Elevating Awareness of Bronchiectasis: Comprehensive Strategies for Diagnosis, Management, and Treatment

Presented by:
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This presentation was created to inform and educate respiratory therapists.

Disclosure

(TR Aksamit)

Relevant Financial Relationship(s)

None

Director: Bronchiectasis and NTM Association

Past-chair: U.S. Bronchiectasis Research Registry

Research clinical study activity:

- -U.S. Bronchiectasis Research Registry
- -Bayer, Cipro DPI, Global PI
- -Aradigm/Grifols, Cipro liposomal
- -Insmed, inhaled liposomal amikacin, brensocatib
- -BI, BI1291583
- -Verona, ensifentrine
- -Zambon, inhaled colistin
- -AztraZeneca, benralizumab
- -Armata, AP-PA02 phage
- -Spero, SPR720
- -Electromed, HillRom, RespiTech

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- -All funding directly made to the Mayo Foundation for Medical Research and Education

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Objective - Bronchiectasis

- Understand the pathophysiology, epidemiology, and signs and symptoms
- Diagnosis and treatment options
- Bronchiectasis is not COPD or asthma
- Identify strategies for patient education and support
- Increased awareness including World Bronchiectasis Day
- Summary and Q&A

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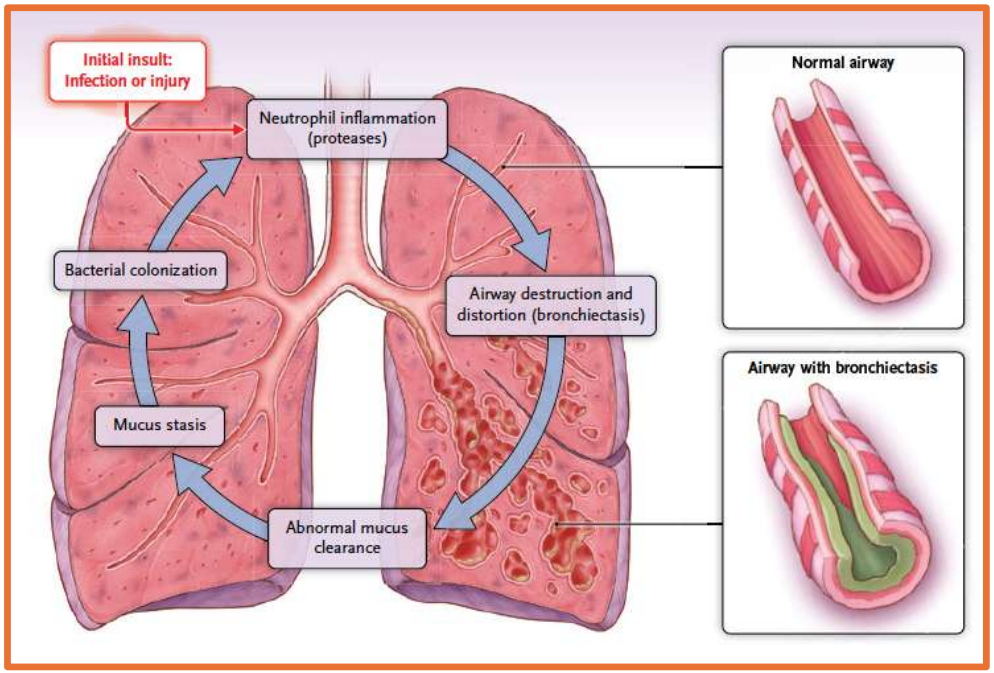
What is Bronchiectasis?

Bronchiectasis:

- Infection
- Inflammation
  - Neutrophilic predominant
  - Limited eosinophilic, 20%
- Epithelial dysfunction and impaired mucociliary clearance
- Structural disease
  - Bronchial dilatation
  - Bronchial wall thickening
  - Mucous plugging

Etymology: Greek, bronchus + ektasis, stretching



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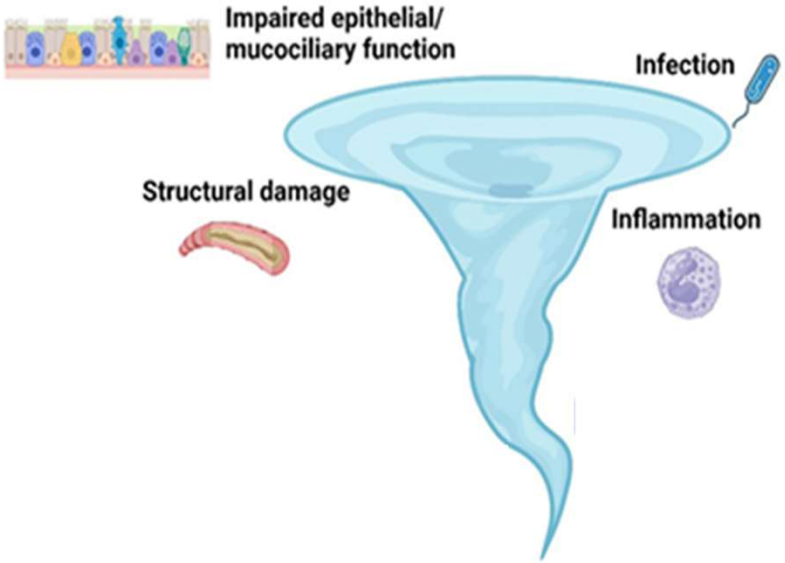
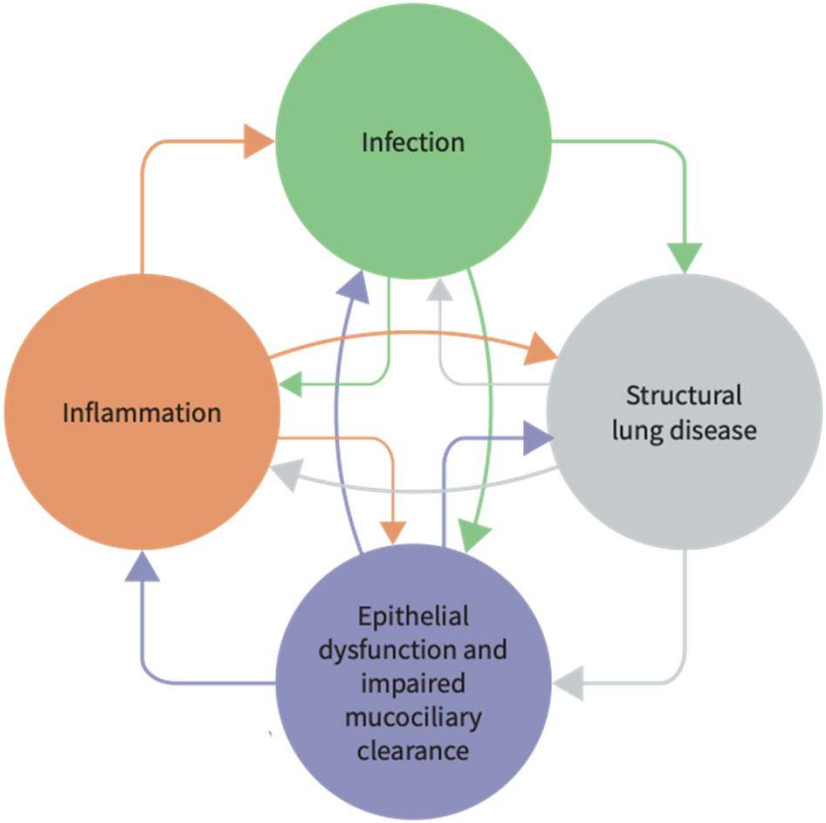
Flume et al. *Lancet* 2018: 392: 880
O'Donnell AE. *N Engl J Med*. 2022;387:533.

Bronchiectasis Pathogenesis





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Johnson E, et al. *Eur Respir Rev*. 2024;33:230234
Shteinberg M, et al. *Am J Respir Crit Care Med*. 2024; 210: 1

Epidemiology and Burden of Disease - Bronchiectasis

- An estimated 350,000 to 500,000 adults are affected by bronchiectasis in the United States.
- Increases 8% per year
- More common in women than men
- The prevalence increases significantly with age:
    - Ages 60 and older: 300 to 500 per 100,000.
    - Ages under 40-50: 40 to 50 per 100,000.

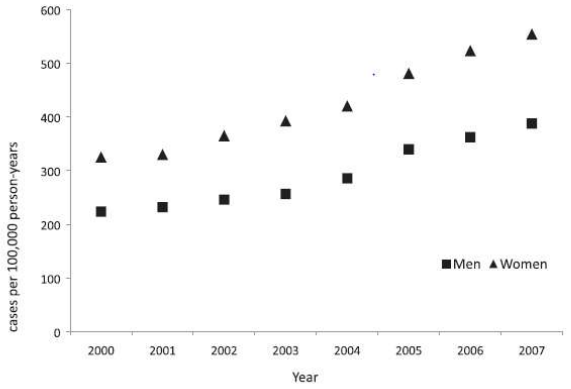

FIGURE 4. Trend in annual prevalence of bronchiectasis by sex.

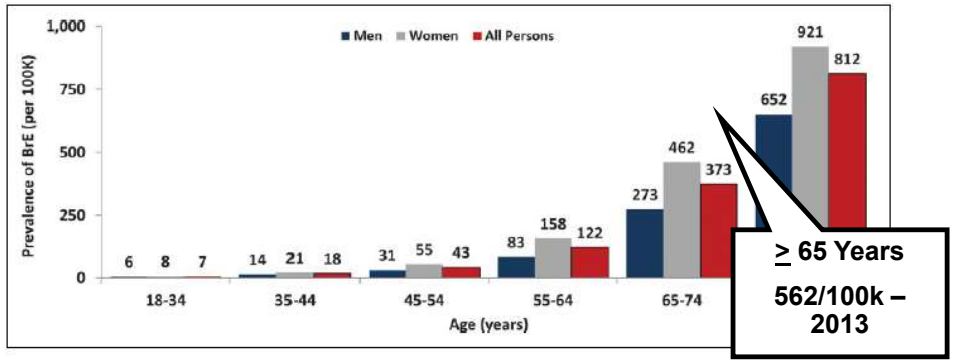

Figure 2. Prevalence of bronchiectasis among US adults, by age and sex.

Seitz AE, et al. *Chest*. 2012;142:432.
Weycker D, et al. *Chron Respir Dis*. 2017;14:377.

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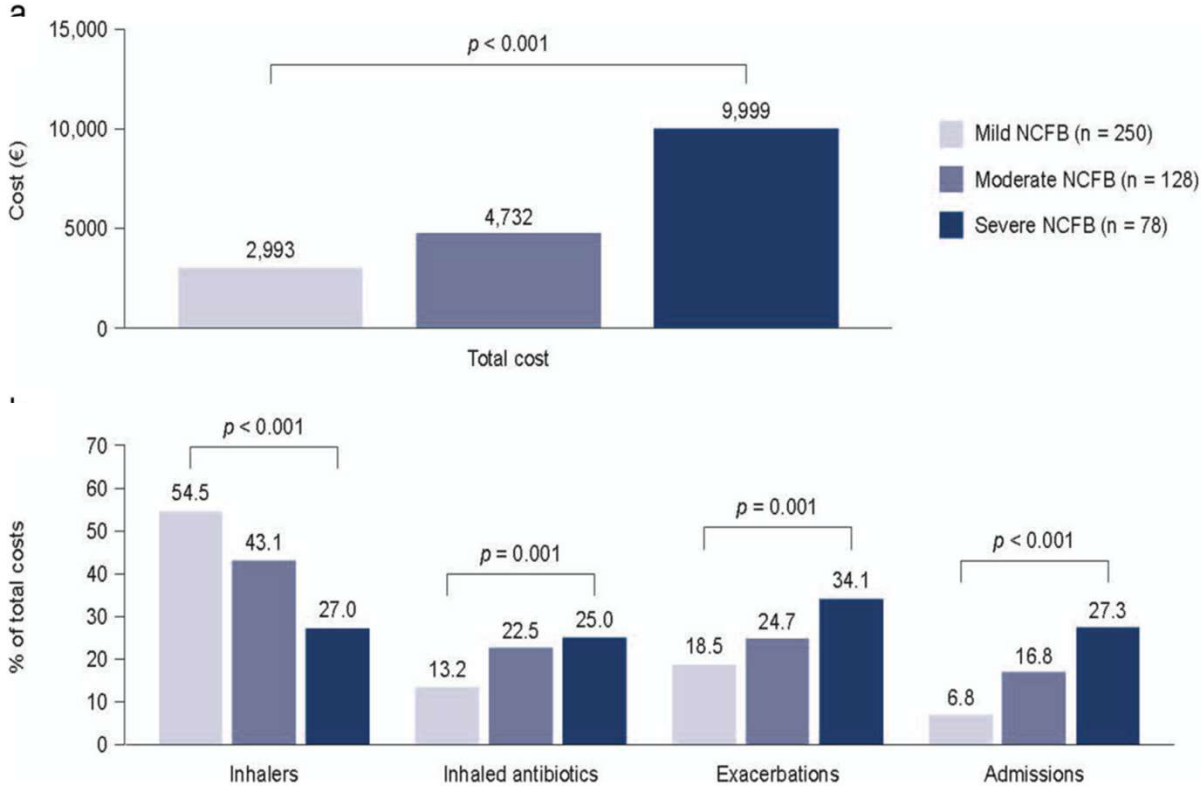
Epidemiology and Burden of Disease - Bronchiectasis

Management Costs of BE

- Two US studies reported total annual costs of approximately US$26,000 in patients without exacerbations, increasing to US$36,000–37,000 in patients with exacerbations.
- *P. aeruginosa* infection increased management costs by US$31,551 to US$56,499, as reported in two US studies, with hospitalization being the main cost driver.



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Goeminne, et al. *BMC Pulm Med*. 2019;19:54

Causes Associated with Bronchiectasis

AUTOIMMUNE DISORDER	ASPIRATION SYNDROME	LUNG INFECTION	IMMUNODEFICIENCY	OTHER LUNG DISEASES
• Rheumatoid arthritis • Sjögren's syndrome • Inflammatory bowel disease	• Aspiration pneumonia • GERD • Foreign body • Vocal cord disease	• Nontuberculous Mycobacteria (NTM) • Pneumonia • Tuberculosis • Fungal	• Common Variable Immune Deficiency (CVID) • Hypogammaglobulinemia • HIV infection • Hematologic cancer	• Cystic Fibrosis (CF) • Primary Ciliary Dyskinesia (PCD) • COPD • Asthma • Allergic Bronchopulmonary Aspergillosis (ABPA)

*Idiopathic remains a common cause of bronchiectasis

Flume et al. *Lancet* 2018: 392: 880
Lonni S, et al. *Ann ATS*. 2015;12:1764

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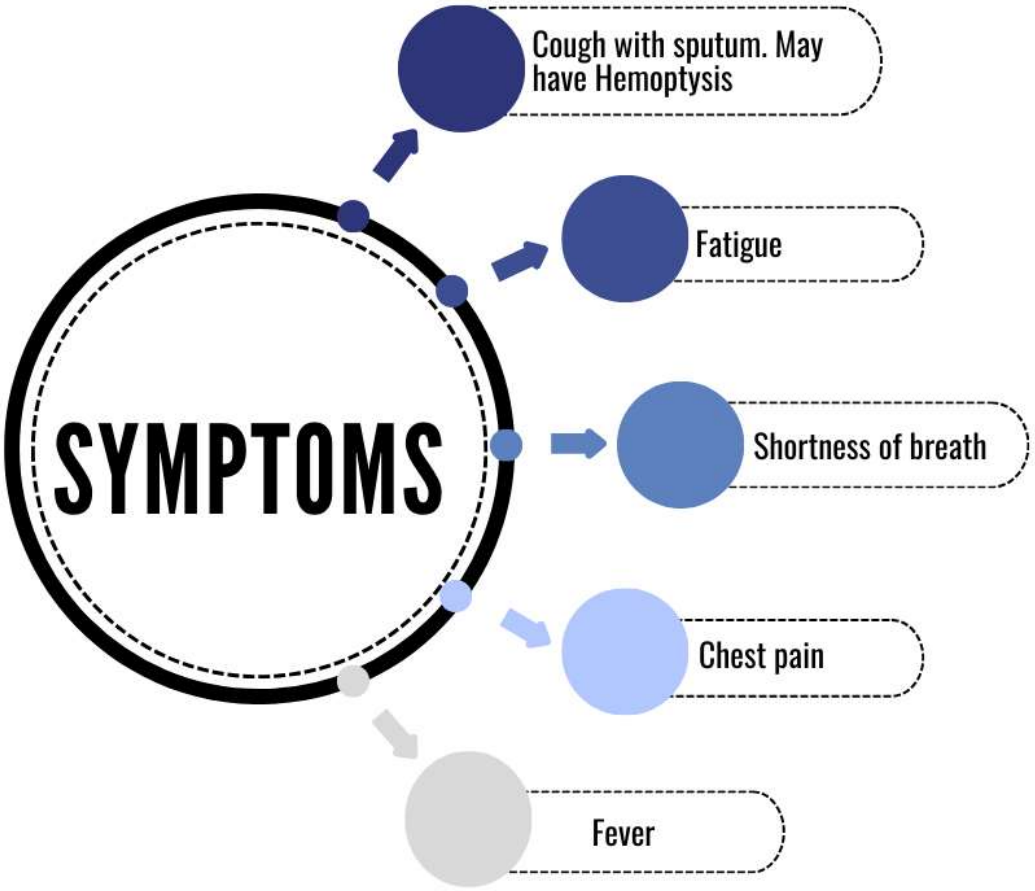
Signs and Symptoms - Bronchiectasis



When to Suspect Bronchiectasis

- Chronic cough with sputum production
- Frequent respiratory infections

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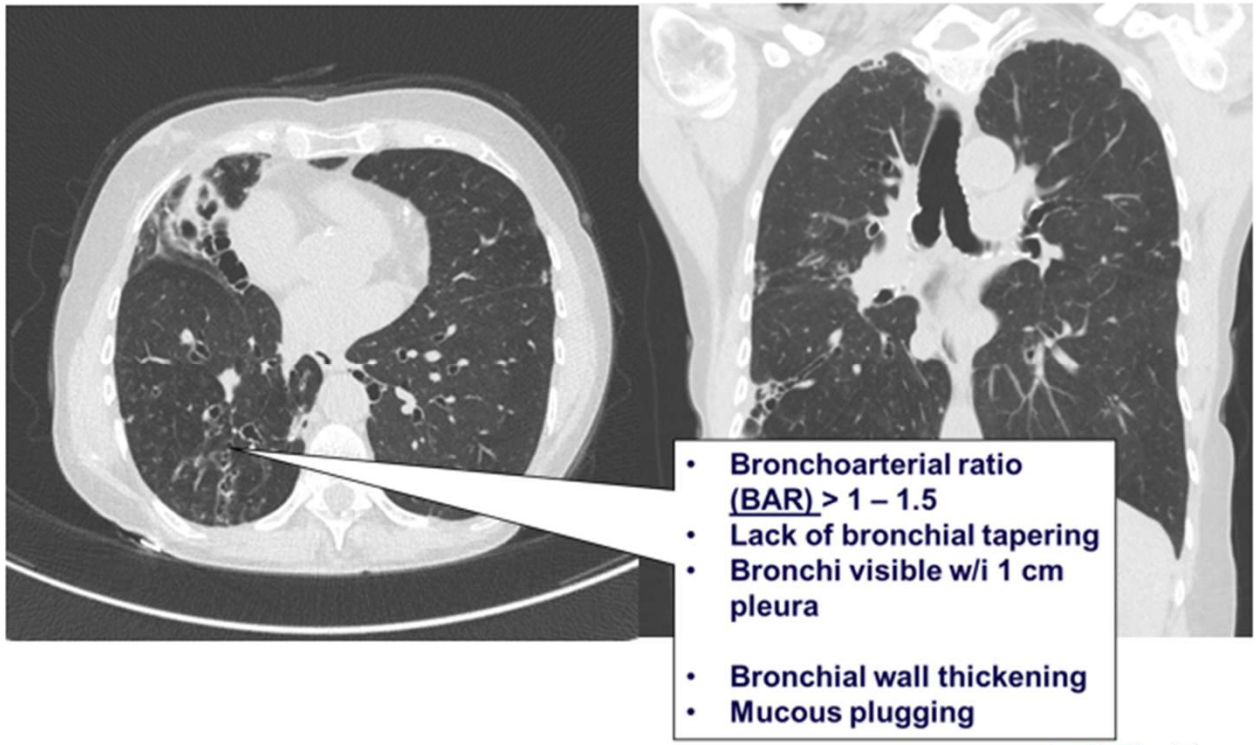
High Resolution Computed Tomography (HRCT)



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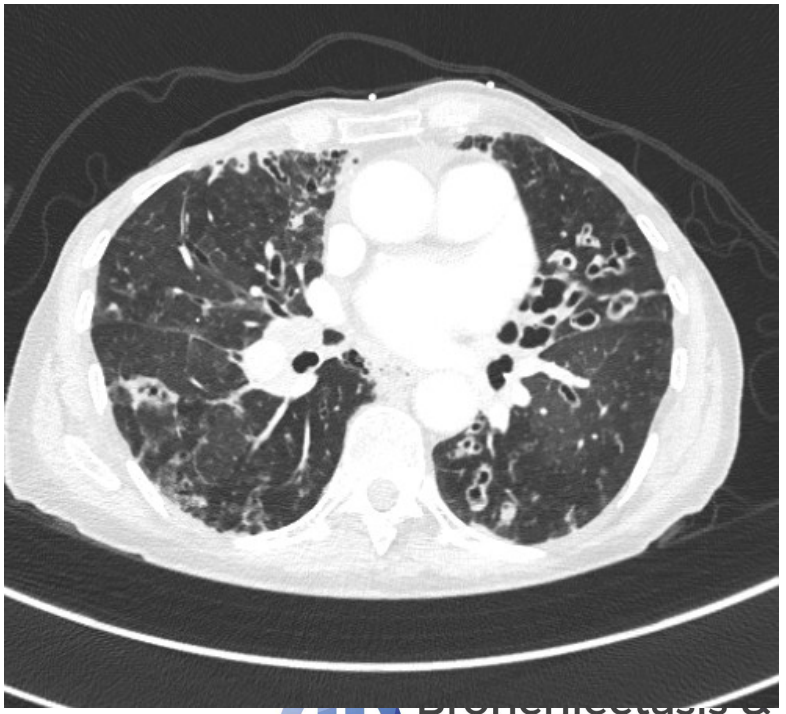
Aliberti S, et al. *Lancet Respir Med*. 2022;10:298

High Resolution Computed Tomography (HRCT)

Spectrum of Disease Varies

Patient 1

Patient 2



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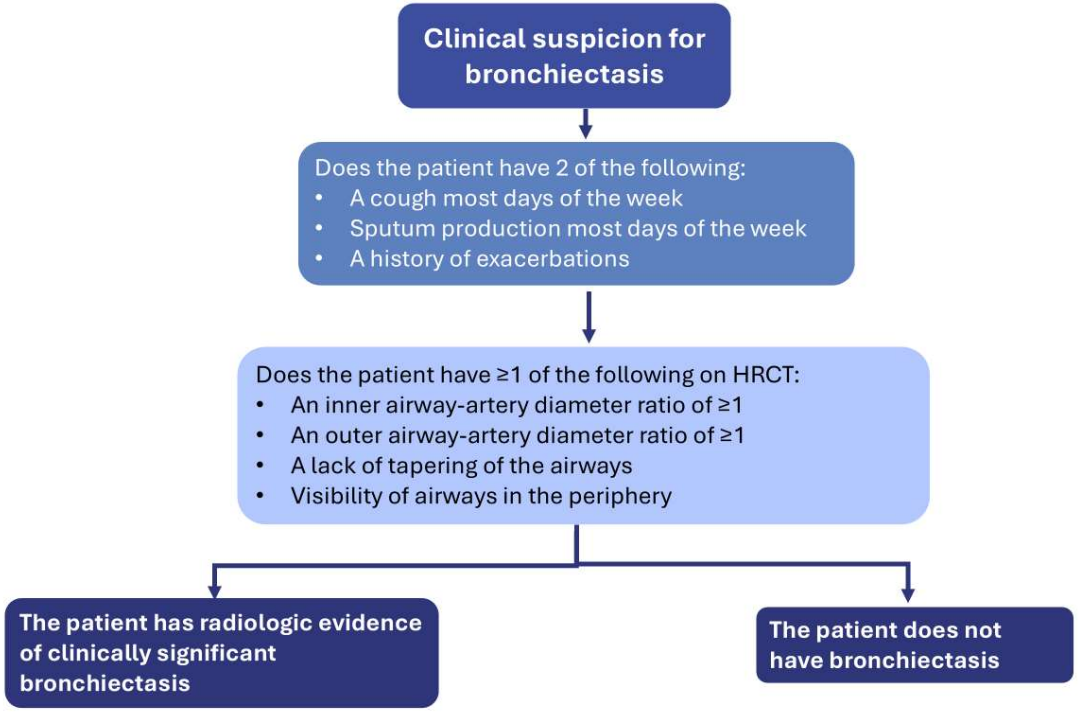
Clinical Suspicion for Bronchiectasis



Aliberti S, et al. *Lancet Respir Med*. 2022;10:298

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Bronchiectasis-COPD-Asthma Overlap Syndrome

Bronchiectasis does NOT equal COPD

Chalmers JD. *CHEST*. 151; 2017: 1204

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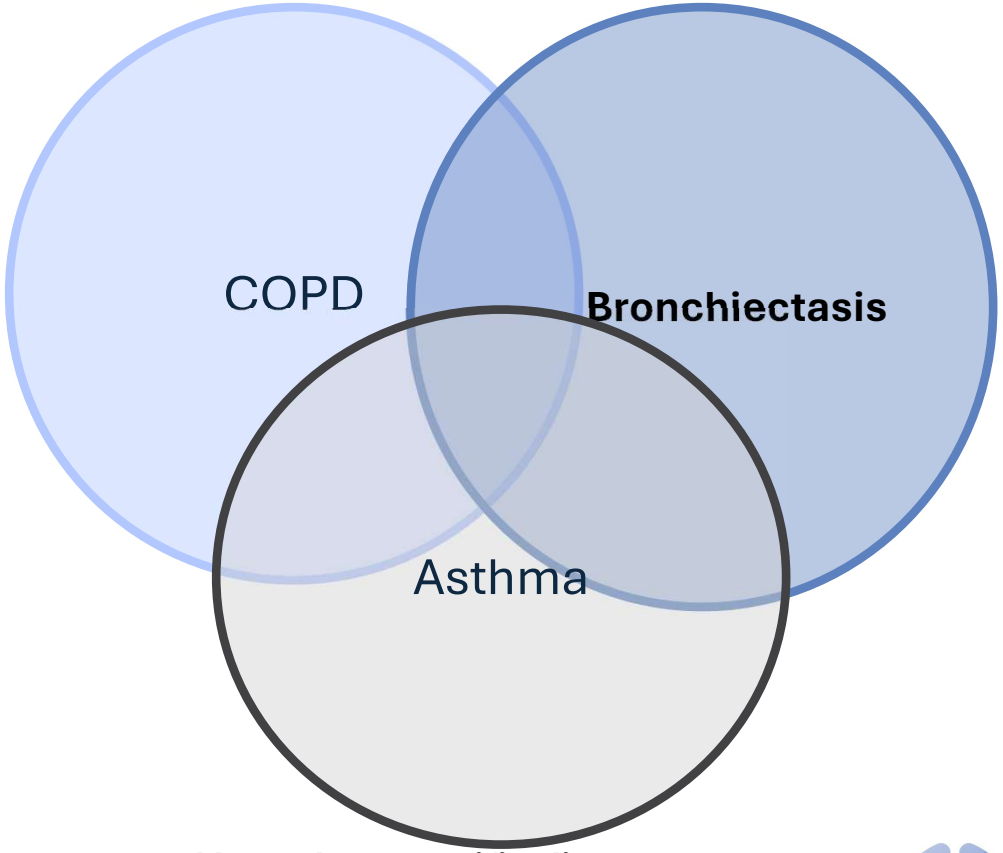
Bronchiectasis-COPD-Asthma Overlap Syndrome



These conditions should be managed based on specific diagnoses

Martinez-Garcia MA, et al. *CHEST*. 2018;154: 737
Polverino E, et al. *Eur Respir J*. 2018; 52: 1800328
Chalmers JD. *CHEST*.151; 2017: 1204

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Case Study

78y.o. female previous (39 years) 10-15 pack year smoker with 3 weeks of increased cough, sputum, fatigue, and dyspnea.

Carried diagnosis of COPD for almost 5 years

- **PHx:** autoimmune hepatitis (on azathioprine), portal HTN, thrombocytopenia, rhinosinusitis, osteopenia, GERD

- **Exam**: VSS, BMI 17
- Anicteric
- Lungs: Pectus but no wheezes, rhonchi, rales, rubs, or consolidative change
- Ext: No C, C, E

- **Labs**: Hg: 12, plt: 84, WBC: 5.0
- Sodium: 140, potassium: 4.1, Cr: 0.38, ALT: 16, alk phos: 126

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Case Study

Exacerbations: 4 in past year

IgG: 659 mg/dl (767-1590) IgM: 7 mg/dl (37-286) IGA: < 1 mg/dl (61-356)

Normal alpha-1-antitrypsin, IgE, and normal sweat chloride 25, 21

Sputum: Moraxella Catarrhalis - course of Augmentin (amoxicillin-clavulanate) given

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Spirometry

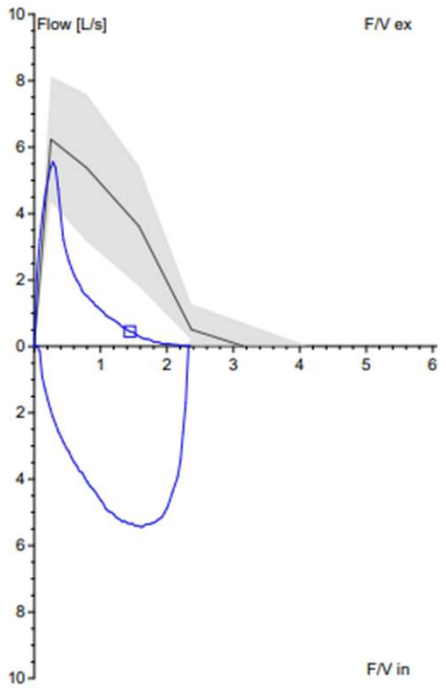
		Pred	LLN	Pre	Pre%Pred	PreZ-score
FVC	L	3.15	2.24	**2.37**	75 %	-1.40
FEV 1	L	2.43	1.70	**1.44**	59 %	-2.20
FEV1/FVC	%	78.2	65.4	**60.7**	78 %	-2.16
FEF 25-75%	L/s	1.93	0.89	**0.60**	31 %	-2.30
PEF	L/s	6.2	4.3	**5.6**	89 %	-0.59
PIF	L/s	4.8	2.4	**5.5**	114 %	0.05
FIVC	L	3.15	2.24	**2.24**	71 %	-1.63
MEF 50 % MIF 50%				**16**		
FET	sec			**15.26**		

DLCO

		Pred	LLN	Pre	Pre%Pred	PreZ-Score
DLCO_SB	ml/(min*mmHg)	20.6	15.5	**17.3**	84 %	-1.03
VA_SB (B)	L	5.10	4.08	**3.93**	77 %	-1.91
KCO	ml/(min*mmHg*L)	4.02	3.07	**4.42**	110 %	0.64

PULSE OXIMETRY (LLN: 93)

	Pre
Resting O2	97
Resting Pulse	60
Exercise O2	97
Exercise Pulse	116
Exercise Time	3:00
Step Height (5 or 9 inches)	9



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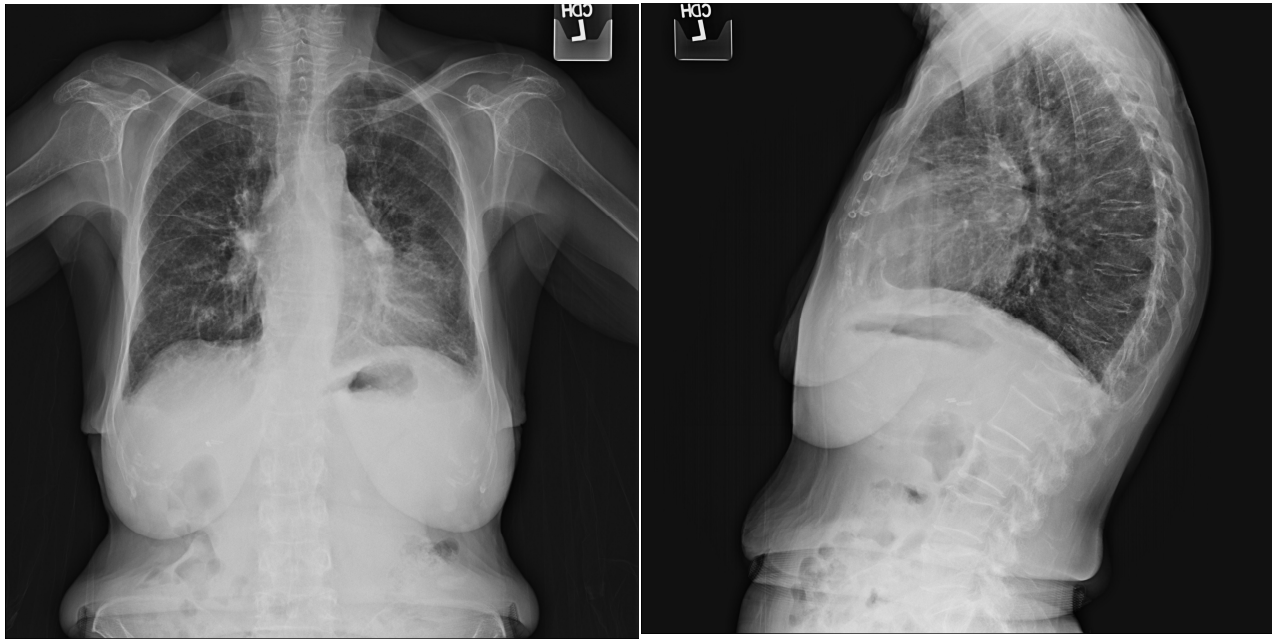
Case Study



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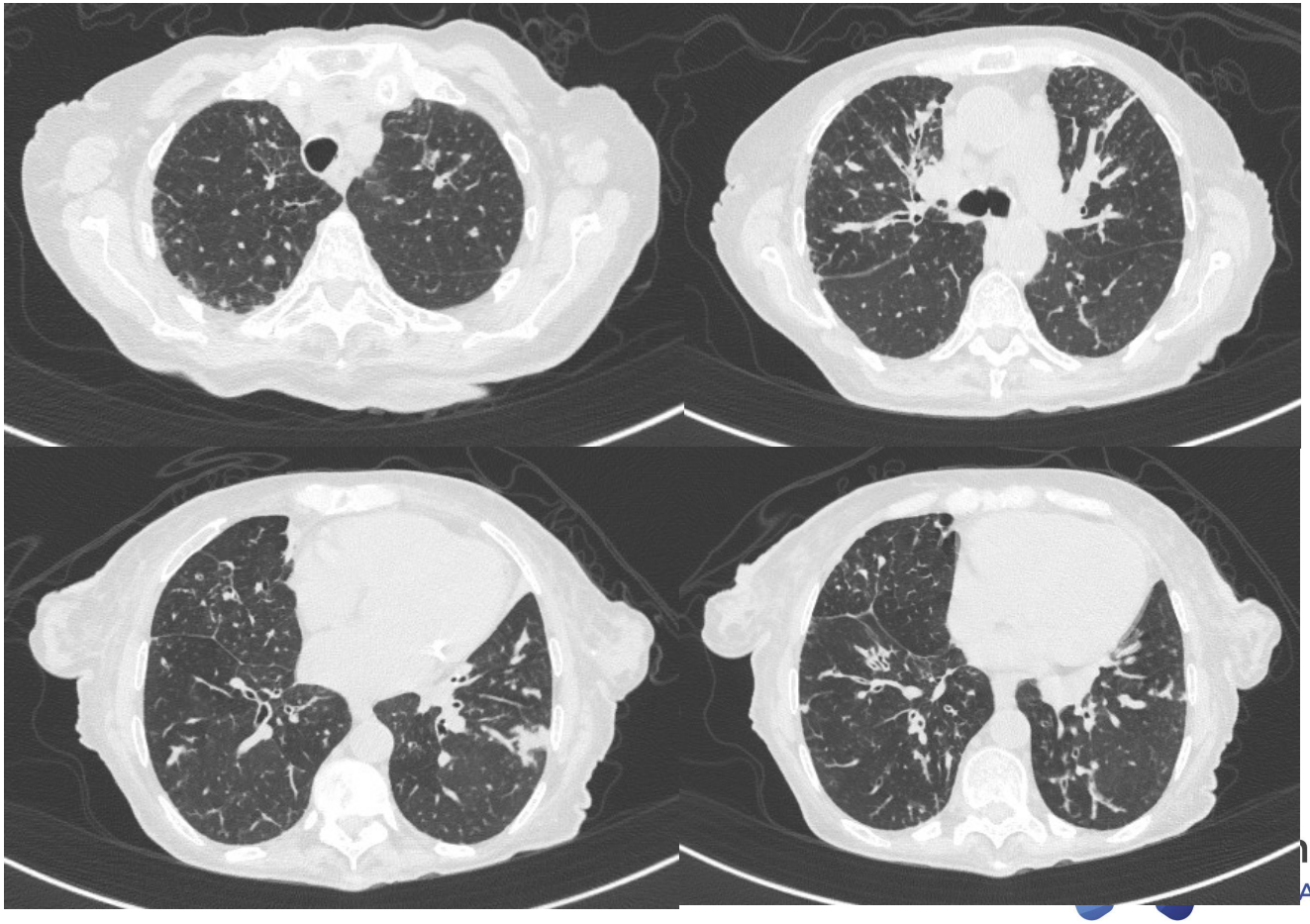

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Normal alpha-1-antitrypsin, IgE, and normal sweat chloride 25, 21

Sputum: Moraxella Catarrhalis

Airway clearance: Aerobic activity, active clearance therapy, nebulized albuterol, 3% (7% not tolerated), Aerobika (PEP valve) BID, but no vest (rib fx)

GERD: Followed Hepatology/esophageal clinic
PPI and reflux precautions

Rhinosinusitis: Followed by ENT (rhinology) s/p surgery
BID mometasone and Cipro saline rinses

Immunology: IVIG replacement

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Case Study

Exacerbations: NONE going on 18 months

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Clinical Suspicion for Bronchiectasis

Know your patient: Who/when to ask questions about whether bronchiectasis may be present:

Avoid delay in diagnosis

- Chronic productive cough
- Frequent antibiotic use for respiratory infections (≥ 2 per year)
- Isolation of pseudomonas or nontuberculous mycobacteria (NTM, e.g. MAC) in sputum
- Refractory symptoms when diagnosis of asthma, COPD, or both present
- Hemoptysis
- Non-resolving associated (respiratory) symptoms: fatigue, weight loss

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Diagnostic Methods - Bronchiectasis

Key Diagnostic Steps:

- **Medical History & Physical Examination**
- **Radiology and Imaging**
  - High-Resolution CT Scan
- **Sputum Cultures**
  - Bacterial Cultures
  - Acid-Fast Bacillus (AFB) Cultures
  - Fungal Cultures
- **Pulmonary Function Testing (PFT)**
- **Laboratory Tests**
  - Complete Blood Count (CBC) with Differential
  - Immunoglobulin Levels (Ig Levels)
  - ABPA (Allergic Bronchopulmonary Aspergillosis) Evaluation
  - Genetics: cystic fibrosis (CF), primary ciliary dyskinesia (PCD)

Delay in diagnosis is common.

Chessari, et al .*ERJ Open Res*. 2024;10(2):00713-2023, Hill AT, et al. *Thorax*. 2019;74(suppl 1):1-69. Polverino, et al. *Eur Respir J.* 2017;50:1700629. Martínez-García MA, et al. *Arch Bronchopneumol.* 2018;54:88-98. Chang, et al. *Eur Respir J*. 2021;58:2002990.

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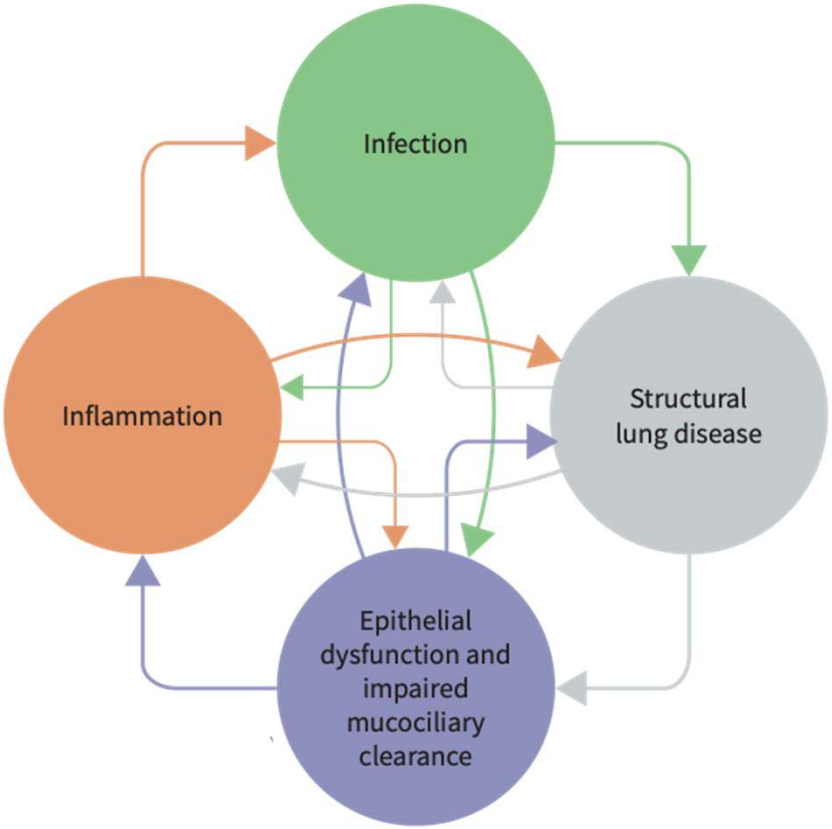
Treatment - Bronchiectasis

- Airway clearance
- Mucus thinning medication
- Bronchodilator
- Medication management
  - Antibiotics: oral, systemic, inhaled
  - Anti-inflammatory
- Pulmonary rehabilitation
- Treat co-morbidities/underlying disease
  - GERD, rhinosinusitis, other
  - Asthma, COPD
- Vaccination up to date
- Smoking Cessation



Johnson, et al. *Eur Respir Rev*. 2024;33:230234
Choi H, et al. *Eur Respir J*. 2024; 63: 2400518
Flume PA, et al. *Lancet*. 2018;392:880
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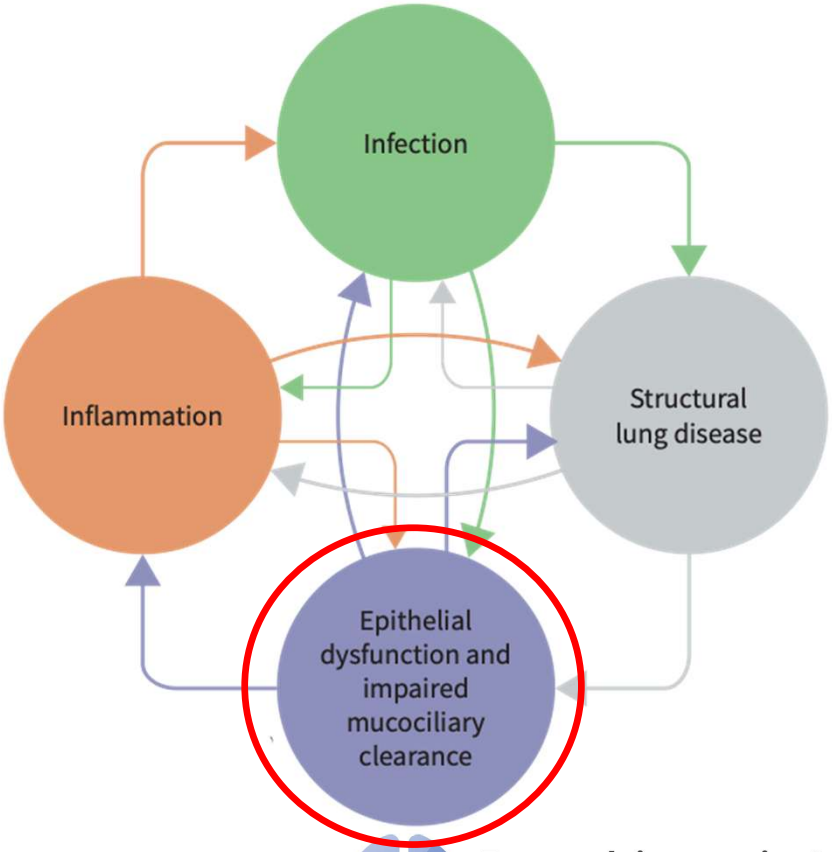

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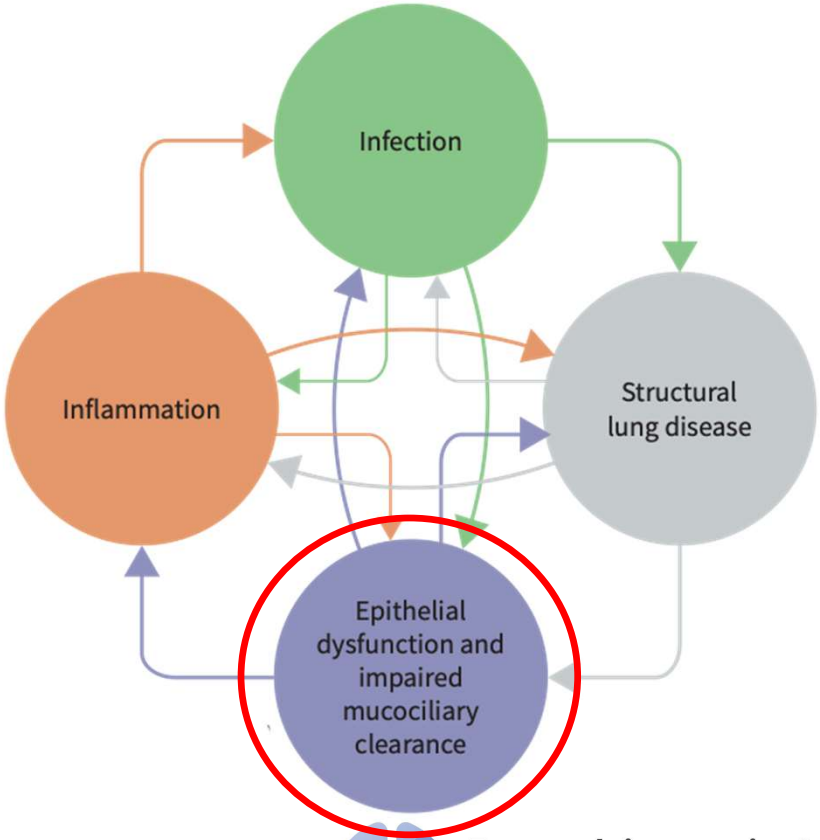
Medication – Bronchiectasis – Mucociliary Clearance

Mucociliary Clearance:

- Nebulized Hypertonic Saline : 3% , 7%
- N-acetylcysteine (NAC) – limited
- Mannitol – not recommended
- Dornase alpha – not recommended



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Hill AT et al. Thorax. 2019; 74:1
Martínez-García MA, et al. *Arch Bronchopneumol*. 2018;54

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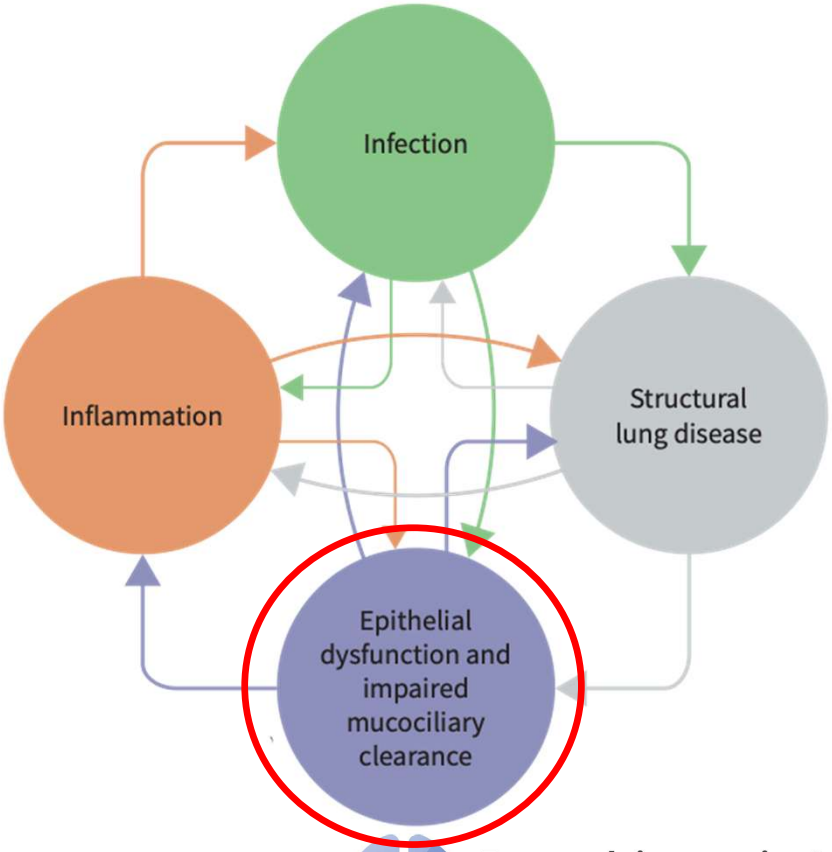
Airway Clearance Therapy (ACT) - Bronchiectasis

Positive effects of airway clearance:

- Increase in sputum volume
- Reduced peripheral airways obstruction
- Fewer inflammatory cells in sputum
- Improved exercise capacity
- Reduced impact of cough on QoL



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Breathing Techniques - Bronchiectasis

Breathing Techniques for Mucus Clearance

- Active cycle of breathing: Combines breathing control, thoracic expansion exercises, and forced expirations to loosen and remove mucus.
- Huff Cough: Using quick, forced exhalations to move mucus from the lower airways up to the upper airway for easier removal.
- Autogenic drainage: Involves inhaling at various lung volumes and adjusting exhalation force to mobilize and move mucus effectively
- ELTGOL: Focuses on controlled expiration in a lateral posture, using an open glottis to allow for slow and sustained exhalation

Spinou et al. *Eur Respir J*. 2024; 63: 2301689
Basavaraj A, et al. *Respir Med Res*. 2024; 86: 101
Herrero-Cortina B et al. *Eur Respir J*. 2023: 62: 2202053
Basavaraj A et al. *Chest*. 2020; 158: 1376

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Airway Clearance Therapy (ACT) - Bronchiectasis

- OPEP (Oscillatory Positive Expiratory Pressure)
- Manual Chest Physiotherapy (CPT)
- Postural Drainage & Positioning
- VEST Therapy (HFCWO)

Spinou et al. *Eur Respir J*. 2024; 63: 2301689
Basavaraj A, et al. *Respir Med Res*. 2024; 86: 101
Herrero-Cortina B et al. *Eur Respir J*. 2023: 62: 2202053
Basavaraj A et al. *Chest*. 2020; 158: 1376

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Airway Clearance – Clinical Outcomes

Patient-Reported Outcomes:

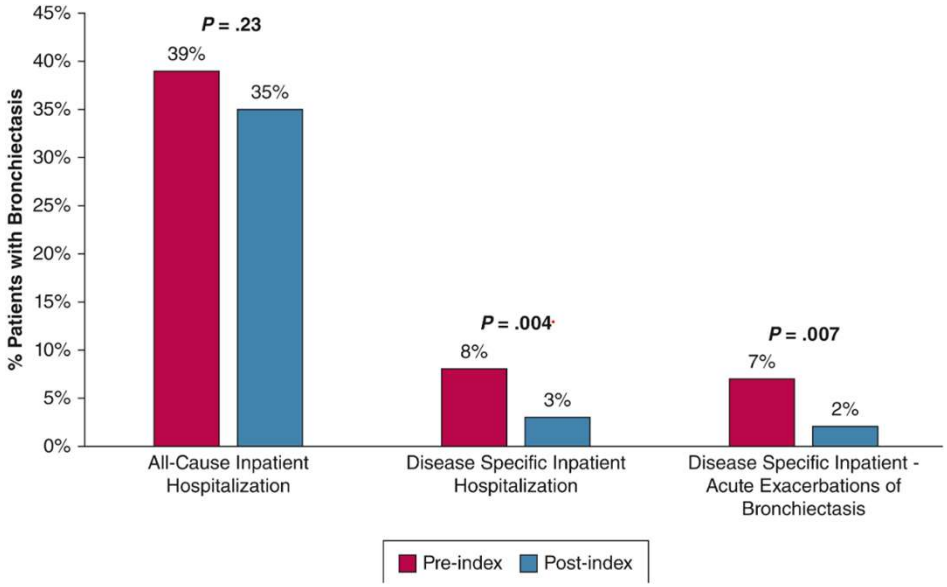
- Significant improvement in Health-related Quality of Life (HRQoL) across seven studies involving 146 participants

Reductions in pulmonary hyperinflation

- FRC decreased by 19% with non-PEP devices
- FRC decreased by 30% with airway oscillatory devices

Improved patient outcomes with HFCWO

- Decreased hospitalizations
- Reduced length of stay by 33%
- Fewer inpatient visits (from 2.4 visits before the index to 1.8 visits after)
- Decrease antibiotic use
  - Oral antibiotics use decreased 9%
  - IV antibiotic use decreased 47%



Camacho Urribarri ME, et al. *Chest Pulmonary*. 2024;163:100013.
Lee AL, et al. *Chr Respir Dis.* 2015; 12: 36
Lee AL, et al. *Cochrane Database Syst Rev*. 2015; 11

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Medication – Bronchiectasis - Infection

Mucociliary Clearance:

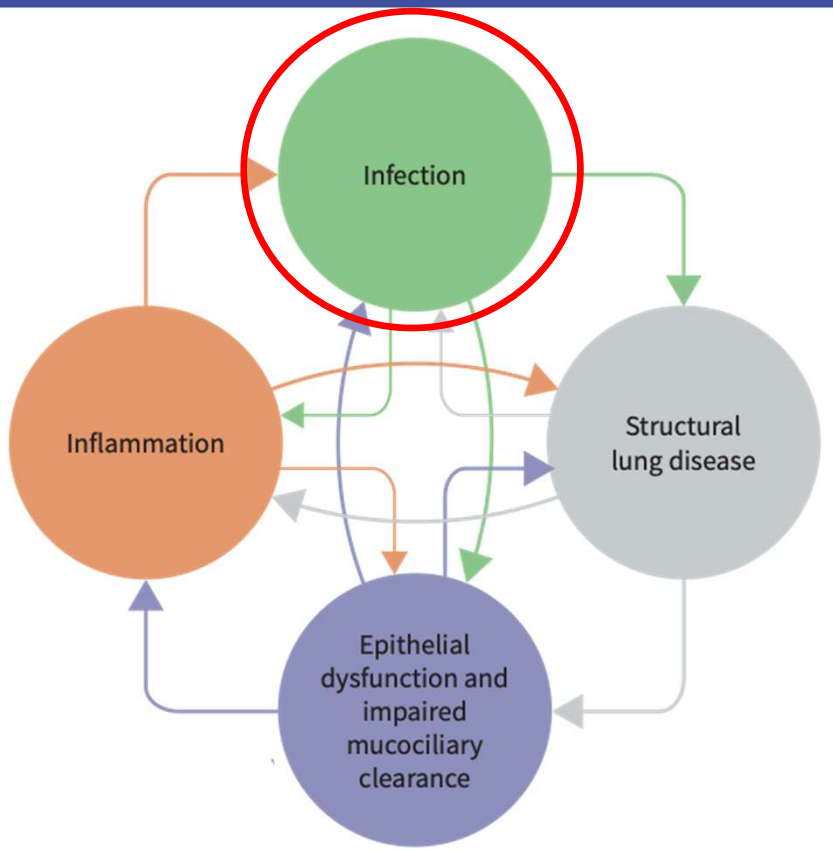
- Nebulized Hypertonic Saline : 3% , 7%
- N-acetylcysteine (NAC) – limited
- Mannitol – not recommended
- Dornase alpha – not recommended

Antibiotics:

- Sputum culture informative, e.g. pseudomonas, staphylococcus, other
- Consider caution regarding resistance and side effects for frequent exacerbators

Inhaled Antibiotics:

- For patients with frequent infections
- Best evidence supports aminoglycosides (e.g., tobramycin) and colistin



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Medication – Bronchiectasis - Inflammation

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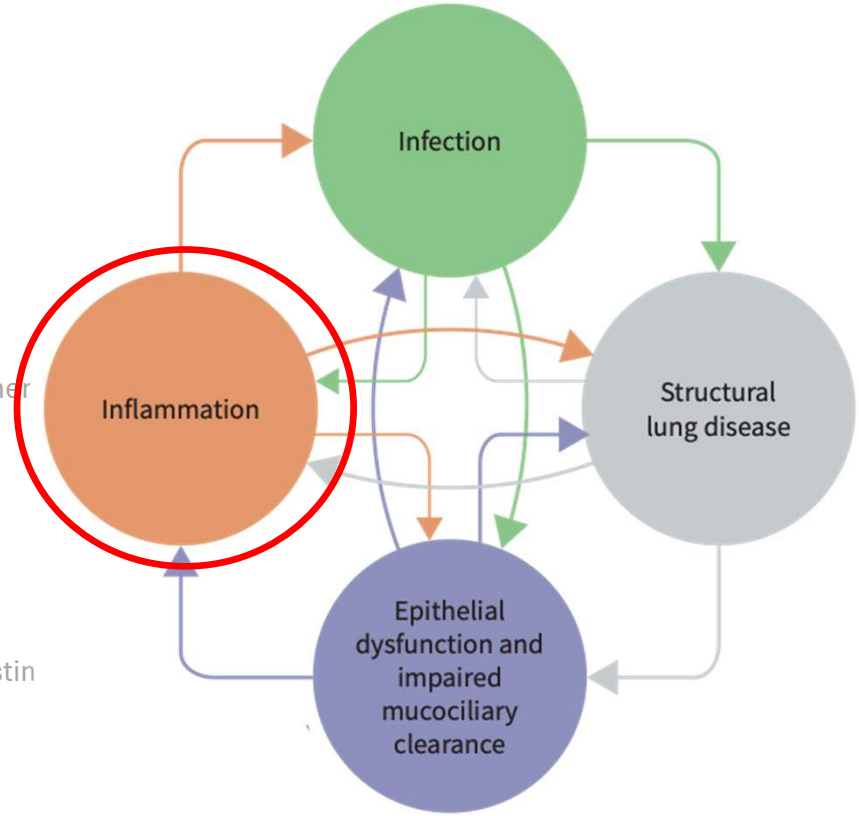
- Sputum culture informative, e.g. pseudomonas, staphylococcus, other
- Consider caution regarding resistance and side effects for frequent exacerbators

Inhaled Antibiotics:

- For patients with frequent infections
- Best evidence supports aminoglycosides (e.g., tobramycin) and colistin

Anti-Inflammatories:

- Inhaled corticosteroids (ICS) – Asthma, otherwise avoid
- Use ICS with caution—may increase risk of NTM and other infections
- Macrolides (e.g. azithromycin, erythromycin)



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Medication – Bronchiectasis - Inflammation

Mucociliary Clearance:

-

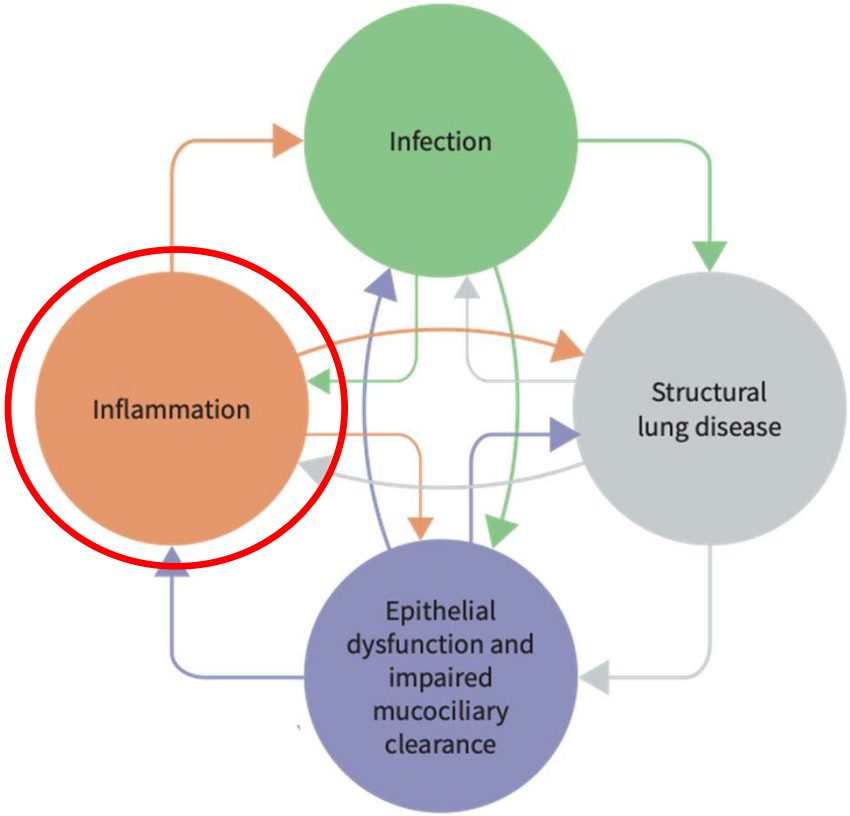
<u>Brensocatib</u> is an oral potent reversible inhibitor of Dipeptidyl peptidase-1: (DPP-1) and other neutrophil serine proteases (neutrophilic inflammation)

Not FDA approved - yet

Chalmers JD, et al. *N Engl J Med*. 2025: 392: 1569
Choi H, et al. *Eur Respir J*. 2024; 63: 2400518
Chalmers JD, et al. *Eur Respir J*. 2025; 65: 2401551

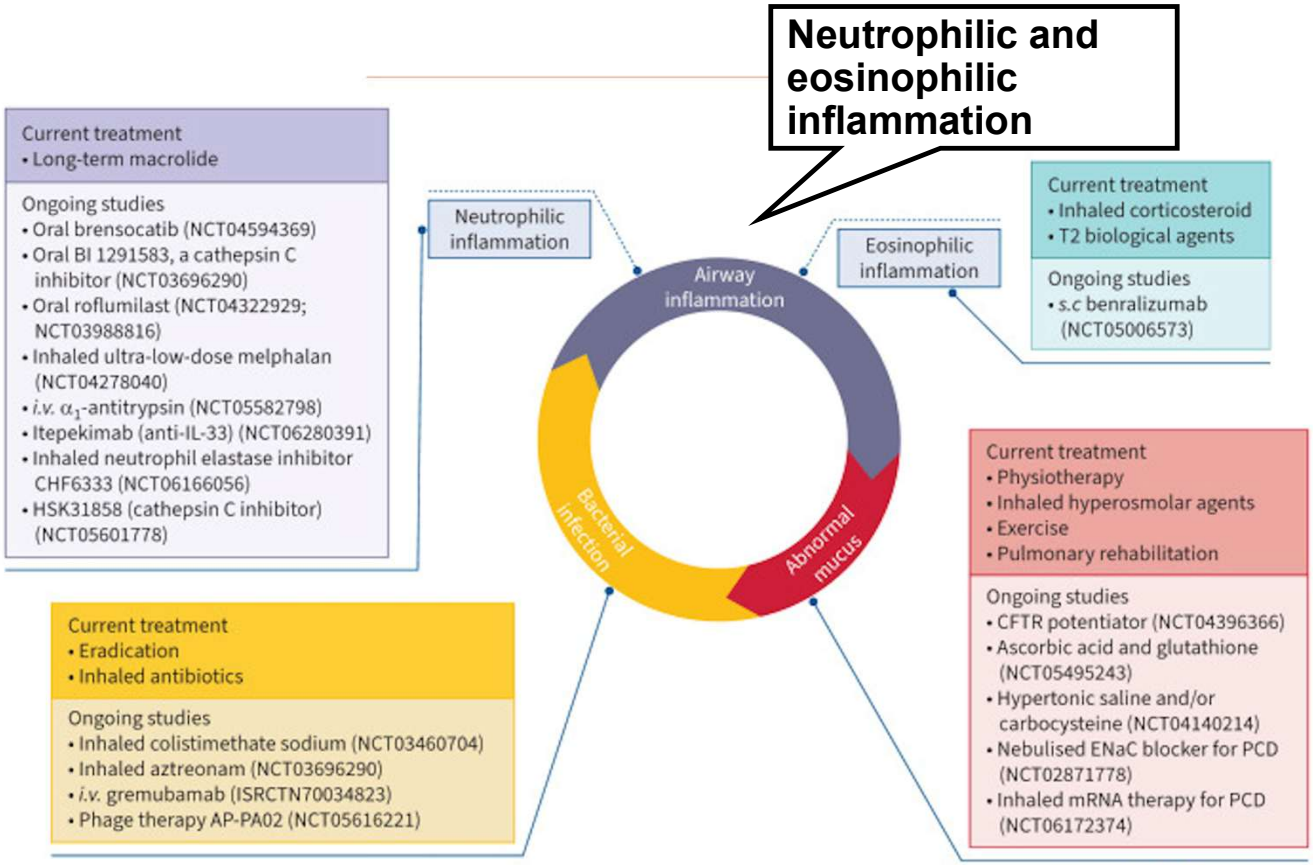
Anti-Inflammatories:

- Inhaled corticosteroids (ICS) – Asthma, otherwise avoid
- Use ICS with caution—may increase risk of NTM and other infections
- Macrolides (e.g. azithromycin, erythromycin)



Bronchiectasis & NTM ASSOCIATION

Research and Advancements



Choi H, et al. *Eur Respir J*. 2024; 63:2400518

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Objective - Bronchiectasis

- Understand the pathophysiology, epidemiology, and signs and symptoms
- Diagnosis and treatment options
- Bronchiectasis is not COPD or asthma
- Identify strategies for patient education and support
- Increased awareness including World Bronchiectasis Day
- Summary and Q&A

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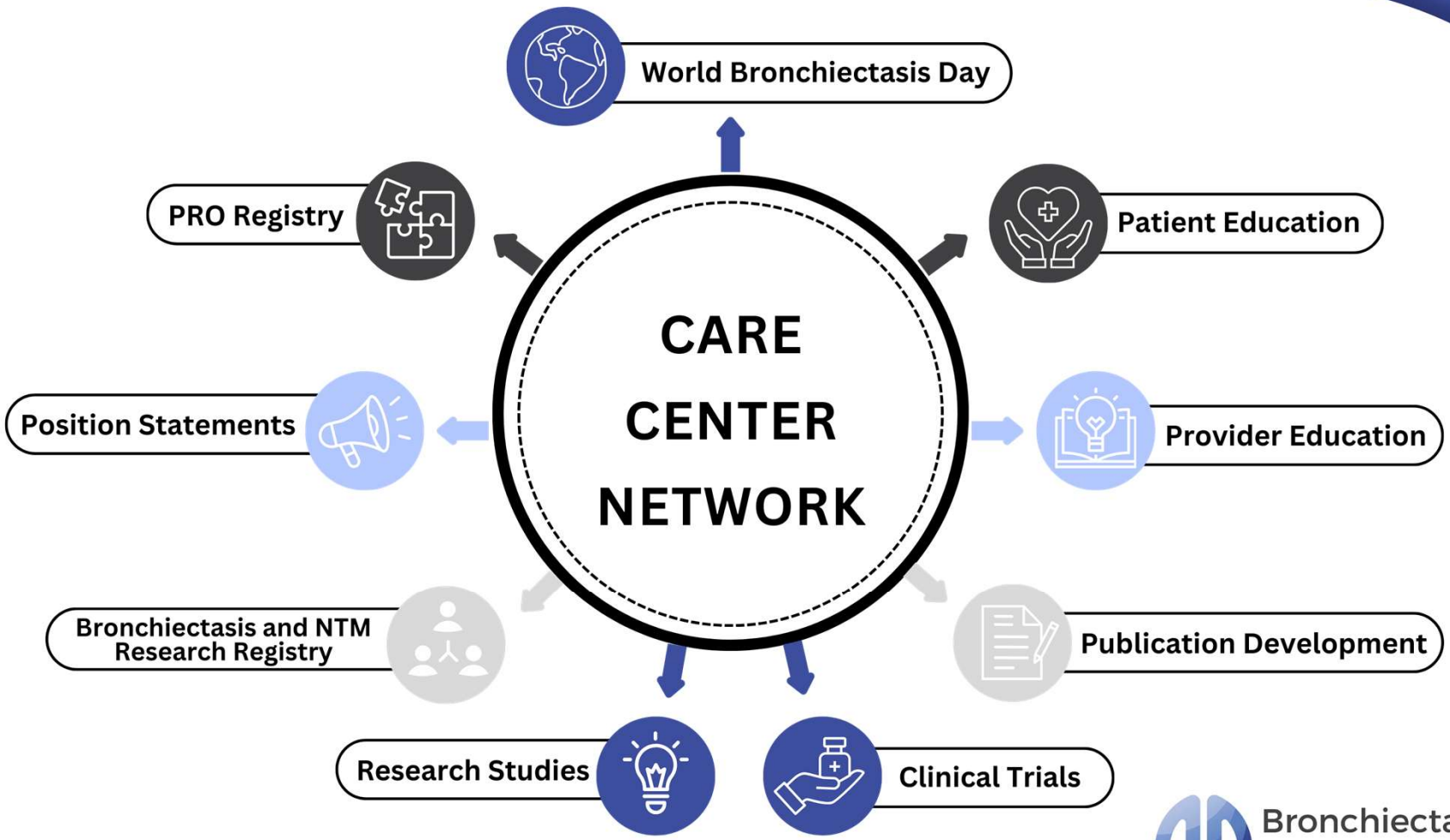

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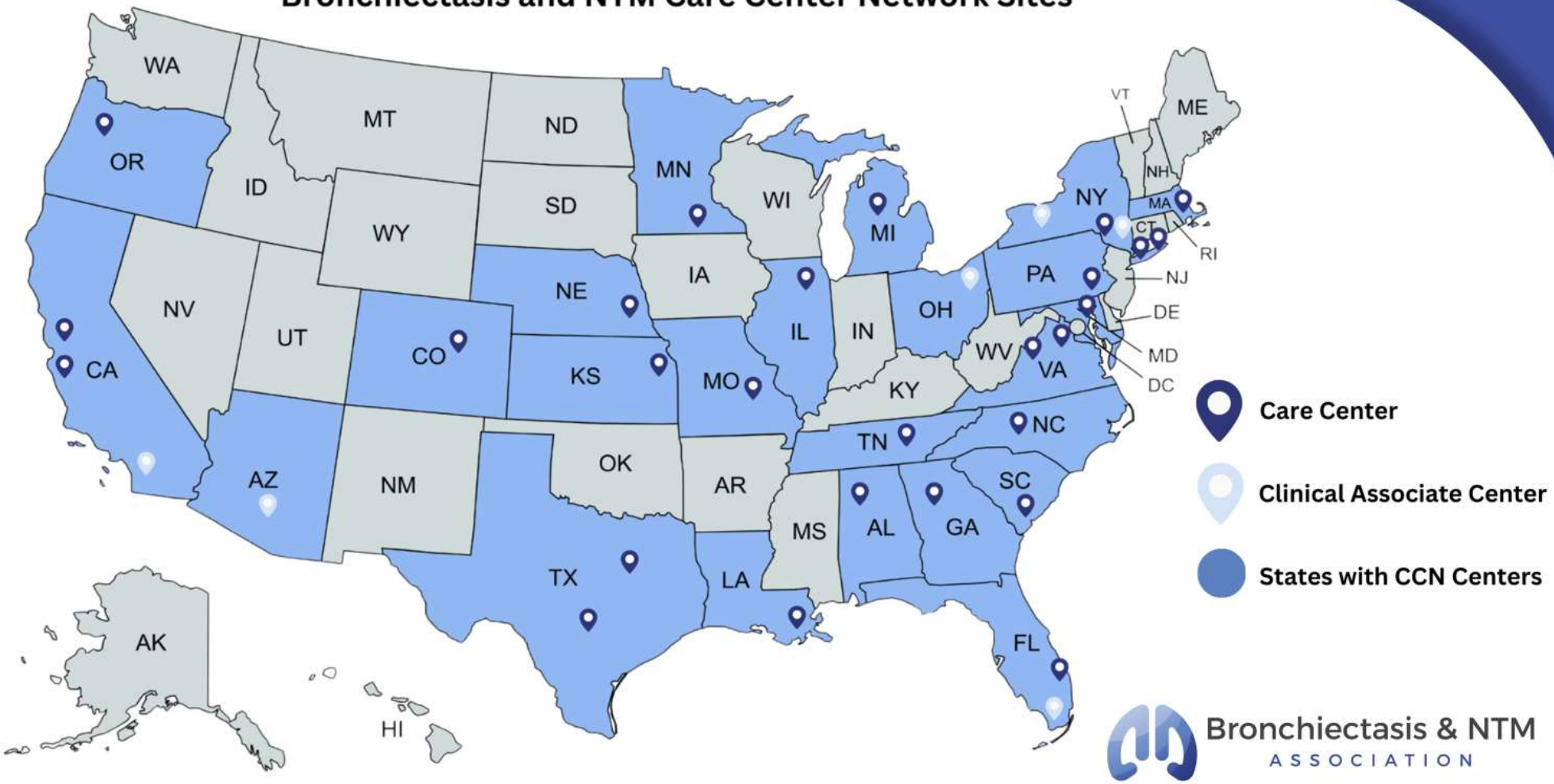
Bronchiectasis and NTM Care Center Network Sites



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Patient Education and Support

BronchandNTM.org

- Downloads Library
- Podcast Channel
- Newsletter
- BronchandNTM360Social
- Find a CCN location

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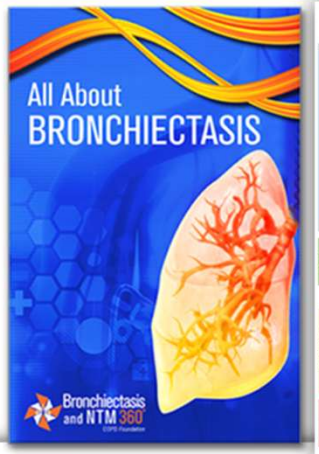
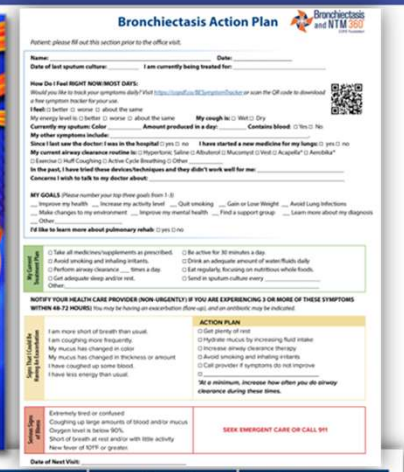
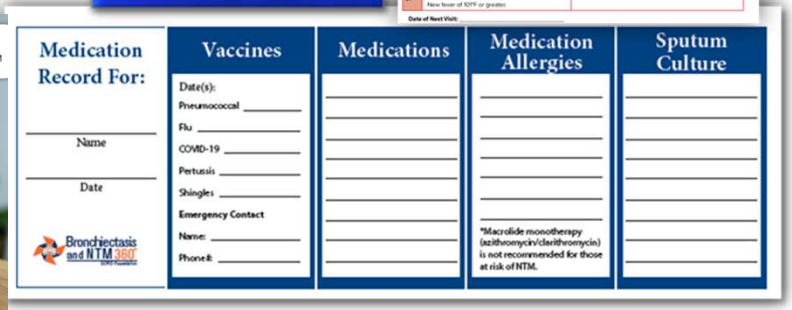
PODCAST







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WBD Global Partner Resources

Lung Foundation Australia
Bronchiectasis Registry

ELF EUROPEAN LUNG FOUNDATION

Bronchiectasis Toolbox

NTMir Nontuberculous Mycobacteria
NTM Info & Research, Inc.

CHEST
AMERICAN COLLEGE of CHEST PHYSICIANS

GLOBAL ALLERGY & AIRWAYS
PATIENT PLATFORM

ATS American Thoracic Society

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World Bronchiectasis Day July 1, 2025

World Bronchiectasis Day aims to raise global awareness, share knowledge, and discuss ways to reduce the burden of bronchiectasis for patients and their families worldwide.

Join us in spreading the word!

www.WorldBronchiectasisDay.org

WBD Global Partner Resources

WORLD BRONCHIECTASIS DAY
JULY 1ST

WorldBronchiectasisDay.org

Resources available in:

- English
- Japanese
- Arabic
- German
- Spanish
- Portuguese
- Italian
- French
- Traditional Chinese
- Simple Chinese

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World Bronchiectasis Day Sponsor 2025

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Questions

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