Life Care Planning with Pulmonary Impairments

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  - Certified Case Manager
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The following items are meant for educational purposes only. They are not meant as a standard or template for treatment recommendations for specific pulmonary impairments.

- Replacement frequencies are generalized suggestions and are not meant for case specific use.
- Case application must be adjusted to their unique demands with activity level and age appropriate recommendations and replacement frequencies supported by treatment team and/or specialist consultations.
- Additional consideration must be given to specific impairments and comorbid progressions as age and disability combine.
Allied Health Evaluations

- Pulmonary nurse clinician
- Respiratory therapy
- Registered dietitian/nutrition therapy
- Physical therapy
- Occupational therapy
- Exercise physiologist
- Functional capacity evaluation (FCE)
- Speech therapy
  - Swallow
  - Communication
- Psychological/mental health
- Recreation therapy
- Driving training
- Genetics counseling
- Sexual counseling

Allied Health Therapeutic Modalities

- Pulmonary nurse clinician
- Respiratory therapy
- Registered dietitian/nutrition therapy
- Physical therapy
- Occupational therapy
- Exercise physiologist
- Speech therapy
  - Swallow
  - Communication
- Psychological
  - Individual adjustment to disability counseling
  - Family adjustment to disability counseling
  - Marital adjustment to disability counseling
- Pharmacist
- Recreation therapy
- Driving

Allied Health Therapeutic Modalities

- Pulmonary Rehabilitation
  - A "multi-disciplinary program of care for patients with chronic respiratory impairment that is individually tailored and designed to optimize physical and social performance and autonomy."
  - In-patient
  - Out-patient
  - Minimum of 12 hours per week for 6 or more weeks

- (Hyperbaric) Oxygen Therapy
  - The prescription should always include:
    - The source of supplemental oxygen (gas or liquid)
    - The method of delivery
    - Duration of use
    - The flow rate at rest, during exercise, and during sleep
  - Typically in Stage IV very severe COPD patients
### Diagnostic and Educational Testing

- Developmental testing and monitoring
- Neuropsychological evaluation for baseline
- Educational testing for IDEA programming
- Serial neuropsychological evaluations for cognitive programming
- Vocational evaluation

### Wheelchair(s) / Mobility / Maintenance

- Manual wheelchair
- Power wheelchair
  - Manual back-up
- Powered cart
- Shower/commode wheelchair
- Maintenance of each @ 10% of purchase price beginning second year after purchase
- Referenced foundation for replacement frequencies

### Wheelchair Accessories

- Replacement batteries for powered wheelchair/cart (stagger replacements)
- Oxygen tank attachments
- Wheelchair cushions
- Augmentative communication attachments
- ECU attachments
- Lap board
- Gloves
- Backpack
Orthotics/Prosthetics

- Impaired mobility may require orthotic interventions for positional and/or mobility supports
- Inserts
- AFO
- KAFO
- WHFO
- HFO

Orthopedic Equipment

- Positioning
  - Electric hospital/specialty bed 1X/10 yrs
  - Micro-air
  - Annual maintenance @ 10% beginning year after warranty expires 1X/2 yrs
  - Replacement components
    - Filter
    - Overlay pad
    - Blower
    - Mattress
    - Alternating pressure mattress 1X/6 yrs
  - Lift recliner 1X/7-10 yrs

Durable Medical Items

- Home ventilation (monthly rental – Check inclusive accessories)
  - Purchase replacement (1X/3-4 yrs)
  - Ventilator circuits
  - Universal power supply battery (1X/6-6 yrs)
  - Back up generator (include installation and maintenance agreement) (1X/5-10 yearly)
  - External ventilator battery kit (1X/6 yrs)
  - External battery charger (1X/6 yrs)
  - Back up portable ventilator with external rechargeable battery (1X/6-6 yrs)
  - AC adapter for portable ventilator (1X/3-4 yrs)
  - 1 Concentrator (1X/6 yrs)
    - Eliminates nitrogen from room air and provides the patient with over 90% pure oxygen
  - Hand held oxygen concentrator analyzer (1X/3-4 yrs)
  - 1 Portable home concentrator
  - Compressor
  - Portable compressor
  - Oxygen cylinder (1X/3-4 yrs)
  - Oxygen cylinder Rack (1X/10 yrs)
Durable Medical Items

• Oxygen cart system (1X/4-6 yrs)
  – Cylinder
  – Regulator
  – Gauge
  – Nasal Cannula
  – Wrench
• Two-wheeled oxygen cart (1X/10 yrs)
• Pulmonary vent back pack – transport (1X/5-7 yrs)
• Stationary suction/aspirator machine (1X/3-4 yrs)
• Portable suction machine (1X/3 yrs)
• Digital overnight pulse oximeter (1X/4-6 yrs)
  – Not recommended for aerosol therapy
• Concha heater
• IV Pole
• Ambu-bag/mask (1X/5 yrs)
• Heated humidifier (1X/3-4 yrs)

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Sources:
* Initial Discharge supplies


Durable Medical Items

- Phrenic nerve stimulator (PNS)
  - DRGs:
    - 327.24 Idiopathic sleep related non-obstructive alveolar hypoventilation
    - 327.25 Congenital central alveolar hypoventilation syndrome
    - 344.01 C1-C4 complete quadriplegia and quadriparesis
    - 344.02 C1-C4 incomplete quadriplegia and quadriparesis
    - 344.05 Chronic respiratory failure
- Equipment
  - PNS implantable neurostimulator electrodes, each (HCPCS L8680)
  - PNS patient programmer (HCPCS L8681)
  - PNS Radiofrequency receiver (HCPCS L8682)
  - PNS Radiofrequency transmitter (HCPCS L8683)
  - PNS rechargeable implantable single array pulse generator (HCPCS L8685)
  - PNS non-rechargeable implantable single array pulse generator (HCPCS L8686)
  - PNS rechargeable implantable dual array pulse generator (HCPCS L8687)
  - PNS non-rechargeable implantable dual array pulse generator (HCPCS L8688)

Aids for Independent Function

- Adaptive clothing allowance
- Adaptive equipment allowance
- Environmental control unit
  - Augmentative communication technologies
  - Computers and Software
- Emergency response/medic alert
- Land based/cell/satellite phone
  - Offset for usual and customary expenditures

Supplies (Disposable)
*Initial Supplies & Supply Replacement Schedule

- 1 box alcohol wipes
- Alcohol isopropyl 16 oz (3/mo)
- 24 sterile concha water (1 case – 1 liter bottles/month)
- 2 controll III disinfectant germicide solution
- 2 boxes cotton tip applications (100/month)
- 4 boxes split gauze sponges 3X2 or 4X4
- 4 boxes non-latex gloves
- 2 boxes thermorevent heat/moisture exchanger
- 2 bottles hydrogen peroxide 16 oz (1/mo)
- 2 tubes water soluble lubricant
- 2 nebulizer filters
- 4 nebulizer kits (then 3/mo.)
- 4 nebulizer masks
- 8 bottles normal saline
- 2 boxes normal saline vial
- 4 suction canisters (then 2/mo.)
Supplies

- 2 suction and connection tubing (then 6’ 2-4X/mo.)
- 200 suction catheters (2/day)
- 4 Yankauer suction catheters (then 2/mo.)
- Suction kits (120/mo) – What is included?
- 3 tracheostomy tubes (Cuffless) (14/yr.)
  - 2 m/o sizes
  - 1 one-size
- Tracheostomy collars (2/month)
- 3 tracheostomy tubes (Cuffless) (14/yr.)
  - 2 same size
  - 1 one size smaller
- *15 tracheostomy tube holders (1/day)
- Tracheostomy ties (7-8X/mo.)
- *30 tracheostomy care kits
- *Tracheostomy sponges (2 boxes/month)
- *Passy-Muir speaking valves (6/yr)
- *6 aerosol drain bags
- *4 tracheostomy masks
- *4 large volume aerosol nebulizers

Supplies (Disposable)

- 16 oxygen swivel adaptors/connections
- 15 and 22 mm adaptors (2/mo. each)
- 2 - 100 feet corrugated oxygen tubing (1/mo)
- 1 H system (Large Oxygen Cylinder)
- 4 H refills (Oxygen)
- *1 E system (Portable Oxygen Cylinder)
  - Portable Compressed Oxygen for transport
- Entrainment for humidifier (1X/week)
- Sterile cotton tip applicators (1 bx/mo)
- Oral suction tips (1 bx/mo)
- Saline bullets for suctioning (1 - 100 count bx/mo)
- Antibacterial/Alcohol foam hand soap (1/mo)
- Back up portable ventilator battery (1X2 years)
- Disinfectant 8 oz. (1/mo)
- Omniflex connectors (1/mo)

Supplies (Disposable)

- Vent circuit, disposable with PEEP (1/mo)
  - Power reboot system
- Vent bacteria filter (1/mo)
- Air inlet filters
- Exhalation valve assembly (1/mo)
- Enteral syringes 60 cc (30/mo)
- Sodium chloride 0.9% inhalation solution
- Gauze, sterile drain 4X4X6 (100/mo)
- Tape, transparent clear (1-2 rolls/mo)
- Disposable bed pads (if incontinent and/or otherwise impaired mobility)
- Oximeter probes (1/mo)

NOTE: Consumption rates increase during periods of illness and/or exacerbations and as the patient matures
Supplies (Disposable)

- Nutritional Supplementation
  - Off-set cost of supplementation from the usual expenditures for nutrition
- Adaptive clothing allowance
- Continence supplies
- Symptom diary

Medications

- Bronchodilators
  - Beta₂-agonists
    - Short-acting
      - Fenoterol
      - Salbutamol (albuterol) - preferred
      - Terbutaline
    - Long-acting
      - Formoterol
      - Salmeterol
  - Anticholinergics
    - Short-acting
      - Ipratropium bromide (may supplement albuterol)
      - Second most preferred
      - Oxytropium bromide
    - Long-acting
      - Tiotropium

- Bronchodilators
  - Combination short-acting Beta₂-agonists plus anticholinergic in one inhaler
    - Fenoterol/Ipratropium
    - Salbutamol/Ipratropium
  - Methylxanthines: Slow release preparations
    - Aminophylline
    - Theophylline
  - Inhaled glucocorticosteroids
    - Beclomethasone
    - Budesonide
    - Fluticasone
    - Triamcinolone
Medications

- **Bronchodilators**
  - Combination long-acting Beta2-agonists plus glucocorticosteroids on one inhaler
    - Formoterol/Budesonide
    - Salmeterol/Fluticasone
  - Systemic glucocorticosteroids (Severe COPD)
    - Prednisone/prednisolone
    - Methylprednisolone

- **Other Pharmacologic Treatments**
  - Vaccines:
    - Influenza vaccines can reduce serious illness and death in COPD patients by about 50%. Vaccines containing killed or live, inactivated viruses are recommended, and should be given once (in autumn) or twice (in autumn and winter) each year.
  - Antibiotics:
    - Only in treating infectious exacerbations of COPD and other bacterial infections
      - First-line agents
        - Amoxicillin
        - Trimethoprim/sulfamethoxazole (TMP/SMX)
        - Doxycycline
      - Second-line agents
        - Second-generation cephalosporins
        - Azithromycin
        - Clarithromycin
        - Amoxicillin/clavulanate
      - Second-line agents
        - Azithromycin
        - Clarithromycin
        - Amoxicillin/clavulanate

- **Mucolytic (Mucokinetic, Mucoregulator) Agents**
  - Ambroxol
  - Erdosteine
  - Carbocysteine
  - Iodinated glycerol
  - Although a few patients with viscous sputum may benefit from mucolytics, these agents are not recommended

- **Antioxidant Agents**
  - N-acetylcysteine
  - Used experimentally to reduce the frequency of exacerbations but requires more trials

- **Immunoregulators (Immunostimulators, Immunomodulators)**
  - May decrease severity, but not the frequency of exacerbations
  - Not recommended as preliminary studies have not been replicated

- **Antitussives**
  - Coughing, while a troublesome symptom, has a significant protective role.
  - Regular use of antitussives is contraindicated in stable patients
Medications

- Vasodilators
  - Inhaled nitric oxide is contraindicated with risk of worsening gas exchange with altered hypoxic regulation of ventilation-perfusion balance
- Respiratory Stimulants are not routinely recommended in stable patients
  - Doxapram, a non-specific respiratory stimulant available as an intravenous formulation
- Narcotics
  - The use of oral and parenteral opioids may be effective for treating dyspnea in COPD patients with advanced disease
  - Nebulized opioids may have serious adverse effects with use limited to a few sensitive subjects
- Others not recommended
  - Alternative healing methods not adequately tested

Medications - Step-Care: Pharmacologic Approach for Managing Stable COPD

- Each step represents an intervention that should be considered only if the previous course of action fails to improve symptoms of COPD.
  - Step 1 is an intervention that is generally associated with mild COPD.
  - Step 2 is associated with moderate COPD.
  - Steps 3 and 4 are associated with severe COPD. While the intensity of pharmacological management generally increases with higher levels of severity, they are not necessarily directly correlated.
  - Albuterol and ipratropium are bronchodilators, improving dyspnea and exercise tolerance.
  - Salmeterol is a long-acting bronchodilator which is a suitable agent for scheduled administration.

Medications

- Step 1
  - Inhaled short-acting bronchodilator
  - Short-acting beta agonist (albuterol is preferred)
  - 2-4 puffs when necessary/as needed (PRN)
    - 2-4 puffs, every 4-6 hours
- Consider Step 2 if symptoms persist

- Step 2
  - Continue when necessary/as needed (PRN) inhaled short-acting bronchodilator PLUS scheduled dosing of one of the following:
    - Salmeterol (Serevent® Discus)
    - Formoterol (Foradil®)
    - Albuterol (Proventil®, Ventolin®)
    - Ipratropium (Atrovent®)
    - Levalbuterol
    - 0.63-1.25 mg every 6-8 hours via nebulizer
- Consider Step 3 if symptoms persist
Medications

- **Step 3**
  - Continue therapy in Step 2 and perform corticosteroid trial
  - Prednisone IV 50-60 mg daily for 2-4 weeks or inhaled corticosteroid in a dose of 300-400 mcg beclomethasone/day or dose equivalent of another inhaled steroid for 6-12 weeks
  - Consider Step 4 if symptoms persist

- **Step 4**
  - **Positive Response**
    - greater than or equal to 15% improvement in post-bronchodilator FEV1, symptoms + improvement in 6-minute walk
    - **Pharmacological Intervention**
      - Taper off or discontinue oral corticosteroids and prescribe or continue inhaled corticosteroids
  - **Negative Response**
    - Less than 15% improvement in post-bronchodilator FEV1 or no improvement in symptoms +/-6 minute walk
    - Discontinue corticosteroids and consider theophylline as adjunctive therapy with inhaled bronchodilators

- **Dosage Information**
  - Therapeutic range of theophylline at a steady state has conventionally been considered to be 10-20 micrograms/mL, but lower serum concentrations of 5-15 micrograms/mL provide similar efficacy with a lower incidence of adverse effects

- **Potentially significant adverse effects and drug interactions that must be carefully considered and closely monitored during therapy**

Home Care

- **Family: Willing and Able**
  - Composition
  - Stability
  - Location (EMS proximity)
  - Respite for family caregivers

- **Medical social worker**

- **Home health care agency**
  - Attendant
    - Skilled Nursing
    - LPN
    - RN

- **Case manager**

- **DME Vendor**
  - Respiratory Therapist

- **Community notification (power and telephone companies, EMS)**

- **Medical Foster Care**
  - Private Residence

- **Facility Care**
  - May be required as alternative to home care dependent on community resources available
  - May be presented as an option to home care
  - Consider specialized facilities
  - Cystic Fibrosis Care Centers (CFCC)
  - Medical Foster Care
    - Group Home
Future Medical Care Routine

- Pediatrician/Primary Care Physician for routine preventive care and monitoring
- Routine vaccinations
  - Pneumococcal vaccination
  - Haemophilus influenza
- Pediatric pulmonologist/pulmonologist and/or intensivist
  - Follow up: one week following exacerbation
  - Follow up four weeks after initiation of therapy
  - Follow up every two to four weeks until control is attained
  - Follow up: every four to six months for persistent symptoms
- Pediatric otolaryngologist/otolaryngologist (if has a tracheostomy)

Future Medical Care Routine

- Diagnostics
  - Chest x-ray
  - Diaphragm fluoroscopy
  - Bronchoscopy
  - Electrocardiogram
  - Echocardiogram
  - Holter monitor recording
  - Brain MRI
  - Brainstem MRI
  - Sleeping pediatric respiratory physiology lab studies

Future Medical Care Routine

- Labs
  - Serum carnitine levels
  - Urine carnitine levels
  - CBC (baseline, follow-up as needed)
  - Electrolytes (baseline, follow-up as needed)
  - Sputum culture and sensitivity
  - Blood glucose (especially if on steroids)
  - Arterial blood gas (ABG as needed)

- Respiratory Syncytial Virus (RSV) Prophylaxis: American Academy of Pediatrics Practice Guidelines
  - [AVAILABLE] Online: http://aappgrandrounds.aappublications.org/cgi/content/extract/5/4/37
  - [AVAILABLE] Online: http://aappolicy.aappublications.org/
Transportation

- Transport capacity with ventilator tray
- Adapted van
  - Minus average cost of a vehicle ($29,400 4th Qtr. 2006)
  - [AVAILABLE] On-line
  - Minus vehicle trade-in value (from economist)
  - Minus equipment trade-in value (from economist)

Architectural Renovations

- Considerations
  - Proximity to EMS
  - House/Room Size
  - Space and storage
  - Electrical systems/power source
  - Climate control
  - Plumbing
  - Communication (telephone)
  - Back-up power source/generator
  - Mobility
  - Med-Alert System/Community awareness
  - Comorbidities affecting independence to activities of daily living (ADLs)
  - Reference $50,000 if unable to obtain actual retrofit analysis, design and bid
  - Source: [AVAILABLE] On-line
    - [http://www.vba.va.gov/benefit_facts/Home_Loans/English/HomeModseg_0406.doc](http://www.vba.va.gov/benefit_facts/Home_Loans/English/HomeModseg_0406.doc)

Health and Strength Maintenance

- Patients are encouraged, when possible, to participate in an ongoing maintenance exercise program to sustain strength and endurance
- Free weights or elastic exercise bands
- Health club membership
- Home exercise equipment
- Camps for Medically Fragile Kids
  - [AVAILABLE] On-line
    - [http://www.familyvillage.wisc.edu/Leisure/camps.html](http://www.familyvillage.wisc.edu/Leisure/camps.html)
Acute Medical Intervention

- Genetic testing
- Emergency Room Treatment

2007 Usual and Customary Fees

<table>
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<tr>
<th>Code</th>
<th>ER Visit</th>
<th>50%</th>
<th>75%</th>
<th>90%</th>
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<td>$ 49</td>
<td>$ 82</td>
<td>$ 93</td>
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<td>99282</td>
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<td>$107</td>
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<td>99283</td>
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<td>$150</td>
<td>$211</td>
<td>$241</td>
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<tr>
<td>Plus hospital ER charges</td>
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</tbody>
</table>

Surgical Intervention

- Medialization laryngoplasty
- Implantation PNS neurostimulator electrodes (CPT: 64577)
- Insertion or replacement of peripheral or gastric neurostimulator pulse generator or receiver, direct or inductive coupling (CPT: 64590)
- Bullectomy – Lung Volume Reduction Surgery (LVRS)
  - In carefully selected patients, this procedure is effective in reducing dyspnea and improving lung function
  - Remove compressive effects of diseased lung tissue on the ventilation and perfusion of surrounding lung
  - Diagnostic Testing
    - Thoracic computed tomography scan
    - Arterial blood gas measurement
    - Comprehensive respiratory function test
    - Bronchoscopy

Lung Volume Reduction Surgery (LVRS)

- An experimental palliative surgical lung resection to reduce hyperinflation
- Does not improve life expectancy
- Does improve exercise capacity in patients with predominant upper lobe emphysema
- Does improve low post-rehabilitation exercise capacity
- May improve global health status in patients with heterogeneous emphysema
Surgical Intervention

**Lung Volume Reduction Surgery (LVRS)**

- CPT Codes (Medical Fees in the United States 2007)

<table>
<thead>
<tr>
<th>Procedure Description</th>
<th>Usual</th>
<th>Customary</th>
<th>Usual</th>
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<tbody>
<tr>
<td>32441 – 32446 Remove Lung Lesion</td>
<td>50%</td>
<td>75%</td>
<td>90%</td>
</tr>
<tr>
<td>32449 – 32450 Remove Lung Lesion</td>
<td>50%</td>
<td>75%</td>
<td>90%</td>
</tr>
<tr>
<td>32460 – 32465 Lungs Reduction</td>
<td>50%</td>
<td>75%</td>
<td>90%</td>
</tr>
<tr>
<td>32470 – 32475 Thoracotomy</td>
<td>50%</td>
<td>75%</td>
<td>90%</td>
</tr>
</tbody>
</table>

- **Potential Complications**

- **Ventilator Dependence**

  - Monitoring
    - Obstruction or airway obstruction
    - Weakened airway
    - Erosion of soft tissue
    - Cuff over or slide inflated
  - Pulmonary
    - Tension pneumothorax
    - Subcutaneous emphysema
    - Pneumopericardium
    - Pneumoperitoneum
  - Infection
  - Oxygen toxicity
  - Inadequate ventilation
    - Atelectasis
    - Decreased functional residual capacity (FRC)
    - Decreased compliance
    - Decreased V/Q
    - Decreased PaO2

- **Transplantation**

  - Lung Transplantation
    - Criteria for referral for lung transplantation include FEV1 <35% predicted, PaO2 <7.8-8.2 kPa (55-60 mm Hg), PaCO2 >6.7 kPa (50 mm Hg), and secondary pulmonary hypertension.
    - Referred when 2 year survival rate is less than 50%.
    - Bilateral sequential lung transplant
      - 85% survival 0-1 year
      - 5% survival 0-5 years
      - 5% survival 0-10 years
    - Liver Transplantation
      - Milliman Studies
        - (AVAILABLE) Online:
Potential Complications Ventilator Dependence

- Cardiovascular
  - Diminished venous return
  - Hypotension
  - Diminished cardiac output
  - Diminished oxygenation
- Gastrointestinal
  - Fecal impaction
- Equipment
  - Tracheostomy tube
    - inadequate size
    - faulty cuff
  - Ventilator circuitry
    - Disconnection between patient and ventilator
    - Tubing obstruction
    - Tubing leaks
    - Improper assembly
    - Failed exhalation valve

Potential Complications Ventilator Dependence

- Ventilator
  - Electrical failure
  - Mechanical failure
  - Pneumatic system failure
  - Faulty/inaccurate settings
- Humidification Device
  - Electrical failure
  - Improper temperature
  - System leaks
- Monitoring Device
  - Not activated
  - Improper adjustment
  - Mechanical malfunction

Vocational Rehabilitation

- Parental/Family Occupational Patterns
- Educational attainment (individual/parents/family)
- Evaluation Results
- Developmental Attainment
- Synthesis (Integration of PEED)
- Rehabilitation Plan
- Access to Labor Market
- Placeability
- Earning Capacity
- Labor Force Participation
Official Disability Guidelines
Pulmonary ICD-9 Codes

- Diseases of the Respiratory System
  - ICD-9: 460-466 Acute Respiratory Infections
  - ICD-9: 470-478 Other UR Tract Diseases
  - ICD-9: 480-487 Pneumonia and Influenza
  - ICD-9: 490-496 COPD and Related Conditions
  - ICD-9: 500-508 Pneumoniosis and Other Lung Diseases Due to External Agents
  - ICD-9: 510-519 Other Disease of the Respiratory System

Official Disability Guidelines
Pulmonary ICD-9/CPT Codes

- COPD and Allied Conditions
  - ICD-9: 490
  - Average length of hospital stay: 3.4 days
  - Average cost of hospital stay: $9,453
  - Average disabled work days: 36.22
  - At risk work days

  - Typical CPT
    - 71020 Chest x-ray
      - 71020-26 Reading
        - 94640 Airway Inhalation Tx
        - 94760 Measure Blood O2
        - 99281 ER Visit

- Chronic Bronchitis
  - ICD-10: J41-J42
  - Average length of hospital stay: 3.3 days
  - Average cost of hospital stay: $15,234
  - Average disabled work days: 6.83
  - At risk work days: 25
  - Typical CPT

  - Usual and Customary Fees
    - 36415 Collection Venous Blood
    - 36460 Withdrawal Art. Blood
    - 82375 Carbon Monoxide
    - 94640 Airway Inhalation Tx
    - 94760 Measure Blood O2
Official Disability Guidelines
Pulmonary ICD-9/CPT Codes

• Emphysema
  – ICD-9 492
  – ICD-10 J43
  – Average length of hospital stay 6 days
  – Average cost of hospital stay $26,720
  – Average disabled work days 105.71
  – At risk work days 365

Other Diseases of the Lung
  – ICD-9 518
  – ICD-10 J81, J82, J83, J84
  – Average length of hospital stay 5.4 days
  – Average cost of hospital stay $45,680.00
  – Average disabled work days 19.95
  – At risk work days 28

Typical CPT

  31500 Insert emergency airway
  – Typical CPT Usual and Customary Fees
    50% 75% 90%
  36415 Collection Venous Blood
  36600 Withdrawal Art. Blood
  64550 Apply Neurostimulator
  71010 Chest x-ray
  71010-26 Reading
  71020 Chest x-ray
  71020-26 Reading

Typical Lab CPT

  80048 Basic Meta Panel
  81003 Urinalysis
  82150 Amylase
  82550 Creatine Kinase (cK)
  82645 Assay Creatinine Blood
  82947 Glucose, Qualitative
  83615 Lactate Dehydrogenase
  83890 Lipase
  85735 Magnesium
  84075 Phosphates, Alkaline
  84100 Phosphates, Inorganic
### Typical Lab CPT

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<tr>
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<tr>
<td>84450</td>
<td>Transamidase (Aut) (SGOT)</td>
<td>$20 $28 $36</td>
</tr>
<tr>
<td>84460</td>
<td>Transamidase; Alanine</td>
<td>$21 $28 $37</td>
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<tr>
<td>84520</td>
<td>Urea Nitrogen, Qual.</td>
<td>$18 $24 $32</td>
</tr>
<tr>
<td>84550</td>
<td>Uric Acid; Blood</td>
<td>$19 $26 $35</td>
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<tr>
<td>85041</td>
<td>Blood Count; Hematocrit</td>
<td>$ 5  $ 6   $ 8</td>
</tr>
<tr>
<td>85018</td>
<td>Blood Count; Hemoglobin</td>
<td>$15 $18 $21</td>
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<tr>
<td>85025</td>
<td>Blood Count; Complete</td>
<td>$14 $19 $24</td>
</tr>
<tr>
<td>85610</td>
<td>Prothrombin Time</td>
<td>$18 $26 $31</td>
</tr>
</tbody>
</table>

### Typical Diagnostic CPT

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Usual and Customary Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>94010</td>
<td>EKG, Complete</td>
<td>$69 $86 $103</td>
</tr>
<tr>
<td>94015</td>
<td>EKG, Tracing</td>
<td>$59 $71 $83</td>
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<tr>
<td>94210</td>
<td>Breathing Capacity Test</td>
<td>$77 $102 $139</td>
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<tr>
<td>94260</td>
<td>Thoracic Gas Volume</td>
<td>$66 $87 $108</td>
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<tr>
<td>94640</td>
<td>Airway Inhalation Tx</td>
<td>$40 $53 $72</td>
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<tr>
<td>94664</td>
<td>Aerosol or Vapor Inhal.</td>
<td>$42 $56 $76</td>
</tr>
<tr>
<td>94760</td>
<td>Measure Blood O2</td>
<td>$26 $34 $46</td>
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</tbody>
</table>

### Typical Treatment CPT

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Usual and Customary Fees</th>
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</thead>
<tbody>
<tr>
<td>97001</td>
<td>PT Eval</td>
<td>$115 $145 $177</td>
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<tr>
<td>97002</td>
<td>PT Ref-Eval</td>
<td>$65 $80 $100</td>
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<tr>
<td>97010</td>
<td>Hot/Cold Pack Tx</td>
<td>$25 $31 $36</td>
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<tr>
<td>97030</td>
<td>Ultrasound</td>
<td>$22 $40 $49</td>
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<tr>
<td>97040</td>
<td>Therapeutic Activities</td>
<td>$14 $20 $24</td>
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<tr>
<td>97050</td>
<td>Manual Therapy</td>
<td>$ 6 $ 9   $12</td>
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<tr>
<td>99203</td>
<td>Office, New Out-Pt</td>
<td>$137 $158 $187</td>
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<tr>
<td>99212</td>
<td>Office, Est. Out-Pt</td>
<td>$ 78 $ 86 $ 100</td>
</tr>
<tr>
<td>99213</td>
<td>Office, Est. Out-Pt</td>
<td>$ 78 $ 89 $ 103</td>
</tr>
<tr>
<td>99214</td>
<td>Office, Est. Out-Pt</td>
<td>$118 $135 $150</td>
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<tr>
<td>99220</td>
<td>ER Visit</td>
<td>$107 $126 $144</td>
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<tr>
<td>99230</td>
<td>ER Visit</td>
<td>$110 $127 $148</td>
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<tr>
<td>99240</td>
<td>ER Visit</td>
<td>$194 $211 $240</td>
</tr>
<tr>
<td>99253</td>
<td>ER Visit</td>
<td>$269 $316 $360</td>
</tr>
</tbody>
</table>
Official Disability Guidelines
Pulmonary ICD-9/CPT Codes

Typical Treatment CPT

<table>
<thead>
<tr>
<th>Common Inpatient Treatment</th>
<th>Usual and Customary Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>99222 Initial Hospital Care</td>
<td>$198 $233 $272</td>
</tr>
<tr>
<td>99223 Initial Hospital Care</td>
<td>$260 $306 $357</td>
</tr>
<tr>
<td>99231 Subsequent Hosp. Care</td>
<td>$ 72 $ 85 $ 99</td>
</tr>
<tr>
<td>99232 Subsequent Hosp. Care</td>
<td>$101 $119 $139</td>
</tr>
<tr>
<td>99235 Subsequent Hosp. Care</td>
<td>$140 $174 $203</td>
</tr>
<tr>
<td>99238 Hosp Discharge Day</td>
<td>$116 $136 $159</td>
</tr>
<tr>
<td>99239 Hosp Discharge Day</td>
<td>$138 $185 $216</td>
</tr>
<tr>
<td>99243 Office Consult</td>
<td>$197 $232 $269</td>
</tr>
<tr>
<td>99252 Initial In-Pt Consult</td>
<td>$152 $180 $209</td>
</tr>
<tr>
<td>99253 Initial In-Pt Consult</td>
<td>$192 $227 $263</td>
</tr>
<tr>
<td>99254 Initial In-Pt Consult</td>
<td>$251 $297 $344</td>
</tr>
</tbody>
</table>

Reference

• Common Abbreviation of Terms
  - A/C: Assist Control - voluntary breathing with machine assist
  - AHA: Alveolar Hypoventilation Syndrome
  - BPD/CLD: Bronchopulmonary Dysplasia/Chronic Lung Disease of Prematurity
  - CFCC: Cystic Fibrosis Care Centers
  - CK, CPK: Creatine Kinase
  - CLD: Chronic Lung Disease
  - CMC: Continuous Mandatory Ventilation - each breath machine controlled
  - CON: Certificate of Need
  - COPD: Chronic Obstructive Pulmonary Disease
  - CPAP: Continuous Positive Airway Pressure - elevated baseline pressure during spontaneous breathing
  - CPT: Current Procedural Terminology Codes®
  - CSA: Central sleep apnea
  - CSR: Cheyne Stokes Respiration

Reference

• Common Abbreviation of Terms
  - CSV: Continuous Spontaneous Ventilation (a.k.a. PSV) spontaneous pressure limiting patient breathing
  - CT: Computed tomography
  - CWP: Coal Worker's Pneumoconiosis
  - CX: Chest x-ray/radiograph
  - DLCO: Diffusing capacity for carbon monoxide
  - DPS: Dry powder inhaler
  - ECS: Environmental control system
  - "E" Cylinder: Mobile oxygen tank
  - FRC: Functional residual capacity
  - FVC: Forced vital capacity
  - FEV1: Forced expiratory volume in 1 second
  - "H" Cylinder: Stationary oxygen tank
  - HCPCS: Healthcare Common Procedure Coding System
  - LAI: Lower airway injuries
  - LAS: Lower airway system
  - LRTI: Lower respiratory tract infections
Reference

- LVRS: Lung volume reduction surgery
- LTOF: Long-term oxygen therapy
- MDI: Metered dose inhaler
- OA: Occupational asthma
- OSA: Obstructive sleep apnea
- PEFR: Peak expiratory flow rate – boosted baseline pressure during mechanical ventilation
- PSG: Polysomnography
- REAs: Reactive airway dysfunction syndrome
- SIMV: Synchronized intermittent mandatory ventilation
- SDBD: Sleep related breathing disorders
- UAI: Upper airway injuries
- UARS: Upper airway resistance syndrome
- VLBW: Very low birth weight infants

Bibliography

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- Available:
  - AutoExec: Lucie/CRC, 2007
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  - http://www.walgreens.com
  - http://pillbot.com/
  - http://rxusa.com/


