A Place For Airway Clearance Therapy In Today's Healthcare Environment

Michigan Society for Respiratory Care
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Objectives

- Describe patients who will benefit from Airway Clearance Therapy (ACT) and options for therapy
- Health care reform and chronic respiratory conditions — an important intersection
- Discuss an emerging picture of ACT efficacy

Why This Matters

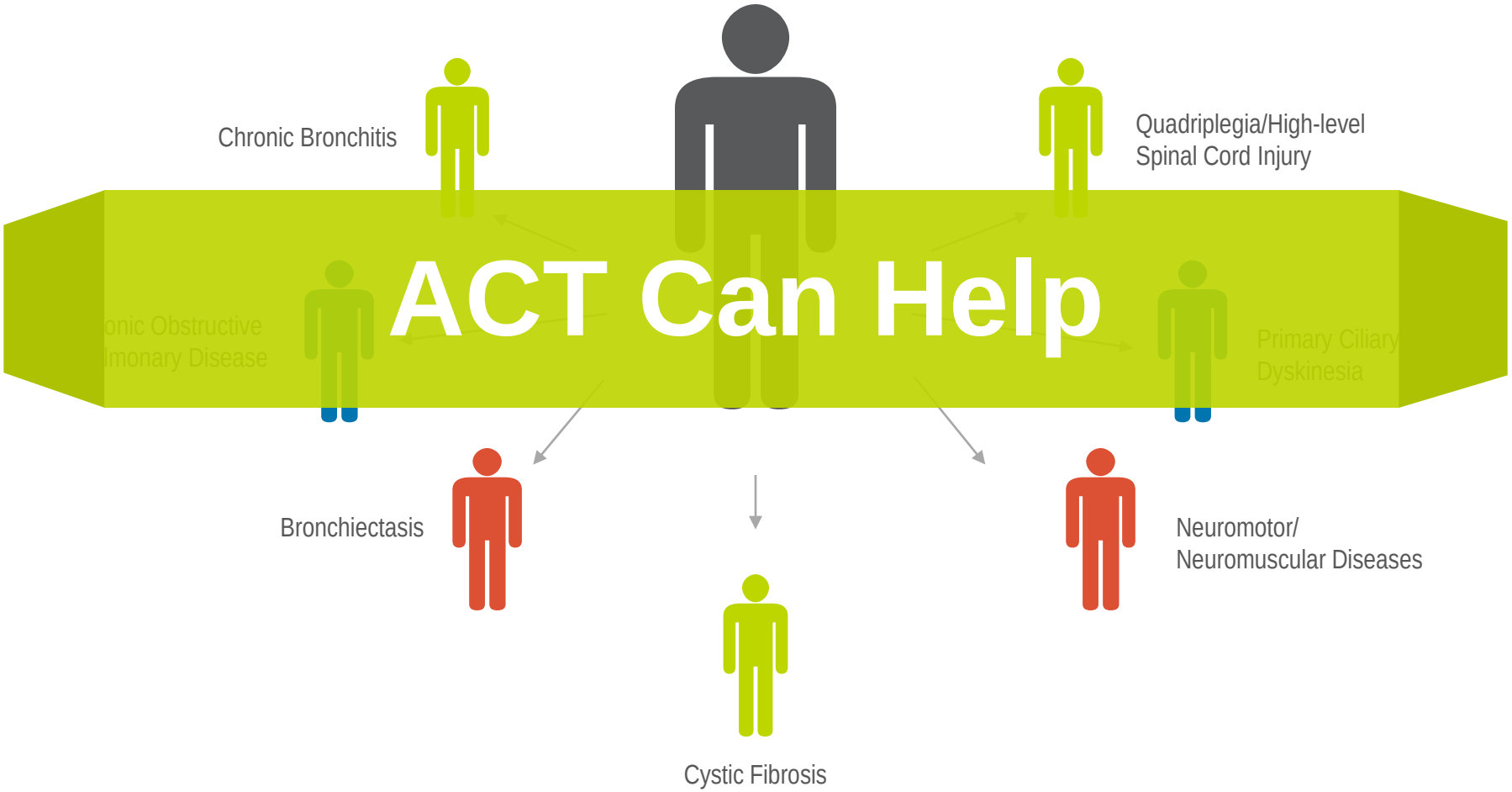
- ACT needs in your patient population — pediatric and adult
- More attention paid to frequent and expensive conditions
- Triple Aim

Poor Secretion Clearance

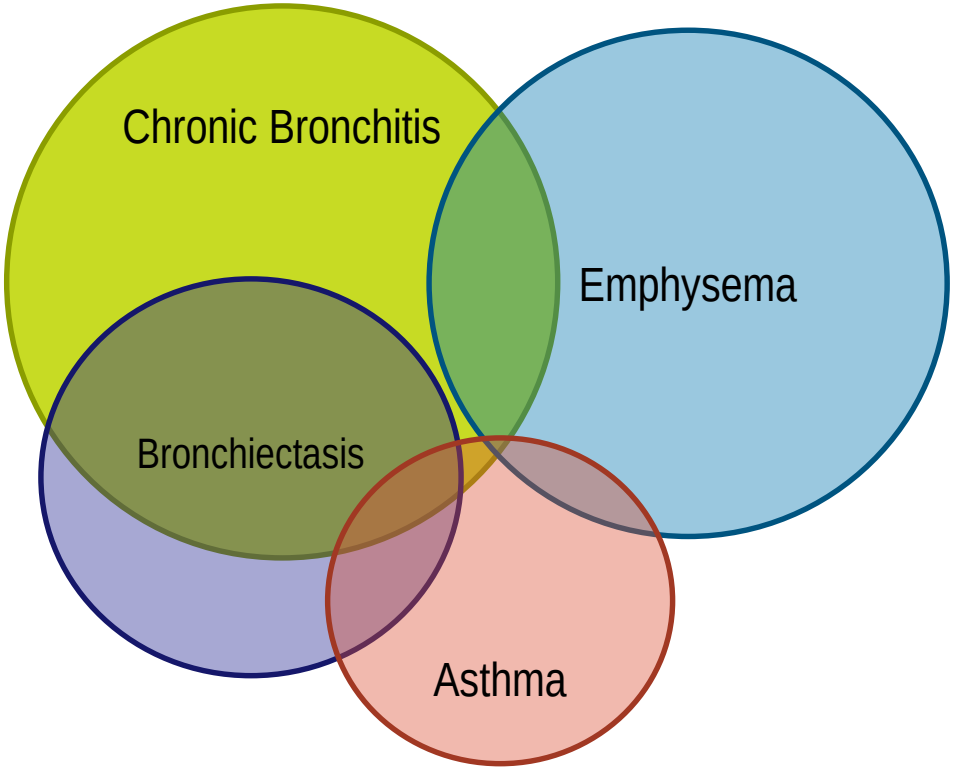
- Inflamed airways
- Chronic cough
- Lung congestion
- Decreased ability to exercise
- Shortness of breath
- Respiratory infection
- Lung damage
- Pneumonia
- Respiratory failure

Potential Consequences

May Have Impaired Ability To Clear Lungs



Complex Intersections In Chronic Respiratory Conditions



Non-proportional representations

ACT Options

TECHNIQUES

- Percussion & postural drainage
- Positive expiratory pressure
- Active-cycle-of-breathing technique
- Autogenic drainage
- IPV
- Exercise
- HIGH FREQUENCY CHEST COMPRESSION (HFCC; also known as vest therapy)

&

CONSIDERATIONS

- Cost
- Ease-of-use/implementation
- Adherence
- Evidence

Effective ACT Matters…
Maybe More Than Ever

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Value-based Purchasing

- “In healthcare, value can be broadly considered to be a function of quality, efficiency, safety and cost. In VBP, providers are held accountable for the quality and cost of healthcare services they provide.”
- “Incentive payments for achieving performance targets or demonstrating improved quality and efficiency will be derived from progressive reduction in reimbursement.”

Targeting the “Hotspotter”

- High-cost patients (referred to as “hotspotters” by some) become much more important
- 1% of patients consume 28% of total healthcare costs
- New behaviors as we shift from individual payments to fixed cost for a population
- Implementing evidence-based practices offers a way to manage “hotspotters” to:
  - Better clinical outcomes
  - Lower overall costs

Hospital Readmission Reduction Program

- 2010 estimates of health care costs directly related to avoidable hospital readmissions within 30 days of discharge = $17.5 billion
- Seven conditions and procedures account for 30% of potentially preventable readmissions

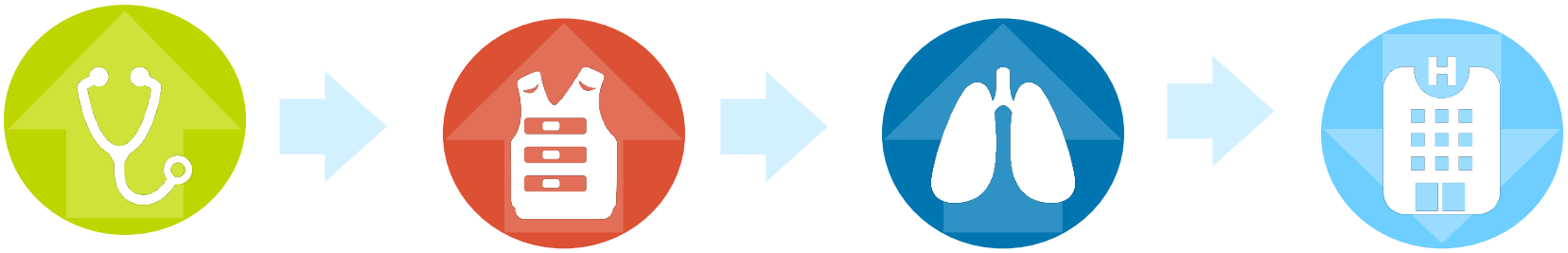
- Heart Attack
- Congestive Heart Failure
- Pneumonia
- COPD
- Coronary Artery Bypass
- Angioplasty
- Other Vascular Procedures

Cost of Readmissions*

- 2011 estimated cost of avoidable readmissions: $41.8 billion
- CHF: $1.75 billion (134,500 readmits)
- Pneumonia: $1.15 billion (88,000 readmits)
- COPD/Bronchiectasis: $924 million (77,000 readmits)

** Agency for Healthcare Research and Quality*

Key Steps To Managing Costs, Improving Quality and Reducing Readmissions



Diagnosis
Early and Accurate

Effective Treatment
Interventions That Work

Improvement
Care, Quality of Life and Costs

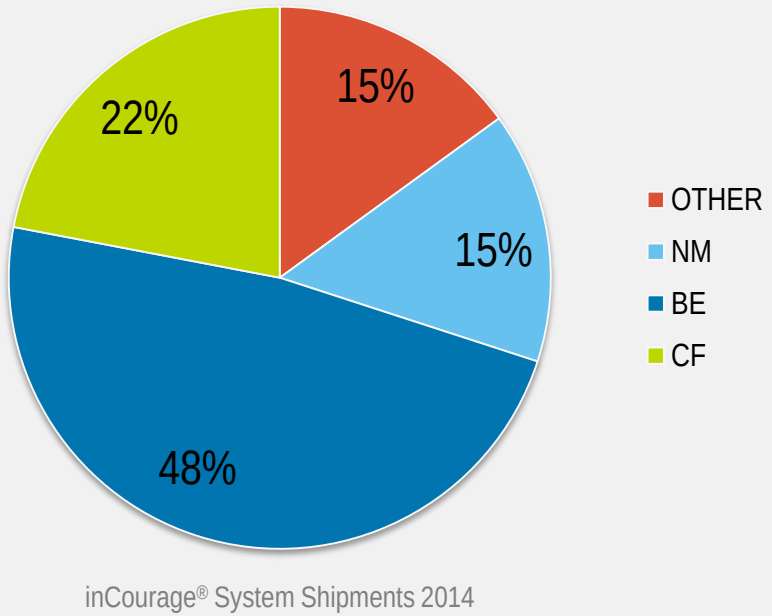
Reduce Hospital Visits

Vest Therapy As A Preferred Approach To ACT

- Safe
- Easy to use
- Technique independent
- Effective
- Self-directed therapy — fosters patient independence
- Effective treatment leads to extended compliance

Conditions Treated by Vest Therapy

- Bronchiectasis (BE)
  - 50%+ of moderate to severe COPD patients have BE
  - Known population of patients exceeds 475,000
  - Forecasted to grow about 9% per year with greater use of CT scans
- Cystic Fibrosis (CF)
  - More than 30,000 patients in US
  - 87% of CF patients aged 6-17 years use vest therapy
- Neuromuscular conditions such as cerebral palsy and ALS (NM)
- Other smaller segments



inCourage® System Shipments 2014

Bronchiectasis

- Common, progressive respiratory disease—recurrent chest infections, high morbidity, reduced QOL
  - Long-term cohort of 91 patients: about 30% mortality during 13-year period; median age 60[1]
- Has been poorly studied
- Evidence for treatment largely based on CF studies or expert opinion
- Often unrecognized or poorly diagnosed as asthma or COPD—underestimated prevalence
- Expensive, particularly if not diagnosed early

1. McDonnell, C et al. Non-cystic fibrosis bronchiektasie. *Q J Med* 2013; 106:709–715 (Advance Access Publication)

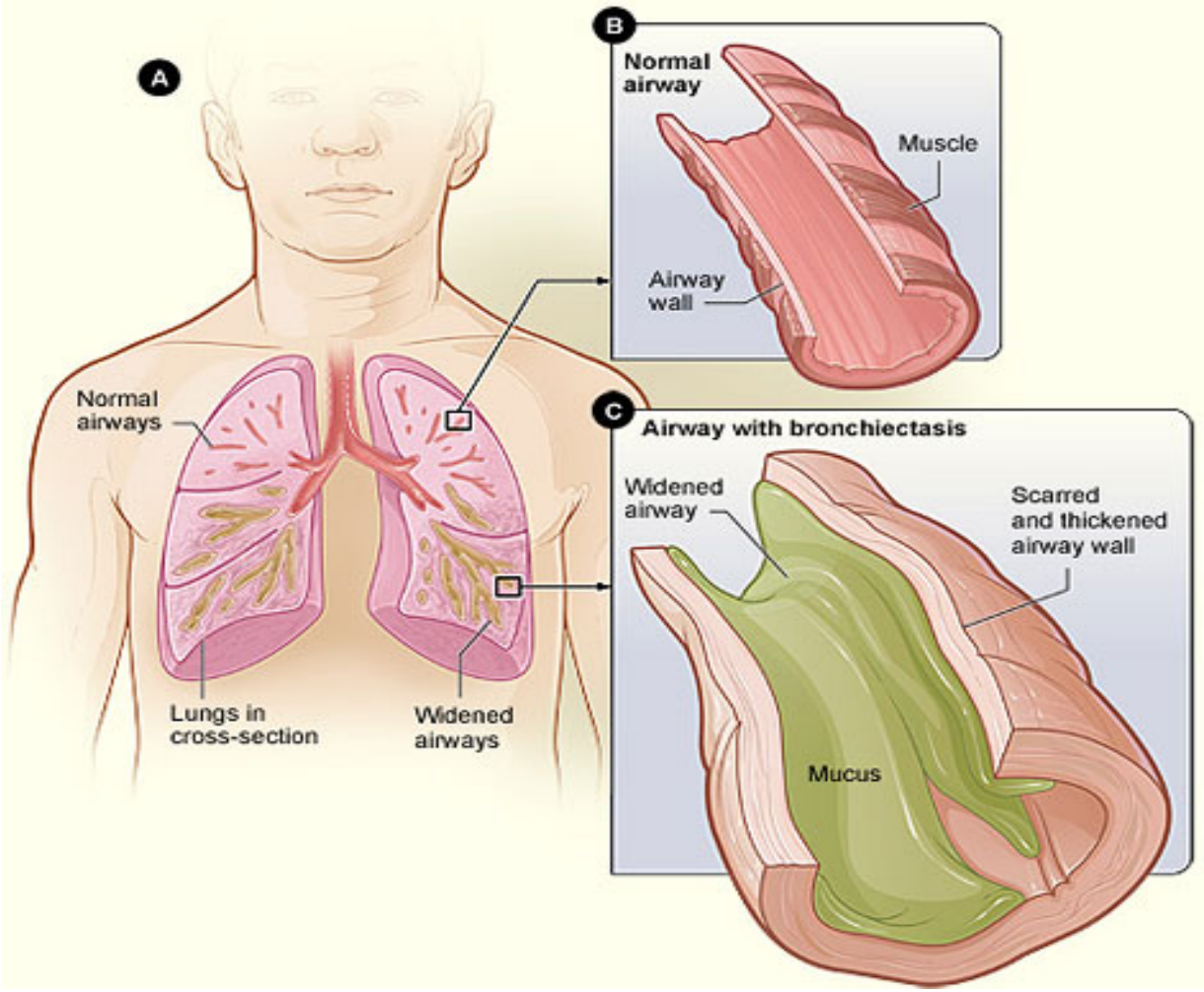
Bronchiectasis Symptoms

- A daily cough for months or years, with large amounts of sputum containing mucus, trapped particles, pus
- Shortness of breath and wheezing
- Chest pain
- Clubbing (thickening of flesh under fingernails, toenails)
- Failure to thrive
- Death (e.g., due to associated heart failure)

http://www.nhlbi.nih.gov/health/health-topics/topics/brn/signs

Bronchiectasis — Pathophysiology

- Scarring condition of bronchial tubes
  - Irreversible widening of airways
- Basic defect is a cycle of airway infection, inflammation, and injury
  - Damage to airway walls
    - Destruction of cilia
  - Mucus accumulation
  - Bacterial overgrowth
  - Inflammation
  - Scar formation


A
Normal airways
Lungs in cross-section
Widened airways
B
Normal airway
Muscle
Airway wall
C
Airway with bronchiectasis
Widened airway
Scarred and thickened airway wall
Mucus

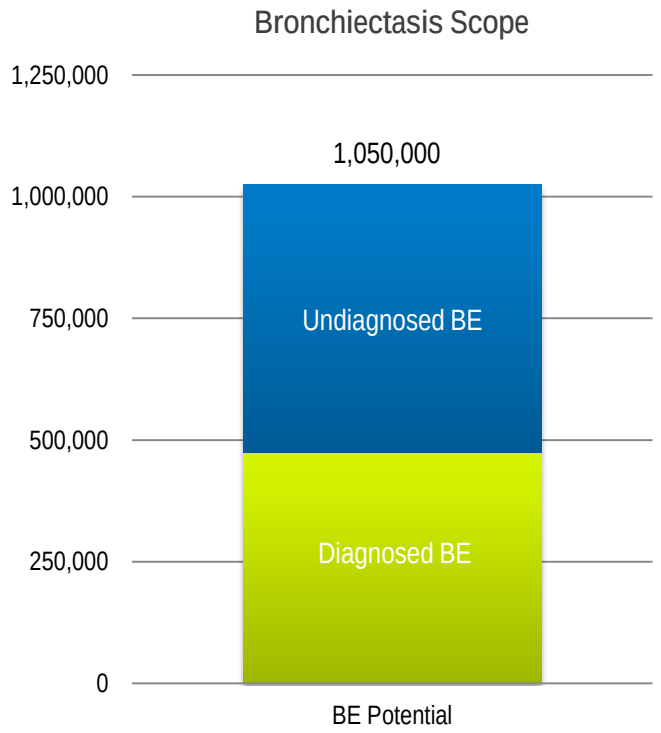
What Causes Bronchiectasis?

- 30-50% idiopathic
- Lung infections: pneumonia, whooping cough, TB, fungal infections
- Cystic fibrosis: almost 90% of adult CF patients have BE
- Immunodeficiency disorders
- Allergic bronchopulmonary aspergillosis
- Disorders affecting cilia: primary ciliary dyskinesia
- Chronic pulmonary aspiration
- Connective tissue diseases: rheumatoid arthritis, Sjögren's syndrome, Crohn's disease
- Other conditions causing airway blockage: tumors, inhaled material

http://www.nhlbi.nih.gov/health/health-topics/topics/brn/causes

Bronchiectasis — Estimated Prevalence

- An estimated 50%+ of moderate to severe COPD patients have BE, with estimates of total diagnosed COPD patients at 14 million
- The known population of bronchiectasis patients is more than 475,000
- Patient population forecasted to grow about 9% per year with greater use of CT scans



1. Seitz et al, Trends in bronchiectasis in Medicare beneficiaries in the US 200-2007, Chest, 142(2), 432-439
2. Company estimates
3. Matinez-Garcia et al, Factors associated with bronchiectasis in patients with COPD, Chest, 140, 1130-1137

Bronchiectasis Common among Moderate-to-Severe COPD Patients

Probability of the presence of HRCT-confirmed bronchiectasis in patients with moderate to severe COPD	Moderate/Severe COPD Probability – 58%	
	Moderate COPD only (FEV, levels of 50-70%) Probability = 39%	Severe COPD only (FEV, levels of <50%) Probability = 73%
Plus: 1 or more pathologic organisms isolated from sputum:	50%	90%
Plus: 1 or more previous-year hospitalizations for pulmonary exacerbations:	83%	99%

Martinez-Garcia, MA, et. al., *CHEST* 2011;140;1130-1137.

Symptoms

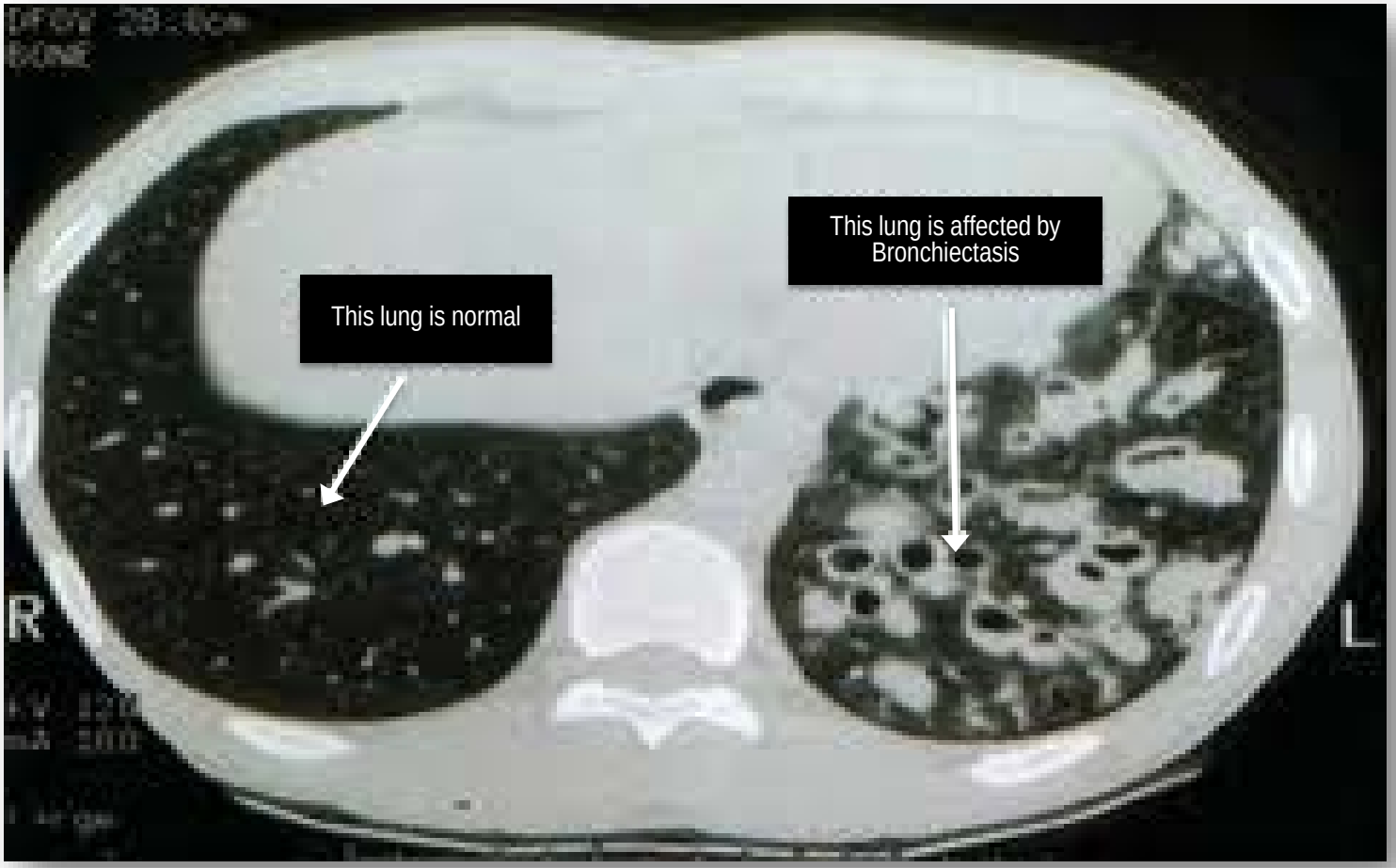
- Daily productive cough
- Chest pain
- Fevers
- Fatigue
- Shortness of breath
- Coughing up blood
- Frequently diagnosed as chronic bronchitis or recurrent pneumonia (think COPD *readmission*)

A clinical question:
When do you order a CT to confirm BE?

Bronchiectasis – Diagnosed by HRCT

- Bronchial wall thickening
- Airway dilatation
- Lack of tapering
- Mucus plugging
- Cystic features
- Air-fluid levels
- Lung scarring

Bronchiectasis HRCT Scan



Bronchiectasis Treatment

- Antibiotics, expectorants, mucus thinners, bronchodilators, inhaled corticosteroids (w/ wheezing, asthma)
- Hydration
- Breathing techniques: Forced-expiration technique (FET) and active cycle breathing (ACB)
- CPT: manual, mechanical; PEP devices; HFCC

  "Some of these methods and devices are popular with patients and doctors, but little information is available on how well they actually work. Choice usually is based on convenience and cost."
  (We'll come back to this.)
- Surgery or lung transplant

http://www.nhlbi.nih.gov/health/health-topics/topics/brn/treatment

An Evolving Outcomes Story

HFCC and Bronchiectasis

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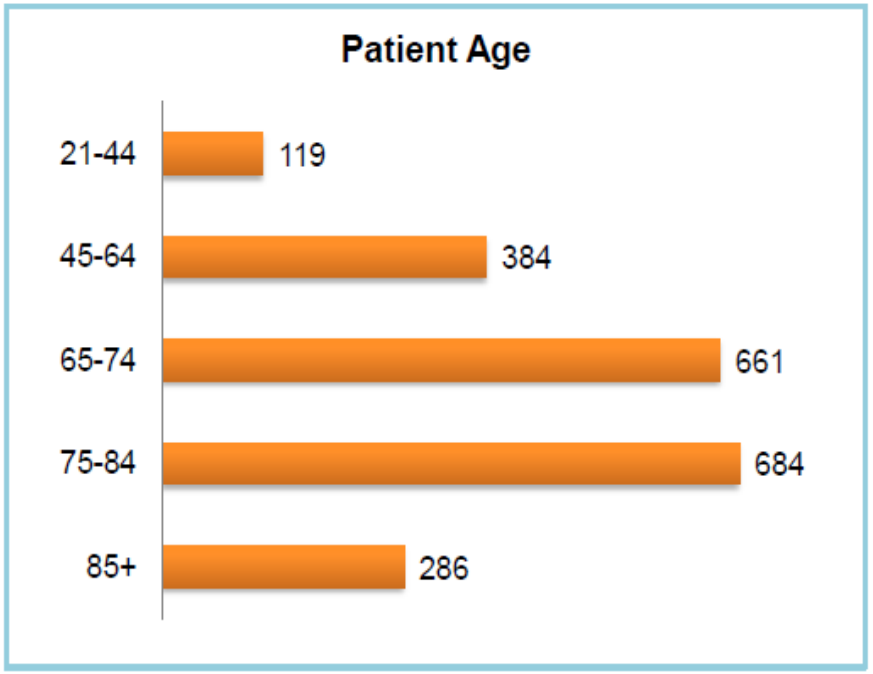
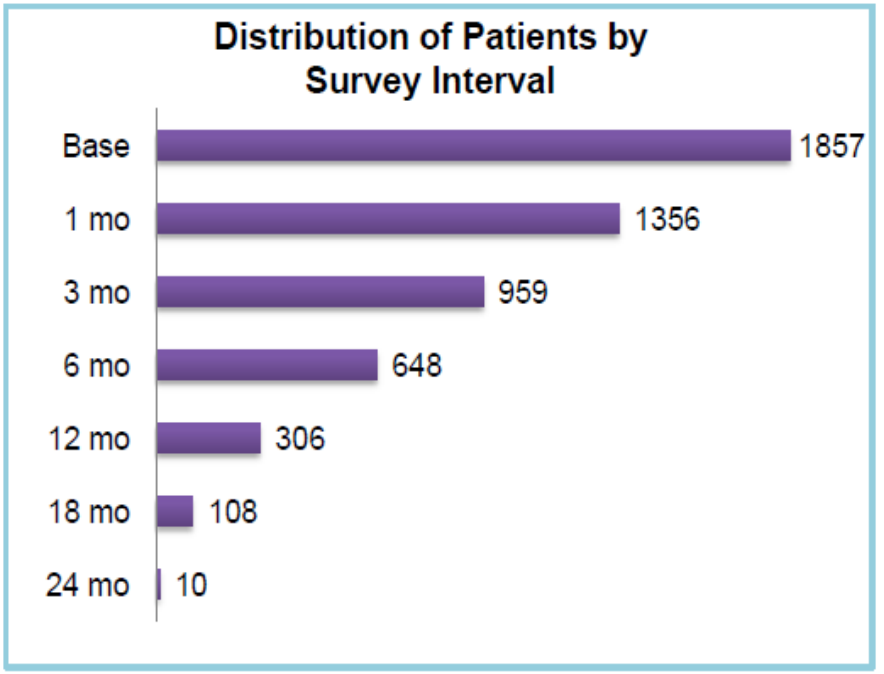
Bronchiectasis — Quality of Life Survey Summary Data

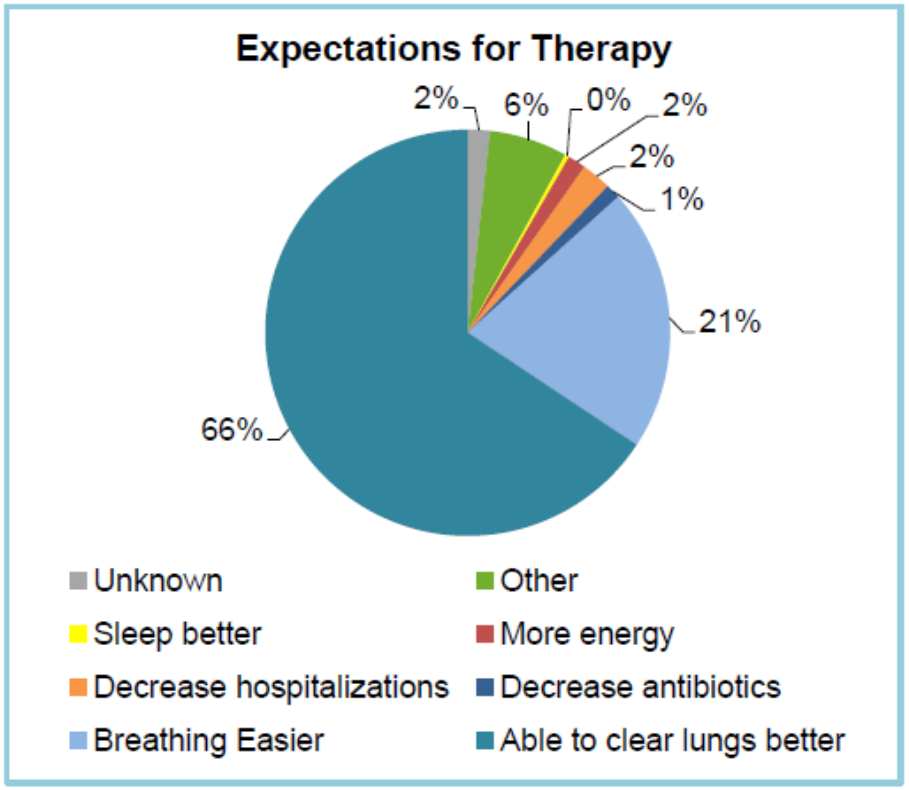
PATIENTS SURVEYED

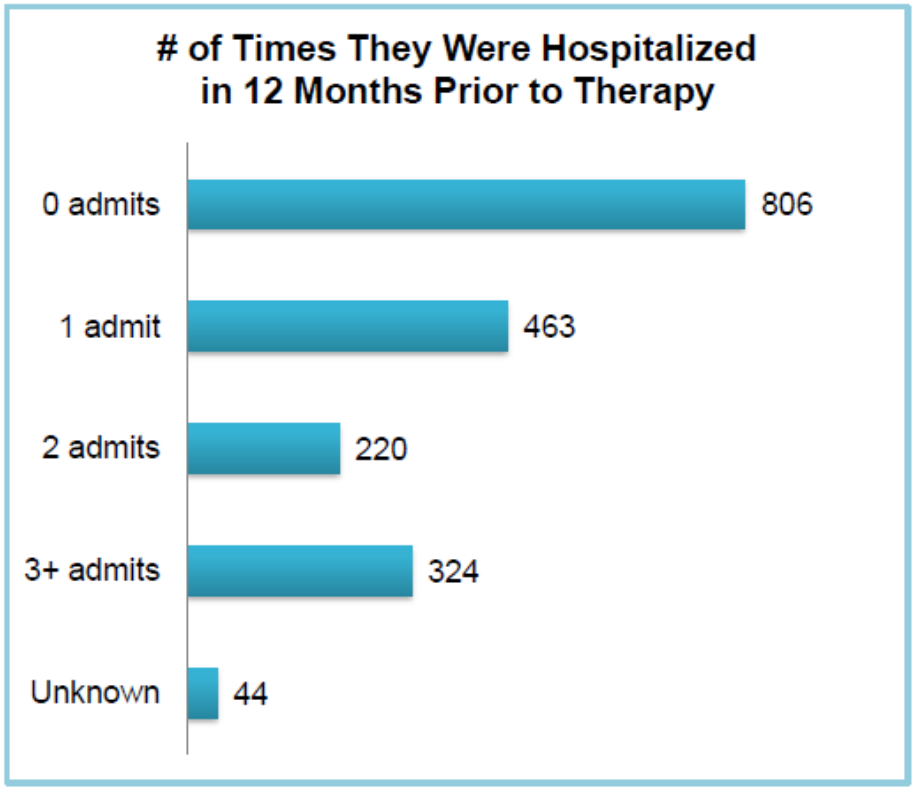




Pre-HFCC Patient Status

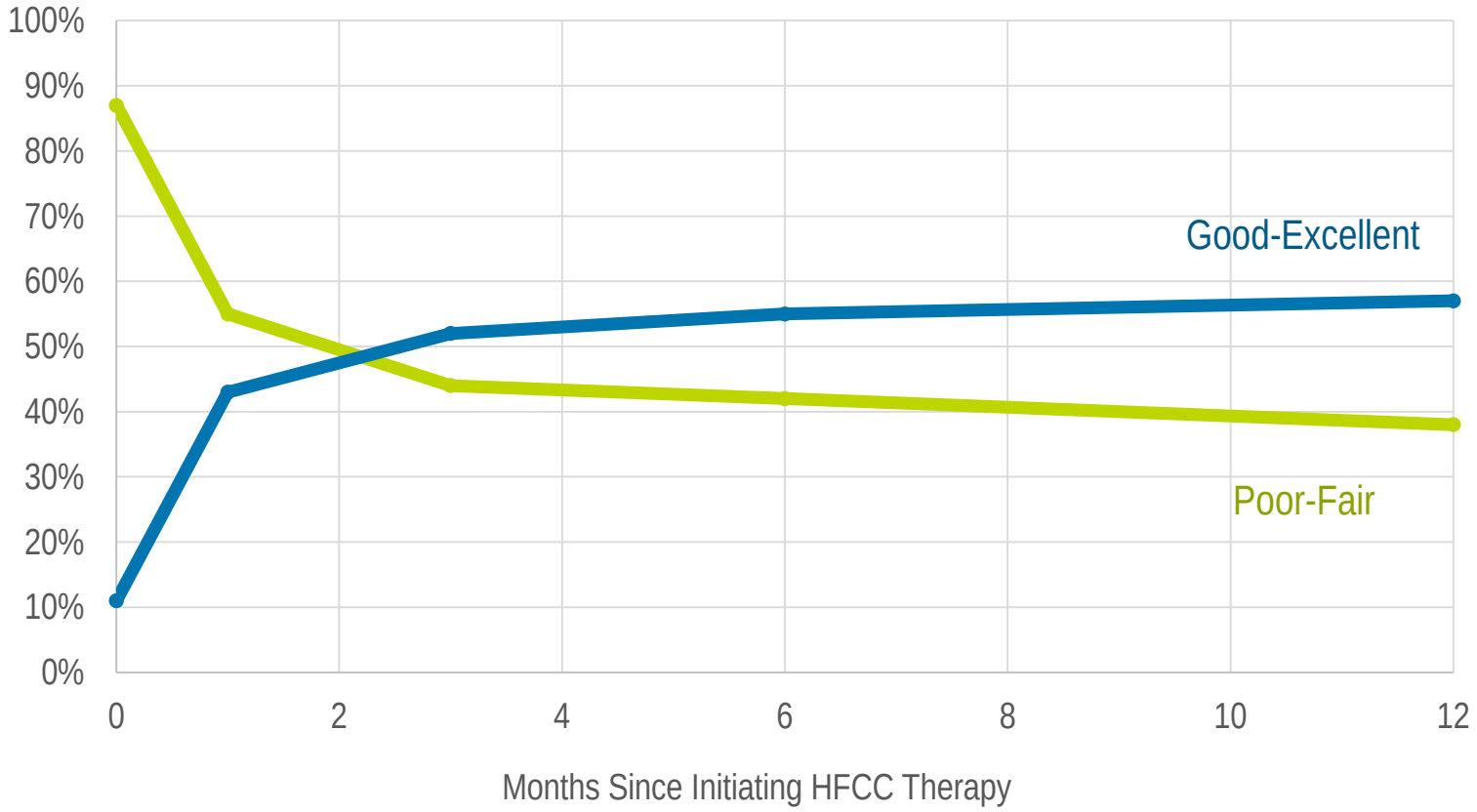
BEFORE STARTING VEST THERAPY, PATIENTS TOLD US:





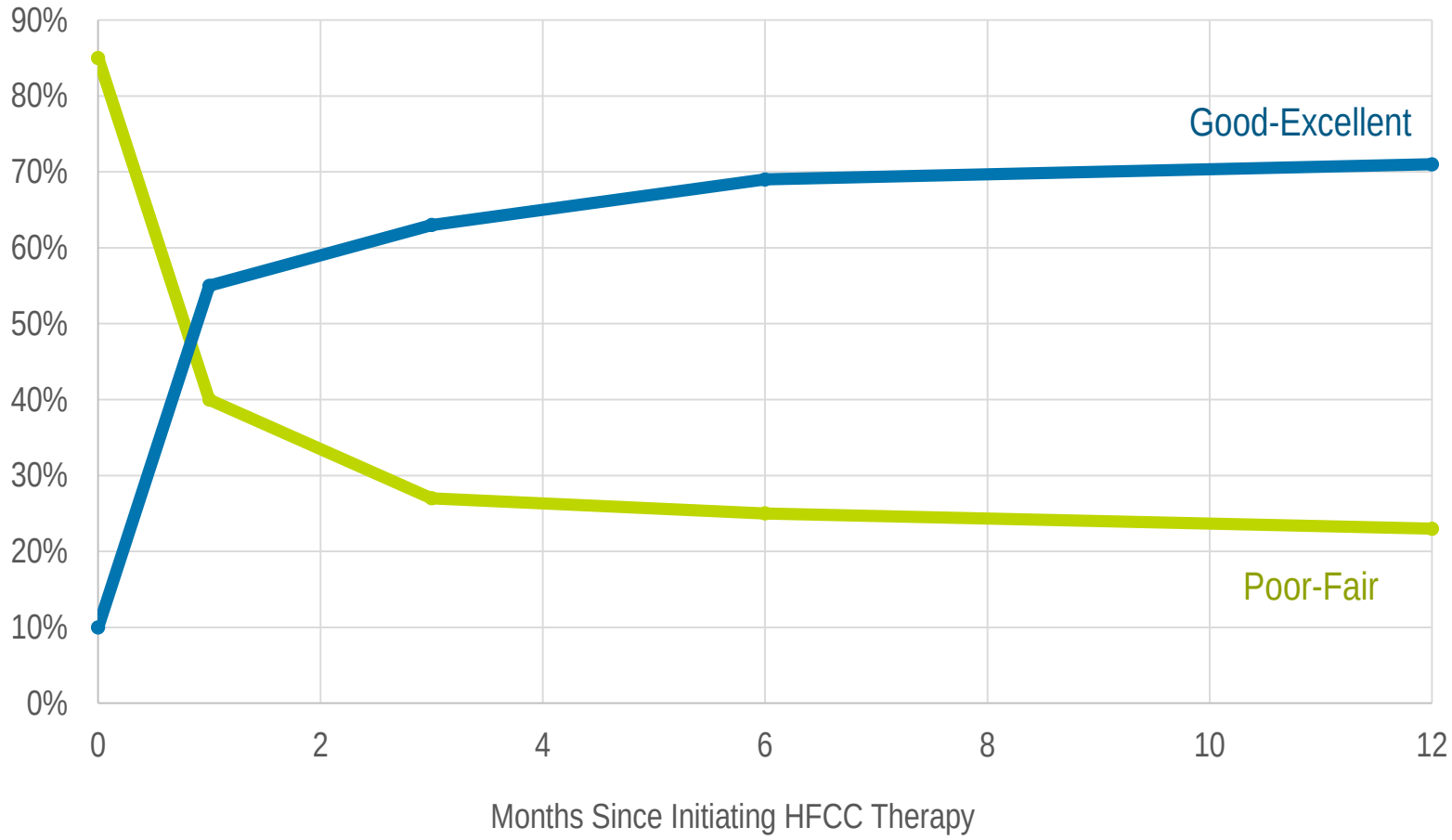
Overall Respiratory Health

How would you rate your overall respiratory health?



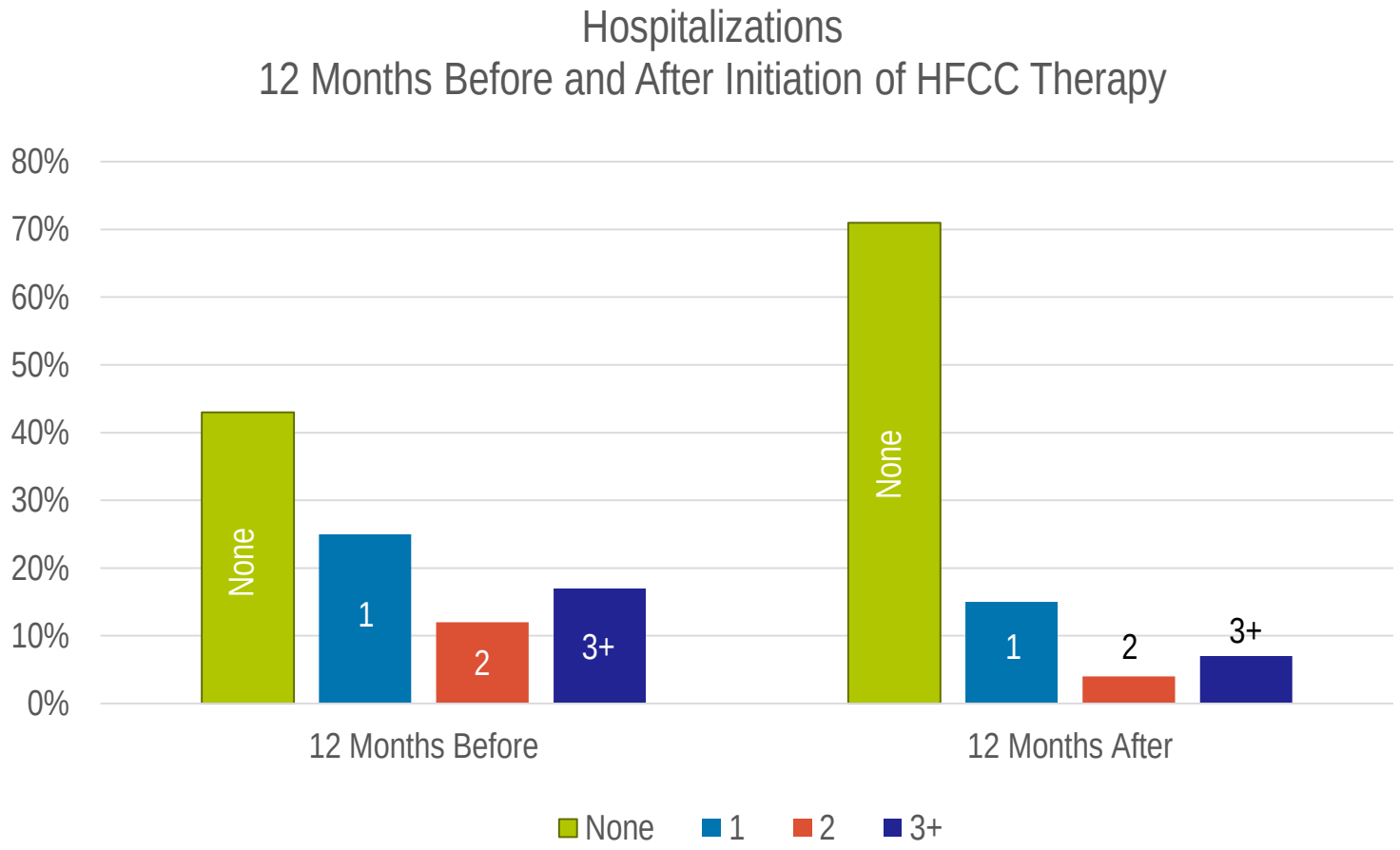
Ability to Clear Lungs

How would you rate your ability to clear your lungs?



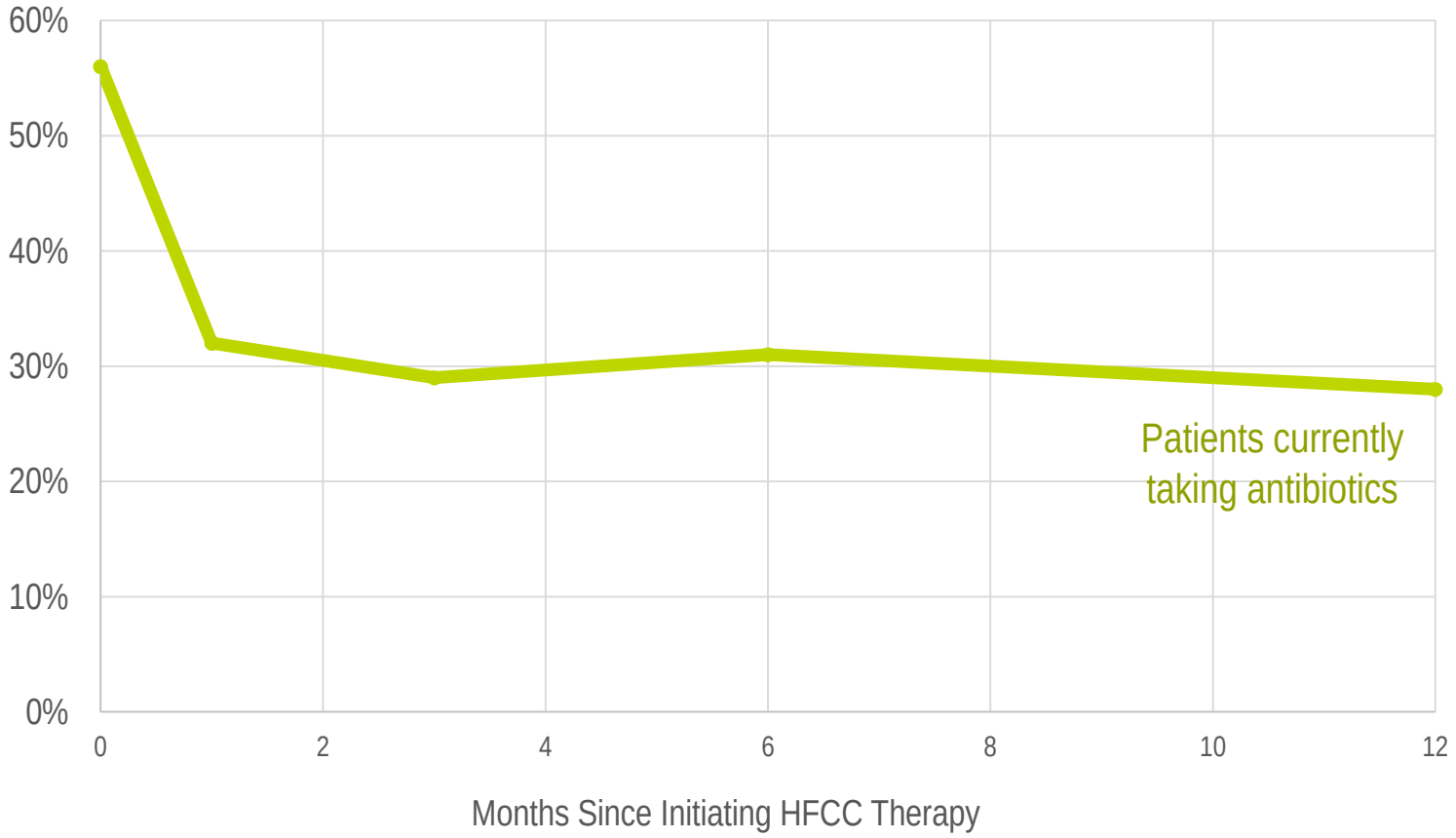
Hospitalizations Since Onset Therapy

How many times have you been in the hospital?



Antibiotic Use

Are you currently taking antibiotics for breathing problems?



Preliminary Outcomes Data

12 months before and after initiation of inCourage System vest therapy

FEV1 (predicted)	
FVC (predicted)	
Hospital admits per patient/month	
Office visits per patient/month	

Based on Respirtech outcomes data base, cross-referenced with patient chart data. Results calculated and validated by independent actuarial firm Cirdan Health Systems.

Re: HFCC and Bronchiectasis

- Confirm bronchiectasis with CT when symptoms warrant
- Initiate ACT to provide symptom relief
- Ask patients about QOL factors and denote outcomes-related measures (hospital admissions, antibiotic use)
- Track your patient populations to see how vest therapy helps
  - Add to the growing information about vest use

ACT and Today's Healthcare

- The environment we work in—must deliver more effective care at a lower cost
- Chronic respiratory conditions represent a significant challenge
- Effective airway clearance therapy in selected patients will add therapeutic and QOL value

Thank You!

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