

# The ABCs of Bronchiectasis: Always Be Clearing (the airways first!)

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# Disclosure

I am an employee of Electromed, Inc.

# Learning Objectives

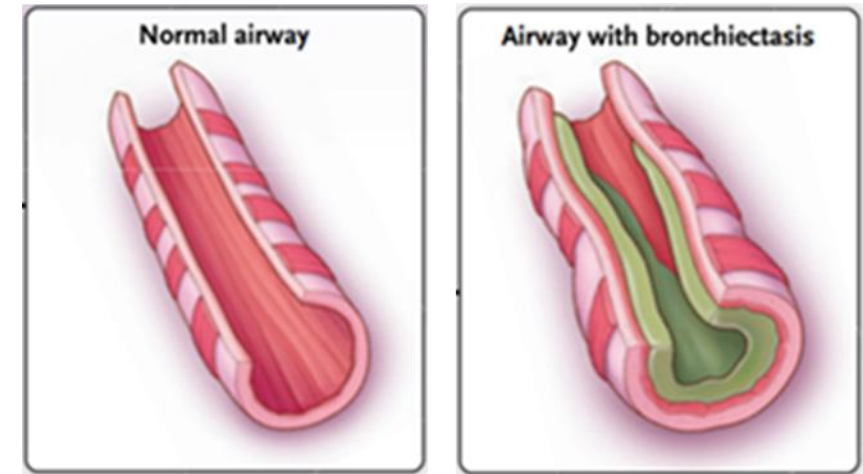
- Understand bronchiectasis pathophysiology and treatment management
- Identify airway clearance options and considerations when managing bronchiectasis
- Understand bronchiectasis overlap risk factors

 **BRONCHIECTASIS OVERVIEW**

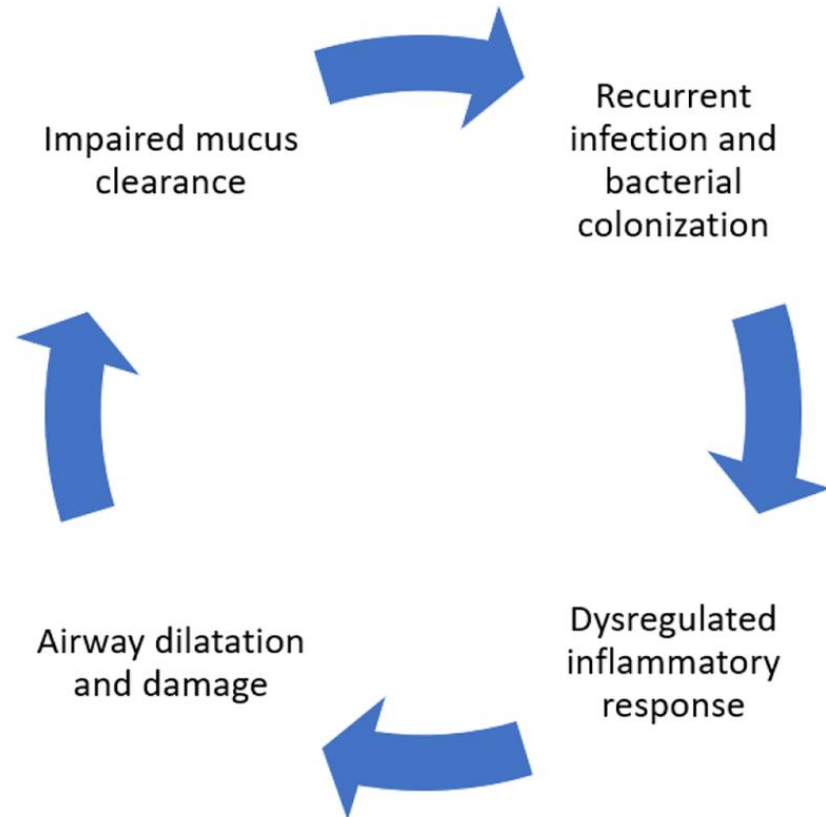
# Bronchiectasis

(bron-kee-ek'-tas-is)

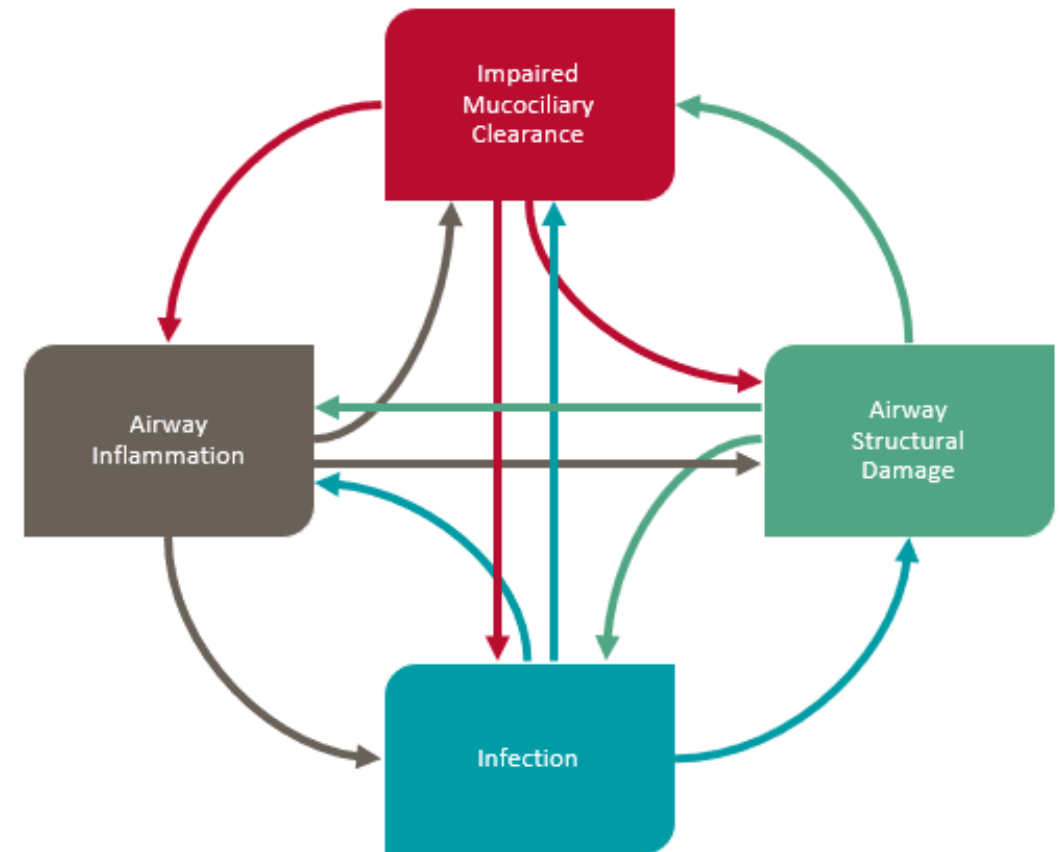
- Abnormal widening of the airways
- Damaged airways impairs bronchial drainage
- Bacterial growth, infections, and inflammation lead to progressive lung damage



## Vicious Cycle

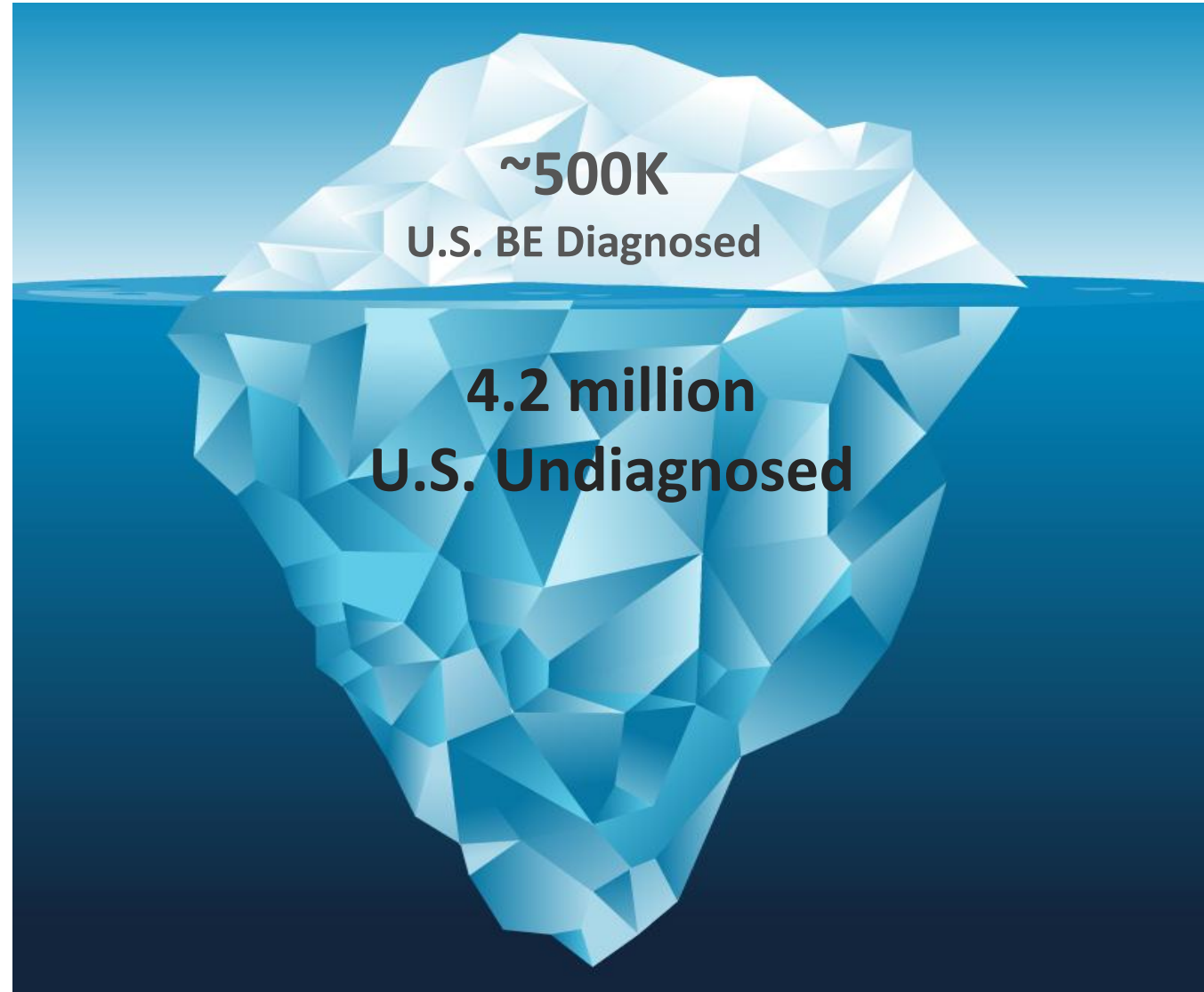


## Vicious Vortex



# Bronchiectasis Prevalence

- More common in women (66%) than men
- Increasing at least 8% annually
- Actual prevalence is likely greater due to lack of universal screening



# Bronchiectasis Symptoms

- Chronic cough, productive
- Hemoptysis
- Recurrent pulmonary infections
- Fatigue
- Wheezing

## Bronchiectasis & NTM 2024 Registry Data



**47.7%**  
have a history  
of pneumonia



**61.6%**  
diagnosed with  
past or current  
NTM\*

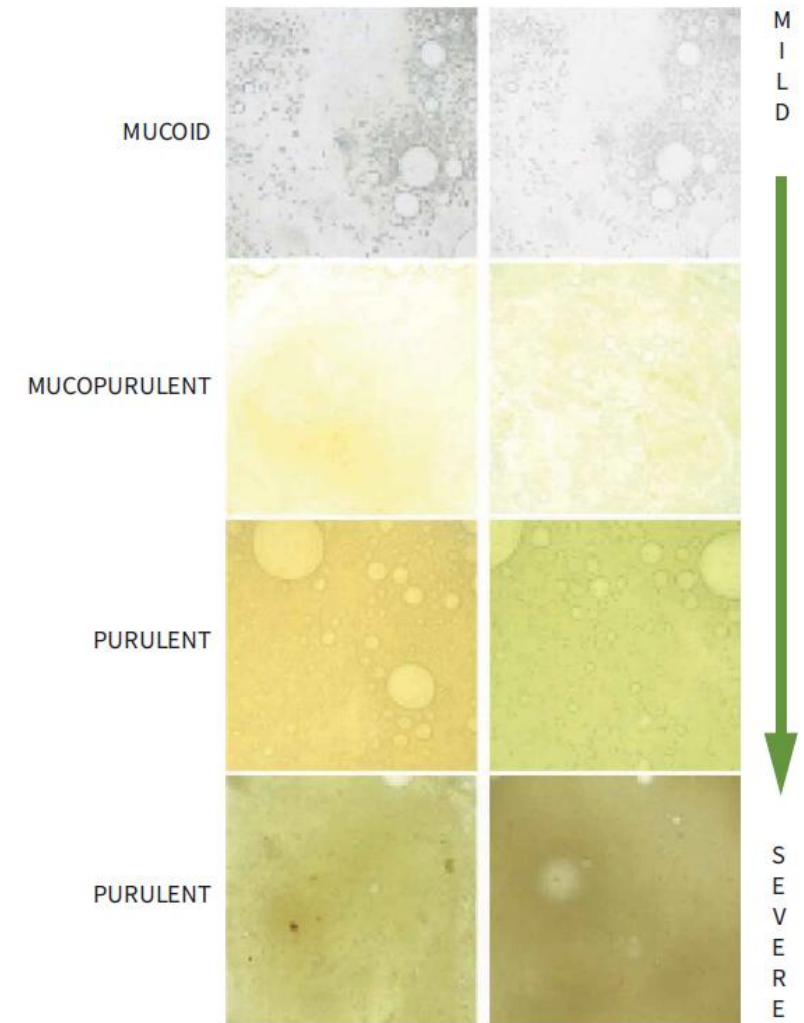


**20.6%**  
diagnosed with  
past or current  
pseudomonas\*\*<sup>4</sup>

\* Defined by one or more positive culture -or- by physician diagnosis  
\*\* Defined by one or more positive culture

# SPUTUM!

- Sputum color is associated with disease severity
  - Purulent sputum is associated with increased exacerbations
  - Purulent sputum is associated with a greater risk of hospitalization and mortality
- Mucus plugging is common in symptomatic patients
  - Airway clearance therapy has proven to decrease plugging on HRCT
  - Airway clearance therapy has proven to decrease symptom burden



Murray Sputum Colour Chart

# Bronchiectasis Causes



- Cystic fibrosis
- Primary ciliary dyskinesia



- Post-infective
- NTM
- HIV



- Lupus
- Rheumatoid arthritis
- Connective tissue disease



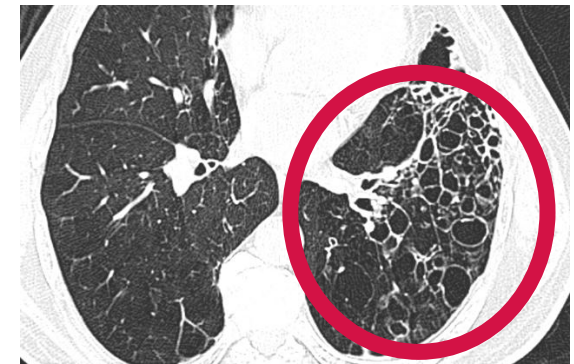
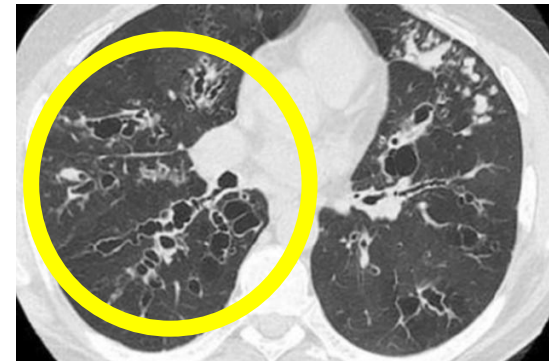
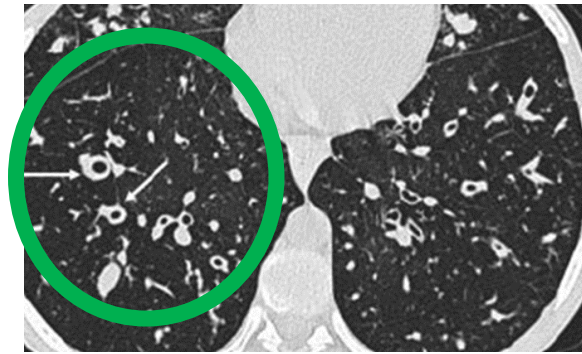
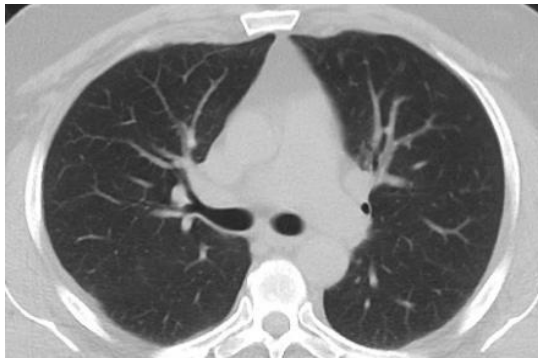
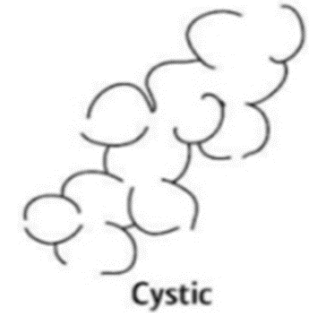
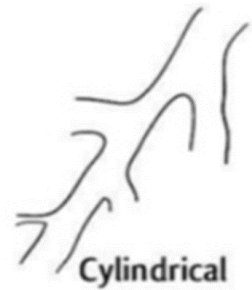
- Crohn's
- IBD
- Ulcerative colitis
- GERD
- Aspiration



- COPD
- Asthma
- ILD
- ABPA

~50% idiopathic

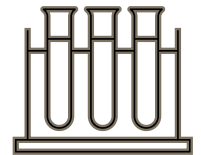
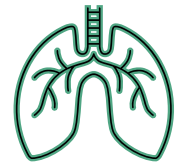
# Bronchiectasis Diagnosis



High Resolution CT Scan (HRCT) is the Gold Standard for Diagnosis

# Bronchiectasis Diagnosis

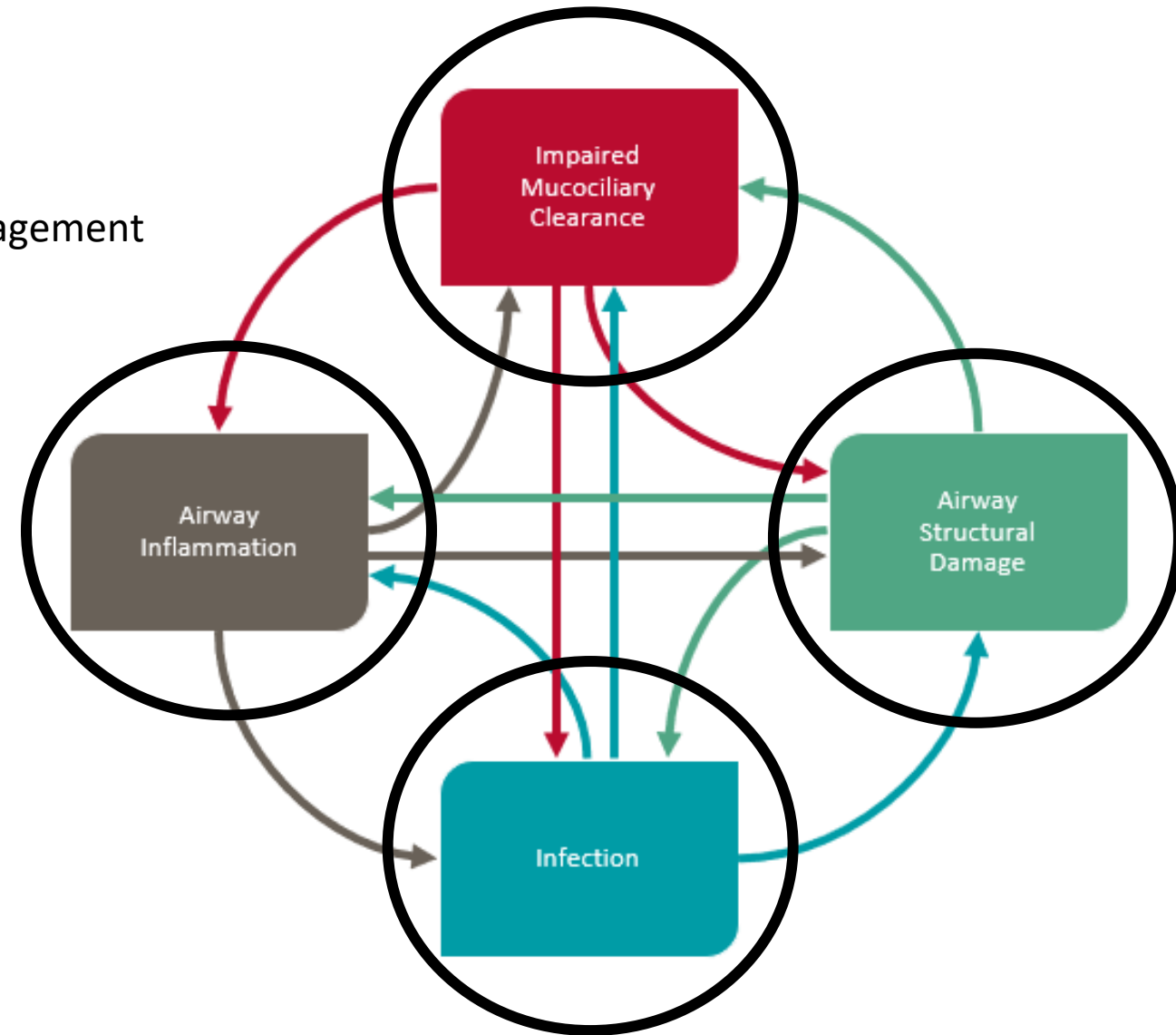
- PFT
  - Determine baseline lung function
- Sputum cultures
  - Pathogens including bacteria, mycobacteria, fungus
- Blood
  - Immune deficiencies and inflammatory diseases
- Genetic & sweat test
  - Test for underlying causes such as cystic fibrosis



 **AIRWAY CLEARANCE THERAPY**

# Bronchiectasis Treatment

- **Airway clearance** is a mainstay of bronchiectasis management
  - ~ 56% of patients use non-pharmacological ACT
- **Pulmonary rehab**
  - Surgery for severe or isolated cases
- **Antibiotics** for infections
  - Rule out NTM first
- **Anti-inflammation**
  - Novel anti-inflammatory Rx is on the horizon



# Airway Clearance

Due to structural airway changes,

Airway Clearance Therapy is a mainstay for bronchiectasis management

## Goals of Airway Clearance Therapy

Decrease symptom burden

Reduce exacerbations

Preserve lung function

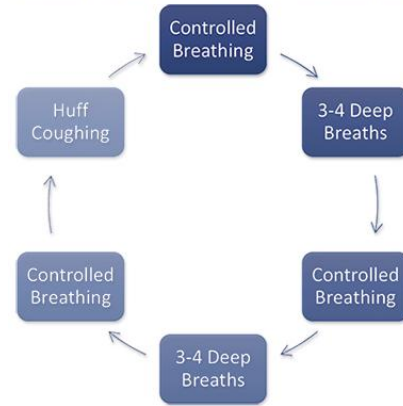
Improve quality of life

# Breathing Techniques

- Huff cough
- Active cycle of breathing
- Autogenic drainage



## Active Cycle Breathing Technique



## Autogenic Drainage

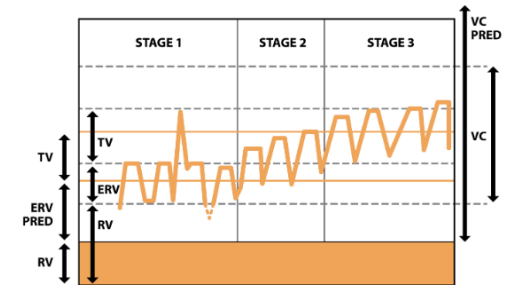
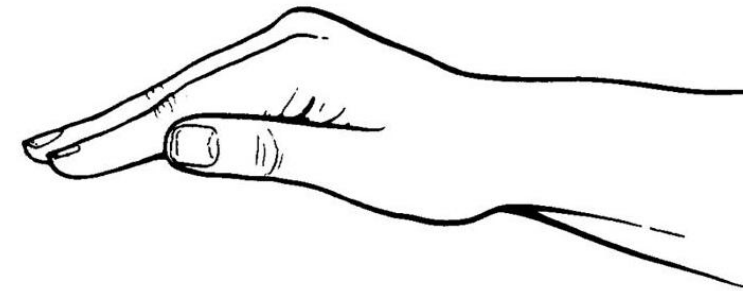


Fig 2. AD stages in relation to lung volumes. Stage 1 - small peripheral airways. Stage 2 - medium airways. Stage 3 - large central airways.

# Manual Techniques

- Chest percussion
- Postural drainage
- Exercise

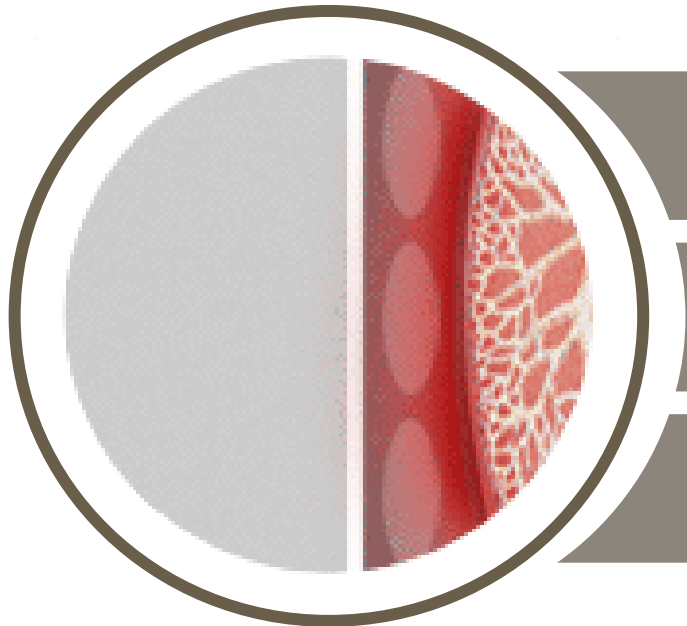


# Device Therapy

- Oscillating Positive Expiratory Pressure (OPEP)
- Oscillation Lung Expansion (OLE)
- High Frequency Chest Wall Oscillation



# High Frequency Chest Wall Oscillation



Forces produced by HFCWO ripple across retained secretions to **SHEER** mucus away from the walls of the airway.

This consistent force reduces the viscosity of the secretions, to make them **THIN**.

**PROPEL** the mucus up towards the large airway where it can be expectorated or suctioned more easily.

**57%** Reduction  
in antibiotic  
prescriptions<sup>1</sup>

**59%** Decrease  
in hospitalizations<sup>1</sup>

**60%** Fewer  
in emergency  
department visits<sup>1</sup>

Generator produces an alternating flow of air into the garment that rapidly compresses and releases the chest wall at a variety of frequencies and pressures.

# Algorithm of Care

- 43 bronchiectasis patients
- Chronic productive cough
- > 2 exacerbations for 12-months
- Followed an Algorithm of Care for 12-months

Bronchodilators

Mucolytics

Macrolides

HFCWO



**REDUCED  
HOSPITALIZATIONS**

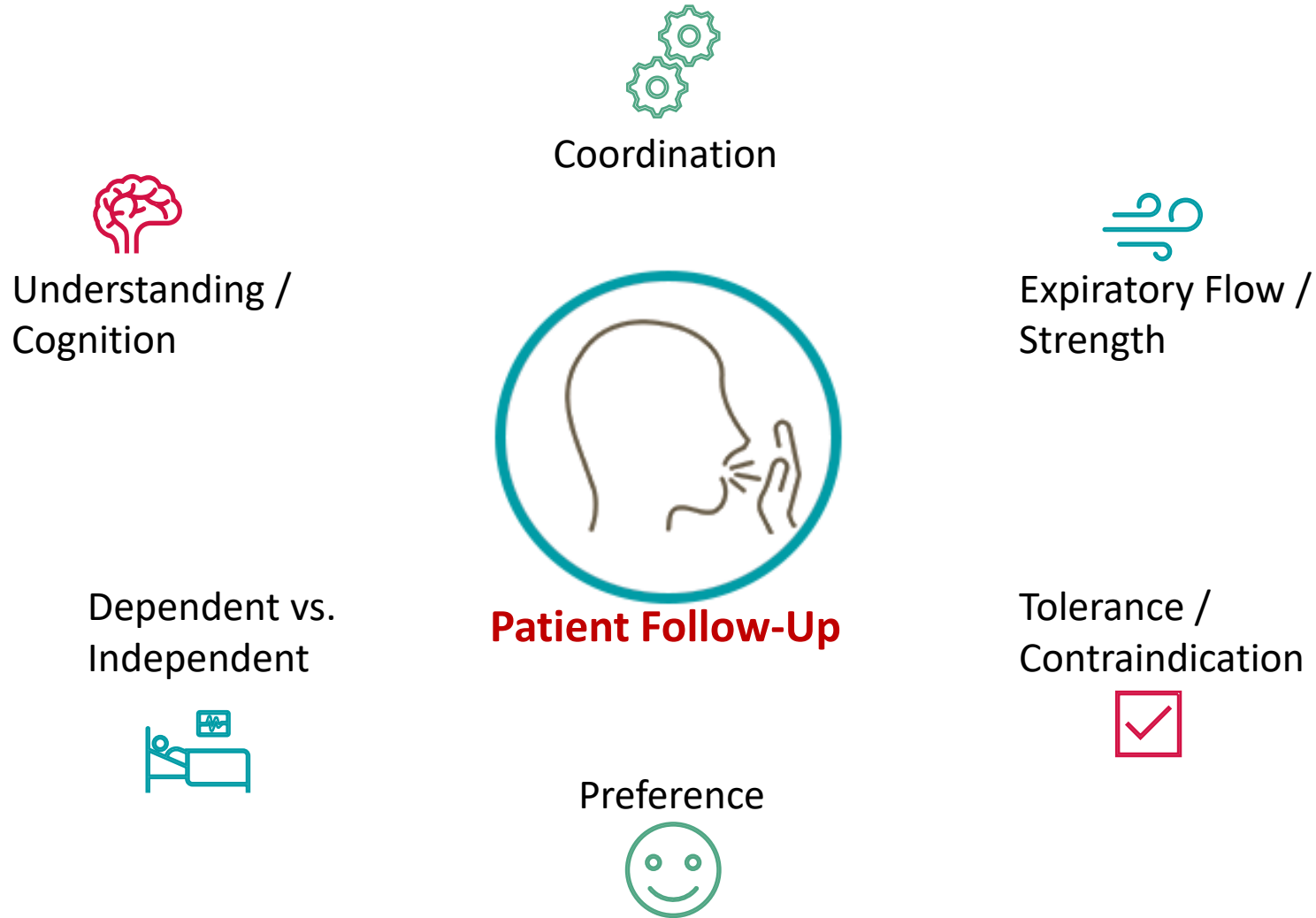


**REDUCED  
ANTIBIOTIC USAGE**

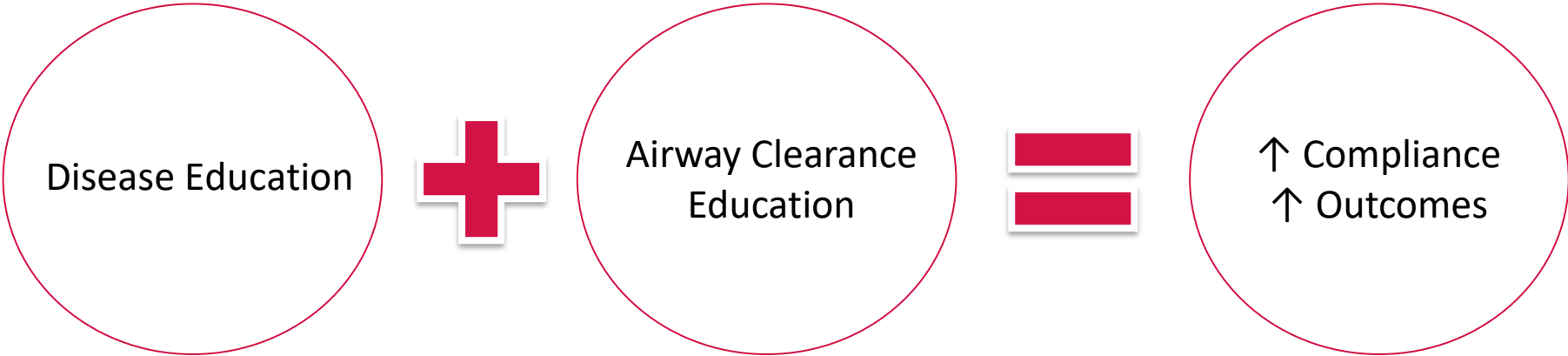


**STABILIZED  
LUNG FUNCTION**

# Airway Clearance Selection



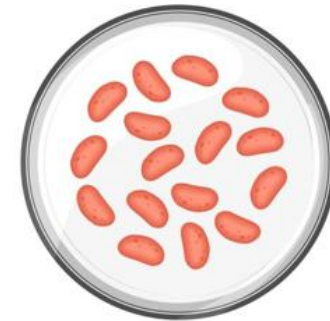
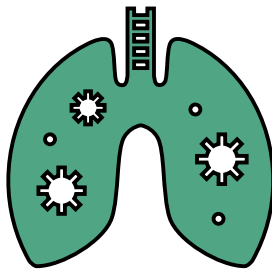
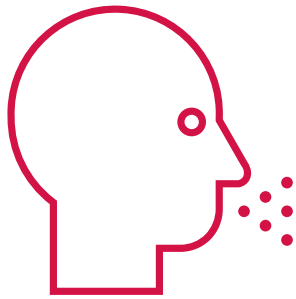
# Patient Education



 **BRONCHIECTASIS & OVERLAP**

# Bronchiectasis-COPD Overlap Syndrome (BCOS)

- ~50% of COPD patients have co-morbid bronchiectasis
- Bronchiectasis prevalence increases as COPD severity increases
- Increased exacerbations and mortality
- Increased sputum production with chronic colonization



# Bronchiectasis & Nontuberculous mycobacteria (NTM)

- Naturally occurring bacteria in water and soil
- Infections are prevalent in patients with bronchiectasis
- There are ~200 different species of NTM
- The most common species of NTM is *Mycobacterium avium* complex (MAC)



Tap water



Showerheads

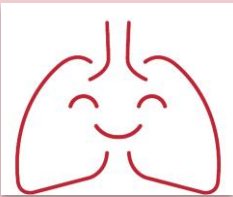


Soil from parks, gardens,  
and environment

# Summary



~4.2 million patients with undiagnosed BE, growing at 8% annually



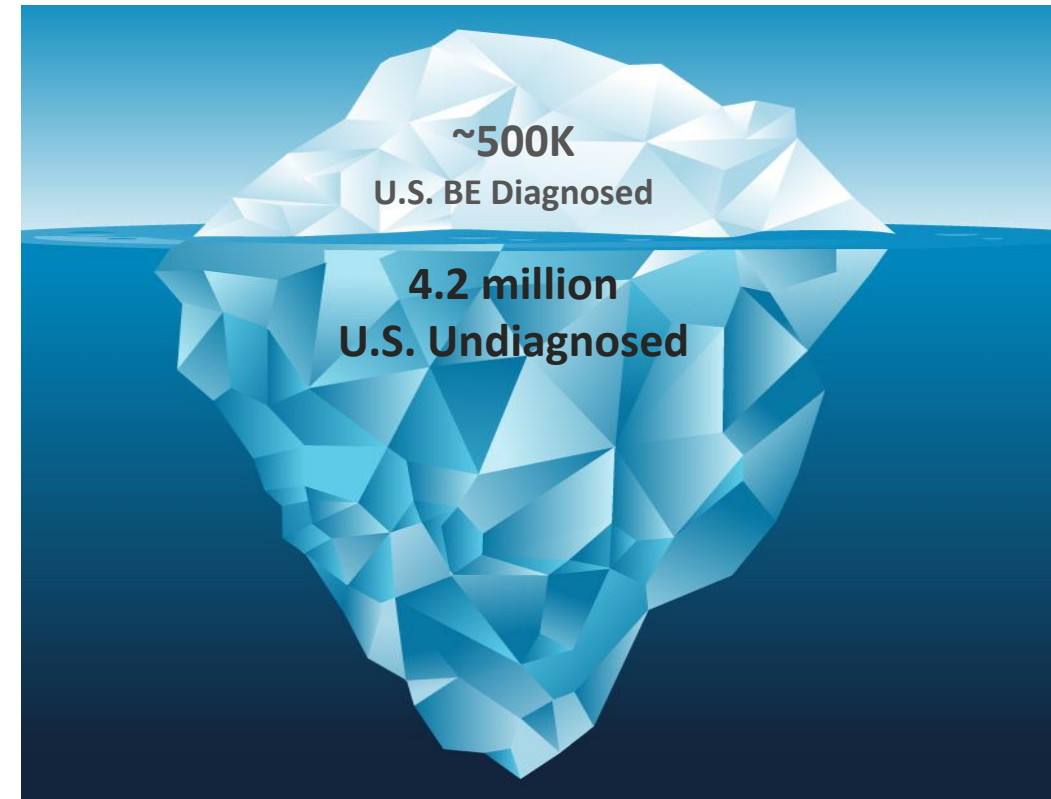
Identification of BE is essential to provide targeted treatment management and disrupt the vicious vortex



COPD and NTM commonly co-exist with bronchiectasis

# RT Call to Action

- What's your role?
  - Inpatient
  - Clinic / Outpatient
  - COPD Navigator / Educator / Discharge Management
- What to look for?
  - Chronic productive cough
  - Frequent exacerbations
  - Co-morbidities
- Have they had an HRCT?
- What is the ACT management?
  - Reduce the risk of exacerbations and hospitalizations



# Resources

- **Bronchiectasis and NTM Association** <https://www.bronchiectasisandntminitiative.org/>
- **World Bronchiectasis Day** [www.WorldBronchiectasisDay.org](http://www.WorldBronchiectasisDay.org)
- **COPD Foundation** <https://www.copdfoundation.org/>



Thank you! Questions?



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