders. In year 2 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of procedures, decision making, and communication with patients, their families and other health care professionals involved in the care of the patient. In year 3 of training, fellows will be functioning near or at the level of the attending in terms of overall care of the patient, while still under the supervision of the faculty.

Medical Knowledge: Fellows will develop a sound knowledge of the basic physiological principles that underlie pulmonary disease. They will learn the appropriate work-up and management of a wide variety of pulmonary disorders, especially in the inpatient setting. This includes specialized knowledge and exposure in the areas of history taking, physical exam, imaging and pathologic analysis of cells and tissues. In year 2 of training, fellows will acquire more advanced knowledge of pathophysiology and disease states, and understand and utilize resources to gain additional knowledge. In year 3, fellows will be fully versed in sufficient knowledge of pulmonary and critical care medicine that they may be prepared to sit for their board examinations.

Professionalism: Fellows will interact with their patients and with the hospital support staff and other colleagues in a professional and polite manner. They will respect patient privacy and autonomy and be sensitive to the diversity of patients' backgrounds. In the second year of training, fellows will be expected to improve their professionalism by acquiring team leadership skills and the ability to manage conflict resolution. They will

also develop time management skills, especially to assist them in balancing their clinical duties and their research activities. By the third year the fellows will have developed an independent professional style.

Communication and Interpersonal Skills: Fellows will communicate clearly and completely with patients and hospital support staff regarding all aspects of patient care. They will also learn how to appropriately communicate by dictated letter and telephone with referring physicians regarding their assessment and advise regarding the patient. In the second year, fellows will develop increasing experience and skill at teaching colleagues through effective communication and delivery of useful information. In the third year of training, fellows will be adept at efficient and complete communication with colleagues and patients, especially as this pertains to in-hospital care of patients.

Practice-Based Learning: Fellows will develop a working knowledge of the current standards of care of patients based on guidelines and review of the medical literature. They will participate in Quality Assurance projects that seek to optimize and improve patient care. In year 2, fellows will increasingly identify and acknowledge their own limitations in knowledge and skills and work towards improving them. In year 3, fellows will continue to hone their skills in reading and interpreting the medical literature, advance their learning through participating in seminars and conferences, and improve the quality, efficiency and cost-effectiveness of care through participation in quality assurance programs.

System-based Practice: Fellows will learn to use the medical information systems available to them in clinic, including the electronic medical record (PRISM), and radiology systems, and ultimately the electronic medical record as it becomes available in the clinic. They will also learn about other systems available to assist and participate the care of their patients, such as social work services, respiratory therapy, visiting nurses, home oxygen companies and hospice services, when appropriate. In year 2, fellows will improve their skills at use of consultative services, as well as awareness and implementation of cost-effective health care strategies. In year 3, fellows will be fully aware of and gain further experience in utilizing the health care related services and resources available to them to provide the most cost-effective and high quality care of their patients in the hospital setting.

Educational Experience

Bedside Teaching -Fellows will attend rounds daily with the attending teaching physician and visit selected patients.

Fellows will visit inpatients in a timely fashion for new consultation and daily (or as frequently as appropriate) thereafter. At each visit, fellows will carry out an appropriately focused bedside exam and review relevant laboratory data, consultations, and radiographic information.

Didactic Sessions - The fellow assigned to the pulmonary consultation service will attend routinely scheduled didactic session including case conferences, VLC meetings,

grand rounds, journal club, and textbook review sessions. Fellows will complete appropriate readings regarding key inpatients in textbooks, journals, and other scholarly sources.

It can be anticipated that each fellow will consult on at least 20-40 new patients during each month on the clinical consultation service.

Fellows will assume increasing responsibility for patient care as they become more senior in their training. By their third year, fellows will be functioning independently as a consultant, interacting directly with housestaff and attendings, performing procedures, and being involved in interdisciplinary care of their patients.

Evaluation and Feedback

Written evaluation will be completed by the attending physician(s) at the end of each rotation on the consult service. The fellowship program director will provide feedback to the fellows regarding their performances in the scheduled semi-annual meeting.
The trainees will provide written evaluation of the attending and the rotation at the end of each month’s rotation.

Concerns or issues regarding fellows' performance that are raised by medical staff outside the pulmonary training program will be brought to the attention of the program director who will address them individually with the fellow.

Areas for improvement can be addition of additional evaluation session with fellows at 2 weeks into the inpatient rotation to allow feedback and time for change, if needed.

Fellows will be evaluated with respect to the 6 competencies using tools appropriate to the Consult rotation, as shown in the table of tools.

Surgical Intensive Care Unit (SICU) Rotation

Goals

To gain knowledge skills in the care of patients with a variety of surgical problems. To gain knowledge and skills in procedures unique to the care of SICU patients. To gain knowledge of the unique management needs of surgical patients.

Objectives

The surgical intensive care unit cares for all critically ill surgical patients. This provides the trainee with an opportunity to become familiar with the care of a wide variety of surgical problems. Trainees will become experienced in the care and management of patients in the following areas: trauma, neurosurgery, general surgery, vascular surgery, and cardiothoracic surgery.

These goals and objectives will be based on the 6 ACGME competencies, as specified for each competency below. This rotation is required during the 1st, 2nd and 3rd years of training for a total of 3 months experience.

Patient Care: Fellows will provide compassionate and appropriate care of patients with critical illness or consulted upon because of acute deterioration in clinical stability or status. In the SICU, this will particularly pertain to patients with surgical issues, such as post-operative state, trauma. They will become adept at all basic invasive procedures required in the care of the critically ill patient, including, but not limited to central venous access, arterial blood monitoring, pulmonary artery catheter placement and data interpretation, intracranial pressure monitoring, mechanical ventilation, thoracentesis, paracentesis, lumbar puncture and chest tube insertion. In year 3 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of procedures, decision making, running rounds, teaching, and communication with patients, their families and other health care professionals involved in the care of the patient.

Medical Knowledge: Fellows will develop a sound knowledge of the basic physiological principles that underlie critical illness. They will understand the appropriate work-up and management of a wide variety of surgical conditions or diseases that result in critical illness. They will understand, in particular, the appropriate role of additional diagnostic testing (e.g. imaging) and subspecialty consultation. Fellows will also learn about end of life issues and gain experience in working with psychiatrists, social workers, palliative care specialists and the hospice team. Fellows will learn about caring not only for the critically ill patient but also supporting their family at the time of illness. In year 2 of training, fellows will acquire more advanced knowledge of pathophysiology and disease states, and understand and utilize resources to gain additional knowledge. In year 3, fellows will be fully versed in sufficient knowledge of surgical critical care in relation to pulmonary and critical care medicine that they may be prepared to sit for their board examinations.

Professionalism: Fellows will interact with their patients and with the hospital support

staff and other colleagues in a professional and polite manner. They will respect patient privacy and autonomy and be sensitive to the diversity of patients' backgrounds. They will be particularly sensitive to the needs of their patients family and loved ones. In the second year of training, fellows will be expected to improve their professionalism by acquiring team leadership skills and the ability to manage conflict resolution. They will also develop time management skills, especially to assist them in balancing their clinical duties and their research activities. By the third year the fellows will have developed an independent professional style

Communication and Interpersonal Skills: Fellows will communicate clearly and completely with patients, families and hospital support staff regarding all aspects of patient care. They will also learn how to appropriately communicate by dictated letter and telephone with referring physicians regarding their assessment and advise regarding the patient. . In the second year, fellows will develop increasing experience and skill at teaching colleagues through effective communication and delivery of useful information. In the third year of training, fellows will be adept at efficient and complete communication with colleagues and patients, especially as this pertains to in-hospital care of patients.

Practice-Based Learning: Fellows will develop a working knowledge of the current standards of care of patients based on guidelines and review of the medical literature. They will participate in Quality Assurance projects that seek to optimize and improve patient care. In year 2, fellows will increasingly identify and acknowledge their own limitations in knowledge and skills and work towards improving them. In year 3, fellows will continue to hone their skills in reading and interpreting the medical literature, advance their learning through participating in seminars and conferences, and improve the quality, efficiency and cost-effectiveness of care through participation in quality assurance programs.

System-based Practice: Fellows will learn to use the medical information systems available to them in clinic, including the electronic medical record (PRISM) and radiology systems. They will learn how to effectively use their subspecialty colleagues who provide consultation services. They will also learn about other systems available to assist and participate the care of their patients, such as social work services, respiratory therapy, visiting nurses, home oxygen companies and hospice services, when appropriate. In year 2, fellows will improve their skills at use of consultative services, as well as awareness and implementation of cost-effective health care strategies. In year 3, fellows will be fully aware of and gain further experience in utilizing the health care related services and resources available to them to provide the most cost-effective and high quality care of their patients in the hospital setting.

Educational Experience

Experience will be accomplished by caring for SICU patients as a member of the Surgical Critical Care Service. Care of patients in the surgical intensive care unit is a collaborative effort between the surgical team and the critical care team. Pulmonary Critical Care Fellows will rotate as a member of the SICU team. The team is comprised

of one senior and one junior surgical resident and an attending physician. Fellows will rotate on the service for one month in each of their first, second and third years of training. Bedside teaching and procedure training will occur as part of the daily work rounds. Fellows should document all procedures performed in the SICU.

An informational packet regarding SICU policies and procedures will be distributed to each fellow prior to their first SICU rotation. Fellows are expected to follow these guidelines.

Fellows will assume increasing roles in teaching and supervising the surgical housestaff about critical care medicine as they progress from their second to third years.

General Guidelines

Fellows will attend all SICU teaching conferences as part of the SICU team. Fellows are expected to attend the ½ day Pulmonary continuity clinic as scheduled and the Thursday and Friday Pulmonary and Critical Care conferences. Night call will be taken as part of the regular Pulmonary and Critical Care Medicine call schedule. Fellows are encouraged to participate in the care of SICU patients as much as possible when on call for the Pulmonary and Critical Care Medicine division.

Evaluation and Feedback

Fellows will be informally critiqued on case management and performance of invasive procedures while rotating on the SICU service.

Fellows will be formally evaluated on a rotation basis by the surgical ICU attending physician. Fellows will evaluate their educational experience on the SICU rotation and the SICU attending(s) at the end of each rotation.

Fellows will be evaluated with respect to the 6 competencies using tools appropriate to the SICU rotation, as shown in the table of tools. Attendings will meet with fellows at the end of the rotation to review the evaluation.

The Vermont Regional Sleep Disorders Center (VRSDC) is a regional referral area for patients with sleep disorders from Vermont and upstate New York. The Center is composed of, neurologists, ENT surgeons, oral surgeons, general dentists, and clinical psychologists. The Center operates a testing facility which carries out a full range of diagnostic testing for patients with sleep disorders including laboratory polysomnograms, home sleep tests, overnight oximetry, and multiple sleep latency tests. Other laboratory and physiologic testing is available through the University of Vermont Medical Center laboratories and through the Pulmonary Function Laboratory. The core physicians in the Center oversee the management of the patients.

Sleep Clinic Rotation

Goals

Trainees will learn the physiology of sleep and ventilatory control during sleep, and the pathophysiology of the common sleep disorders. Trainees will become familiar with the diagnostic tests available for evaluating sleep, sleep-disordered breathing, and other sleep disorders. Trainees will learn to diagnose and manage patients with sleep disorders.

Objectives

Provide trainees with education in the physiology and pathophysiology of sleep and sleep disorders. Provide trainees with experience in carrying out and interpreting the diagnostic tests used to evaluate patients with sleep disorders. Provide trainees with clinical experience in the recognition, diagnosis, and treatment of sleep disorders.

These goals and objectives will be based on the 6 ACGME competencies, as specified for each competency below. This is a mandatory month-long rotation during the 1st year, and fellows may elect to spend additional time in the sleep clinic during the 2nd or 3rd year as part of their 6 additional months of half-day per week ambulatory care experience.

Patient Care: Fellows will learn how to take care of patients with sleep disorder breathing, with special attention to obstructive and central sleep apnea. In year 2 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of procedures, decision making, and communication with patients, their families and other health care professionals involved in the care of the patient. In year 3 of training, fellows will be functioning near or at the level of the attending in terms of overall care of the patient, while still under the supervision of the faculty.

Medical Knowledge: Fellows will develop a basic knowledge of the pathophysiology and treatment of sleep and sleep disordered breathing. The will learn how to acquire and read polysomnograms, as well as become familiar with the sleep latency test and other diagnostic modalities. They will learn about non-invasive ventilation with CPAP and BiPAP. In year 2 of training, fellows will acquire more advanced knowledge of pathophysiology and disease states, and understand and utilize resources to gain additional knowledge. In year 3, fellows will be fully versed in sufficient knowledge of pulmonary sleep medicine that they may be prepared to sit for their board examinations.

Professionalism: Fellows will interact with their patients and with the clinic support staff in a professional and polite manner. They will respect patient privacy and autonomy and be sensitive to the diversity of patients' backgrounds. In the second year of training, fellows will be expected to improve their professionalism by acquiring team leadership skills and the ability to manage conflict resolution. They will also develop time management skills, especially to assist them in balancing their clinical duties and their

research activities. By the third year the fellows will have developed an independent professional style.

Communication and Interpersonal Skills: Fellows will communicate clearly and completely with patients and clinic support staff regarding all aspects of patient care. They will also learn how to appropriately communicate by dictated letter and telephone with referring physicians regarding their assessment and advise regarding the patient. In the second year, fellows will develop increasing experience and skill at teaching colleagues through effective communication and delivery of useful information. In the third year of training, fellows will be adept at efficient and complete communication with colleagues and patients, especially as this relates to the care of patients with sleep related breathing disorders.

Practice-Based Learning: Fellows will develop a working knowledge of the current standards of care of patients based on guidelines and review of the medical literature. They will participate in Quality Assurance projects that seek to optimize and improve patient care. In year 2, fellows will increasingly identify and acknowledge their own limitations in knowledge and skills and work towards improving them. In year 3, fellows will continue to hone their skills in reading and interpreting the medical literature, advance their learning through participating in seminars and conferences, and improve the quality, efficiency and cost-effectiveness of care through participation in quality assurance programs.

System-based Practice: Fellows will learn to use the medical information systems available to them in clinic, including the electronic medical record (PRISM), and radiology systems, and ultimately the electronic medical record as it comes online in the outpatient setting. They will also learn about other systems available to assist and participate the care of their patients, such as social work services, respiratory therapy, visiting nurses, and home oxygen companies. In year 2, fellows will improve their skills at use of consultative services, as well as awareness and implementation of cost-effective health care strategies. In year 3, fellows will be fully aware of and gain further experience in utilizing the health care related services and resources available to them to provide the most cost-effective and high quality care of their patients with sleep related breathing disorders.

Educational Experience

Pulmonary Fellows Seminars – Didactic Seminars will be conducted by the director the Sleep Laboratory, and will focus on the physiology of sleep, the physiology of ventilatory control during sleep, and the pathophysiology of various sleep disorders. Attendance is mandatory for all trainees.

Sleep Laboratory Experience - Trainees will gain experience with the following diagnostic tests: laboratory polysomnogram, home sleep tests, overnight oximetry, and multiple sleep latency tests. The Sleep Laboratory director will oversee this experience. Trainees will observe a minimum of two of each of the diagnostic tests as they are carried out. This includes participating in the scoring of the laboratory polysomnograms.

Trainees will participate in the interpretation of a minimum of five of each of the diagnostic tests.

Sleep Disorders Clinic - Trainees will begin their experience with sleep disorders with a concentrated experience for one month in the first year in order to familiarize them with the management of patients with sleep disorders.

Evaluation and Feedback

Evaluation of the level of preparedness of the fellows for the seminars and discussions will occur as part of the established quarterly evaluation by the faculty members. The Sleep Laboratory director will evaluate trainees on their knowledge base and clinical progress as part of the established quarterly evaluation of trainees. Trainees will document the tests that they observed and interpret, and report this to the program director at a semiannual evaluation in the first year.

Fellows will be evaluated with respect to the 6 competencies using tools appropriate to the Sleep clinic, as shown in the table of tools. Dr. Susan Dunning will meet with fellows at the end of the rotation to review the evaluation.

General Guidelines

Sleep Disorders training is coordinated by the Fellowship Program director and the Sleep Laboratory director. Fellows should contact the Sleep Laboratory director prior to beginning the rotation for specific details as to the time and location of the clinic

Pulmonary Physiology Rotation

Goal
To educate trainees in pulmonary physiology and pulmonary function testing.

Objectives
To provide a physiological basis for the understanding and performance of pulmonary function testing and interpretation. To provide a working knowledge of the techniques involved in pulmonary function testing. To provide direct, hands-on experience in performing and supervising pulmonary function testing.

These goals and objectives will be based on the 6 ACGME competencies, as specified for each competency below. This is a mandatory rotation during the first year, and fellows continue to read PFTs throughout their 3 years of training.

Patient Care: Fellows will provide compassionate and appropriate care of patients undergoing pulmonary function testing, including guiding them through the testing procedure as well as helping them understand the results. In year 2 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of lung function testing, and communication with patients, their families and other health care professionals involved in the care of the patient. By year 3, fellows will be knowledgeable in all aspects of pulmonary function testing performance and interpretation, as well as in decision making based on results.

Medical Knowledge: Fellows will develop a sound knowledge of the basic physiological principles that determine pulmonary function. This will include knowledge of airflow, lung mechanics, gas diffusion, muscle function, drive to breathe, airways hyperresponsiveness, and exercise physiology. They will also learn about the principles of pulmonary function instrumentation and measurement, as well as interpretation. In year 2 of training, fellows will acquire more advanced knowledge of pathophysiology and disease states, and understand and utilize resources to gain additional knowledge. In year 3, fellows will be fully versed in sufficient knowledge of pulmonary function testing that they may be prepared to sit for their board examinations. They will especially be prepared to interpret complex tests such as cardiopulmonary exercise tests.

Professionalism: Fellows will interact with the pulmonary function lab technologists and support staff in a professional, polite manner. In the second year of training, fellows will be expected to improve their professionalism by acquiring team leadership skills and the ability to manage conflict resolution. They will also develop time management skills, especially to assist them in balancing their clinical duties and their research activities. By the third year the fellows will have developed an independent professional style.

Communication and Interpersonal Skills: Fellows will communicate clearly and completely with the pulmonary function lab technologists and support staff when

ordering and interpreting tests as well as assessing quality control. Fellows will also learn to communicate effectively with referring physicians to convey the results of pulmonary function testing in a manner that is clinically helpful to those physicians. In the second year, fellows will develop increasing experience and skill at teaching colleagues through effective communication and delivery of useful information. In the third year of training, fellows will be adept at efficient and complete communication with colleagues and patients regarding the results and interpretation or pulmonary function tests.

Practice-Based Learning: Fellows will develop a working knowledge of the ATS/ERS guidelines on all aspects of pulmonary function testing, as well as become familiar with other authoritative sources including the AARC guidelines and classic papers and book chapters. In year 2, fellows will increasingly identify and acknowledge their own limitations in knowledge and skills and work towards improving them. In year 3, fellows will continue to hone their skills in reading and interpreting the medical literature, advance their learning through participating in seminars and conferences, and improve the quality, efficiency and cost-effectiveness of care through participation in quality assurance programs related to the PFT lab.

System-based Practice: Fellows will learn to use the PFT system and learn about resources to help them with lab-based mechanical or procedural issues, such as working with local technical support and company tech support. In year 2, fellows will improve their skills at use of consultative services, as well as awareness and implementation of cost-effective health care strategies. In year 3, fellows will be fully aware of and gain further experience in utilizing the health care related services and resources available to them to provide the most cost-effective and high quality care of their patients receiving PFT testing.

Educational Experience

Didactic Seminars -All pulmonary/critical care fellows will attend a series of monthly hour-long seminars given by Dr. Kaminsky during their rotation through the PFT lab that will address the physiological basis of each of the following aspects of pulmonary function:

- Flow-volume loops and spirometry
- Lung volumes
- Pressure-volume relationships
- Bronchial challenge testing
- Gas exchange and lung diffusing capacity
- Symptom-limited exercise challenge testing
- Research topics in pulmonary physiology

A set of reading on each of the above topics, including all up-to-date ATS guidelines, will be provided for each fellow.

Pulmonary Function Testing Interpretations - Each pulmonary fellow will interpret all non-clinic PFT's performed at the hospital while on-service for the pulmonary consultation service. These PFT interpretations will be supervised by the attending on-service that month. In addition, each fellow will interpret the outpatient PFT's performed during their weekly clinic day, again under the supervision of an attending physician. The total number of tests expected to be interpreted is approximately 1500 in the 1st year and 600 in each of the 2nd and 3rd year.

Practical Experience in the PFT Lab - Each pulmonary fellow will observe the performance of at least 6 of each of the pulmonary function tests conducted in the PFT lab, including relevant calibration and set-up. In particular, fellows will participate in the supervision required during all exercise testing. Each fellow will also be asked to have their own pulmonary function measured, which will allow them to directly experience each test.

Evaluation and Feedback

Each faculty member will be asked to comment in their routine quarterly reports on the performance of the fellows in the area of pulmonary function testing interpretation. In addition, Dr. Kaminsky will directly address the performance of each fellow not only in the area of PFT interpretation, but also in the area of PFT testing, based on his direct observation of each fellow in the lab as well as feedback from the PFT technologists. Dr. Kaminsky will provide direct feedback to the fellows regarding their performance in these areas, and will invite the comments and criticism of each fellow regarding the curriculum in this area

Fellows will be evaluated with respect to the 6 competencies using tools appropriate to the PFT lab experience, as shown in the table of tools. Dr. David Kaminsky will meet with fellows at the end of the rotation to review the evaluation.

Pulmonary Subspecialty Rotation

Goal

To provide trainees with more in-depth educational experience in the evaluation and management of patients with selected pulmonary conditions.

Objectives

To learn the evaluation and management of patients presenting to subspecialty clinics. These subspecialty clinics include: lung nodule clinic, interventional pulmonary clinic, cancer survivorship clinic, interstitial lung disease clinic, pulmonary hypertension clinic, cystic fibrosis clinic, and pulmonary rehabilitation.

These goals and objectives for each clinic will be based on the 6 ACGME competencies.

Shared competencies across clinics:

Professionalism: Fellows will interact with their patients and with the clinic support staff in a professional and polite manner. They will respect patient privacy and autonomy and be sensitive to the diversity of patients' backgrounds.

Communication and Interpersonal Skills: Fellows will communicate clearly and completely with patients and clinic support staff regarding all aspects of patient care. They will also learn how to appropriately communicate by dictated letter and telephone with referring physicians regarding their assessment and advise regarding the patient.

Practice-Based Learning: Fellows will develop a working knowledge of the current standards of care of patients based on guidelines and review of the medical literature.

System-based Practice: Fellows will learn to use the medical information systems available to them in clinic, including electronic medical record (PRISM), and radiology systems, and ultimately the electronic medical record as it comes online in the clinic. They will also learn about other systems available to assist and participate the care of their patients, such as social work services, respiratory therapy, visiting nurses, home oxygen companies and hospice services, when appropriate

Clinic specific objectives for patient care and medical knowledge

Cancer clinics (including lung nodule clinic, interventional pulmonary clinic, survivorship clinic):

Patient Care: Fellows will learn the initial approach to diagnosis and staging of patients with suspected thoracic malignancies, management of local complications of thoracic malignancies, as well as standard therapies for lung cancer based on stage. Fellows will learn diagnostic approach to patients with respiratory complications related to therapy for cancer at any site including lung. Fellows will learn the indications for endobronchial ultrasound bronchoscopy and will participate in bronchoscopic procedures. During procedures, they will demonstrate knowledge of airway and mediastinal anatomy and

be able to identify the IASLC specified lymph node stations. They will be able to perform 2-person transbronchial fine needle aspiration. In third year, they will demonstrate proficiency in performing single-operator transbronchial fine needle aspiration.

Medical Knowledge: Fellows will develop a basic knowledge of the pathophysiology of lung cancer, including the evaluation, staging and treatment of disease. In addition, the fellow will become familiar with the specific types of pathologic features associated with each type of cancer. The fellow will identify modalities for palliation of local complications of thoracic malignancies. The fellow will recognize cancer therapies that are associated with pulmonary complications.

Cystic Fibrosis Clinic

Patient Care: Fellows will learn how to take care of patients with CF, including its many pulmonary and non-pulmonary manifestations

Medical Knowledge: Fellows will develop a basic knowledge of the pathophysiology of CF, as well as transplant medicine as it relates to the assessment of patients for and care of patients after lung transplant.

Interstitial Lung Disease Clinic:

Patient Care: Fellows will learn the initial evaluation and management of patients referred with interstitial lung diseases and

Medical Knowledge: Fellows will develop a basic knowledge of the clinicoradiopathologic features of interstitial lung diseases delineated by the American Thoracic Society including idiopathic pulmonary fibrosis, connective tissue disease related interstitial lung disease, idiopathic nonspecific interstitial pneumonitis, cryptogenic organizing pneumonia, hypersensitivity pneumonitis. Fellows will learn the laboratory, radiographic, and pathologic evaluation of these diseases and be able to initiate and adjust management in these patients.

Pulmonary Rehabilitation:

Patient Care: Fellows will learn how to take care of patients referred to pulmonary rehab with a wide variety of pulmonary disorders. In year 2 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of procedures, decision making, and communication with patients, their families and other health care professionals involved in the care of the patient. In year 3 of training, fellows will be functioning near or at the level of the attending in terms of overall care of the patient, while still under the supervision of the faculty.

Medical Knowledge: Fellows will develop a basic knowledge of the pathophysiology of pulmonary diseases and the current treatment approaches to these diseases. They will also develop a working knowledge of the background and techniques used in

pulmonary rehab medicine.

Pulmonary Hypertension

Patient Care: Fellows will provide compassionate and appropriate care of patients with pulmonary hypertension.

Medical Knowledge: Fellows will develop a sound knowledge of the basic physiological principles that underlie pulmonary hypertension. They will become familiar with the WHO classification of pulmonary hypertension and with the recommended steps in diagnosis, evaluation and management.

Educational experience:

Weekly schedule:

MON AM	MON PM	TUES AM	TUES PM	WED AM	WED PM	THURS AM	THURS PM	FRI AM	FRI PM
Cancer Clinics	LMDC	Proc EBUS	Continuity (1st yr) IP (3rd yr)	EBUS Pulm htn	Pulm rehab	ILD	Thoracic radiology (2P-4P) Continuity (3rd year)	CF	CF

Responsible staff:

- Cancer clinics – Garrison (Nodule), Kinsey (Interventional Pulmonary), Suratt (Cancer survivorship)
- LMDC – Garrison, Kinsey
- ILD – Menon
- Pulmonary rehab – Teneback, O'Shea
- Pulmonary hypertension - Antkowiak
- CF – Teneback, Leclair

General guidelines

During this rotation, fellows will have the opportunity to have more in-depth exposure to several subspecialty focus areas within pulmonary and critical care medicine. During the clinic days, trainees will generally be responsible for seeing new evaluations and follow-ups with significant educational value as discussed with the attending physician. On Mondays, the fellows will see new patient evaluations seeing either Dr. Garrison, Dr. Kinsey, or Dr. Suratt. Fellows will see the patients independently and staff with the attending physician after formulating an assessment and plan; fellows will be responsible for completing documentation for the encounter.

Fellows should anticipate participating in any bronchoscopic procedures scheduled on patients they have evaluated during the procedure. EBUS procedures commonly occur on Tuesdays and Wednesdays. The trainee function as the EBUS fellow for the month and has the opportunity to participate in any IP and EBUS procedure as schedule and work hours permit. Fellows may also participate in any right heart catheterizations scheduled and performed by Dr. Antkowiak.

For the pulmonary rehabilitation days, the fellow will evaluate patients during rehabilitation sessions and will participate in patient education on selected days.

For thoracic radiology, the fellow will spend the afternoon with Dr. Gentchos, Dr. Klein, or Dr. Green in the thoracic reading room.

During this month, vacation can be taken for 1 week. Overnight call should be arranged to avoid missing a clinic multiple times during the month. If circumstances do not allow for a fellow to participate in a clinic, the fellow should notify the attending the day prior.

Evaluation

The fellows will receive a competency based summary evaluation reflecting clinical performance during the rotation. They will receive in-person formative feedback from attendings with whom they have been present for three or more clinics.

Research Experience

Overview

Substantive experience in research is a key element in the education of a sub-specialist in Pulmonary Disease and Critical Care Medicine (PCCM). The research experience linked with didactic teaching and independent learning activities will prepare the Trainee to meet the challenges of rapidly changing technology and new bodies of knowledge. For some Trainees, the research experience will become the catalyst for career development and life-long pursuits as an investigator. For Trainees primarily directed towards clinical practice and teaching, the research experience will serve as foundation for a critical appreciation of how new knowledge becomes a part of medical practice. For all Trainees, our collective experience is that research, whether basic or clinic, is a stimulating and rewarding experience.

Training Goals

The overall goals of research experience as part of the Training Program are:

- To enhance understanding of the process through which new biomedical knowledge is acquired.
- To prepare the Trainee to critically evaluate new research developments and to be prepared to implement them into clinical practice.
- To prepare the Trainee for further career development in academic medicine and biomedical research.

Specific Objectives

All Trainees will devote a substantial portion of their three-year program to research, and each will participate in one or more research projects during the course of training. All Trainees will become familiar with and gain direct experience in:

- Formulation of a research question
- Formulation of a testable hypothesis
- Study design
- Selection and development of appropriate methods
- Performance of experiments and / or data collection
- Research ethics
- Analysis of data
- Organization of results
- Formulation of conclusions
- Peer review with presentation & publication of research findings
- Basic statistical concepts and methods as related to experimental design and data analysis.
- Modern concepts of molecular biology, cell biology, immunology, and related fields as they relate to new developments in medical diagnosis and therapy.
- Participation in a research project designed and executed with the Trainee.
- Presentation and publication of research results through the peer review process.

Individual Trainees will become familiar with specific concepts, research methodology, and procedures, depending on their particular research project. These **may** include:

- Ethical, legal, and practical issues in research with human subjects, including:
- Principals of ethical study design
- Principals of informed consent
- Obligations and interactions with an Institutional Review Board (IRB) (Human Studies Committee).
- Fair compensation for human research subjects.
- Recruiting human subjects for biomedical research.
- Reporting, record keeping, and confidentiality issues in human research.
- Techniques of humane anesthesia and restraint
- Ethical and practical issues in research utilizing living animals, including:
- Principals of ethical study design
- Obligations and interactions with an Institutional Animal Care and Use Committee (IACUC).
- Reporting and record keeping in animal research.
- Acquisition of specific skills related to human studies research, such as:
- Development and application of questionnaires and study instruments.
- Performance of specialized procedures (e.g. bronchoalveolar lavage, lung physiology measurements, metabolic observations, etc.)
- Population-based data collection and survey methodology
- Acquisition of specific skills related to animal research, such as:
- Maintenance and monitoring of rodents for laboratory research.
- Development and breeding of genetically modified mouse strains.
- Interventions to create animal models of disease (e.g. acute and chronic drug administration, inhalation toxicology, immunization and sensitization, etc.).
- Physiologic measurements in laboratory animals (e.g. metabolic parameters, immune responses, pulmonary physiology).
- Recovery of organs and tissues from experimental animals (e.g. small animal surgery and dissection, bronchoalveolar lavage, blood sampling, harvest of spleen or lymph node immune cells, etc.)
- Histological or immunocytochemical techniques and quantitative histological analysis
- Acquisition of general and specific laboratory skills, such as:
- Basic techniques in cell culture and propagation.
- Common techniques in molecular biology (nucleic acid extraction, Northern analysis, PCR expansion, etc.)
- Basic methods in laboratory immunology (antibody purification and measurement, lymphocyte proliferative responses, cell surface antigen phenotype expression, flow cytometry, etc.)
- Approaches to tissue pathology (conventional histologic staining, immunohistochemistry, in situ hybridization, simple morphometry).
- Fundamentals of biomedical laboratory procedures (solutions and buffers, sterile technique, weights and measures, centrifugation, spectrophotometry, etc.).
- Acquisition of specific skills related to epidemiology, public health, and the promotion of healthy behaviors, such as:

    - Development and implementation of survey instruments
    - Development of intervention tools to influence skills, knowledge, attitudes or resources and thus change behavior and outcome as related to health risks (smoking prevention, smoking cessation, air pollution, etc.).
- Analysis of large group and public health statistical information.
- Analysis of health outcomes data.

Research Activities

Preparation for the research training portion of the Fellowship begins during the first year of Fellowship, when fellows and their faculty mentors work together to identify an appropriate Research Mentor.

Selection of a Research Mentor from the faculty: It is essential that fellows work under the supervision and mentorship of one identified faculty member for the 24 months of their research training. This promotes a strong relationship between the mentor and mentee, and allows for a focused and effective use of the research training time. Any willing faculty member who is actively performing research, and who has sufficient time and space to devote to a fellow may be selected as a research mentor pending approval of the Research Committee (below). The process of mentor selection should begin early in the first year of fellowship, and includes (mandatory) attendance at the Vermont Lung Center Conference (Tuesdays at 8:15AM, HSRF 400), at which faculty and fellows present their research. This forum gives first year fellows an opportunity not only to learn a great deal about both bench and clinical pulmonary and critical care research, but also to discover the many projects that are available to them in the coming research years. Other resources that are useful in this process include the VLC web site (www.VermontLung.org) and the Cell and Molecular Biology web site (www.uvm.edu/cmb/). During the first year, fellows should make arrangements to meet with individual faculty members to discuss their work and explore the research opportunities that may exist. Although the fellow's faculty mentor is a great resource in this process, it is imperative that fellows be proactive in exploring these options themselves. Fellows should identify a Research Mentor by April 1st of first year.

Development of a Research Training Plan: Once a Research Mentor has been identified, a Research Training Plan must be developed in conjunction with this mentor, and according to the guidelines of the Research Committee. The plan should include a summary of the research proposed, a basic 2 year timeline of the project, and, most importantly, a description of the research training to occur. Included in this should be details of planned coursework, conferences, and collaborations that will complement the mentored research experience. It is recognized that many details of these research plans may change during the 2 years of training. The first year fellow's Research Training Plan is presented to the Research Committee by the fellow and mentor in May of first year. The Research Committee will evaluate the Training Plan to ensure that the proposed training will meet both the requirements of the various governing bodies (such as the Residency Review Committee) and the expectations of the PCCM Division.

Expectations of the fellow during the Research Training Years: The research years present

an invaluable opportunity for fellows to experience medical research first hand, and to develop skills that will serve them in their careers whether or not they choose to pursue research following training. To ensure such an experience, the following requirements apply to research fellows:

All fellows participating in clinical research will be required to take the free, online course "Introduction to the Principles and Practice of Clinical Research" offered by NIH (http://clinicalcenter.nih.gov/training/training/ippcr1.html). This course is offered in weekly units from October to March and culminates in a test that leads to a Certificate of Completion. This course will form the foundation of the didactic clinical research training that all clinical research fellows will be required to obtain during their research experience.

Didactic Teaching & Conferences in PCCM Research

A wide variety lectures, seminars, and conferences relevant to lung research occur on a regular basis within the UVM College of Medicine and University of Vermont Medical Center. Trainee attendance at several of these conferences is required (*), while at other conferences attendance would be based on personal interest. Regular scheduled conferences include:

Vermont Lung Center Research in Progress Seminar *(Required)
(Tuesdays HSRF 400 Conference Room, UVM, 8:15 - 9:30 AM)

This conference is scheduled as one of our weekly Division conference series. Each Trainee is expected to present their personal research plans or results twice a year in the 2nd and 3rd years of training. This research conference encompasses:

- Presentation of recent research findings by PCCM faculty members.
- Presentation of relevant research by other UVMMC / UVM faculty.
- Presentation of personal research by visiting scientists.
- Presentation of research project planning and results by Trainees.

Other Conferences:

- Individual lab meetings
- Cell Biology Seminars (Mon. 11am)
- VT Lung Center Clinical Trials Meeting

Timetable for Research Activities

Year 01

- The Trainee will meet with members of the PCCM faculty, faculty in other Units, and investigators in other Departments of the University to learn about ongoing topics of research related to lung disease and critical illness.
- The Trainee and faculty will identify a research mentor with whom the Trainee will primarily work. The mentor will be a senior faculty member with substantial research experience. The mentor may be a member of PCCM faculty, but may also be a basic scientist and/or a member of another department. The Trainee and the mentor will develop a research topic, and will the plan study design, and will begin methods development. A total of two months elective time during the first year will be reserved for the process of planning a research project to begin at the start of the second year.
- The Trainee will attend the weekly VLC Research Conferences of the PCCM Unit.
- The Trainee will present one VLC Research Conference during the second half of the year to explain the research problem and the study design that has been selected.
- The Trainee will attend the bi-weekly conferences of the Department of Medicine Training Series.
- The Trainee will attend research conferences related to his / her chosen area of research after the initial planning and selection of topic are underway.
- The Trainee may, if appropriate, attend one or two day-long courses in research methodology (transgenic mice, basics of molecular biology, lung physiology in small animals, etc.) put on each spring at the Annual Meeting of the American Thoracic Society.

Year 02

- The Trainee will begin in the second year to carry out the laboratory or clinical research project designed during the first year. The Trainee will devote a minimum of four months, and up to eight months if needed, to this project. During these months the Trainee will not be assigned in-patient responsibilities except for night and weekend call. The Trainee will participate in ambulatory patient care up to two half-days per week.
- The Trainee and the mentor will meet on a regularly scheduled basis to review progress and plan activities (typically, this is in the form of a weekly laboratory group meeting).
- The Trainee will attend the weekly VLC Research Conferences of the PCCM Unit.
- The Trainee will present two Research Conferences during the year to provide progress reports on research accomplishments and planned activities.
- The Trainee will attend the bi-weekly conferences of the Department of Medicine Training Series.
- The Trainee will attend University research conferences related to his / her chosen area of research.
- The Trainee will attend one national or regional conference focused specifically on their topic of research.

Year 03

- The Trainee will continue in the third year to carry out their laboratory or clinical research project. When appropriate, the Trainee may choose to pursue an additional research project in the same or another discipline. For example, a Trainee involved primarily with laboratory research might participate in a limited clinical research project in order to gain experience with human studies. The Trainee will devote a minimum of four months, and up to eight months if needed, to research projects. During these months the Trainee will not be assigned in-patient responsibilities except for night and weekend call. The Trainee will participate in ambulatory patient care up to two half-days per week.
- The Trainee and the mentor will meet on a regularly scheduled basis to review progress and plan activities.
- The Trainee will attend the weekly VLC Research Conferences of the PCCM Unit.
- The Trainee will present one Research Conference during the first half of the year to provide a progress report on research accomplishments and planned activities, and will during the second half of the year will provide a final summary of results and conclusions.
- The Trainee will attend the bi-weekly conferences of the Department of Medicine Training Series.
- The Trainee will attend University research conferences related to his / her chosen area of research.
- The Trainee will be encouraged to submit and present their research findings at a national scientific meeting.
- The Trainee will be encouraged to submit their research findings for peer review and publication.
- The third year Trainee will assist with research training and supervision of graduate students, and first or second year Trainees engaged in similar research activities.
- The third year Trainee will assist with seminar and didactic research teaching through the activities of the mentor and through the regular conference schedule of the division.

Year 04

- A fourth year of intensive research training is highly desirable for physicians planning an academic career with research activities. This fourth year is not part of the accredited training program, but may be available through our T32 training grant in Lung Biology. Trainees with a research career goal will be encouraged to remain at the institution for an additional year, and to devote 80% of their time to research. During their third year they will be encouraged to apply for national career development awards through the National Institutes of Health and through private agencies and foundations. The activities during the fourth year will be similar to those listed for the third year.

Evaluation

Trainees will be evaluated semi-annually in regards to their research activities to assure that they are making progress towards the goals and objectives listed above. The

results of these evaluations will be provided to both the Trainee and the Program Director in writing. The means and criteria for evaluation will be appropriate for the specific activities of each year of training, and will include:

- Progress towards identifying, planning, and performing a research project as judged by the direct observation of the research mentor and the training faculty.
- Effective presentation of research progress reports at the scheduled Research Conferences.
- Attendance and diligence in the research project.
- Attendance at research conferences.
- Submission of grant requests.
- Submission of research results for presentation at scientific meetings.
- Submission of research results for publication.

Research mentors will be evaluated in writing semi-annually. The results of these evaluations will be provided to the Faculty and Program Director.

Optional clinical rotations

The training program as currently constructed allows for a broad range of clinical experiences. However, there may be additional experiences that the trainee may wish to arrange. These rotations may add to or replace a month of the Pulmonary Subspecialty rotation in 3rd year. The rotations may also be taken during research time if approved by the trainee's research mentor during 2nd or 3rd year.

Additional experiences available locally include:

- Allergy and Immunology (Timber Lane Allergy & Asthma Associates, Burlington, VT)
- Anesthesia (UVMMC)
- Infectious diseases (UVMMC)
- Thoracic radiology (UVMMC)

Additional internal experiences may be proposed by the fellow during the 2nd and 3rd year. These proposals should be discussed with and submitted to the Program Director a minimum of 4 months prior to the anticipated start date. Fellows may arrange experiences outside of the UVMMC system. These experiences need to be proposed a minimum of 6 months in advance and will require approval by the Program Director and the UVMMC GME office. Fellows leaving the area for additional clinical opportunities will be required to make-up accumulated call responsibilities either before or after the rotation.

Allergy and Immunology Rotation

Goal

To provide trainees educational experience in the evaluation and management of patient with allergic diseases.

Fellows may participate at any time during the 2nd or 3rd year. The rotation may involve weekly half day clinic over 4-8 weeks. The clinic takes place at Timber Lane Allergy and Asthma Associates in South Burlington, VT.

Objectives

To learn the pathophysiology, natural history, diagnostic test and treatment options of outpatients referred for allergy evaluation. To learn the longitudinal management of patients with allergies. To gain experience and understanding of testing procedures in allergy management.

These goals and objectives will be based on the 6 ACGME competencies, as specified for each competency below.

Patient Care: Fellows will learn how to take care of patients with allergy, including, but not limited to, those with asthma and allergic bronchopulmonary mycosis. In year 2 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of procedures, decision making, and communication with patients, their families and other health care professionals involved in the care of the patient. In year 3 of training, fellows will be functioning near or at the level of the attending in terms of overall care of the patient, while still under the supervision of the faculty.

Medical Knowledge: Fellows will develop a basic knowledge of the pathophysiology of allergy as related to pulmonary disease, with special attention to anaphylaxis and asthma. They will learn about the method and interpretation of skin testing and RAST. In year 2 of training, fellows will acquire more advanced knowledge of pathophysiology and disease states, and understand and utilize resources to gain additional knowledge. In year 3, fellows will be fully versed in sufficient knowledge of pulmonary allergy-related medicine that they may be prepared to sit for their board examinations.

Professionalism: Fellows will interact with their patients and with the clinic support staff in a professional and polite manner. They will respect patient privacy and autonomy and be sensitive to the diversity of patients' backgrounds. In the second year of training, fellows will be expected to improve their professionalism by acquiring team leadership skills and the ability to manage conflict resolution. They will also develop time management skills, especially to assist them in balancing their clinical duties and their research activities. By the third year the fellows will have developed an independent professional style.

Communication and Interpersonal Skills: Fellows will communicate clearly and completely with patients and clinic support staff regarding all aspects of patient care. They will also learn how to appropriately communicate by dictated letter and telephone with referring physicians regarding their assessment and advise regarding the patient. In the second year, fellows will develop increasing experience and skill at teaching colleagues through effective communication and delivery of useful information. In the third year of training, fellows will be adept at efficient and complete communication with colleagues and patients.

Practice-Based Learning: Fellows will develop a working knowledge of the current standards of care of patients based on guidelines and review of the medical literature. They will participate in Quality Assurance projects that seek to optimize and improve patient care. In year 2, fellows will increasingly identify and acknowledge their own limitations in knowledge and skills and work towards improving them. In year 3, fellows will continue to hone their skills in reading and interpreting the medical literature, advance their learning through participating in seminars and conferences, and improve the quality, efficiency and cost-effectiveness of care through participation in quality assurance programs.

System-based Practice: Fellows will learn to use the medical information systems available to them in clinic, including the electronic medical record (PRISM), and radiology systems, and ultimately the electronic medical record (PRISM) as it comes online in the outpatient setting. They will also learn about other systems available to assist and participate the care of their patients, such as social work services, respiratory therapy, visiting nurses, and home oxygen companies. In year 2, fellows will improve their skills at use of consultative services, as well as awareness and implementation of cost-effective health care strategies. In year 3, fellows will be fully aware of and gain further experience in utilizing the health care related services and resources available to them to provide the most cost-effective and high quality care of their patients with allergic disease.

Educational Experience

Allergy Clinic – Fellows who elect to do so will have the opportunity to have a concentrated clinic effort in allergy. Fellows will see patients with allergic complaints or disorders under the guidance of Dr. Edward Kent at the Timberlane Allergy Center in So. Burlington, VT. In the second year of training, fellows will have a one-month experience in which they have a concentrated effort in allergy immunology. They will approximately spend half of their outpatient time in the allergy clinic learning the care and management and testing associated with management of allergy patients with allergic diseases. This will include history and physical examination, participation in skin testing and development of management plans in consultation with the attending allergist.

Didactic Teaching - During their rotation, fellows will attend a didactic session on the basic science related to allergy. Additionally, one journal club per year will be designated for current allergy and immunology literature review overseen by one of the

attending allergists.

Evaluation and Feedback

Fellow presentations will be critiqued informally by the attending allergist at the time of presentation. This will include feedback on content and presentation. Written evaluation will be submitted at the end of the one month experience. Fellows will be evaluated with respect to the 6 competencies using tools appropriate to the Allergy Clinic, as shown in the table of tools.

Trainees will submit a separate evaluation form for this rotation at the end of their clinical rotation through this service. The program director will review all evaluations and monitor the quality of the educational experience. The program director will formally review the educational program semi-annually with the fellows and the faculty.

Fellows should keep an outpatient log of patients seen with a variety of allergy diseases.

General Guidelines

Timber Lane Allergy and Asthma Associates is located in the Timber Lane medical facility in South Burlington, VT. Fellows are responsible for making specific schedule arrangements with Dr. Edward Kent, two-months prior to their scheduled rotation.

Anesthesia Elective Rotation

Goals

To acquire knowledge of and competence in airway management and conscious sedation. To acquire knowledge in the physiology and pharmacology related to managing patients undergoing general anesthesia.

This rotation may be taken as a 2 week rotation in years 2 or 3

Objectives

Understand the indications, contraindications, and complications of general, regional, and local anesthesia. Obtain competence in: establishment of the airway; maintenance of the airway in the non-intubated, unconscious, paralyzed patient; oral and nasotracheal intubation; use of the laryngeal mask airway (LMA); and ventilation by bag or mask. Acquire knowledge of and experience in the use of paralytic agents. To acquire knowledge of double lumen endotracheal tube placement and management, and observe the use of intraoperative cardiac monitoring with transesophageal echo.

These goals and objectives will be based on the 6 ACGME competencies, as specified for each competency below.

Patient Care: Fellows will provide compassionate and appropriate care of patients undergoing anesthesia and in need of airway management. In year 2 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of procedures, decision making, and communication with patients, their families and other health care professionals involved in the care of the patient. In year 3 of training, fellows will be functioning near or at the level of the attending in terms of overall care of the patient, while still under the supervision of the faculty.

Medical Knowledge: Fellows will develop a sound knowledge of the basic physiological principles that underlie the principles of anesthesia and airway management. In particular, they will learn about the pharmacological principles that govern the use of sedatives, hypnotics, anesthetics, pressors, inotropes, paralytics and the like. They will also learn about hemodynamic monitoring and monitoring of respiratory status on mechanical ventilation. They will become familiar with the use of the laryngeal mask airway and other adjunct devices used in airway management. In year 2 of training, fellows will acquire more advanced knowledge of pathophysiology and disease states, and understand and utilize resources to gain additional knowledge. In year 3, fellows will be fully versed in sufficient knowledge of anesthesia in relation to pulmonary and critical care medicine that they may be prepared to sit for their board examinations.

Professionalism: Fellows will interact with their patients and with the hospital support staff and other colleagues in a professional and polite manner. They will respect patient privacy and autonomy and be sensitive to the diversity of patients' backgrounds. In the

second year of training, fellows will be expected to improve their professionalism by acquiring team leadership skills and the ability to manage conflict resolution. They will also develop time management skills, especially to assist them in balancing their clinical duties and their research activities. By the third year the fellows will have developed an independent professional style

Communication and Interpersonal Skills: Fellows will communicate clearly and completely with patients, families and hospital support staff regarding all aspects of patient care. They will also learn how to appropriately communicate by dictated letter and telephone with referring physicians regarding their assessment and advice regarding the patient. . In the second year, fellows will develop increasing experience and skill at teaching colleagues through effective communication and delivery of useful information. In the third year of training, fellows will be adept at efficient and complete communication with colleagues and patients, especially as this pertains to anesthesia related care of patients.

Practice-Based Learning: Fellows will develop a working knowledge of the current standards of care of patients based on guidelines and review of the medical literature. They will participate in Quality Assurance projects that seek to optimize and improve patient care. In year 2, fellows will increasingly identify and acknowledge their own limitations in knowledge and skills and work towards improving them. In year 3, fellows will continue to hone their skills in reading and interpreting the medical literature, advance their learning through participating in seminars and conferences, and improve the quality, efficiency and cost-effectiveness of care through participation in quality assurance programs.

System-based Practice: Fellows will learn to use the medical information systems available to them in the hospital, including the EMR (Prism), and radiology systems. They will learn how to effectively use their subspecialty colleagues who provide consultation services. They will also learn about other systems available to assist and participate the care of their patients, such as social work services, respiratory therapy, visiting nurses, home oxygen companies and hospice services, when appropriate. In year 2, fellows will improve their skills at use of consultative services, as well as awareness and implementation of cost-effective health care strategies. In year 3, fellows will be fully aware of and gain further experience in utilizing the health care related services and resources available to them to provide the most cost-effective and high quality care of their patients.

Educational Experience

Fellows will 1) spend time in the OR to learn more about airway management, pharmacology and monitoring of patients undergoing surgery; 2) spend time in the outpatient setting and OB to learn more specifically about the use of conscious sedation and airway management using the LMA; 3) observe the use of TEE in the OR for assessment of intraoperative cardiac function; 4) observe and gain some experience with placement of a double lumen endotracheal tube; 5) observe and gain some experience with management of the difficult airway.

The members of the anesthesia department will provide direct supervision and instruction in airway management techniques. Special attention will be focused on the use of conscious sedation and the use of the LMA and other adjunct devices for airway management.

Didactic teaching in anesthesia pharmacology and specifically paralytic agents will be provided as part of the critical care lecture series.

Fellows will be expected to do additional text and journal reading as assigned by Department of Anesthesia.

Fellows will keep a log of all procedures performed as part of this rotation.

Evaluation and Feedback

Trainees will be evaluated for cognitive and technical skills by the supervising anesthesia physician(s). Fellows will be evaluated with respect to the 6 competencies using tools appropriate to the Anesthesia rotation, as shown in the table of tools. Attendings will meet with fellows at the end of the rotation to review the evaluation.

Trainees will evaluate the rotation and supervising physicians following the month rotation using the standard evaluation form (see section 3).

The program director will review these evaluations at the semi-annual evaluation.

Infectious Diseases Rotation

Goals and Objectives

Learn to recognize, diagnose, and manage common Infectious Disease syndromes. Gain knowledge of the antimicrobial agents available and their appropriate use. Learn how to interpret gram stain and culture results and how to use the microbiology lab appropriately.

These goals and objectives will be based on the 6 ACGME competencies, as specified for each competency below. This elective may be taken at any time during the 2nd or 3rd year.

Patient Care: Fellows will provide compassionate and appropriate care of patients with infectious disease. They will become familiar with diagnostic evaluation of sputum for cells and organisms. In year 2 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of procedures, decision making, and communication with patients, their families and other health care professionals involved in the care of the patient. In year 3 of training, fellows will be functioning near or at the level of the attending in terms of overall care of the patient, while still under the supervision of the faculty.

Medical Knowledge: Fellows will develop a sound knowledge of the basic pathophysiology of infections that involve the lungs, as well as sepsis and other infections related to critical illness. In particular, the fellows will become familiar with community-acquired pneumonia, ventilator associated pneumonia, pleural space infections, lung abcesses, and opportunistic infections of the lungs, and their relevant treatment. In year 2 of training, fellows will acquire more advanced knowledge of pathophysiology and disease states, and understand and utilize resources to gain additional knowledge. In year 3, fellows will be fully versed in sufficient knowledge of infectious disease in relation to pulmonary and critical care medicine that they may be prepared to sit for their board examinations.

Professionalism: Fellows will interact with their patients and with the hospital support staff and other colleagues in a professional and polite manner. They will respect patient privacy and autonomy and be sensitive to the diversity of patients' backgrounds. In the second year of training, fellows will be expected to improve their professionalism by acquiring team leadership skills and the ability to manage conflict resolution. They will also develop time management skills, especially to assist them in balancing their clinical duties and their research activities. By the third year the fellows will have developed an independent professional style

Communication and Interpersonal Skills: Fellows will communicate clearly and completely with patients, families and hospital support staff regarding all aspects of patient care. They will also learn how to appropriately communicate by dictated letter and telephone with referring physicians regarding their assessment and advise

regarding the patient. In the second year, fellows will develop increasing experience and skill at teaching colleagues through effective communication and delivery of useful information. In the third year of training, fellows will be adept at efficient and complete communication with colleagues and patients, especially as this pertains to infectious disease related care of patients.

Practice-Based Learning: Fellows will develop a working knowledge of the current standards of care of patients based on guidelines and review of the medical literature. They will participate in Quality Assurance projects that seek to optimize and improve patient care. In year 2, fellows will increasingly identify and acknowledge their own limitations in knowledge and skills and work towards improving them. In year 3, fellows will continue to hone their skills in reading and interpreting the medical literature, advance their learning through participating in seminars and conferences, and improve the quality, efficiency and cost-effectiveness of care through participation in quality assurance programs.

System-based Practice: Fellows will learn to use the medical information systems available to them in clinic, including the electronic medical record (PRISM) and radiology systems. They will learn how to effectively use their subspecialty colleagues who provide consultation services. They will also learn about other systems available to assist and participate the care of their patients, such as social work services, respiratory therapy, visiting nurses, and home oxygen companies. In year 2, fellows will improve their skills at use of consultative services, as well as awareness and implementation of cost-effective health care strategies. In year 3, fellows will be fully aware of and gain further experience in utilizing the health care related services and resources available to them to provide the most cost-effective and high quality care of their patients.

<u>Teaching Methods</u>
Didactic lectures
Housestaff noon lectures
Infectious Disease Conferences
Oral Case presentation and discussion (inpatient and outpatient)
Bedside teaching
Self-directed learning

<u>Curriculum</u>

Urinary Tract Infections
Pneumonia
Central Nervous System Infections
Endocarditis and Intravascular Infections
Skin and Soft Tissue Infections
Bone and Joint Infections Intra-
abdominal Infections
Sexually Transmitted Diseases
Tuberculosis

Management of HIV
Travel Medicine
Adult Vaccination
Sepsis
Fever and Rash
Interpretation of Culture Results
Infections in Immunocompromised Patients

- Neutropenia
- Transplantation
- Hematologic malignancies
- Immune suppressive therapy
- Antimicrobials (mechanisms of action and resistance, spectrum of activity, toxicities)
- Considerations in choice of antimicrobial agent
- Penicillins
- Cephalosporins, monobactams, carbapenems
- Quinolones, aminoglycosides, metronidazole, and clindamycin
- Macrolides, sulfonamides, tetracyclines, vancomycin, strptogramins, oxazolidinones
- Antifungals and Antivirals

Activities (see calender)
Core lectures given at 9 am Mon - Thurs.
Daily clinical rounds each afternoon
Infectious Disease Conference or Journal Club each Thurs at 8 am
Attend outpatient clinic one morning per week
Attend Travel clinic one morning per month
Work up at least one new consultation each day
Follow 3 - 5 consult patients on a daily basis
Formal 15 minute presentation on a topic of his/her choice

Criteria for Evaluation
Fund of knowledge
Understanding of the role of the consultant
Quality of data collection and assessment
Quality of notes and flow sheets
Quality of interactions with patients and all members of the health care team.

Readings
Principles and Practice of Infectious Diseases, Mandell, Bennett, and Dolin. Fifth Edition.

A Practical Approach to Infectious Diseases, Reese and Betts, Fourth Edition

Selected Papers in the Infectious Disease Core Reading File

Evaluation and Feedback

Fellows will be evaluated with respect to the 6 competencies using tools appropriate to the ID rotation, as shown in the table of tools. Attendings will meet with fellows at the end of the rotation to review the evaluation.

Thoracic Radiology Rotation

Goals:

After completion of the rotation in thoracic radiology, the fellow will be able to:

1. Define the role of the radiologist as a consultant to the pulmonary/critical care physician
2. Detail the relative utility of the various thoracic imaging techniques in the evaluation of the patient with chest disease
3. Define the use of imaging studies in guiding invasive diagnostic procedures including bronchoscopy, pleural biopsy, and pleural aspiration and drainage procedures
4. Understand the complementary role of thoracic imaging with clinical and physiologic measurements of chest disease
5. Recognize the knowledge-based objectives listed below

The goals and objectives will be based on the 6 ACGME competencies, as specified for each competency below. Fellows may participate at any time during the 2nd or 3rd year.

Patient Care: Fellows will provide compassionate and appropriate care of patients undergoing diagnostic imaging. In year 2 of training, fellows will develop increasing responsibility for patient care, as evidenced by more independent interpretation of data, performance of procedures, decision making, and communication with patients, their families and other health care professionals involved in the care of the patient. In year 3 of training, fellows will be functioning near or at the level of the attending in terms of overall care of the patient, while still under the supervision of the faculty.

Medical Knowledge: Fellows will develop a sound knowledge of the basic physiological principles that underlie plain x-ray, CT scan, PET scan, MRI, nuclear medicine, ultrasound and other diagnostic imaging modalities. The will also become familiar with invasive radiological approaches and techniques such as CT guided and ultrasound guided aspiration and biopsies. In year 2 of training, fellows will acquire more advanced knowledge of pathophysiology and disease states, and understand and utilize resources to gain additional knowledge. In year 3, fellows will be fully versed in sufficient knowledge of thoracic imaging in relation to pulmonary and critical care medicine that they may be prepared to sit for their board examinations.

Professionalism: Fellows will interact with their patients and with the hospital support staff and other colleagues in a professional and polite manner. They will respect patient privacy and autonomy and be sensitive to the diversity of patients' backgrounds. In the second year of training, fellows will be expected to improve their professionalism by acquiring team leadership skills and the ability to manage conflict resolution. They will also develop time management skills, especially to assist them in balancing their clinical duties and their research activities. By the third year the fellows will have developed an independent professional style

Communication and Interpersonal Skills: Fellows will communicate clearly and

completely with patients, families and hospital support staff regarding all aspects of patient care. They will also learn how to appropriately communicate by dictated letter and telephone with referring physicians regarding their assessment and advise regarding the patient. . In the second year, fellows will develop increasing experience and skill at teaching colleagues through effective communication and delivery of useful information. In the third year of training, fellows will be adept at efficient and complete communication with colleagues and patients, especially as this pertains to thoracic imaging and related procedures involved in the care of patients.

Practice-Based Learning: Fellows will develop a working knowledge of the current standards of care of patients based on guidelines and review of the medical literature. They will participate in Quality Assurance projects that seek to optimize and improve patient care. In year 2, fellows will increasingly identify and acknowledge their own limitations in knowledge and skills and work towards improving them. In year 3, fellows will continue to hone their skills in reading and interpreting the medical literature, advance their learning through participating in seminars and conferences, and improve the quality, efficiency and cost-effectiveness of care through participation in quality assurance programs.

System-based Practice: Fellows will learn to use the medical information systems available to them in clinic, including the electronic medical record (PRISM), and radiology systems. They will learn how to effectively use their subspecialty colleagues who provide consultation services. They will also learn about other systems available to assist and participate the care of their patients, such as social work services, respiratory therapy, visiting nurses, and home oxygen companies. In year 2, fellows will improve their skills at use of consultative services, as well as awareness and implementation of cost-effective health care strategies. In year 3, fellows will be fully aware of and gain further experience in utilizing the health care related services and resources available to them to provide the most cost-effective and high quality care of their patients.

Objectives:

Interstitial lung disease

1. List and identify on a chest radiograph and chest CT four patterns of interstitial lung disease (ILD)
2. Make a specific diagnosis of ILD when supportive findings are present in the history or on radiologic imaging (e.g. dilated esophagus and ILD in scleroderma, enlarged heart and a pacemaker or defibrillator in a patient with prior sternotomy and ILD suggesting amiodarone drug toxicity)
3. Identify Kerley A and B lines on a chest radiograph and explain their etiology
4. Recognize the changes of congestive heart failure on a chest radiograph – enlarged cardiac silhouette, pleural effusions, vascular redistribution, interstitial and/or alveolar edema, Kerley lines
5. Define the terms “asbestos-related pleural disease” and “asbestosis;” identify each on a chest radiograph and chest CT

6. Describe what a “B” reader is as related to the evaluation of pneumoconiosis
7. Identify honeycombing on a radiograph and high resolution chest CT (HRCT), state the significance of this finding (end-stage lung disease), and list the common causes of honeycomb lung
8. State the radiographic classification of sarcoidosis
9. Recognize progressive massive fibrosis/conglomerate masses secondary to silicosis or coal worker’s pneumoconiosis on radiography and chest CT
10. Recognize the typical appearance of irregular lung cysts and/or nodules on chest CT of a patient with Langerhan’s cell histiocytosis
11. List four causes of unilateral ILD
12. List three causes of lower lobe

predominant ILD 13.List two causes of upper lobe
predominant ILD 14.Identify a secondary
pulmonary lobule on HRCT

15. Identify lymphangioleiomyomatosis on a chest radiograph and HRCT
16. Identify and give appropriate differential diagnoses when the patterns of septal thickening, perilymphatic nodules, bronchiolar opacities (“tree-in-bud”), air trapping, cysts, and ground glass opacities are seen on HRCT

Alveolar lung disease

1. List four broad categories of acute alveolar lung disease (ALD)
2. List five broad categories of chronic ALD
3. Name three pulmonary-renal syndromes
4. List five of the most common causes of adult respiratory distress syndrome
5. 5. Name four predisposing causes of bronchiolitis obliterans organizing pneumonia (BOOP)
6. Suggest a specific diagnosis of ALD when supportive findings are present in the history or on the chest radiograph (e.g. broken femur and ALD in fat embolization syndrome, ALD and renal failure in a pulmonary-renal syndrome, ALD treated with bronchoalveolar lavage in alveolar proteinosis)
7. Recognize a pattern of peripheral alveolar lung disease on radiography or chest CT and give an appropriate differential diagnosis, including a single most likely diagnosis when supported by associated radiologic findings or clinical information (e.g. peripheral lung disease associated with paratracheal and bilateral hilar adenopathy in an asymptomatic patient with ”alveolar’ sarcoidosis, peripheral lung disease associated with a markedly elevated blood eosinophil count in a patient with eosinophilic pneumonia, peripheral opacities associated with multiple rib fractures and pneumothorax in a patient with acute chest trauma and pulmonary contusions)

Atelectasis, Airways and Obstructive Lung Disease

1. Recognize partial or complete atelectasis of the following on a chest radiograph: right upper lobe, right middle lobe, right lower lobe, right upper and middle lobe, right middle and lower lobe, left upper lobe, left lower lobe
2. Recognize complete collapse of the right or left lung on a chest radiograph and list an appropriate differential diagnosis for the etiology of the collapse
3. Distinguish lung collapse from massive pleural effusion on a frontal chest radiograph
4. Name the 4 types of bronchiectasis and identify each type on a chest CT
5. Name 5 common causes of bronchiectasis
6. Recognize the typical appearance of cystic fibrosis on a radiograph and chest CT
7. Name the important things to look for on a chest radiograph when the patient history is

"asthma'"

8. Define tracheomegaly
9. Recognize tracheal and bronchial stenosis on chest CT and name the most common causes
10. Name the 3 types of pulmonary emphysema and identify each type on a chest CT
11. Recognize alpha-1-antitrypsin deficiency on a chest radiograph and chest CT
12. Recognize Kartagener's syndrome on a chest radiograph and name the 3 components of the syndrome
13. Define the term giant bulla, differentiate giant bulla from pulmonary emphysema and state the role of imaging in patient selection for bullectomy
14. State the imaging findings used to identify surgical candidates for giant bullectomy and for lung volume reduction surgery

Solitary and Multiple Pulmonary Nodules

1. State the definition of a solitary pulmonary nodule and a pulmonary mass
2. Name the three most common causes of a solitary pulmonary nodule
3. Name four important considerations in the evaluation of a solitary pulmonary nodule
4. Name six causes of cavitary pulmonary nodules
5. Name four causes of multiple pulmonary nodules
6. State the indications for percutaneous biopsy of a solitary pulmonary nodule
7. State the indications for percutaneous biopsy when there are multiple pulmonary nodules
8. State the complications and the frequency with which complications occur due to percutaneous lung biopsy using CT or fluoroscopic guidance
9. State the indications for chest tube placement as a treatment for pneumothorax nrelated to percutaneous lung biopsy
10. State the role of positron emission tomography (PET) in the evaluation of a solitary pulmonary nodule

Benign and Malignant Neoplasms of the Lung and Esophagus

1. Name the four major histologic types of bronchogenic carcinoma, and state the difference between non-small cell and small cell lung cancer
2. Name the type of non-small cell lung cancer that most commonly cavitates
3. Name the types of bronchogenic carcinoma that are usually central
4. Describe the TNM classification for staging non-small cell lung cancer, including the components of each stage (I, II, III, IV, and substages), and the definition of each component (T1-4, N0-3, M0-1)
5. State the staging of small cell lung cancer
6. Name the four most common extrathoracic sites for non-small cell lung cancer and small cell lung cancer to metastasize
7. State which stages of non-small cell lung cancer are potentially resectable
8. Recognize abnormal contralateral mediastinal shift on a post-pneumonectomy chest radiograph and state five possible etiologies for the abnormal shift
9. Name the most common location for adenoid cystic and carcinoid tumors to occur
10. Suggest the possibility of radiation change as a cause of new apical opacification on a chest radiograph of a patient with evidence of mastectomy and/or axillary node dissection
11. Describe the acute and chronic radiographic and CT appearance of radiation injury in the thorax (lung, pleura, pericardium, esophagus) and the temporal relationship to radiation therapy

12. State the role of MR in lung cancer staging (e.g. chest wall invasion, superior sulcus or Pancoast tumor)
13. State the role of positron emission tomography (PET) in lung cancer staging
14. Describe the TNM classification for staging esophageal carcinoma, including the components of each stage (I, II, III, IV) and the definition of each component (T, N and M)
15. State the role of imaging in the staging of esophageal carcinoma
16. State which stages of esophageal carcinoma are potentially resectable
17. State the classification of lymphoma, the role of imaging in the staging of lymphoma, and the typical and atypical manifestations of thoracic lymphoma
18. Define primary pulmonary lymphoma
19. Describe the typical chest radiograph and chest CT appearances of Kaposi sarcoma

Evaluation and Feedback

Fellows will be evaluated with respect to the 6 competencies using tools appropriate to the Thoracic Radiology rotation, as shown in the table of tools. Attendings will meet with fellows at the end of the rotation to review the evaluation.

Education session goals & objectives

Pulmonary and Critical Care Case Conference (Thursdays at noon)

Objectives

To provide trainees opportunity to present pulmonary and critical care hospital consultations for peer review. To provide trainees the opportunity to learn presentation skills. To learn the pathophysiology, diagnosis and management of patients hospitalized with pulmonary disease and critical illnesses. To review historic and current literature relevant to the cases presented for discussion.

Educational Experience

This once monthly conference will focus on inpatient pulmonary and critical care medicine consultations. The educational objectives will be obtained by the following methods:

1. The inpatient consultation service will select 2-3 cases for presentation.
2. Cases will be presented and relevant laboratory and radiographic material will be available for review.
3. Following each case presentation, a discussion of the relevant literature will take place
4. A reference list or copies of relevant articles should be available for distribution at the conference for all participants.

Evaluation and Feedback

Fellow presentations will be critiqued by faculty members present at the time of presentation. This will include feedback on content and presentation.

General Guidelines

The trainees and/or faculty members responsible for the inpatient pulmonary consultation service are expected to prepare and present this conference. It is expected that trainees will present a minimum of six conferences in the course of the training program.

Outpatient Pulmonary Case Conference (Thursdays at noon)

Goal
To provide additional training in the management of outpatients with pulmonary disease

Objective
To learn management issues specific to outpatients with pulmonary diseases. To enhance skills in case presentations to peers. To review relevant literature to the management of outpatients with pulmonary disease.

Educational Experience
This conference is held once per month in the MICU conference room. Two to three cases will be presented. The format will be a five-minute presentation followed by a 10-minute discussion. Each presenter will provide a review of the journal articles relevant to the presented case. Second and third year fellows will manage and present this conference under the guidance of a faculty member.

Evaluation and Feedback
Fellow presentations will be critiqued by faculty members present at the time of presentation. This will include feedback on content and presentation.

The program director will review all evaluations and monitor the quality of the conference series. The program director will formally review this educational program semiannually with the fellows and the faculty.

General Guidelines
A senior fellow will be assigned to coordinate this conference for the academic year. Requests for radiographs should be submitted to the radiology file room no later than 2 days prior to the conference. It is each presenter's responsibility to obtain all relevant materials for the conference.

Pulmonary Pathology-Radiographic Correlation (Thursdays at noon)

Objectives

To provide trainees didactic training in lung pathology. To understand the radiographic correlates in lung pathology

Educational Experience

This once monthly conference is a multidisciplinary conference directed at learning lung pathology and the radiographic correlates. The pulmonary division will present three cases and a chest radiologist will discuss the radiographic features. The pathologist will then show the corresponding pathology and discuss the pathologic features as well as relevant diagnostic techniques such as special stains. Trainees are encouraged to bring journal articles relevant to their cases for group discussion.

General Guidelines

A designated trainee will coordinate the pathology/radiology conference.

Pulmonary and Critical Care Teaching Conferences (Fridays at Noon)

Goal

To provide specific, detailed knowledge of critical care medicine topics.

Objectives

To provide education in the basic science and the physiology of critical care medicine. To provide instruction in specific multidisciplinary critical care medicine topics. To provide education in the indications, contraindications, and complications of common ICU procedures.

Educational Experience

All pulmonary/critical care fellows will attend a series of weekly hour-long seminars given by faculty members of the Pulmonary/Critical Care Division as well as by faculty in other related disciplines such as Medicine subspecialties, Surgery, Anesthesia and Obstetrics/Gynecology. The outline for these topics, to be completed over 2 years, is as follows (~75 lectures):

Critical Care Topics:

Cardiovascular Disease • cardiopulmonary resuscitation • cardiogenic shock • myocardial infarction • arrhythmias • pericardial and valvular diseases • cardiomyopathy • hypertensive crisis • vascular emergencies • hemodynamic monitoring/temporary pacers	***Endocrine/Dermatlogic Diseases*** • thyroid – myxedema, storm, sick euthyroid • adrenal crisis, pheochromocytoma • diabetes: DKA, HNK • nutrition • TEN, Stevens-Johnson	***Gastrointestinal Diseases*** • upper and lower GI bleeding • acute pancreatitis • acute hepatic failure • acute biliary disease • acute inflammatory bowel disease • acute vascular bowel disease • toxic megacolon • acute perforations, ruptures	***Ethical, administrative issues*** • ethical and legal considerations • psychosocial aspects of critical illness • JCAHO guidelines
Respiratory Disease • acute respiratory failure • status asthmaticus • pneumonia • pulmonary, air embolism • aspiration, chemical pneumonitis, drowning, smoke inhalation/burns • hemoptysis • mechanical ventilation and monitoring • upper airway obstruction • pulmonary hypertension	***Infectious Diseases*** • sepsis, septic shock • antimicrobials • immunocompromised hosts (including AIDS) • nosocomial infections • community-acquired (toxic shock, meningococcus, SBE)	***Genitourinary, obstetric-gynecologic diseases*** • obstructive uropathy • urinary tract bleeding • complications of pregnancy (toxemia, etc.)	***Poisonings*** • acetominophen, aspirin, alcohol, cocaine TCA, MAO, neuroleptic, opiates • other – carbon monoxide
Renal Disease • acute renal failure • acid-base disorders • metabolic derangements (Ca++, Mg++, etc.) • dialysis	***Hematologic Diseases*** • acute coagulation defects • anticoagulation, fibrinolytic therapy • acute hemolytic disorders (including sickle cell) • acute neoplastic crisis' • blood component therapy	***Surgical issues*** • head trauma • chest trauma • abdominal trauma • skeletal trauma	***Monitoring*** • hemodynamic • cerebral • respiratory • metabolic • imaging • biomechanics
Neurologic Disease • coma • seizures • Myasthenia, Guillaine-Barre • cerebral vascular disease • crush injury • burns • necrotizing fasciitis, soft-tissue infections • transplant issues	***Rheumatologic*** • vasculitis •	***Anesthesia issues*** • airway maintenance • paralytics • perioperative complications •	

Pulmonary Topics

Airway diseases • Asthma • COPD • Bronchiolitis • Cystic fibrosis	***Malignancy*** • Bronchogenic carcinoma • Metastatic disease • Carcinoid, tracheal tumors, etc	***Pleural disease*** • Empyema • Malignancy • Other etiologies: asbestos, collagen vascular disease, Dressler's
Parenchymal diseases • IPF • DPLD (occupational/environmental, collagen vascular, other (sarcoid, LAM, EG, HSP, etc.)	***Infections*** • Pneumonia • Immunocompromised hosts • TB, atypical mycobacterial disease	***Occupational/environmental disease*** • Occupational disease • Drug-induced lung disease ***Mediastinal disorders***
Vascular diseases • Pulmonary hypertension • Vasculitis, alveolar hemorrhage • Pulmonary embolism	***Lung Injury*** • ARDS • Radiation, inhalation, trauma	***Pulmonary manifestations of systemic disease and pregnancy*** • Collagen vascular disease • Sepsis, endocarditis • Renal, hepatic disease • Pregnancy
Pulmonary physiology • PFT's • Exercise testing ***Pulmonary rehabilitation***	***Pulmonary radiology*** • CXR • CT • Nuclear ***Other: Angio, PET, MRI***	***Pulmonary pathology*** ***Pulmonary procedures*** ***Respiratory care*** ***Sleep medicine*** • Physiology • Sleep-testing ***Clinical disorders***

Lung Cancer Multidisciplinary Clinic (Mondays 1-2 pm)

Goal

To understand the evaluation and management of chest tumors from a multidisciplinary perspective

Objectives

To understand the diagnostic evaluation of patients with chest tumors. To understand the indications for and limitations of diagnostic studies in the evaluation of chest tumors. To understand lung cancer staging and implications for treatment. To develop professional skills in working with colleagues in other disciplines.

Educational Experience

This conference is held weekly in the radiology department. The multidisciplinary team comprises chest radiologists, thoracic surgeons, medical oncologists, radiation oncologists and pulmonologists. The physician submits cases in advance for presentation. The diagnostic strategy and management is discussed. Further diagnostic studies or treatment is then planned based on the group consensus. Time for follow-up reports on patient progress is provided. Patients with lung cancer are staged and entered into the tumor registry based the recommendations of this conference. Fellows are expected to present pertinent cases and follow-up on the recommendations made at the conference. The Multidisciplinary Lung Tumor Clinic immediately follows from 2-5 pm.

Pulmonary & Critical Care Journal Club (4th Thursday or Friday noon)

Goal

To provide an educational experience in literature review relevant to pulmonary medicine.

Objective

To provide trainees a review of current literature in Pulmonary and Critical Care Medicine. To provide trainees an understanding of statistical methodology used in research articles. To develop skills in evaluating the quality of published pulmonary and critical care literature.

Educational Experience

This conference will be held once per month. Fellows are expected to present 1 or 2 articles for detailed review. Assigned trainees will select the article(s) at least 2 weeks prior to the scheduled conference. A faculty member must be assigned to review the article with the trainee prior to the conference presentation. The trainee will present the journal article(s) at the conference and lead the discussion. Each trainee will present at this conference 2 times per year. Faculty and Fellow attendance is mandatory.

Evaluation and Feedback

Fellow presentations will be critiqued informally by faculty members present at the time of presentation. This will include feedback on content and presentation.

The program director will monitor the quality of the conference series. The program director will formally review this educational program semiannually with the fellows and the faculty.

General Guidelines

Journal club is held on the 5th Friday of each month with 5 Fridays, or Thursdays at noon during months with only 4 Fridays, in the MICU conference room. Fellows should submit articles to the unit secretary for distribution 2 weeks prior to the conference. The MICU and SICU teams also have a quarterly journal club that will count toward the monthly journal club requirement during those relevant months.