ATS 2025 Clinical and AI / ML Preview

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ATS 2025

ATS 2025 Preview – Table of Contents

ATS 2025 – General Overview

- **Global collaboration:** ATS 2025 is expected to convene worldwide leaders in respiratory immunology to address unmet needs in allergic and eosinophilic airway diseases
- **Focus on disease remission:** Asthma remission emerges as a central clinical goal, with emphasis on defining patient-centered endpoints across disease severity
- **Translational breakthroughs:** Sessions will aim to bridge molecular insights and clinical strategies in Type 2 inflammation, highlighting IL-5, IL-13, and IL-33 pathways
- **AI in respiratory diagnostics:** Machine learning tools are being spotlighted for identifying early disease phenotypes and guiding biologic therapy decisions
- **Environmental influences:** Studies are linking air pollution, maternal obesity, and aeroallergen exposure to long-term immune dysregulation and asthma risk
- **Real-world outcomes:** U.S. and global datasets seek to validate triple therapy effectiveness and early intervention post-exacerbation in severe asthma and ACO

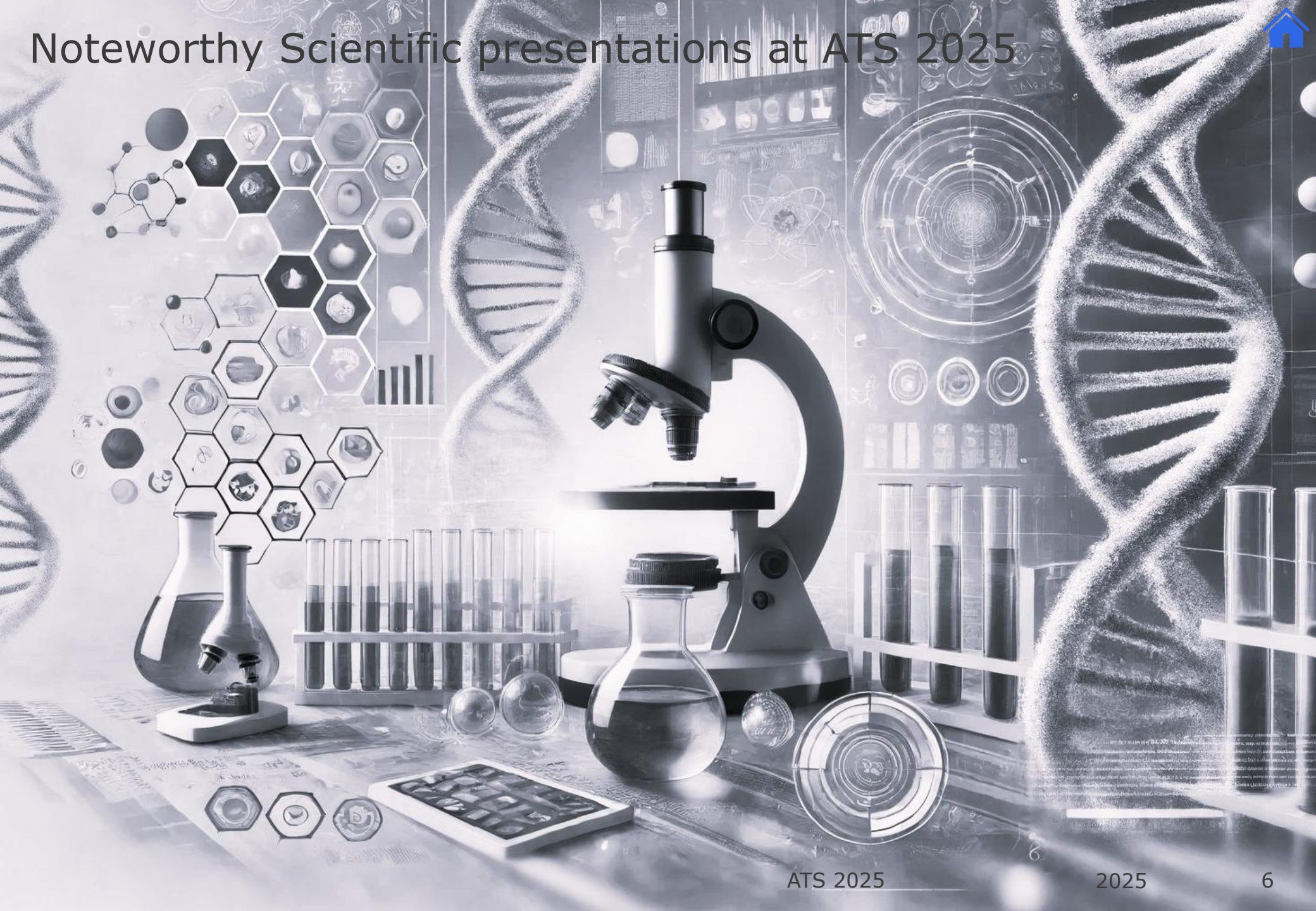
ATS 2025– Conference Themes (1/2)

- **Biologic comparisons across phenotypes:** The conference is expected to feature head-to-head and model-based analyses of benralizumab, mepolizumab, and tezepelumab, highlighting efficacy in eosinophilic and non-eosinophilic asthma populations
- **IL-33 Pathway as a Therapeutic Target:** New IL-33 inhibitors like tozorakimab are anticipated to be presented, with data supporting safety and efficacy in reducing allergic airway inflammation and asthma exacerbations
- **Post-Exacerbation Strategies:** Data on the prompt use of triple therapy (BGF) after exacerbations will likely emphasize its role in reducing recurrence and cardiopulmonary risk in COPD-asthma overlap patients
- **Advances in Allergen Sensitization Science:** Studies will present deeper insights into aeroallergen-triggered immune pathways via skin prick testing and STAT6 inhibition across pediatric and adult cohorts

ATS 2025– Conference Themes (2/2)

- **Patient-Reported Outcomes and Asthma Remission:** Cross-national data on asthma control, treatment satisfaction, and remission definitions will be highlighted, emphasizing the growing role of patient-centered endpoints
- **Pediatric Innovations in Asthma Care:** Behavioral interventions, including ACT-based strategies for children, are expected to show benefits in asthma symptom control and psychosocial integration
- **Real-World Data Driving Clinical Practice:** US cohort and retrospective analyses will inform on practical outcomes of fixed triple therapies, improving guidance on systemic corticosteroid (SCS) minimization
- **Corticosteroid Stewardship in Care Models:** Emerging evidence will advocate for reduced SCS reliance, highlighting the need for reform in both primary and specialty asthma management frameworks

Noteworthy Scientific presentations at ATS 2025



Key Topics From Notable Presentations (1/10)

- **Asthma:** Sessions will highlight biologics and targeted therapies—including benralizumab and tezepelumab that can provide effective treatment across diverse asthma phenotypes and comorbidity profiles, while triple inhaler therapies offer scalable improvements in real-world disease control and cost reduction
  - Benralizumab Shows Broad Efficacy Across Lung and Nasal Outcomes: In pooled SIROCCO and CALIMA trials, benralizumab significantly improved lung function (FEV_1 +307 mL) regardless of eosinophil level. The TOAST study confirmed nasal symptom relief, even in eosinophil-low patients
  - Triple Therapy with FF/UMEC/VI Improves Control and Reduces Healthcare Burden: A large real-world study (n=17,959) showed FF/UMEC/VI reduced exacerbations by 52%, ED visits by 39%, and costs by $1,115 per patient, supporting its role in uncontrolled asthma
  - Tezepelumab Demonstrates Consistent Exacerbation Reductions Across Triggers: In the DIRECTION study across Asia (n=400), tezepelumab reduced annual exacerbation rates by 50–79%, confirming broad efficacy against various exacerbation triggers, including infections and allergens

Key Topics From Notable Presentations (2/10)

- **COPD:** The spotlight will be on advances in biomarker-guided therapies, machine learning diagnostics, and sex-specific research that will be transforming COPD management, shifting toward earlier, personalized, and more precise treatment approaches
  - Precision Medicine and Sex-Specific Approaches: The NOVELTY cohort (n=11,192) revealed that women with COPD experience faster lung function decline and higher exacerbation burden than men, emphasizing the need for sex-specific treatment strategies
  - Early Intervention and Targeted Therapy Impact: The AETHER Phase 2 trial showed that acumapimod improved FEV_1 and halved re-hospitalization risk in AECOPD. Prompt BGF initiation (n=25,603) also reduced exacerbations by up to 31%, reinforcing the timely therapy benefits
  - Biomarkers and Machine Learning for Diagnosis and Prognosis: Studies validated ECM biomarkers and immune cell ratios (e.g., NLR, PLR) for early emphysema detection and COPD severity prediction. CAPTURE and GALATHEA confirmed eosinophil variability and benralizumab's suppressive effects on eosinophilic inflammation markers

Key Topics From Notable Presentations (3/10)

- **Interstitial Lung Disease (ILD) / Pulmonary Fibrosis:** The conference will highlight a shift in ILD/PPF care toward mechanistically guided therapies, biomarker-driven monitoring, and improved alignment with evolving diagnostic and treatment guidelines

  - Therapeutic Innovation and Emerging Targets: Investigational therapies such as bersiporocin (NCT05389215), inhaled nintedanib (AP02), zampilimab (TG2 inhibitor), and GPR87-targeting agents demonstrated early safety and mechanistic rationale for novel IPF treatment strategies

  - Real-World Insights and Guideline Alignment: Studies showed pirfenidone slowed FVC decline in PPF; however, real-world guideline adherence was inconsistent—only 19% met all 2022 PPF criteria, and antifibrotics were often used off-guideline

  - Biomarkers and Holistic Disease Understanding: Lipidomic profiling (e.g., TG, SM, Cer), genetic markers (e.g., PARN in FIP), K-BILD HRQoL scores, and mental health burden offer multidimensional insights into disease progression, prognosis, and patient care needs

Key Topics From Notable Presentations (4/10)

- **Pulmonary Hypertension:** Experts will discuss advances in pulmonary hypertension care through survival-enhancing agents like sotatercept, novel biologics (HS135), and personalized mechanistic models, reshaping both therapeutic and diagnostic paradigms

  - Emerging Therapies with Survival and Mechanistic Benefits: Sotatercept (STELLAR trial) significantly reduced PAH mortality risk (HR = 0.17; p=0.037), while HS135 showed favorable biomarker modulation and metabolic effects, supporting disease modification potential

  - Precision Strategies and Pathobiology Insights: Studies in BMPR2Δex4 rats and iPSC-endothelial models revealed genotype-linked severity and transplant integration differences. BMP9 signaling and hepatic inflammation emerged as novel contributors to PAH pathogenesis

  - CTEPH and Vasodilator Optimization: Network meta-analysis ranked bosentan and riociguat highest for PVR and 6MWD in inoperable CTEPH. Iloprost outperformed nitric oxide in SVR and mPAP reduction, guiding therapeutic selection

Key Topics From Notable Presentations (5/10)

- **Pulmonary Infections (TB/NTM/MAC/RSV):** Novel antibiotics and biomarker-guided strategies in NTM and TB, alongside sustained therapeutic gains with ETI in CF, advancing precision care across pulmonary infections, will be discussed

  - New Therapeutics for NTM and TB: Omadacycline significantly improved sputum clearance in MABc NTM-PD (56.4% vs. 29.2%), showing promise in a space lacking approved treatments. Extended therapy in drug-susceptible TB showed no relapse benefit

  - Molecular and Microbiome Biomarkers: Severe pulmonary MAC was defined by elevated neutrophil activation genes; gut microbiome analysis linked low Prevotella levels to NTM-LD severity, identifying potential biomarkers for disease stratification

  - Real-World and Long-Term Efficacy: ETI therapy in CF led to durable improvements in ppFEV$_1$ (+7.1%), BMI, exacerbation rates (−56.7%), and P. aeruginosa detection (−32.2%), reinforcing its role in long-term CF management

Key Topics From Notable Presentations (6/10)

- **Pediatric / Developmental Lung Disease:** Sessions will highlight the data, reinforce the role of ciliary and molecular defects in BPD pathogenesis, paving the way for targeted interventions to restore lung development in preterm infants
  - Mucociliary Dysfunction in BPD: Infants with severe bronchopulmonary dysplasia (BPD) exhibited significantly reduced ciliary beat amplitude and angle, suggesting impaired mucociliary clearance may contribute to disease severity
  - Molecular Architecture of BPD: Spatial multi-omics of BPD lungs revealed disrupted alveolar niches, altered lipid regulation, neutrophil deficiencies, and macrophage infiltration, identifying potential molecular targets for regenerative therapies

Key Topics From Notable Presentations (7/10)

- **Lung Cancer & Screening:** Discussions will highlight that maximizing lung cancer screening impact requires addressing disparities in access, improving imaging standards, and implementing long-term cardio-oncology interventions
  - Barriers to Screening in Underserved Populations: Patient-clinician misalignment and stigma hinder lung cancer screening uptake among Black and Latino populations. Navigation support and emotional engagement are needed to bridge these gaps
  - Low-Dose CT Quality and Accuracy Issues: Significant technical and interpretive inconsistencies exist in LCS imaging across VHA sites. Chest-trained radiologists outperformed generalists, emphasizing the need for standardized QA and specialized training
  - Elevated Cardiovascular Mortality in Survivors: Lung cancer survivors face high early cardiovascular mortality, especially among NH Black, male, and Hispanic patients. Personalized cardio-oncology care is critical for survivorship

Key Topics From Notable Presentations (8/10)

- **Other Respiratory / Immunological:** Discussions will reinforce the value of precision strategies in respiratory care through personalized vaccination, innovative biologics, and addressing early-life and environmental contributors to disease burden

  - Vaccine Uptake and Tailored Strategies: RSV and pneumococcal vaccine studies revealed suboptimal uptake and outcome disparities, especially by race, region, and comorbidity. PCV21 serotypes showed worse outcomes, supporting personalized vaccine strategies

  - Innovative Therapies for Chronic Conditions: Novel approaches such as hypoglossal nerve stimulation (OSA), ASV in CSA-HFrEF, camlipixant and CHF6795 (chronic cough), and leptin modulation (COPD) demonstrated promising safety and efficacy profiles

  - Environmental and Early-Life Risk Factors: Poor indoor air quality in schools and early-life growth deficits were linked to respiratory impairment and pulmonary vascular phenotypes, emphasizing prevention-focused policies

Key Topics From Notable Presentations (9/10)

- **Biomarkers & Molecular Mechanisms:** Emerging mechanistic insights from ATS 2025 will underscore the importance of personalized, cell-specific, and chronobiology-informed strategies for targeting inflammation and fibrosis across diverse lung diseases
  - Sex- and Cell-Type-Specific Disease Pathways: Studies revealed sex-driven differences in alveolar macrophage metabolism post-injury and NAIP/NLRC4 dominance in neutrophilic ARDS, highlighting the need for sex- and cell-targeted interventions
  - Novel Molecular Therapeutic Targets: Bexotegrast inhibited profibrotic gene programs in ILD, and Cx43-mediated signaling in alveolar macrophages emerged as a critical driver of ventilator-induced lung injury
  - Developmental and Circadian Regulation in Lung Disease: Disruption of circadian clock genes in preterm lungs was associated with bronchopulmonary dysplasia and senescence, suggesting clock-based interventions for lung maturation

Key Topics From Notable Presentations (10/10)

- **Real-World Evidence, Health Disparities, and Policy:** Presentations will showcase that tailored, community-centric programs and equitable policy execution are critical to addressing systemic disparities in respiratory healthcare access and outcomes
  - Access Gaps and Disparities in Respiratory Care: Racial, ethnic, and rural disparities persist in access to pulmonary rehabilitation, asthma care, and diagnostic recognition, with Black, Hispanic, and rural populations underdiagnosed or underserved
  - Community-Based and Culturally Tailored Interventions: The Navajo Nation asthma initiative and interviews with Hispanic ICU families emphasize the value of localized, linguistically inclusive strategies to improve engagement and care perception
  - Equitable Public Health Implementation: Belgium's prioritization strategy successfully improved COVID-19 vaccine access in high-risk populations, showing how targeted policies can mitigate inequity

Focus of Key Industry Sponsored Sessions at ATS 2025 (1/6)

- **Eli Lilly:**
  - Focus Areas: Triple Therapy, Inflammation in COPD and Asthma
  - Sessions will explore single-inhaler triple therapy, COPD exacerbation mapping, eosinophilic inflammation, and real-world management strategies for chronic airway diseases
- **GSK:**
  - Focus Areas: IL-5/IL-33 Biology & Mucus in Airway Disease
  - Presentations will highlight the role of IL-5 in severe eosinophilic asthma, IL-33 in COPD, mucus burden management, and inflammation-driven endotypes in asthma and CRSwNP
- **Sanofi:**
  - Focus Areas: Asthma Paradigm Shift & Respiratory Vaccine Strategy
  - Talks will focus on reimagining the asthma care pathway, treatment personalization, and overcoming vaccination barriers for pertussis, influenza, and COVID-19 in respiratory patients

Focus of Key Industry Sponsored Sessions at ATS 2025 (2/6)

- **AstraZeneca:**
  - Focus Areas: COPD Exacerbations, Phenotyping & BGF Evidence
  - Product theaters will present data on eosinophilic COPD phenotypes, triple therapy initiation timing, and integrating cardiopulmonary risk assessment into clinical care
- **Boehringer Ingelheim:**
  - Focus Areas: IPF/PPF Pathways & Diagnostic Innovation
  - Sessions will highlight unmet treatment needs in IPF/PPF, inhaled antifibrotics like nintedanib, and novel imaging platforms (IQ-UIP™) for early ILD detection
- **United Therapeutics:**
  - Focus Areas: Chronic PAH Management & Multispecialty Collaboration
  - Discussions will include patient case-based learning and collaborative strategies between cardiologists and pulmonologists for optimizing PAH treatment outcomes

Focus of Key Industry Sponsored Sessions at ATS 2025 (3/6)

- **Verona Pharma:**
  - Focus Areas: Inhaled Dual PDE3/PDE4 Inhibition & Dyspnea Relief
  - Theater presentations will focus on the clinical potential of a novel inhaled PDE3/PDE4 therapy and best practices for managing breathlessness in moderate-to-severe COPD
- **Chiesi:**
  - Focus Areas: Bronchiectasis Management & Non-Drug Interventions
  - Sessions will cover exacerbation etiology, burden of disease, and emerging non-pharmacological strategies for stable bronchiectasis care
- **Pulmatrix / IQVIA:**
  - Focus Areas: Functional Lung Imaging in ILD
  - Highlighting CT: VQ imaging to assess regional ventilation/perfusion without contrast, aiding in precision diagnosis and monitoring of interstitial lung disease

Focus of Key Industry Sponsored Sessions at ATS 2025 (4/6)

- **Insmed:**
  - Focus Areas: Refractory Cough & Exacerbation Burden in Bronchiectasis
  - Presentations will emphasize timely diagnosis and symptom-specific interventions for chronic cough and bronchiectasis-related complications
- **Altavant / Merck KGaA**
  - Focus Areas: PH-ILD Clinical Evidence
  - Theaters will address updated screening protocols, diagnostic workflows, and emerging therapeutic strategies in pulmonary hypertension associated with interstitial lung disease
- **Vyaire Medical;**
  - Focus Areas: Optimizing Aerosol Drug Delivery
  - Sessions will showcase techniques and devices to maximize aerosol deposition efficiency across respiratory diseases including asthma, COPD, and bronchiectasis

Focus of Key Industry Sponsored Sessions at ATS 2025 (5/6)

- **Respira Technologies / Alung**
  - Focus Areas: CO_2 Clearance & Advanced Respiratory Support
  - Innovative sessions will present enteral CO_2 absorption devices and nasal high-flow applications for managing hypercapnic respiratory failure
- **IQVIA / NASA Collaboration:**
  - Focus Areas: Environmental Respiratory Health Modeling
  - Presentations will explore the use of NASA-derived data and AI models to predict and manage respiratory health in populations exposed to environmental risk factors
- **Vertex Pharmaceuticals:**
  - Focus Areas: Cystic Fibrosis Recognition & Management
  - Product theaters will discuss under-recognition of adult CF, genotype-driven treatment approaches, and expanding awareness in underserved and diverse patient populations.

Focus of Key Industry Sponsored Sessions at ATS 2025 (6/6)

- **Bristol Myers Squibb (BMS):**
  - Focus Areas: Eosinophilic Inflammation Across Airway Diseases
  - BMS will explore epithelial cytokine signaling, eosinophil-driven inflammation in persistent airflow limitation, and shared mechanisms across asthma, COPD, and nasal polyposis
- **4DMedical:**
  - Focus Areas: Advanced Respiratory Imaging for COPD & ILD
  - Sessions will showcase dynamic ventilation/perfusion imaging to evaluate disease heterogeneity, guide treatment, and track functional improvement non-invasively
- **Merck & Co.:**
  - Focus Areas: PH-ILD Management & Broader Pulmonary Advances
  - Co-hosting with Altavant, Merck will highlight updated diagnostics, clinical trial activity, and novel therapies in pulmonary hypertension associated with ILD

Notable Presentations and Late-breaking Sessions at ATS 2025

Notable Presentations at ATS 2025
Asthma (1/6)

Date	Title	Author	Summary
18 May 2025	Lung Function Improvement in Patients With Uncontrolled, Moderate-to-Severe Asthma Treated With Benralizumab: A New, Retrospective Analysis of the Pooled Sirocco and Calima Studies	Donna D. Carstens MD	• **Introduction:** Airway remodeling in severe asthma contributes to irreversible airflow limitation. This study evaluated the impact of benralizumab on lung function using pooled spirometry data from SIROCCO and CALIMA trials. • **Methodology**: Retrospective pooled analysis of Phase 3 SIROCCO/CALIMA trials. Patients (n=839) received benralizumab 30 mg Q8W for 48–56 weeks. Spirometric changes (FEV1/FVC) were assessed pre- and post-bronchodilator, stratified by eosinophil count. • **Results:** Pre-BD FEV1 and FVC improved by 307 mL and 349 mL; post-BD values increased 97 mL and 94 mL. Benefit was observed regardless of eosinophil levels. • **Conclusions:** Benralizumab improves lung function across eosinophil strata, likely reflecting reduced hyperinflation and airway obstruction.
18 May 2025	Effect of Benralizumab on Nasal Symptoms in Patients With Severe Asthma: An Analysis From the Tokyo Asthma Study (TOAST)	Yuto Akiyama MD, PhD, Division of Pulmonary Medicine, Department of Medicine	• **Introduction:** Benralizumab is effective in eosinophilic asthma, but its impact on nasal symptoms is less defined. This study evaluated nasal symptom changes over 56 weeks in severe asthma patients on benralizumab. • **Methodology**: In the multicenter TOAST study (n=84), nasal symptoms (VAS) and asthma control (ACQ-5) were tracked. Improvement was defined by VAS/ACQ-5 thresholds. Clinical variables and biomarkers were also analyzed. • **Results:** VAS nasal scores improved significantly (mean −1.88, $p<0.0001$). Nasal improvement aligned with asthma control. Even eosinophil-low patients showed nasal benefit. Key predictors: high IgE, allergen sensitization, no depression/steroids. • **Conclusions:** Benralizumab improves nasal symptoms in severe asthma, independent of eosinophil levels, supporting its broader utility in type 2 airway inflammation.

Notable Presentations at ATS 2025
Asthma (2/6)

Date	Title	Author	Summary
18 May 2025	Evaluation of Patient-Reported Outcomes (PRO) and Satisfaction With Once-daily Vilanterol/Fluticasone Furoate (VI/FF) in Uncontrolled Asthma Patients Experiencing Frequent Exacerbations on Conventional Treatment: Sub Group Analysis of a Real World Study	Divya Bhojwani BDS, MSc in Pharmaceutical Medicine	• **Introduction:** Nearly 45% of SMART users remain uncontrolled. Inhaler satisfaction improves adherence and asthma outcomes. This study assessed VI/FF DPI's impact in frequent exacerbators in India. • **Methodology**: Multicenter, open-label, 12-week study of 177 asthma patients. PROs including ACQ-5, adherence, and satisfaction were evaluated at baseline, 4, and 12 weeks post-VI/FF initiation. • **Results:** ACQ-5 scores improved from 2.35 to 1.31 ($p<0.001$); 74.19% achieved MCID. Adherence >90%; >95% reported high satisfaction. Mild AEs occurred in 12.9%. • **Conclusions:** Switching to VI/FF improved control and satisfaction in uncontrolled asthma patients, supporting its role in frequent exacerbators.
18 May 2025	Highly Selective and Reversible STAT6 Inhibition Demonstrates Potential for Differentiated Efficacy and Safety Profile in Type 2 Allergic Inflammation	Patrick Metz PhD	• **Introduction:** IL-4/IL-13 biologics are effective in type 2 inflammation, but small-molecule JAK inhibitors carry safety risks. STAT6 offers a more targeted, safer alternative. • **Methodology**: Recludix developed a proprietary SH2 domain platform to identify reversible, selective small-molecule STAT6 inhibitors that block IL-4/13 signaling without affecting hematologic homeostasis. • **Results:** The STAT6 inhibitor showed sub-nanomolar potency, high SH2 family selectivity, and suppressed pSTAT6 in key tissues without altering total STAT6. In allergic asthma models, it matched anti-IL-4/13 biologic efficacy. • **Conclusions:** Reversible STAT6 inhibition may offer biologic-level efficacy with oral convenience and improved safety over JAK inhibitors in allergic diseases.

Notable Presentations at ATS 2025
Asthma (3/6)

Date	Title	Author	Summary
18 May 2025	The Betri Study: Preliminary Information on Characteristics of Patients With Asthma or Asthma and Concomitant COPD Overlap Treated With Medium-strength Inhaled Corticosteroid / Long-Acting Beta-Agonists (ICS/LABA) and Switching to High-Strength ICS/LABA or Medium-Strength Beclomethasone /Formoterol /Glycopyrronium (BDP/FF/G)	Alessio Piraino MD, Global Medical Affairs	• **Introduction:** GINA guidelines 2024 recommend step-up treatments for uncontrolled asthma, but real-world evidence on patient characteristics prior to treatment choice is lacking. This study explores characteristics of patients prescribed either msBDP/FF/G or hsICS/LABA in a real-world setting. • **Methodology**: A cohort study using UK electronic medical records from 2.9 million asthma patients. It analyzed adults initiating msBDP/FF/G or hsICS/LABA after ≥1 year of medium-dose ICS/LABA treatment. • **Results:** Patients on msBDP/FF/G were older, more likely to smoke, had higher comorbidities (COPD, cardiovascular issues), and worse lung function compared to those on hsICS/LABA. • **Conclusions:** msBDP/FF/G was prescribed to patients with more severe asthma, COPD, and higher comorbidity burden. Further studies on efficacy are needed
19 May 2025	Comparison of Systemic Corticosteroid Use (SCS) for Asthma in Family Medicine Versus Internal Medicine Specialty Care: A Real-world Study Using Immunolab, a Rwe-generation Platform	Christine Cox CRNP	• **Introduction:** Despite declining systemic corticosteroid (SCS) use in specialty care due to biologics, SCS overuse persists in family medicine settings, which manage ~60% of asthma cases in the U.S. • **Methodology**: Retrospective analysis (Q4 2019–Q1 2023) using ImmunoLab with Optum EHR and claims data comparing high SCS users (≥6 prescriptions/year) across specialties. • **Results:** Family medicine prescribed more SCS (e.g., prednisone: 30.2% vs 21.2%) and antibiotics. High SCS users had elevated BMI, HbA1C, renal markers, smoking, and alcohol use. • **Conclusions:** Family medicine shows higher SCS and antibiotic overuse. Education, specialist referral, and lifestyle-focused interventions are essential to reduce burden.

Notable Presentations at ATS 2025
Asthma (4/6)

Date	Title	Author	Summary
19 May 2025	Feasibility, Acceptability and Preliminary Efficacy of an Acceptance and Commitment Therapy and Empowerment-based Asthma Management Intervention for School-age Children With Asthma and Their Parents: A Pilot Randomized Controlled Trial	Xu Wang PhD in Nursing	• **Introduction:** Pediatric asthma remains poorly controlled, with caregiver stress hindering management. This pilot RCT tested an ACT- and empowerment-based intervention (ACT-EAM). • **Methodology**: 56 dyads were randomized to ACT-EAM or usual care. The 5-week program included online and in-person sessions. • **Results:** High adherence (71%) and satisfaction (93–100%) were reported. ACT-EAM significantly improved children's self-management (B=11.89, p=0.002) and parents' asthma knowledge (B=2.45, p<0.001). • **Conclusions:** ACT-EAM is feasible, acceptable, and improves asthma-related outcomes. Larger trials should enhance flexibility and sustainability.
20 May 2025	Patient Perspectives Inform Key Criteria for a Patient-Centered Definition of Asthma Remission: Results of a Multi-Country Qualitative Study	Tom Keeley PhD	• **Introduction:** Remission is an emerging goal in asthma care, but existing definitions lack patient input. This study aimed to develop a patient-informed definition. • **Methodology**: Structured interviews with 100 adults across 4 countries refined an initial definition. Feedback from 75 patients guided finalization. • **Results:** 75% favored minimal/absent symptoms; 89% valued physician agreement; 87% accepted ongoing treatment; 63% endorsed ≥12-month criteria. Patients influenced inclusion of trigger response and exacerbation expectations in the final definition • **Conclusions:** A patient-centric asthma remission definition was established, enabling shared decision-making and aligning treatment goals with patient experiences and expectations.

Notable Presentations at ATS 2025
Asthma (5/6)

Date	Title	Author	Summary
20 May 2025	Exacerbation Reduction in Patients With Asthma Following Initiation of Fluticasone Furoate/Umeclidinium/ Vilanterol (FF/UMEC/VI) in the United States	Stephen Noorduyn MSc	• **Introduction:** Many U.S. asthma patients remain uncontrolled on ICS/LABA therapy. This study examined real-world outcomes of escalating to FF/UMEC/VI triple therapy. • **Methodology**: A retrospective pre-post analysis of 17,959 patients from Komodo Health claims (2019–2023) assessed exacerbation rates, medication use, ED visits, and medical costs pre- and post-FF/UMEC/VI initiation. • **Results:** Post-initiation, exacerbations dropped 52% (OR=0.48), ED visits by 39%, OCS bursts by 30%, SABA use by 18%, and costs by $1,115—all statistically significant (p<0.001). • **Conclusions:** FF/UMEC/VI significantly improves asthma control and lowers healthcare costs, validating its utility as a step-up option in uncontrolled asthma.
20 May 2025	Association Between Lifestyle-associated Metabolites Signatures and the Risk of Late-onset Asthma	Yan Zhang M.D., Ph.D., Xiangya Hospital	• **Introduction:** Late-onset asthma (≥40y) is linked to lifestyle and environmental exposures, but metabolic mechanisms remain unclear. • **Methodology**: UK Biobank data (n=198,607) was analyzed using NMR metabolomics, regression models, and elastic net to identify lifestyle-related metabolites predictive of asthma. • **Results:** 103 metabolites were linked to asthma risk; 9 improved predictive accuracy (AUC 0.812 vs. 0.758). High-risk metabolic profiles increased asthma risk by 77% overall and 91% in females. • **Conclusions:** Lifestyle-related metabolites significantly predict late-onset asthma, enabling risk stratification and potential for targeted prevention—especially in high-risk females

Notable Presentations at ATS 2025
Asthma (6/6)

Date	Title	Author	Summary
20 May 2025	Efficacy of Tezepelumab in Adults With Severe, Uncontrolled Asthma Across Multiple Exacerbation Trigger Types: The Phase 3 Direction Study	Christopher S. Ambrose MD, MBA	• **Introduction:** Tezepelumab, a TSLP blocker, previously reduced exacerbations in global asthma studies. This post hoc DIRECTION analysis evaluated its effect across specific exacerbation triggers in Asian populations • **Methodology**: Phase 3, 52-week, double-blind RCT in China, Korea, and the Philippines (n=400). Patients with severe asthma received tezepelumab 210 mg or placebo every 4 weeks. • **Results:** Tezepelumab reduced AAER by 50% (infection-related), 78% (noninfectious inhaled), and 79% (other/unknown triggers) vs. placebo, with all reductions statistically significant. • **Conclusions:** Tezepelumab consistently reduced exacerbations regardless of trigger type, confirming broad efficacy in diverse Asian asthma populations.

Notable Presentations at ATS 2025
Biomarkers & Molecular Mechanisms (1/3)

Date	Title	Author	Summary
19 May 2025	Tissue-resident Alveolar Macrophages as Drivers of Sex-specific Differences Across the Lifespan	Abiud Cantu MS	• **Introduction:** Sex influences macrophage behavior in lung disease. This study explored sex-specific responses in alveolar macrophages (AMs) using a neonatal hyperoxia model. • **Methodology**: scRNA-seq, bulk RNA-seq, redox imaging, and bioenergetics assays were applied to male and female AMs post-hyperoxia exposure. • **Results:** AMs showed distinct sex-driven transcriptional and metabolic profiles. Males favored glycolysis with increased redox stress; females showed enhanced oxidative phosphorylation and higher oxygen consumption. • **Conclusions:** AMs exhibit sex-specific responses to injury, with implications for understanding sex-based differences in lung disease pathogenesis and treatment.
19 May 2025	Upregulation of the NAIP/NLRC4 Inflammasome and Dysregulation of the IL-18 Axis Are Associated With the Onset and Severity of Acute Respiratory Distress Syndrome	Luke Flower MBChB	• **Introduction:** ARDS involves severe neutrophilic inflammation with IL-1β and IL-18 playing central roles. Most data stem from non-human or monocyte-focused models. • **Methodology**: Transcriptomics, Western blotting, and immunostaining assessed inflammasome expression across neutrophils, monocytes, and disease cohorts including ARDS, COVID-19, and sepsis. • **Results:** Unlike murine NLRP3 dominance, human neutrophils expressed NAIP/NLRC4. ARDS patients showed IL18R1 upregulation and IL18BP suppression, correlating with severity. • **Conclusions:** NAIP/NLRC4-driven IL-18 signaling—not NLRP3—is key in ARDS neutrophils, offering a targeted therapeutic pathway for diverse ARDS etiologies.

Notable Presentations at ATS 2025
Biomarkers & Molecular Mechanisms (2/3)

Date	Title	Author	Summary
19 May 2025	Characterizing the Antifibrotic Activity of Bexotegrast on Distinct Fibroblast Populations in PCLS From Multiple ILD Subtypes	Johanna Schaub PhD, Pliant Therapeutics	• **Introduction:** Bexotegrast is a dual integrin inhibitor under late-stage evaluation for fibrotic lung diseases. • **Methodology**: PCLS from non-IPF ILD lungs were treated with bexotegrast and analyzed via single-nuclei RNA sequencing to assess antifibrotic gene modulation. • **Results:** Bexotegrast downregulated profibrotic gene expression (e.g., COL1A1, FN1) in fibroblasts and reduced integrin-related transcripts (ITGB6, ITGAV) in epithelial cells • **Conclusions:** Bexotegrast reduces fibrogenic signaling across fibroblast and epithelial subtypes in non-IPF ILD, reinforcing its therapeutic potential in progressive pulmonary fibrosis.
19 May 2025	The Interplay of Epithelial Molecular Clock and Cellular Senescence in Lung Development	Sadiya Bi. Shaikh PhD	• **Introduction:** Disruption of circadian clock genes in preterm infants may impair lung development and contribute to BPD. • **Methodology**: snRNA-seq and CODEX spatial biology assessed circadian and senescence gene expression across pediatric lung tissues from BRINDL repository. • **Results:** BPD samples showed reduced expression of key clock genes and increased senescence markers (p16, GLB1); growth factor signaling (e.g., VEGF, EGFR) was altered. • **Conclusions:** Circadian disruption in BPD is linked to impaired alveolar development and cellular senescence, suggesting a target for future lung maturation therapies.

Notable Presentations at ATS 2025
Biomarkers & Molecular Mechanisms (3/3)

Date	Title	Author	Summary
21 May 2025	Macrophage-Epithelial Communication Determines Lung Mechano-Immune Responses to Hyperinflation	Liberty Mthunzi PhD	• **Introduction:** Hyperinflation during mechanical ventilation can trigger ventilator-induced lung injury (VILI), yet the underlying mechano-immune signaling is unclear. • **Methodology**: Live confocal imaging of mouse lungs examined alveolar macrophage (AM) Ca^{2+} responses and Cx43-mediated signaling during hyperinflation • **Results:** AMs did not deform under hyperinflation but showed Ca^{2+} surges and TNFα secretion via Cx43 gap junctions. Injury markers increased in wild-type but not in AM-Cx43 knockout mice. • **Conclusions:** AM-epithelial Cx43 signaling—not direct stretch—drives lung immune responses to hyperinflation, positioning Cx43 as a therapeutic target for VILI.

Notable Presentations at ATS 2025
COPD (1/7)

Date	Title	Author	Summary
18 May 2025	Reduced COPD Exacerbation Risk With Prompt Initiation of Budesonide/Glycopyrrolate/Formoterol Fumarate (BGF) After a COPD Exacerbation Among Patients With COPD and Concurrent Asthma: The MITOS EROS+CP (US) Study	Michael Pollack MS	• **Introduction:** COPD exacerbations lead to increased morbidity and mortality, with patients having both COPD and asthma at higher risk. This study investigates whether prompt initiation of Budesonide/Glycopyrrolate/Formoterol Fumarate (BGF) reduces exacerbations in COPD-asthma patients. • **Methodology**: A retrospective analysis of 8,837 COPD-asthma patients assessed the impact of prompt, delayed, and very-delayed BGF initiation on subsequent exacerbations using negative binomial regression. • **Results:** Prompt initiation resulted in a 20%-25% lower rate of subsequent exacerbations compared to delayed initiation. • **Conclusions:** Early BGF treatment post-exacerbation significantly reduces exacerbation risk in COPD-asthma patients.
18 May 2025	Safety Profile of Tozorakimab (an Anti-IL-33 Monoclonal Antibody): Data From the FRONTIER Phase 2 Program of 1076 Patients	Gabriela Saraiva PhD, Late-stage Respiratory and Immunology, BioPharmaceuticals R&D	• **Introduction:** IL-33 dysregulation is implicated in various inflammatory diseases. The FRONTIER program includes phase 2 studies of tozorakimab, an anti-IL-33 monoclonal antibody, targeting diabetic kidney disease, atopic dermatitis, asthma, and COPD. • **Methodology**: Four randomized, double-blind, placebo-controlled studies evaluated the safety, efficacy, and pharmacokinetics of tozorakimab, focusing on adverse events, including heart failure (HF). • **Results:** In 1,076 patients, treatment-emergent adverse events were similar between groups. HF-related adverse events were low, and injection site reactions were more frequent with tozorakimab. • **Conclusions:** Tozorakimab was well tolerated, with ongoing phase 3 studies.

Notable Presentations at ATS 2025
COPD (2/7)

Date	Title	Author	Summary
18 May 2025	Differences in the Characteristics and Outcomes by Sex in Patients With Physician-diagnosed Asthma and/or COPD in the NOVELTY Study	Awa Diop PhD	• **Introduction:** Airway diseases manifest differently by sex. This analysis from the NOVELTY cohort evaluated sex-based differences in symptoms, lung function, and exacerbation risk in asthma/COPD. • **Methodology**: 11,192 patients were followed for 3 years. Baseline characteristics, annual post-BD ppFEV$_1$ decline, and exacerbation rates were analyzed by sex. • **Results:** Women had higher BMI, SGRQ scores, faster ppFEV$_1$ decline (−1.6 vs −1.2), and more exacerbations. Men had higher smoking exposure, eosinophils, and NO levels. Women were more often diagnosed with asthma; men with COPD. • **Conclusions:** Women showed higher symptom burden and decline despite lower Type 2 inflammation, supporting the need for sex-specific disease management.
18 May 2025	The Increased Risk for the Viral Infection After Sepsis in Patients With Chronic Obstructive Pulmonary Disease: A Federated Research Network Study	Wen-Cheng Chao MD, PhD	• **Introduction:** COPD patients' post-sepsis are immunocompromised and face elevated viral infection risk. This study assessed 1-year viral outcomes using a large federated dataset. • **Methodology**: Retrospective analysis of 903,683 COPD patients (113,589 with sepsis) using TriNetX. Propensity score matching and hazard ratios evaluated infection risk and vaccine efficacy. • **Results:** Post-sepsis, COPD patients had significantly higher viral infection risk: RSV (HR 3.30), influenza (HR 3.20), VZV (HR 3.05), CMV (HR 2.10), HSV (HR 1.94). Vaccines provided notable protection, particularly RSV (HR 0.68) and influenza (HR 0.71). • **Conclusions:** Sepsis worsens viral vulnerability in COPD. Prophylactic vaccination is critical in this high-risk group.

Notable Presentations at ATS 2025
COPD (3/7)

Date	Title	Author	Summary
19 May 2025	Temporal Variability in Eosinophil Count Among Newly Diagnosed Patients With COPD in the CAPTURE Study	Sean Spencer BS	• **Introduction:** Eosinophils guide COPD treatment, but their stability over time remains unclear. CAPTURE study assessed eosinophil variability in newly diagnosed COPD patients in primary care. • **Methodology**: Among 4,679 screened patients, 142 had ≥2 eosinophil counts across a ~17-month median interval. Baseline clinical and eosinophil data were analyzed longitudinally. • **Results:** At baseline, 24.6% had eosinophils ≥300 cells/μL. Eosinophil counts were moderately stable (r=0.66). 43% of <100 group rose, 15% of ≥300 group dropped below 100. Category shifts were common. • **Conclusions:** Eosinophil levels fluctuate meaningfully over time in primary-care COPD, supporting repeat testing for accurate biomarker-guided management.
19 May 2025	The Impact of Acute Worsening Events on Daily Lives and Healthcare Seeking Behaviour in Patients With COPD: An International Qualitative Study	Janwillem WH. Kocks MD, University Medical Center Groningen	• **Introduction:** Acute worsening events (AWEs) in COPD often go unreported, with limited understanding of patient perception and healthcare-seeking behavior. • **Methodology**: A qualitative sub-study (2023–2024) across five countries interviewed 19 moderate-to-severe COPD patients twice: after an AWE and 6 weeks later. Grounded theory guided analysis. • **Results:** AWE recognition varied; short events (<2 days) were often unnoticed. Recognition was influenced by symptom worsening or physical limitations. Barriers included clinician access and patient hesitancy • **Conclusions:** AWE perception and response are highly individual. COPD management plans and clinical trial endpoints must incorporate patient experience and event duration variability.

Notable Presentations at ATS 2025
COPD (4/7)

Date	Title	Author	Summary
19 May 2025	Association of Guideline Alignment and Medication Concordance With Clinical Outcomes in COPD	Meredith Anne. Case MD MHS	• **Introduction:** COPD patients often experience guideline misalignment or discordance between prescribed and perceived medications, yet the impact on outcomes remains unclear. • **Methodology**: Secondary analysis of 191 patients from a longitudinal study (2017–2023). Medication alignment and concordance were compared to patient-reported outcomes (PROs) and exacerbation timing. • **Results:** No association was found between alignment/concordance and PROs. However, in GOLD B, both medication overuse (aHR 2.04) and underuse (aHR 2.49) were linked to earlier exacerbations compared to guideline-aligned regimens. • **Conclusions:** While PROs remained unaffected, guideline-aligned therapy significantly reduced exacerbation risk, underscoring its clinical relevance in COPD care.
19 May 2025	Ex-vivo Efficacy of Tanimilast in Human COPD-derived Precision Cut Lung Slices (PCLS)	Silvia Pontis PharmD PhD	• **Introduction:** Tanimilast, a selective inhaled PDE4 inhibitor, is under advanced development for COPD. Its impact on mucus overproduction had not been studied preclinically. • **Methodology**: COPD patient-derived precision-cut lung slices (PCLS) were treated with tanimilast (0.1 µM), budesonide, or ALK5i. Markers of mucus (MUC5AC/B), inflammation (MCP-1), and fibrosis (Col1a1) were quantified by ELISA at 144 hrs. • **Results:** Tanimilast reduced MUC5AC (−50.6%), MUC5B (−31%), MCP-1 (−44%), and Col1a1 (−45.8%) secretion without toxicity. • **Conclusions:** Tanimilast demonstrated robust anti-inflammatory, anti-fibrotic, and mucus-modulating effects in COPD-derived lung tissue, supporting its therapeutic potential in airway-dominant COPD.

Notable Presentations at ATS 2025
COPD (5/7)

Date	Title	Author	Summary
19 May 2025	Pharmacodynamic Effects of Benralizumab on Eosinophil-related Biomarkers in COPD: A Biomarker Analysis of the GALATHEA Study	Christopher McCrae PhD	• **Introduction:** Benralizumab targets IL-5Rα to deplete eosinophils and may benefit COPD patients with eosinophilic inflammation. This GALATHEA trial analysis assessed biomarker responses. • **Methodology**: In a Phase 3 RCT (n≈1100), COPD patients received benralizumab 100 mg Q4W or placebo. Serum eosinophil biomarkers (EDN, ECP, IL-5, eotaxin-1) were measured at baseline, Weeks 4, 24, and 56. • **Results:** Benralizumab markedly reduced EDN and ECP by Week 4, sustained through Week 56. IL-5 and eotaxin-1 increased slightly. Placebo showed no biomarker changes. • **Conclusions:** Benralizumab elicited consistent eosinophil biomarker suppression, supporting its pharmacodynamic activity in eosinophilic COPD. Ongoing trials (e.g., RESOLUTE) will further validate findings.
20 May 2025	Acumapimod Significantly Reduces Key Inflammatory Biomarkers in Severe COPD Exacerbations and Reduces the Rate of Re-Hospitalization	James Fettiplace MD	• **Introduction:** Acumapimod, an oral p38 MAPK inhibitor, targets inflammation during acute COPD exacerbations, aiming to reduce re-hospitalizations. • **Methodology**: Phase 2 AETHER trial (n=282) compared two acumapimod doses vs placebo alongside standard care. Biomarkers (hsCRP, fibrinogen) and lung function (FEV_1) were assessed. • **Results:** Both doses improved FEV_1 at Day 7 (up to +115 mL; $p<0.001$). High-dose reduced re-hospitalizations by 50.3% ($p=0.043$). hsCRP and fibrinogen dropped most with high-dose acumapimod. Efficacy was independent of eosinophil levels. • **Conclusions:** Acumapimod improves lung function, reduces inflammation and re-hospitalization in AECOPD, showing promise as an anti-inflammatory therapy pending further confirmation.

Notable Presentations at ATS 2025
COPD (6/7)

Date	Title	Author	Summary
21 May 2025	Prompt Initiation of Budesonide/Glycopyrrolate/Formoterol Fumarate (BGF) After an Exacerbation Is Associated With Reduced Exacerbation and Cardiopulmonary Risk in Patients With COPD: The MITOS EROS+CP (US) Study	Michael Pollack MS	• **Introduction:** Early intervention post-COPD exacerbation may reduce recurrence and cardiopulmonary risk. This study evaluated outcomes with prompt vs delayed initiation of BGF triple therapy. • **Methodology**: Retrospective U.S. analysis (n=25,603) using claims data (2020–2023). Patients initiating BGF ≤30, 31–180, or 181–365 days post-exacerbation were compared using adjusted negative binomial models. • **Results:** Prompt BGF initiation reduced exacerbations by 26–31% and cardiopulmonary events by 16–17% vs delayed/very delayed groups. Benefits were consistent in dual therapy escalators. • **Conclusions:** Prompt BGF use post-exacerbation significantly lowers COPD exacerbation and cardiopulmonary event rates, supporting timely escalation to triple therapy.
21 May 2025	Identifying Biomarkers of Mild-stage Emphysema in COPD Patients Via Interpretable Machine Learning	Line Egerod MSc	• **Introduction:** Early detection of mild emphysema is vital but challenging. This study developed a machine learning (ML) model using biomarkers to non-invasively diagnose early-stage disease. • **Methodology**: COPD patients (n=1,489) from the ECLIPSE cohort were analyzed. XGBoost models classified mild emphysema using lung function, clinical data, and ECM remodeling biomarkers. • **Results:** The model achieved AUROC 0.71; top features included FEV_1/FVC, age, FFMI, and ECM biomarkers (C3M, PRO-C6, ELA-HNE). Removing biomarkers dropped AUROC to 0.66 and halved negative predictive value. • **Conclusions:** ECM biomarkers significantly enhance ML-based early emphysema detection, supporting future personalized, biomarker-guided diagnostic tools.

Notable Presentations at ATS 2025
COPD (7/7)

Date	Title	Author	Summary
21 May 2025	Disease Burden in an At-risk Population With Early COPD: An Analysis of the MAP Cohort	Jonathan Wang BS	• **Introduction:** Current COPD understanding is skewed toward older populations. The MAP COPD study investigates early disease in younger, at-risk individuals to clarify pathogenesis. • **Methodology**: 200 adults (age 30–55, ≥10 pack-years) underwent spirometry, CT imaging (LAA, PRMfSAD, pi10), and symptom surveys. Linear models adjusted for confounders examined imaging-symptom associations. • **Results:** 82% were GOLD 0; 55% had symptoms (CAAT ≥10). Pi10 (airway wall thickness) was the strongest predictor of symptom burden in all participants (p=0.002), including GOLD 0. Greater PRMnormal indicated fewer symptoms in GOLD 1–2. • **Conclusions:** Early structural lung changes and symptoms occur even in spirometry-normal individuals. CT-derived pi10 is a key imaging marker of symptom severity in early COPD.
21 May 2025	Immune Cell Ratio Biomarkers of Non-type 2 Inflammation in COPD	Craig P. Hersh MD, MPH, ATSF	• **Introduction:** While blood eosinophil count (BEC) is a known biomarker for type 2 COPD, non-type 2 inflammation lacks defined markers. This study explored immune cell ratios as potential alternatives. • **Methodology**: COPDGene Phase 2 CBC data (n≈6000) were used to calculate neutrophil-lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR), and systemic immune-inflammation index (SII). Associations with lung function, CT metrics, and exacerbations were analyzed. • **Results:** All ratios were linked to lower FEV_1% and higher emphysema. NLR and SII correlated with airway wall thickness. PLR showed strongest longitudinal stability (r=0.54). All predicted exacerbation frequency and severity. • **Conclusions:** NLR, PLR, and SII are accessible, reproducible biomarkers associated with COPD severity and outcomes, especially in non-type 2 inflammation

Notable Presentations at ATS 2025
Interstitial Lung Disease (ILD) / Pulmonary Fibrosis (1/7)

Date	Title	Author	Summary
21 May 2025	Efficacy and Safety of Pirfenidone in Patients With Progressive Pulmonary Fibrosis: A Retrospective Single-center Study in South Korea	Jae Ha Lee M.D., Ph.D., Inje University Haeundae Paik Hospital	• **Introduction:** Progressive pulmonary fibrosis (PPF) exhibits worsening despite standard ILD treatment. While nintedanib is guideline-endorsed, pirfenidone's role remains less defined. • **Methodology**: Retrospective study of 33 PPF patients treated with pirfenidone (median 600 mg/day for 7.3 months); FVC changes assessed pre- and post-treatment. • **Results:** FVC decline improved post-treatment (GLMM model: -3.8% vs +3.3%, $p < 0.001$). Adverse events were mild, mainly anorexia (21.2%) and pruritus (15.2%). • **Conclusions:** Pirfenidone may reduce FVC decline in PPF with a tolerable safety profile, supporting its potential utility beyond IPF.
21 May 2025	K-BILD Is Associated With Mortality Risk in Patients With Fibrotic Interstitial Lung Disease Receiving Antifibrotic Therapy: A Multi-center Prospective Longitudinal Study	Yuzo Suzuki MD	• **Introduction:** Fibrotic ILD impacts quality of life; K-BILD is a validated HRQoL measure, but its clinical utility in real-world antifibrotic therapy is understudied. • **Methodology**: Prospective study of 290 fibrotic ILD patients; K-BILD scores assessed at baseline, 6 months, and 1 year after antifibrotic initiation. • **Results:** K-BILD scores improved in some, declined in others; changes only weakly correlated with %FVC. Lower baseline K-BILD and ≥10-point decline predicted reduced survival, independent of ILD-GAP stage. • **Conclusions:** K-BILD can help monitor HRQoL and independently predict mortality risk in fibrotic ILD beyond lung function metrics.

Notable Presentations at ATS 2025
Interstitial Lung Disease (ILD) / Pulmonary Fibrosis (2/7)

Date	Title	Author	Summary
18 May 2025	Health Related Quality of Life in Patients With Interstitial Lung Disease With and Without Antifibrotics: A Single Center, Mixed Methods Cross Sectional Study	Rachana Krishna MD, MSCR	• **Introduction:** Antifibrotics for IPF/PPF are linked to side effects affecting HRQoL and adherence. • **Methodology**: Cross-sectional study of 65 patients completing HRQoL surveys; multivariate models and qualitative interviews evaluated therapy impact. • **Results:** HRQoL scores were similar between antifibrotic users and non-users. Fatigue was higher in non-users. Socioeconomic deprivation worsened functional status. Interviews confirmed side effects impact adherence. • **Conclusions:** HRQoL is not significantly different by antifibrotic use; however, fatigue and deprivation influence patient outcomes and therapy continuation.
18 May 2025	Prevalence and Predictors of Depression and Anxiety in Patients With Fibrotic Interstitial Lung Disease: A Prospective Cohort Study	Na'Ama Avitzur MD	• **Introduction:** ILD patients often experience depression/anxiety, yet subgroup-specific prevalence is unclear. • **Methodology**: Registry data from 3,988 ILD patients assessed depression/anxiety via self-report and medication use; multivariable logistic regression explored predictors. • **Results:** Depression/anxiety occurred in 18% overall, higher in fHP (23%) and unclassifiable ILD (22%). Female sex and oxygen use were strong predictors. Smoking pack-years linked to depression/anxiety in CTD-ILD and unclassifiable ILD. • **Conclusions:** Depression/anxiety is underrecognized in ILD, particularly among women and those with greater disease burden, underscoring the need for integrated mental health care.

Notable Presentations at ATS 2025
Interstitial Lung Disease (ILD) / Pulmonary Fibrosis (3/7)

Date	Title	Author	Summary
18 May 2025	Health Related Quality of Life in Patients With Interstitial Lung Disease With and Without Antifibrotics: A Single Center, Mixed Methods Cross Sectional Study	Rachana Krishna MD, MSCR	• **Introduction:** Antifibrotics for IPF/PPF are linked to side effects affecting HRQoL and adherence. • **Methodology**: Cross-sectional study of 65 patients completing HRQoL surveys; multivariate models and qualitative interviews evaluated therapy impact. • **Results:** HRQoL scores were similar between antifibrotic users and non-users. Fatigue was higher in non-users. Socioeconomic deprivation worsened functional status. Interviews confirmed side effects impact adherence. • **Conclusions:** HRQoL is not significantly different by antifibrotic use; however, fatigue and deprivation influence patient outcomes and therapy continuation.
18 May 2025	Prevalence and Predictors of Depression and Anxiety in Patients With Fibrotic Interstitial Lung Disease: A Prospective Cohort Study	Na'Ama Avitzur MD	• **Introduction:** ILD patients often experience depression/anxiety, yet subgroup-specific prevalence is unclear. • **Methodology**: Registry data from 3,988 ILD patients assessed depression/anxiety via self-report and medication use; multivariable logistic regression explored predictors. • **Results:** Depression/anxiety occurred in 18% overall, higher in fHP (23%) and unclassifiable ILD (22%). Female sex and oxygen use were strong predictors. Smoking pack-years linked to depression/anxiety in CTD-ILD and unclassifiable ILD. • **Conclusions:** Depression/anxiety is underrecognized in ILD, particularly among women and those with greater disease burden, underscoring the need for integrated mental health care.

Notable Presentations at ATS 2025
Interstitial Lung Disease (ILD) / Pulmonary Fibrosis (4/7)

Date	Title	Author	Summary
18 May 2025	Comparison of Clinical, Functional, Radiological and Genetic Characteristics in ILD Patients With Suspected Genetic Predisposition Based on Family Aggregation: Data From a Regional UK Familial Interstitial Pneumonia Service	Trishala Raj MBBS, MRCP(UK)	• **Introduction:** Genetic predisposition impacts diagnosis and management of ILD; a Familial Interstitial Pneumonia (FIP) clinic was established to investigate this. • **Methodology**: 139 ILD patients were evaluated; comparisons made between those with and without family history. • **Results:** Pathogenic variants were more frequent in familial cases (34.2% vs 8%, p=0.02), with PARN most common. Sporadic cases were younger (mean 57 vs 64). Radiological patterns differed, but lung function did not. • **Conclusions:** Genetic variants are more common in familial ILD, but many sporadic cases may still benefit from expanded genetic testing, including telomere analysis.
18 May 2025	A Novel Prolyl-Transfer RNA Synthetase Inhibitor Bersiporocin Phase 2 Trial in Idiopathic Pulmonary Fibrosis: Study Design and Baseline Demographics	Jin Woo Song MD	• **Introduction:** Bersiporocin, a novel oral PRS inhibitor, is under Phase 2 evaluation for IPF following favorable Phase 1 data and regulatory designations. • **Methodology**: A 24-week, randomized, placebo-controlled trial (NCT05389215) stratified by background antifibrotic therapy. • **Results:** Of 71 patients enrolled, 70% were on standard therapy, 50% Asian, mean age 70.6 years, FVC 77.6%, DLCO 51.4%. • **Conclusions:** Early demographic findings show a diverse IPF cohort with varying lung function, supporting broader assessment of bersiporocin's therapeutic potential in heterogeneous populations.

Notable Presentations at ATS 2025
Interstitial Lung Disease (ILD) / Pulmonary Fibrosis (5/7)

Date	Title	Author	Summary
18 May 2025	A Double-blind, Placebo-controlled, Randomized Phase 1 Study to Evaluate Safety, Tolerability, and Pharmacokinetics After Single or Repeat Twice-daily Doses of AP02, a Nebulized Formulation of Nintedanib	Michelle Palacios PhD	• **Introduction:** Inhaled AP02 (nebulized nintedanib) aims to reduce systemic side effects and improve lung targeting in IPF/PPF. • **Methodology**: Healthy volunteers received single/multiple inhaled doses (2–8 mg BID) with BAL performed post 4 mg dose. • **Results:** AP02 was well tolerated with minimal adverse events; BALF drug levels exceeded target IC50 and surpassed oral exposure • **Conclusions:** AP02 achieves higher pulmonary exposure with reduced systemic levels, supporting further development for fibrotic lung diseases.
18 May 2025	Safety, Tolerability, and Pharmacokinetics of CHF10067 in Subjects With Idiopathic Pulmonary Fibrosis: A Phase Ib Study	Chiesi Farmaceutici S.p.A.	• **Introduction:** IPF is a progressive lung disease. Zampilimab (CHF10067) targets TG2 to reduce matrix deposition. • **Methodology**: Phase Ib placebo-controlled study (n=24) evaluated ascending single IV doses (1000–3000 mg) in IPF patients for safety, PK, and immunogenicity. • **Results:** Zampilimab was well tolerated; no discontinuations. Common TEAEs included hypertension and headache. PK was dose-proportional. One neutralizing antibody case, no TG2 level change. • **Conclusions:** Zampilimab showed favorable safety and supports further IPF development.

Notable Presentations at ATS 2025
Interstitial Lung Disease (ILD) / Pulmonary Fibrosis (6/7)

Date	Title	Author	Summary
19 May 2025	Variability of Criteria Used to Confirm Progressive Pulmonary Fibrosis: Results From a Real-World Survey	Pooja Chopra MSci, BPharm	• **Introduction:** 2022 PPF guidelines require ≥2 criteria (symptom, radiologic, or physiologic worsening). Real-world adherence and application remain unclear. • **Methodology**: Cross-sectional global survey of 1761 ILD patients (Feb–Oct 2024) assessing criteria used for PPF diagnosis and treatment practices. • **Results:** Only 19% of patients met all 3 criteria. Symptoms alone were most used (25%), varying by country and ILD subtype. Antifibrotic use occurred even when only one criterion was applied. • **Conclusions:** PPF guideline application varies significantly; overreliance on single criteria may lead to inconsistent management. Enhanced guideline alignment is warranted in clinical practice.
20 May 2025	The Potential Role of GPR87 in the Development of Pulmonary Fibrosis	Johad Khoury MD	• **Introduction:** GPR87, an orphan LPA receptor, is overexpressed in IPF basal and basaloid cells and associated with disease severity. • **Methodology**: GPR87 inhibition was tested in iPSC-derived basal cells, PCLS (normal and IPF), and a bleomycin mouse model. • **Results:** GPR87 knockdown reduced fibrosis markers in vitro, ex vivo, and in vivo. GPR87-/- mice showed less lung fibrosis, lower collagen, and better lung function vs wildtype. • **Conclusions:** GPR87 drives fibrosis via PI3K signaling and represents a promising epithelial-specific therapeutic target in IPF.

Notable Presentations at ATS 2025
Interstitial Lung Disease (ILD) / Pulmonary Fibrosis (7/7)

Date	Title	Author	Summary
21 May 2025	Metabolomic Signatures Linked to HRCT-defined Disease Phenotypes in Progressive and Stable Fibrotic Lung Diseases	Faizan Faizee	• **Introduction:** IPF/ILD subtypes differ in progression; integrating HRCT features with metabolomics may clarify fibrotic disease behavior. • **Methodology**: 60 patients were classified as stable or progressive IPF/ILD. A novel radiographic score and LC-MS/NMR metabolomics profiling were applied. • **Results:** Stable disease showed high triacylglycerols (TG) with traction bronchiectasis, honeycombing, and reticulation. Progressive disease had elevated sphingomyelins (SM) and ceramides (Cer). Ground-glass opacity showed mixed lipid patterns. • **Conclusions:** Specific lipid-metabolite signatures distinguish HRCT phenotypes in fibrotic lung disease, highlighting potential biomarkers of disease stability vs progression.

Notable Presentations at ATS 2025
Lung Cancer & Screening (1/2)

Date	Title	Author	Summary
18 May 2025	Patients Undergoing Endobronchial Ultrasound and Transbronchial Needle Aspiration: A Cross-sectional Study Comparing 2 Time Points in a Tertiary Hospital With a Lung Cancer Service	Lorraine Thong	• **Introduction:** EBUS-TBNA is effective in diagnosing lung cancer and non-malignant disorders. This study examines if the indications for EBUS-TBNA have shifted, with more benign conditions being referred • **Methodology**: A single-center retrospective study compared patients who underwent EBUS-TBNA in 2018 and 2023, analyzing demographics, clinical details, and histology results • **Results:** EBUS-TBNA referrals increased significantly from 207 in 2018 to 366 in 2023. The mean age of patients and the proportion of females increased, while there was a small increase in benign cytology and sarcoidosis cases • **Conclusions:** EBUS-TBNA utilization has increased, with a demographic shift in lung cancer patients, and further studies are needed to assess the rise in benign cases
19 May 2025	A Clinical Study of Invasive Mucinous Adenocarcinoma Detected as Small Nodules and Diagnosed Through Surgical Lung Biopsy	Ryo Hirakawa	• **Introduction:** Invasive mucinous adenocarcinoma (IMA) is a rare lung adenocarcinoma subtype with variable prognosis and no standard treatment. • **Methodology**: Retrospective analysis of 9 IMA cases surgically treated between Jan 2023–Oct 2024. • **Results:** Median age was 72; 44% were never-smokers. Most tumors were solitary and early-stage. Recurrence occurred in 2 cases within 7 months. • **Conclusions:** IMA can appear as small nodular shadows and may be undetectable by bronchoscopy. Early imaging-based suspicion and timely surgical intervention are key to improved outcomes

Notable Presentations at ATS 2025
Lung Cancer & Screening (2/2)

Date	Title	Author	Summary
20 May 2025	Quality Assessment of Low-dose Computed Tomography Lung Cancer Screening at the Veterans Health Administration	Andie O'Laughlin	• **Introduction:** High-quality low-dose CT (LDCT) is essential for effective lung cancer screening (LCS). • **Methodology**: 1,238 LDCT scans from 67 VHA sites were centrally reviewed for adherence to technical and reporting standards. • **Results:** Adherence was lowest for MIPs (62.6%) and radiation dose <3 mGy (73.4%). Index nodule identification (89.8%) was high, but measurement accuracy was low (57.3%). Chest-trained radiologists were significantly more accurate than generalists (p=0.002). • **Conclusions:** Technical and reporting variances exist in LDCT for LCS. Standardized training and QA protocols are critical to improve accuracy and consistency across VHA centers
20 May 2025	Racial/Ethnic and Gender Disparity in Cardiovascular Mortality (CV) Mortality Among Adults Diagnosed With Lung Cancer: A Population-Based Study	Manahil Khan MBBS	• **Introduction:** Cardiovascular (CV) mortality is increasingly relevant in lung cancer survivors. • **Methodology**: SEER data (2000–2021) were analyzed to compute standardized mortality ratios (SMRs) by race/ethnicity, gender, and latency post-diagnosis. • **Results:** CV mortality was highest <2 years post-diagnosis (SMR: 2.70). NH Black patients and males showed the greatest CV mortality. NH Asians had the highest heart disease mortality, while Hispanics had the highest hypertension-related mortality. • **Conclusions:** CV mortality risk in lung cancer varies by race and gender. Cardio-oncology strategies must target high-risk groups to reduce disparities and improve long-term outcomes.

Notable Presentations at ATS 2025
Other Respiratory / Immunological (1/7)

Date	Title	Author	Summary
18 May 2025	Disparities in Respiratory Syncytial Virus Vaccine First Season Uptake Among the Medicare Fee-For-Service Population	Austin Murphy PharmD	• **Introduction:** RSV is a significant cause of morbidity in older adults. This study assesses RSV vaccine uptake following FDA approval and CDC recommendations in 2023. • **Methodology**: A retrospective cohort study of Medicare FFS beneficiaries (≥65 years) from July 2023 to June 2024 evaluated vaccine uptake by demographic and health characteristics. • **Results:** Among 15.8 million beneficiaries, 21.0% received the vaccine, with higher uptake in younger adults, those with comorbidities, and in the western U.S. Disparities were seen by race and socioeconomic status. • **Conclusions:** RSV vaccine uptake was low, highlighting the need for targeted public health efforts.
18 May 2025	Effect of Camlipixant on Cardiac Repolarization in Healthy Participants: A Thorough QT/QTc Study	Elizabeth Anne. Duncan , PhD	• **Introduction:** Camlipixant is being developed for refractory chronic cough. This Phase 1 study aimed to evaluate the effects of camlipixant on the QTcF interval in healthy participants. • **Methodology**: A randomized, double-blind study assessed ascending single doses of camlipixant (50, 200, 400 mg) in healthy participants, with moxifloxacin as a positive control. The primary endpoint was the placebo-corrected change in QTcF interval. • **Results:** Camlipixant at 50 and 200 mg had no significant effect on QTcF. At 400 mg, a mild dose-dependent prolongation was observed. No clinically meaningful effects on heart rate or conduction were noted. • **Conclusions:** Camlipixant at therapeutic and supratherapeutic doses did not significantly affect cardiac repolarization.

Notable Presentations at ATS 2025
Other Respiratory / Immunological (2/7)

Date	Title	Author	Summary
18 May 2025	Model-based Comparison of the Pharmacokinetic/Pharmacodynamic and Eosinophilic Response of Benralizumab Versus Depemokimab at 12 Weeks	Pradeep Lukka PhD	• **Introduction:** Benralizumab and depemokimab are IL-5 monoclonal antibodies for severe eosinophilic asthma. This study compares eosinophil depletion using PK/PD modeling. • **Methodology**: Simulations of different dosing regimens for benralizumab (30 mg Q6M) and depemokimab (100 mg Q6M) predicted eosinophil depletion. • **Results:** Benralizumab (30 mg Q6M) showed 98.7% depletion at 12 weeks, higher than depemokimab (82.1%). Both treatments showed similar depletion at 24 weeks. • **Conclusions:** Benralizumab is predicted to result in greater eosinophil depletion at 12 weeks with more variability than depemokimab.
18 May 2025	First-in-Human Study of CHF 6795, an Oral Selective P2X3 Antagonist for Refractory Chronic Cough	Annalisa Piccinno MSc	• **Introduction:** P2X3 receptor activation contributes to cough hypersensitivity. This first-in-human study evaluated CHF6795, a selective P2X3 antagonist. • **Methodology**: A randomized, double-blind study assessed single and multiple ascending doses of CHF6795 in healthy males, focusing on safety, tolerability, and pharmacokinetics (PK). • **Results:** CHF6795 was rapidly absorbed and slowly eliminated, with dose-proportional exposure. Vertigo was the most common ADR. No serious adverse events or meaningful taste changes were observed. • **Conclusions:** CHF6795 was well tolerated at doses up to 880 mg single and 160 mg BID for 14 days, with no significant food or sex effects on PK.

Notable Presentations at ATS 2025
Other Respiratory / Immunological (3/7)

Date	Title	Author	Summary
18 May 2025	Leptin Decline Is Associated With Improvement in Lung Function and Body Composition in a Longitudinal Tobacco-exposed Cohort	Amy Attaway	• **Introduction:** Skeletal muscle loss worsens outcomes in COPD. GLP-1 RAs, used for weight loss, lower leptin and may impact muscle mass. • **Methodology**: In a 6-year tobacco-exposed cohort (n=191), changes in leptin were assessed with DXA, spirometry, and body composition indices. • **Results:** Leptin decline correlated with improved FEV1 but reduced fat and muscle mass. Lean-to-fat mass ratio increased, indicating improved composition. • **Conclusions:** Leptin decline reflects improved lung function and favorable body composition shifts in COPD, despite muscle mass loss—supporting mechanistic studies on leptin's role in COPD outcomes.
19 May 2025	Accuracy of Monocyte Distribution Width (MDW) in the Diagnosis of Sepsis Among Critically Ill Adult Patients at the Intensive Care Unit at St. Lukes Medical Center: A Cross Sectional Analytical Study	Karla Denyse Bueno Doctor of Medicine	• **Introduction:** Sepsis is a major cause of ICU admissions with delayed detection in emergency settings. • **Methodology**: A cross-sectional study assessed monocyte distribution width (MDW) as a sepsis predictor in 97 ICU patients. • **Results:** MDW significantly predicted sepsis by SIRS criteria (AUC 0.664, p=0.005), with best cutoff >22.46 yielding 69.1% accuracy, 62.1% sensitivity, and 79.5% specificity. No significance was found using qSOFA. • **Conclusions:** MDW, a simple CBC-derived marker, may aid early sepsis detection in resource-limited settings when used alongside SIRS criteria.

Notable Presentations at ATS 2025
Other Respiratory / Immunological (4/7)

Date	Title	Author	Summary
19 May 2025	Comparison of Clinical Characteristics and Viral Shedding Duration Among SARS-CoV-2 Variants in COVID-19 Patients With ARDS: A Retrospective Cohort Study	I-Ting Chen Master degree	• **Introduction:** COVID-19 can lead to ARDS, with variant-specific differences in clinical outcomes and viral shedding. • **Methodology**: A single-center cohort study in Taiwan analyzed ARDS patients with Alpha or Omicron variants (n=82, matched). • **Results:** Omicron cases showed greater illness severity (higher SOFA/APACHE II scores) but had significantly shorter viral shedding (median 11 vs. 17 days, p=0.003). • **Conclusions:** Despite greater severity, Omicron-infected ARDS patients had faster viral clearance than Alpha cases, with Omicron independently linked to reduced shedding duration.
19 May 2025	Study of QT Prolongation in Electrocardiogram in Type 2 Diabetes Mellitus Patients and Its Correlation to Hemoglobin A1C Levels	Neera Vora	• **Introduction:** QTc prolongation increases cardiovascular mortality risk in type 2 diabetes. • **Methodology**: A cross-sectional hospital-based study of 100 adult diabetic patients in Western India assessed ECGs and lab data. • **Results:** QTc prolongation was found in 11%. Risk factors included CVD, loop diuretic use, older age, higher BMI, nephropathy, and low LDL-C. • **Conclusions:** QTc prolongation in diabetics is linked to comorbidities and medication use. Monitoring QTc intervals may help reduce cardiovascular complications in high-risk patients.

Notable Presentations at ATS 2025
Other Respiratory / Immunological (5/7)

Date	Title	Author	Summary
20 May 2025	Impact of Hypoglossal Nerve Stimulation vs. Positive Airway Pressure Therapy on Cardiovascular Health in OSA Patients	Elaine Costa	• **Introduction:** Obstructive sleep apnea (OSA) increases cardiovascular risk; CPAP is first-line, but adherence is poor. Hypoglossal nerve stimulation (HNS) may offer a viable alternative. • **Methodology**: National database analysis comparing cardiovascular outcomes in 1,249 HNS vs. 148,387 CPAP users using propensity matching. • **Results:** HNS was associated with significantly lower risks of arrhythmia (HR 0.52), CAD (HR 0.67), and CHF (HR 0.55). No significant differences in CVA or MI. • **Conclusions:** HNS may reduce specific cardiovascular events in OSA patients nonadherent to CPAP, warranting further prospective validation.
20 May 2025	Effects of Adaptive-Servo-Ventilation on Hypoxemic Burden in Patients With Heart Failure and Central Sleep Apnea - An Ancillary Analysis of the SERVE-HF Major Substudy	Michael Arzt	• **Introduction:** In HFrEF patients with central sleep apnea (CSA), nocturnal hypoxemic burden correlates with mortality. The role of adaptive servo ventilation (ASV) in reducing this burden remains unclear. • **Methodology**: 148 HFrEF+CSA patients from the SERVE-HF trial were randomized to ASV or control. Pulse oximetry was analyzed at baseline, 3, and 12 months. Hypoxemic burden was measured as % of total recording time with oxygen saturation <90% (T90), split into desaturation (T90desaturation) and drift components (T90non-specific). • **Results:** ASV significantly reduced both T90desaturation and T90non-specific at 3 and 12 months ($p<0.001$). ASV led to greater reductions over time than control (98% vs. 49% and 97% vs. 15%, respectively). • **Conclusions:** ASV effectively reduces hypoxemic burden in HFrEF+CSA patients. Its long-term prognostic benefit warrants further study.

Notable Presentations at ATS 2025
Other Respiratory / Immunological (6/7)

Date	Title	Author	Summary
20 May 2025	Association of a Novel Index of Early-life Growth Conditions With Later-life Lung Structure and Function	Sophie Élène. Collins PhD	• **Introduction:** Early-life growth deficits may impair lung health. Height-GaP (difference between actual and genetically predicted height) serves as a proxy for suboptimal early-life growth. • **Methodology**: In the CanCOLD cohort (n=1,284), lung structure/function was assessed via CT, spirometry, plethysmography, DLCO, and CPET. Height-GaP was calculated using polygenic scores. • **Results:** Adults with the largest height-GaP deficits had significantly fewer pulmonary vessels (−1,275), lower DLCO (−3.77), lower V'O_2peak (−1.44 mL/kg/min), and higher exertional dyspnea/V'E. No associations were found with airflow obstruction, emphysema, or interstitial lung features. • **Conclusions:** Height-GaP correlates with a distinct pulmonary vascular phenotype linked to reduced exercise capacity and dyspnea, suggesting early-life growth influences adult lung vascular health.
21 May 2025	Indoor Air Quality (IAQ) at Schools in a Large Multicenter Survey in Italy	Giovanni Viegi , ATSF	• **Introduction:** Poor IAQ in schools may impact children's respiratory health; this large multicenter Italian survey explored such associations. • **Methodology**: IAQ was assessed in 130 classrooms across 8 cities; data from 1,718 children were analyzed via questionnaires and regression models. • **Results:** Most schools lacked HVAC; mean CO_2 and $PM_{2.5}$ levels were high. $PM_{2.5}$ was linked to respiratory symptoms (OR 1.88; p=0.04); CO_2 was associated with nasal problems (OR 1.02; p=0.03). • **Conclusions:** Poor IAQ in Italian schools correlates with respiratory symptoms, supporting the urgent need for improved ventilation policies and school infrastructure upgrades.

Notable Presentations at ATS 2025
Other Respiratory / Immunological (7/7)

Date	Title	Author	Summary
21 May 2025	Moving Towards Personalization in Immunization Against Streptococcus Pneumoniae?	Francisco Sanz	• **Introduction:** The study explores tailoring pneumococcal vaccination based on patient profiles using PCV20 and PCV21 coverage in bacteremic pneumococcal pneumonia. • **Methodology**: 859 vaccine-naïve hospitalized patients were assessed; serotypes were grouped per PCV20/21 and compared for demographics and outcomes. • **Results:** PCV21 serotypes were linked with older age, cardiovascular risks, more severe pneumonia, complications, and higher mortality (28% vs. 13.9%, p<0.01). • **Conclusions:** PCV21 serotypes affect high-risk individuals with worse outcomes. These findings support personalizing vaccine strategies based on patient characteristics to optimize protection.

Notable Presentations at ATS 2025
Pediatric / Developmental Lung Disease

Date	Title	Author	Summary
19 May 2025	Analyzing Respiratory Cilia Dynamics in Relation to Bronchopulmonary Dysplasia Severity	Daniel Yassa	• **Introduction:** BPD is a chronic lung disease in preterm infants, but the role of mucociliary clearance in its progression remains underexplored. • **Methodology**: Nasal HSVA from 9 BPD patients (36 recordings) was analyzed to assess ciliary metrics (length, angle, amplitude). • **Results:** Severe BPD showed significantly reduced net ciliary beat angle (p=0.045) and amplitude (p=0.028) versus moderate BPD, with no significant differences in other metrics. • **Conclusions:** Altered ciliary dynamics correlate with BPD severity, indicating a potential role for mucociliary dysfunction in disease pathophysiology and guiding future therapeutic targets.
20 May 2025	Elucidating Cellular and Molecular Dynamics in Bronchopulmonary Dysplasia Through Advanced Spatial-Omics	Geremy Charles Daniel. Clair PhD	• **Introduction:** BPD disrupts alveolar development in preterm infants, with limited therapeutic options. • **Methodology**: Multiplexed spatial and bulk omics (MPLEx, MALDI imaging, nanoPOTS proteomics, MxIF) profiled alveolar tissue from BPD patients. • **Results:** BPD lungs showed disrupted alveolar niches, loss of lipid-regulatory proteins, reduced Cap1 cell activity, abnormal ECM deposition, neutrophil protein deficiency, and infiltration of CD45+ and iron-laden macrophages. • **Conclusions:** Spatial multi-omics uncovered key molecular defects in BPD alveolar architecture, suggesting targets to restore alveolarization and guide therapy.

Notable Presentations at ATS 2025
Pulmonary Hypertension (1/5)

Date	Title	Author	Summary
18 May 2025	Complement-Containing Matrix-Bound and Liquid-Phase Nanovesicles: Key Players in Matrix Remodeling and Inflammation Leading To Pulmonary Hypertension	Sushil Kumar PhD, University of Colorado	• **Introduction:** Pulmonary hypertension (PH) involves inflammation and ECM remodeling; the role of nanovesicles in this process is unclear. • **Methodology**: Bovine PH lung tissue was analyzed using TEM, PCLS, proteomics, and immuno-TEM to study sEVs and matrix-bound vesicles (MBVs). • **Results:** PH tissue showed increased sEVs, especially MBVs enriched near ECM. Proteomics revealed activation of complement/coagulation cascades. Immuno-TEM confirmed higher C3 in PH-derived sEVs. • **Conclusions:** Distinct vesicle populations, especially MBVs, may drive complement-mediated ECM remodeling and macrophage reprogramming in PH, offering novel targets for therapeutic intervention.
18 May 2025	Endothelial Replacement Therapy for Pulmonary Vascular Disease Using Induced Pluripotent Stem Cells	Alexander Holtz PhD	• **Introduction:** Pulmonary hypertension is driven by endothelial dysfunction, often due to gene mutations; iPSC-derived endothelial therapies offer a promising solution. • **Methodology**: Researchers used a BMP9-based protocol to generate lung-specific iPSC-endothelial cells (hiEndos) and performed transplantation in hyperoxia-injured NSG mice using a competitive lung reconstitution assay. • **Results:** BMP9 enhanced hiEndo engraftment, morphology, and lung-specific gene expression. CRISPR-corrected BMPR2-mutant hiEndos showed improved capillary integration versus uncorrected lines, revealing post-transplant insights not seen in vitro. • **Conclusions:** BMP9 pre-patterning is key to lung engraftment success. This model uncovers in vivo endothelial defects in pulmonary hypertension missed by standard culture systems.

Notable Presentations at ATS 2025
Pulmonary Hypertension (2/5)

Date	Title	Author	Summary
18 May 2025	Patient Reported Experience of Participants in the ARTISAN Study for Pulmonary Arterial Hypertension (PAH)	Mary Lou Tomson B.S., M.A.	• **Introduction:** The ARTISAN Phase 4 study uses a treat-to-pressure strategy for PAH, combining parenteral treprostinil and CardioMEMS monitoring. • **Methodology**: A patient questionnaire assessed pre-study concerns, in-study experience, activity levels, and willingness to recommend participation. • **Results:** Of 17 respondents, 41% had pre-study concerns, 88% found education/home nurse visits reassuring, 71% managed daily tasks, 82% reported improved activity, and 100% would recommend the study. • **Conclusions:** Despite initial apprehension, robust pre-study support led to improved confidence, functional status, and unanimous endorsement of ARTISAN participation.
19 May 2025	Comparative Efficacy of Pharmacological Treatments for Inoperable Chronic Thromboembolic Pulmonary Hypertension: A Network Meta-analysis	Suchith Boodgere Suresh M.B.B.S	• **Introduction:** Chronic thromboembolic pulmonary hypertension (CTEPH) is a rare but serious complication of pulmonary embolism, often diagnosed late. • **Methodology**: A network meta-analysis of 7 RCTs (n=658) compared six therapies vs placebo in inoperable CTEPH, assessing PVR, 6MWD, and NT-proBNP using SUCRA rankings. • **Results:** Bosentan ranked highest for PVR and NT-proBNP reduction; Riociguat was best for improving 6MWD. Sildenafil and Macitentan showed moderate efficacy. • **Conclusions:** Bosentan and Riociguat offer superior benefits in key outcomes. These findings support their prioritization in treating inoperable CTEPH pending further long-term and combination strategy studies.

Notable Presentations at ATS 2025
Pulmonary Hypertension (3/5)

Date	Title	Author	Summary
19 May 2025	Hepatic Inflammation and BMP9 Dysfunction in Pulmonary Arterial Hypertension	Navneet Singh , MBA	• **Introduction:** Inflammation and dysregulated BMP9 signaling from the liver may contribute to PAH pathobiology via a liver-lung axis. • **Methodology**: SuHx and MCT rat liver tissues were analyzed using histology, RNA sequencing, qPCR, ELISA, and immunoblotting to evaluate inflammation and BMP pathway alterations. • **Results:** SuHx livers showed increased CD68+ macrophages and inflammatory gene expression. BMP9 protein expression was higher in females but with reduced BMPR2/pSMAD signaling; males showed the opposite. • **Conclusions:** SuHx rats exhibit novel hepatic inflammation and sexually dimorphic BMP9 signaling, suggesting dysfunctional BMP9 processing and compensatory GDF2 expression, contributing to PAH pathology
19 May 2025	Overall Survival of Patients on Sotatercept: An Analysis of STELLAR and SOTERIA Trials	Tanvee Thakur Ph.D., Merck & Co.	• **Introduction:** Pulmonary arterial hypertension (PAH) is a progressive disease with poor prognosis. Sotatercept, an activin signaling inhibitor, has shown efficacy in improving clinical outcomes. • **Methodology**: Patients from the STELLAR trial were analyzed for overall survival (OS), with treatment crossover adjusted using RPSFT modeling. • **Results:** Sotatercept significantly reduced mortality risk versus placebo (HR=0.17; p=0.037). Event rates were lower for sotatercept (0.02) than unadjusted (0.08) or adjusted placebo (0.15). • **Conclusions:** Sotatercept demonstrated a substantial survival benefit in PAH. Ongoing trial follow-up will help assess long-term efficacy.

Notable Presentations at ATS 2025
Pulmonary Hypertension (4/5)

Date	Title	Author	Summary
20 May 2025	Comparative Efficacy of Inhaled Nitric Oxide Versus Prostacyclin Analogues on Hemodynamic Outcomes in Pulmonary Hypertension: A Systematic Review and Meta-analysis	Warren Fernandes	• **Introduction:** Pulmonary hypertension (PH) management involves vasodilators like nitric oxide (NO) and prostacyclin analogs, but comparative hemodynamic efficacy remains unclear. • **Methodology**: A systematic review of 11 studies (n=509) assessed NO vs. prostacyclin analogs (including iloprost, epoprostenol) on mPAP, PVR, SVR, PCWP, and CO using meta-regression. • **Results:** Prostacyclin analogs significantly reduced SVR (mean difference 166.67; p=0.004). Iloprost showed superiority over NO in mPAP and SVR. PVR reduction was not significant overall. • **Conclusions:** Prostacyclin analogs, especially iloprost, offer greater SVR reduction than NO, though long-term clinical impact remains uncertain. Further randomized trials are needed.
20 May 2025	Varying Efficacy of Tadalafil in Bone Morphogenetic Protein Receptor 2 Mutation Carriers Compared to Wild Type Rats in an Experimental Model of Pulmonary Arterial Hypertension	Silvia Cantoni PhD	• **Introduction:** PAH is marked by elevated PAP and PVR, often due to BMPR2 mutations linked to familial and sporadic cases. • **Methodology**: BMPR2Δex4 mutant rats were generated using CRISPR/Cas9. PAH was induced via Sugen5416 and hypoxia. Tadalafil was administered, and cardiopulmonary metrics were assessed via ultrasound and hemodynamics. • **Results:** BMPR2Δex4 rats developed more severe PAH, with higher PVRi, lower CI, and poorer survival. Tadalafil improved metrics in both genotypes but was less effective in BMPR2Δex4 rats. • **Conclusions:** BMPR2Δex4 rats model heritable PAH more accurately than mice and are suitable for preclinical testing of targeted therapies.

Notable Presentations at ATS 2025
Pulmonary Hypertension (5/5)

Date	Title	Author	Summary
20 May 2025	HS135, a Novel Investigational Activin Inhibitor for the Treatment of Pulmonary Hypertension (PH): Results From a Healthy Volunteer Phase 1 Trial Demonstrated Favourable Safety Profile and Pharmacodynamic Responses, Including Improved Body Composition and Cardiac Biomarkers	Maureen O'Connor PhD	• **Introduction:** HS135 is a novel Activin/GDF trap protein developed for pulmonary hypertension (PH), aiming to modulate overactive signaling implicated in PAH pathology. • **Methodology**: A Phase 1, placebo-controlled trial in healthy postmenopausal women evaluated safety, PK/PD, FSH modulation, body composition, and biomarkers. • **Results:** HS135 was well tolerated, showed dose-proportional PK, and caused durable FSH reductions. Doses ≥1 mg/kg improved lean mass and reduced fat mass. Biomarker profiling showed favorable modulation of PAH and heart failure markers. • **Conclusions:** HS135 demonstrated strong target engagement, metabolic benefits, and potential disease-modifying effects, supporting its further development for PAH and HF.

Notable Presentations at ATS 2025
Pulmonary Infections (TB/NTM/MAC/RSV) (1/3)

Date	Title	Author	Summary
18 May 2025	Long-term Impact of Elexacaftor/Tezacaftor/Ivacaftor on Clinical Outcomes and Laboratory Markers in People With Cystic Fibrosis With at Least One F508del Allele: A 42-month Single-Center Study	Sivagurunathan Sutharsan	• **Introduction:** Elexacaftor/tezacaftor/ivacaftor (ETI) improves outcomes in cystic fibrosis (CF) patients with ≥1 F508del allele. • **Methodology**: In this 42-month observational cohort (n=85), changes in lung function, BMI, exacerbations, lab markers, and quality of life were assessed. • **Results:** ETI led to a 7.1% ppFEV$_1$ increase, 0.735 kg/m^2 BMI gain, 56.7% exacerbation reduction, and a 26.3-point CFQ-R improvement. HbA1c and liver enzymes improved, while P. aeruginosa detection fell by 32.2%. • **Conclusions:** Long-term ETI therapy produced significant, sustained clinical and biochemical benefits, confirming its efficacy in CF management.
19 May 2025	A Phase 2, Double-blind, Randomized, Placebo-controlled, Multi-center Study to Evaluate the Efficacy, Safety, and Tolerability of Oral Omadacycline in Adults With Nontuberculous Mycobacterial Pulmonary Disease (NTM PD) Caused by Mycobacterium Abscessus Complex (MABc)	Kevin L. Winthrop , MPH	• **Introduction:** Omadacycline, an FDA-approved antibiotic, exhibits activity against Mycobacterium abscessus complex (MABc), a challenging cause of nontuberculous mycobacterial pulmonary disease (NTM-PD) lacking approved treatments. • **Methodology**: A Phase 2, placebo-controlled study randomized 66 patients with MABc NTM-PD to omadacycline or placebo for 84 days. Clinical, microbiological, and safety endpoints were assessed. • **Results:** Omadacycline showed superior symptom improvement, higher rates of sputum culture reduction (76.5% vs. 45.8%) and clearance (56.4% vs. 29.2%). Nausea was the most common side effect. • **Conclusions:** Omadacycline demonstrated favorable efficacy and tolerability, supporting further investigation in pulmonary MABc.

Notable Presentations at ATS 2025
Pulmonary Infections (TB/NTM/MAC/RSV) (2/3)

Date	Title	Author	Summary
19 May 2025	Whole Blood Transcriptomics Characterize Molecular Phenotypes of Pulmonary Mycobacterium Avium Complex Disease	Chio Sakai	• **Introduction:** Pulmonary MAC disease exhibits clinical and immunological heterogeneity; this study aimed to characterize gene expression patterns across severity levels. • **Methodology**: Whole blood RNA-sequencing was performed at baseline and 1-month post-treatment in 100 patients. Clustering and DEG analyses were adjusted for blood cell composition. • **Results:** Three clusters emerged: mild (C1), moderate (C2), and severe (C3). C3 showed elevated neutrophils and activation of neutrophil degranulation and interferon signaling pathways. Twenty-four neutrophil-related genes distinguished severe disease, correlating with prior mortality-associated signatures. • **Conclusions:** Activated neutrophil signatures define severe pulmonary MAC and may serve as prognostic biomarkers.
19 May 2025	Predicting Value of Decreasing Gut Prevotella Species for Getting Nontuberculous and Its Severity: A Pilot Study	Chin-Chung Shu , PhD	• **Introduction:** Gut dysbiosis, particularly reduced Prevotella species, has been linked to immune dysfunction in nontuberculous mycobacterial lung disease (NTM-LD). • **Methodology**: Fecal samples from 26 NTM-LD patients and 20 controls were analyzed via real-time PCR to quantify Prevotella levels. • **Results:** NTM-LD patients had significantly lower Prevotella abundance (ΔCt 20.0 vs 14.1; p=0.004). Cavitary NTM-LD showed further reduction (ΔCt 22.5 vs 18.6; p=0.034). ROC analysis showed predictive value (AUC 0.725; p=0.010). • **Conclusions:** Prevotella deficiency correlates with NTM-LD severity and may serve as a predictive biomarker and therapeutic target.

Notable Presentations at ATS 2025
Pulmonary Infections (TB/NTM/MAC/RSV) (3/3)

Date	Title	Author	Summary
19 May 2025	The Development of Pulmonary Tuberculosis in COPD: A Nationwide Population-Based Study	Joo Hun Park , PhD	• **Introduction:** COPD patients are at increased risk of pulmonary tuberculosis (TB), but the role of inhaled corticosteroids (ICS) and comorbidities remains unclear. • **Methodology**: A retrospective cohort study (n=139,589) from Korean national data analyzed TB development in COPD patients ≥40 years newly prescribed inhalers (2015–2020). • **Results:** ICS, heart failure, and GERD were not TB risk factors. Prior TB (HR=18.14), ≥2 hospitalizations (HR=1.55), older age, and male sex independently predicted TB. • **Conclusions:** Prior TB and hospitalization were strong predictors of pulmonary TB in COPD, while ICS therapy showed no significant association.
20 May 2025	Efficacy of Prolonged Treatment in Drug-susceptible Pulmonary Tuberculosis Patients With Cavities or Positive Sputum Culture at Two Months of Treatment: A Multi-center Registry Analysis From Republic of Korea	Yong Soo Kwon	• **Introduction:** Extended therapy is commonly used in drug-susceptible pulmonary TB patients with cavities or positive sputum cultures at 2 months, though supporting evidence is limited. • **Methodology**: A retrospective study using a multicenter prospective cohort (2019–2023, South Korea) compared relapse rates in standard vs. extended treatment (>6 months). • **Results:** Among 302 patients, extended therapy did not reduce relapse (2.1% vs. 3.7%; p=0.38). Propensity matching and regression confirmed no benefit. Diabetes, chronic lung disease, retreatment, and drug interruption >7 days were independent risk factors. • **Conclusions:** Extended treatment did not improve outcomes in high-risk TB patients, challenging current treatment paradigms.

Notable Presentations at ATS 2025
Real-World Evidence, Health Disparities, and Policy (1/3)

Date	Title	Author	Summary
18 May 2025	Conducting Research on Tribal Lands: Results From the Navajo Community Asthma Program	Bruce G. Bender PhD	• **Introduction:** Asthma rates among Native American children are high, yet few interventions have been implemented on tribal lands. • **Methodology**: A stepped wedge trial of the Community Asthma Program was conducted across three Navajo Nation communities. Staff were trained in asthma management, and schools implemented stock inhaler protocols. • **Results:** 439 staff received training. Despite pandemic-related disruptions, post-pandemic data showed increased asthma-related visits, suggesting improved care-seeking. • **Conclusions:** The program appears to have raised asthma awareness and promoted medical engagement, though the pandemic confounded direct outcome attribution.
19 May 2025	Racial and Ethnic Disparities in Pulmonary Rehabilitation Utilization Among COPD Patients With Exacerbations	Abhi Lohana , MBBS	• **Introduction:** Pulmonary rehabilitation (PR) is a key intervention for COPD, yet access remains unequal, especially among racial and ethnic minorities. • **Methodology**: This study compared two COPD patient cohorts: 493 who received PR and 457,573 who did not. Disparities in PR utilization were analyzed by race and ethnicity. • **Results:** White patients were the largest group in PR (31.2%), while Black and Asian patients were underrepresented. The non-PR cohort had a higher proportion of Black and Hispanic patients. • **Conclusions:** Racial and ethnic disparities in PR access highlight the need for strategies to address barriers and promote equitable healthcare for COPD management.

Notable Presentations at ATS 2025
Real-World Evidence, Health Disparities, and Policy (2/3)

Date	Title	Author	Summary
20 May 2025	Is Equitable Priority Vaccination of Vulnerable People Feasible in a Real-World Context? The Case of Belgium	Charlotte Scheerens MSc	• **Introduction:** Belgium implemented a comprehensive vaccination strategy prioritizing high-risk groups during the COVID-19 pandemic. This study evaluates whether prioritized groups were vaccinated sooner and identifies socio-demographic factors related to vaccine uptake. • **Methodology**: Time to vaccination was analyzed using data from the LINK-VACC project, assessing differences between prioritized and non-prioritized groups. • **Results:** Prioritized individuals were vaccinated 34.7 days earlier, with larger differences seen in younger age groups. Factors such as age, region, income, and nationality were associated with quicker vaccination. • **Conclusions:** The prioritization strategy effectively accelerated vaccine access for high-risk populations, promoting equitable vaccine distribution.
21 May 2025	Hispanic Family Member Experiences in Intensive Care Units: A Qualitative Study	Luz Mercado MPH	• **Introduction:** Hispanic individuals faced higher COVID-19 hospitalization rates and mortality, with limited research on their families' experiences in critical care. • **Methodology**: Semi-structured interviews were conducted via Zoom with Hispanic family members of ICU patients from March 2020 to 2022. Interviews were transcribed and analyzed to identify emergent themes. • **Results:** Fourteen participants reported feeling ignored due to ethnicity and language barriers, perceiving lower-quality care, and struggling with language interpretation. Restricted visitation during COVID-19 amplified feelings of fear and confusion. • **Conclusions:** The study highlights the need for bilingual ICU staff and interpreters to improve care for Hispanic families.

Notable Presentations at ATS 2025
Real-World Evidence, Health Disparities, and Policy (3/3)

Date	Title	Author	Summary
21 May 2025	Rural CAPTURE (COPD Assessment in Primary Care to Identify Undiagnosed Respiratory Disease and Exacerbation Risk) Study Participants Experience Greater Symptom Burden, But Similar COPD Prevalence	Jamuna K. Krishnan , MS	• **Introduction:** Rural health disparities in chronic diseases, including respiratory conditions, are a growing concern. Limited research exists on respiratory health in rural populations, despite heightened attention. • **Methodology**: A post-hoc analysis of CAPTURE trial data examined responses from 4,336 adults (45-80 years) enrolled in 100 U.S. primary care practices. Rural vs. non-rural participants were compared based on exposures, symptoms, and chronic illnesses using the CAPTURE COPD screening tool and spirometry • **Results:** Rural participants reported higher exposure to pollutants and greater respiratory symptoms, especially among men. Despite these symptoms, no significant difference in asthma or COPD diagnosis was found. • **Conclusions:** Further research is needed to address respiratory health disparities and symptom management in rural populations.

Key Industry Sponsored Sessions Information

ATS 2025 Key Industry Sponsored Sessions Information (1/7)

Date	Sponsor	Title
18 May 2025	Eli Lilly and Company	Product Theater for Zepbound® (tirzepatide) Injection
18 May 2025	GSK	A Closer Look at Single Inhaler Triple Therapy for COPD and Latest Real-World Evidence
18 May 2025	Amgen / AstraZeneca	Unraveling the Complexity: Managing Multiple Triggers and Drivers of Inflammation in Severe Asthma
18 May 2025	AstraZeneca	AIRSUPRA® (albuterol 90 mcg/budesonide 80 mcg): The Paradigm Is Shifting
18 May 2025	GSK	Many Paths, One Goal: Discover the Advances in IL-5 Science
18 May 2025	GSK	Mapping COPD Exacerbation: Understanding Outcomes and Impact of Hospital Visits on the Path to One Goal
18 May 2025	Aerogen	Optimizing Aerosol Drug Deposition Across the Respiratory Continuum

ATS 2025 Key Industry Sponsored Sessions Information (2/7)

Date	Sponsor	Title
18 May 2025	Vertex Pharmaceuticals	Closing the Gap: Recognizing Cystic Fibrosis in Adults and Diverse Populations
18 May 2025	4D Medical	CT:VQ™: Transforming Regional Lung Function Assessment Through Non-Contrast CT-Based Ventilation/Perfusion Imaging
18 May 2025	Biomedical GmbH	Breathing Via the Gut – Enteral CO2 Absorption for the Treatment of Hypercapnia
18 May 2025	GSK	Evidence for the Role of IL-5 in Severe Eosinophilic Asthma
18 May 2025	Verona Pharma Inc.	A Novel Inhaled PDE3/PDE4 Inhibitor for the Maintenance Treatment of COPD in Adults
18 May 2025	Boehringer Ingelheim	Cracking the Case: Interactive Insights on Collaborative Care in Interstitial Lung Disease Diagnosis
18 May 2025	GSK	At a Crossroads: Recognizing and Addressing Barriers to Asthma Control

ATS 2025 Key Industry Sponsored Sessions Information (3/7)

Date	Sponsor	Title
18 May 2025	Amgen / AstraZeneca	A Fresh Perspective on Airway Diseases: Connecting Epithelial Cytokines in Severe Asthma, CRSwNP, and COPD
18 May 2025	Foresee Pharmaceuticals	SyMMPonia: A Phase 2 Study of Linvemastat (FP-020) in Uncontrolled Asthma
18 May 2025	Bristol Myers Squibb	Unmet Needs in Treatment of IPF & PPF: How Our Mechanistic Understanding of Disease Pathways Could Unlock the Future
19 May 2025	Sanofi / Regeneron	Problem Based Learning: Type 2 Inflammation in COPD
19 May 2025	Liquidia Technologies	PH-ILD: Screening, Diagnosis, Treatment and Ongoing Clinical Research
19 May 2025	Verona Pharma	Dyspnea in COPD: Clearing the Air on Effective Management
19 May 2025	Sanofi / Regeneron	Eosinophils in COPD: A Biomarker of Type 2 Inflammation to Predict Therapeutic Response

ATS 2025 Key Industry Sponsored Sessions Information (4/7)

Date	Sponsor	Title
19 May 2025	Insmed Incorporated	Clearing the Air on Bronchiectasis Exacerbations: Burden, Causes, and Management of Exacerbations
19 May 2025	Boehringer Ingelheim	Everyday Essentials: ILD Resources for Learning
19 May 2025	Amgen / AstraZeneca	One Approach, Many Patients: Addressing Eosinophilic Inflammation
19 May 2025	GSK	Breathe Easier: Can We Do More to Improve Management of Adult Patients With Asthma?
19 May 2025	4D Medical	Advancements in IPF Diagnosis: Accelerating Accurate Detection with IQ-UIP™
19 May 2025	Amgen / AstraZeneca	Persistent Airflow Obstruction: Elucidating the Impact of Eosinophilic Inflammation
19 May 2025	Inogen	Role of Ambulation in Patients with Chronic Disorders Requiring LTOT

ATS 2025 Key Industry Sponsored Sessions Information (5/7)

Date	Sponsor	Title
19 May 2025	Johnson & Johnson	Patient Cases for the Chronic Treatment of Adults with PAH
19 May 2025	GSK	Are Your Patients at Greater Risk of COPD Exacerbations? It Is Time to Rethink Management for COPD With an Eosinophilic Phenotype
19 May 2025	Amgen / AstraZeneca	Triple Therapy in Focus: The Importance of a Proactive Approach
19 May 2025	Chiesi USA	Finding the Space to Breathe: Harnessing NASA's Data to Improve Respiratory Health
19 May 2025	Genentech	Decoding Inflammation in COPD: New Insights and Opportunities
19 May 2025	Boehringer Ingelheim	Bridging the Gap: Understanding Interstitial Lung Disease (ILD) from a Physician and Patient Perspective
19 May 2025	Merck & Co	Spotlight on a Treatment Option for Pulmonary Arterial Hypertension (PAH)

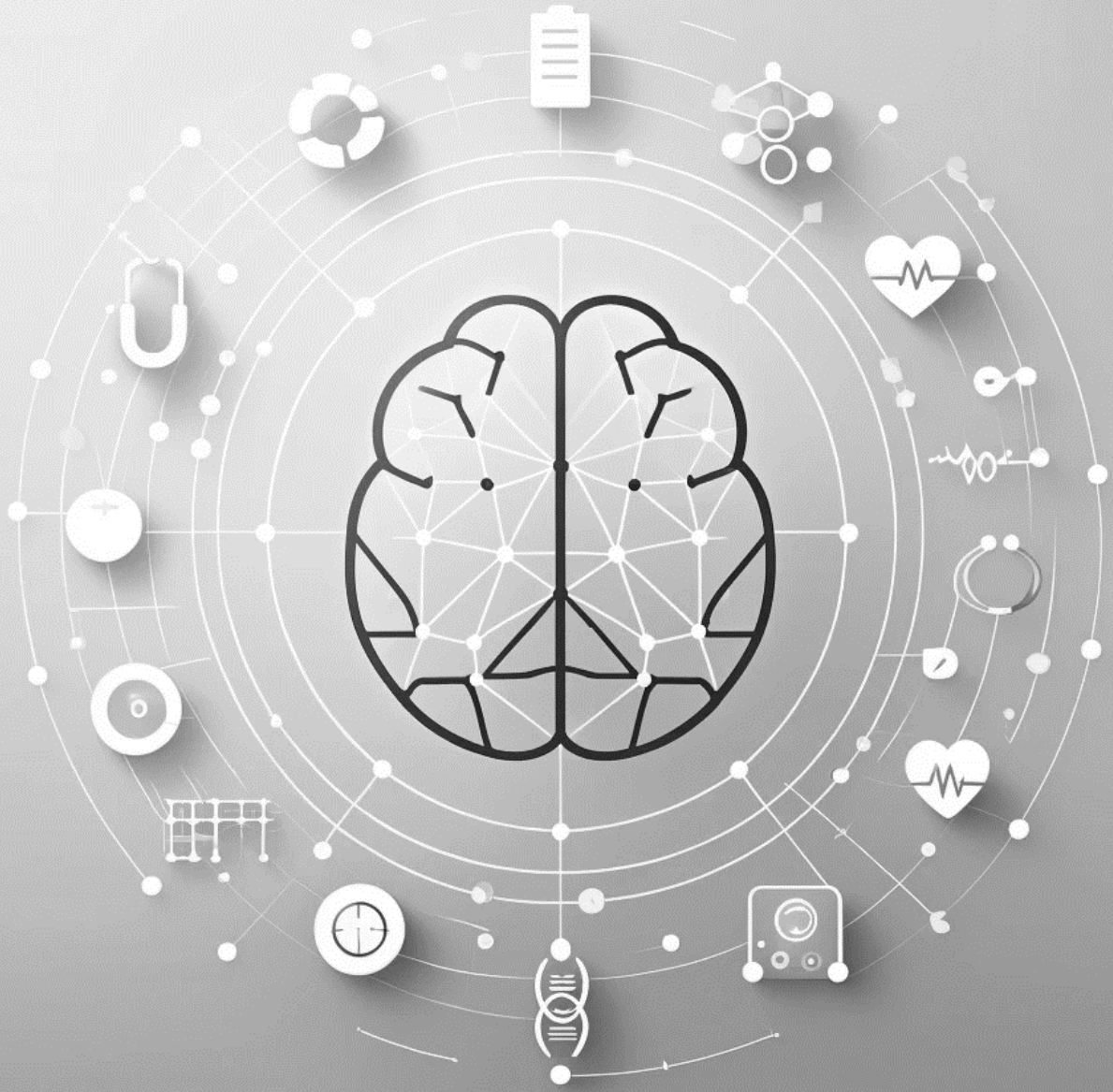
ATS 2025 Key Industry Sponsored Sessions Information (6/7)

Date	Sponsor	Title
19 May 2025	Sanofi / Regeneron	Treating the Whole Patient: Is Controlling Exacerbations Doing Enough in Asthma and COPD?
20 May 2025	Liquidia Technologies	PH-ILD: Screening, Diagnosis, Treatment and Ongoing Clinical Research
20 May 2025	AstraZeneca	IL-33 in COPD: Two Sides to the Story
20 May 2025	Sanofi	SANOFI Why Respiratory Vaccines Are Still Important: The Current Challenges & Opportunities in Pertussis, COVID-19 and Influenza Vaccination
20 May 2025	Sanofi | Regeneron	Learn About the Latest on Asthma and Mucus Burden
20 May 2025	AstraZeneca	Taking Control: The Urgent Need to Identify and Address Uncontrolled Asthma
20 May 2025	Avalyn Pharma	Breathing New Life: Inhaled Nintedanib and the Future of Pulmonary Fibrosis Treatment

ATS 2025 Key Industry Sponsored Sessions Information (7/7)

Date	Sponsor	Title
20 May 2025	AstraZeneca	Pulmonologist & Cardiologist Live: A Collaborative Approach to Cardiopulmonary Risk in COPD
20 May 2025	Inogen	Non-Pharmacological Therapies in Bronchiectasis – Current Gaps and Evidence
20 May 2025	Johnson & Johnson	Expert Discussion: Emerging Evidence on a PAH Treatment
20 May 2025	Sanofi / Regeneron	Evolving Our View of COPD: Sounding the Alarm on Chronic Inflammation
20 May 2025	GSK	Cough and Effect: Diagnosing Refractory Chronic Cough with Speed and Precision
20 May 2025	Fisher & Paykel Healthcare	Nasal High Flow: Emerging Paradigms in Noninvasive Respiratory Support
20 May 2025	Sanofi	Sanofi Shifting the Paradigm in Asthma Care: Redefining the Patient Journey

Noteworthy AI / ML presentations at ATS 2025



Themes from key AI / ML presentations at ATS 2025 (1/5)

- **At ATS 2025, AI/ML tools will demonstrate transformative potential across respiratory medicine from improving early disease detection and stratification (e.g., ILD, COPD, IPF) to personalizing therapy and streamlining diagnostics, validated through large datasets, novel biomarkers, and real-world clinical trials**
- Check out the key AI / ML themes at ATS 2025 below:
- **Diagnostic AI Tools for Pulmonary Disease:**
  - AI models like EfficientNet-B7 and ScreenDx showed high accuracy in classifying pleural effusions (AUC 0.80) and detecting ILD in COPDGene, enabling earlier, non-invasive respiratory diagnoses
- **AI in Imaging Biomarker Quantification:**
  - Validated AI platforms (e.g., Fibresolve, Qureight, VIDA) quantified fibrosis, airway, and vascular volumes, offering prognostic markers for IPF, COPD, and heart failure with high correlation to FVC and DLCO
- **Machine Learning in COPD Prognosis:**
  - ML-enhanced CT radiomics outperformed BODE index (c-index 0.76 vs. 0.72), while plasma biomarker-based models better predicted respiratory failure outcomes (AUC 0.70 vs. 0.63 for FEV1)

Themes from key AI / ML presentations at ATS 2025 (2/5)

- **AI-Enhanced Therapy Monitoring:**
  - Tools like SIVA (CCC = 0.959) and Rest Assure provided accurate real-time monitoring for cough and OSA therapies, improving adherence, treatment adjustments, and comfort without compromising efficacy
- **Trial: MAGNIFY Study:**
  - The MAGNIFY trial (n=835) demonstrated that a digital adherence package reduced COPD treatment failure by 23% (HR 0.77; p=0.009), validating EMR-integrated AI interventions in real-world care
- **Deep Learning in Critical Care:**
  - TrAcE and eCARTv5 models outperformed traditional methods for extubation prediction (AUROC 0.859) and sepsis alerts (67.4% sensitivity vs. 24.3%), guiding early interventions with temporal data integration
- **AI in ILD & IPF Diagnosis:**
  - Deep learning models accurately classified UIP in EB-OCT datasets (100% sensitivity/specificity) and ILD severity using LUS+HRCT features, advancing non-invasive, scalable diagnostic frameworks

Themes from key AI / ML presentations at ATS 2025 (3/5)

- **Predictive Models in Exacerbation Risk:**
  - AI models using ANN or wearable data reduced asthma and CHF exacerbations by 60% and predicted CHF readmissions with 87.5% accuracy, supporting early intervention strategies
- **Quantitative CT (qCT) in PH & COPD:**
  - qCT metrics like BV5/TVV and emphysema % differentiated COPD-PH phenotypes (AUC = 0.94 for PVR), while AI-defined vascular/pruning patterns correlated with mPAP and PCWP in HFrEF
- **AI-Guided Drug Discovery:**
  - USP21-targeting compounds in NSCLC were identified using AI-driven docking ($\Delta G < -70.6$ kcal/mol), demonstrating machine learning's role in structure-guided repurposing for immune evasion pathways
- **AI in Clinical Trial Integrity:**
  - AI-based spirometry signature analysis flagged 100% of simulated duplicate trial sites with 88% specificity, improving risk-based monitoring and data authenticity in respiratory trials

Themes from key AI / ML presentations at ATS 2025 (4/5)

- **AI-Based Phenotyping of Disease Subtypes:**
  - Clustering and ML on qCT and CFD data uncovered distinct phenotypes in COPD and CPFE, enabling stratification by disease burden and outcome correlation (accuracy up to 90.5%)
- **EHR & NLP for Rare Disease & Symptom Extraction:**
  - Hybrid NLP detected PE with 94.8% accuracy, and LLMs (e.g., Llama 3.1) structured OSA symptoms from unstructured notes, enhancing detection and documentation workflows
- **ML-Guided Ventilator & ICU Resource Optimization:**
  - Models predicted LTAC discharge (AUC 0.90) and ICU readmissions by integrating early vitals, FiO2, and tracheostomy data, improving care planning and resource allocation
- **Deep Learning for Airway Obstruction Detection:**
  - An LSTM model identified fixed airway obstruction from flow-volume loops with high recall (94.6%) and F1 score (83.9%), outperforming traditional spirometry interpretation

Themes from key AI / ML presentations at ATS 2025 (5/5)

- **AI-Based Metabolomics in MPE:**
  - Machine learning models using 71 metabolites predicted malignant pleural effusion and 1-year mortality, offering new diagnostic and therapeutic insights for lung cancer patients
- **Digital Twins in ICU Decision Support:**
  - LLMs (e.g., LLaMA-3 with LoRA) trained on ICU notes predicted medications with high BERTScore (0.820), supporting personalized digital twin models for clinical recommendation systems
- **Automated RALE Scoring for Lung Edema;**
  - CNNs with computer vision preprocessing achieved ICC = 0.85 for RALE score prediction, automating lung edema assessment and enabling scalable use in ARDS/COVID-19 monitoring
- **Personalized PAP Therapy for OSA:**
  - Transfer learning improved AI-based PAP event detection by 38%, reducing pressure levels while maintaining AHI control (<5 events/hr), supporting individualized treatment for sleep apnea
- **DNA Methylation-Based ML in Asthma:**
  - The PACA model used DNAm scores to improve BEC/IgE biomarker utility, stratifying asthma patients more accurately and predicting biologic therapy response in pediatric cohorts

Noteworthy AI / ML presentations at ATS 2025

Notable Presentations at ATS 2025
AI / ML (1/30)

Date	Title	Author	Summary
18 May 2025	A Deep Learning Approach to Differentiating Between Transudative and Exudative Pleural Effusions on Thoracic Ultrasound	Meghan Snuckel	• **Introduction**: Differentiating transudative from exudative pleural effusions using thoracic ultrasound alone is unreliable, often requiring invasive thoracentesis. This study explores deep learning to enhance non-invasive diagnostic accuracy. • **Methodology**: Researchers applied ResNet18, ResNet50, and EfficientNet-B7 to a retrospective, multicenter dataset of 4,271 ultrasound images from 1,243 adults with lab-confirmed effusion types based on Light's criteria. Images were preprocessed and split into training/testing sets with class balancing and patient-level stratification. • **Results:** EfficientNet-B7 outperformed other models (AUC 0.80), while ResNet18 and ResNet50 achieved AUCs of 0.72 and 0.71. Misclassification was higher for transudates across all models • **Conclusions:** Deep learning shows promise in classifying pleural effusions, potentially reducing the need for diagnostic thoracenteses.
18 May 2025	Real-Time Reliability: Unveiling the Accuracy of Pleural Fluid Glucose Measurement with Point-of-Care Arterial Blood Gas Analyzer Technology	Guido Marchi	• **Introduction**: Prompt identification of complicated parapneumonic effusions (CPPE) is critical. While pleural fluid (PF) pH is the gold standard, glucose (PFG) can serve as a surrogate when immediate pH testing is unavailable. This study evaluates point-of-care (POC) arterial blood gas analyzer (ABGA) accuracy versus standard laboratory glucose measurement. • **Methodology**: In 31 adults undergoing thoracentesis, PFG and pH were measured simultaneously using GEM Premier 5000® ABGA, with PF also sent for standard lab testing. Correlation and agreement were assessed via Pearson coefficient and Bland-Altman analysis. • **Results:** ABGA-PFG and Lab-PFG showed strong correlation (r = 0.99). Mean bias was 4.58 mg/dL, indicating close agreement. • **Conclusions:** ABGA provides reliable, rapid PFG measurement, potentially improving emergency CPPE management.

Notable Presentations at ATS 2025
AI / ML (2/30)

Date	Title	Author	Summary
18 May 2025	Improved Prediction of Bronchopulmonary Dysplasia Severity Using Time-series Machine Learning	Divya Chhabra	• **Introduction**: Traditional BPD prediction tools in ELGANs use limited static data and fixed time points, potentially reducing predictive accuracy. This study assesses whether time-series ML models can better predict BPD severity. • **Methodology**: A retrospective cohort of 392 ELGANs was analyzed using LSTM models trained on time-series EMR data, compared to the NRN BPD calculator and linear regression models. Outcomes followed a 5-class BPD severity scale. • **Results:** The LSTM model achieved superior prediction (mean AUC 0.7811; peak 0.8274 at DOL 28) versus the BPD calculator (AUC 0.6782). Key predictive features varied over time. • **Conclusions:** Time-series LSTM models offer more accurate BPD severity prediction, enabling earlier, targeted clinical interventions.
18 May 2025	Automated AI Detection of Interstitial Lung Disease by Computed Tomography (CT) in the COPDGene Trial; Subanalysis and Characteristics of Accurately Detected Cases	Sahithee Batchu	• **Introduction**: Interstitial lung disease (ILD) is often incidentally detected via CT. ScreenDx, an FDA-cleared AI tool, autonomously reviews chest CTs for suspected ILD. This study characterizes ScreenDx-detected true positive cases from the COPDGene cohort. • **Methodology**: ScreenDx analyzed 2,280 COPDGene CT scans with 1.45% ILD prevalence. True positives were those ScreenDx flagged as ILD and were confirmed by study investigators. Demographics, lung function, and health characteristics were compared to the full cohort. • **Results:** True positives had higher median age, more white patients, greater COPD/emphysema history, and lower TLC, FEV_1, and FVC values. FEV_1/FVC, BMI, smoking history, and ethnicity were similar. • **Conclusions:** ScreenDx effectively identifies undiagnosed ILD, correlating with reduced lung function, and may enhance early ILD detection in clinical settings.

Notable Presentations at ATS 2025
AI / ML (3/30)

Date	Title	Author	Summary
18 May 2025	Offering Digital Adherence Support Improves Clinical Outcomes for High-Risk Chronic Obstructive Pulmonary Disease (COPD) Patients With Poor Adherence to Inhaled Therapy	David Price	• **Introduction**: Non-adherence to COPD therapy worsens outcomes; digital tools may improve adherence, but clinical impact remains uncertain. This trial assessed a digital adherence intervention's effect on outcomes in high-risk COPD patients. • **Methodology**: In a 12-month cluster-randomized trial (MAGNIFY), 164 UK primary care centres were allocated to a digital adherence package or usual care. The intervention included EMR-based risk stratification, remote reviews, and electronic inhaler monitoring. Time to treatment failure was the primary outcome. • **Results:** Of 835 eligible patients, 656 accepted the intervention. Digital support reduced treatment failure risk by 23% (HR 0.77; p=0.009) and lowered exacerbation rate by 11% (IRR 0.89; p=0.047). • **Conclusions:** This large, real-world trial confirms that digital adherence interventions significantly improve COPD outcomes in high-risk populations.
18 May 2025	AI-guided Engineering and Generation of Bispecific Antibodies Targeting Both IL13 and TSLP for Chronic Respiratory Diseases	Hao Ran	• **Introduction**: TSLP and IL-13 are key, genetically linked drivers of asthma, COPD, and dermatologic inflammation. Resistance to monotherapies targeting either cytokine limits treatment efficacy. This study presents HXN-1012, a novel bispecific antibody targeting both TSLP and IL-13. • **Methodology**: Anti-TSLP and anti-IL13 antibodies were AI-engineered and validated via multiple in vitro assays. Dual blockade was assessed using co-stimulation models in human PBMCs. • **Results:** HXN-1012, a 2+1 bispecific format, binds two TSLP epitopes and IL-13, maintaining parent-level potency. It outperformed single agents in cytokine-induced PBMC activation assays. • **Conclusions:** HXN-1012 offers a potent dual-cytokine blockade, showing promise for refractory asthma, COPD, and inflammatory skin diseases.

Notable Presentations at ATS 2025
AI / ML (4/30)

Date	Title	Author	Summary
18 May 2025	Self-directed Learning Via AI-assisted Probe Guidance Versus Traditional Expert Guided Ultrasound Training in Novices: A Pilot Study	Jason Livingstone	• **Introduction**: Ultrasound training in internal medicine is limited by expert availability. This pilot study evaluates whether AI-assisted probe guidance is non-inferior to traditional expert-led instruction for novice users acquiring echocardiographic images. • **Methodology**: Ten ultrasound-naive residents underwent a crossover trial using both AI-guided and expert-guided methods to obtain five standard cardiac views. Image quality was independently assessed by blinded reviewers using a validated grading scale. • **Results:** No significant difference in image quality was found between AI and expert-guided images ($p > 0.05$), indicating non-inferiority of AI assistance. Reviewer assessments were consistent across modalities. • **Conclusions:** AI-assisted ultrasound training is a viable, scalable alternative to expert-led instruction for novices.
18 May 2025	A Machine Learning-derived Clinical Score Predicts Passive Ventilation 48 Hours After Initiation of Invasive Mechanical Ventilation	Richard Adrian. Greendyk	• **Introduction**: Prolonged diaphragm inactivity during invasive mechanical ventilation (IMV) worsens outcomes in acute hypoxemic respiratory failure (AHRF). This study aimed to predict passive ventilation risk at 48 hours using a machine learning-derived clinical score. • **Methodology**: Retrospective analysis of 1,186 IMV patients assessed passive ventilation via occluded inspiratory airway pressure (Pocc). A k-folds cross-validated supervised model identified key predictors; model performance was validated using LOOCV AUC. • **Results:** Passive ventilation occurred in 549 patients. Prone positioning, PEEP, P0.1, and FiO_2 were key predictors. The resulting clinical score achieved an AUC of 0.836. • **Conclusions:** This score may guide early identification of patients who could benefit from diaphragmatic neurostimulation.

Notable Presentations at ATS 2025
AI / ML (5/30)

Date	Title	Author	Summary
18 May 2025	Machine Learning Prediction of Disease Severity in Patients With Interstitial Lung Disease Based on Lung Ultrasound and CT Imaging	Thomas Deiss	• **Introduction**: ILD diagnosis traditionally relies on HRCT, PFTs, and clinical data; LUS has shown utility in monitoring disease severity. This study explores AI-based classification of ILD severity using annotated HRCT and LUS features. • **Methodology**: In 35 ILD patients, LUS videos and temporally matched HRCTs and PFTs were collected. Trained investigators annotated imaging features. A Random Forest model was trained on 29 patients and tested on 6, using LUS, HRCT, or combined annotations to predict FVC and DLCO severity • **Results:** Accuracy for FVC prediction was 33% (LUS), 33% (HRCT), and 50% (combined). DLCO prediction accuracy was 50% (LUS), 66% (HRCT), and 66% (combined). • **Conclusions:** Combining LUS and HRCT annotations modestly improves AI prediction of ILD severity; larger datasets are needed for clinical application.
18 May 2025	Clinical Experience With the First FDA-Authorized Artificial Intelligence Tool in Interstitial Lung Disease and Idiopathic Pulmonary Fibrosis	Juan Uribe	• **Introduction**: Fibresolve, FDA-authorized in 2024, is the first AI tool approved for adjunctive diagnosis of IPF, identifying CT patterns beyond typical UIP features. This report details its initial clinical use in undiagnosed ILD cases. • **Methodology**: Data from 23 Fibresolve tests across 11 U.S. sites were analyzed. Patient demographics, lung function, prior diagnostics, and test results were collected via routine clinical workflows. • **Results:**Technical success was 100%, with a positivity rate of 39.1%. Median age was 73 years; 69.6% were never or former smokers. Median ppFVC was 74%. Most patients underwent follow-up CT prior to testing; only one was on antifibrotics. • **Conclusions:** Fibresolve demonstrated robust feasibility and identified IPF-associated patterns in 39% of cases. Further studies will assess its clinical impact.

Notable Presentations at ATS 2025
AI / ML (6/30)

Date	Title	Author	Summary
18 May 2025	Prediction of Prognosis and Time-series Analysis of Prognostic Factors in Acute Exacerbation of Idiopathic Pulmonary Fibrosis Using Machine Learning	Tomonori Ito	• **Introduction**: Prognostication after acute exacerbation (AE) of idiopathic pulmonary fibrosis (IPF) is difficult. This study aimed to develop a machine learning model to predict 90-day prognosis post-AE and identify prognostic markers. • **Methodology**: Retrospective data from 141 AE-IPF patients across two Japanese ILD centers were used. Logistic regression (LR) and random forest (RF) models were trained and validated. Key variables were analyzed using partial dependence plots and time-series methods. • **Results:** The RF model outperformed LR, achieving validation accuracy of 0.81, with high specificity (0.92). Monocyte ratio <2.5% predicted poor prognosis, with a decline observed six months pre-AE. • **Conclusions:** The RF model offers strong prognostic accuracy for AE-IPF. Early monocyte decline may signal impending exacerbation and poor outcomes.
18 May 2025	Evaluation of a Novel Digital Cough Monitor in a Phase 2a Clinical Trial of Chronic Cough	Julia Gomez Camblor	• **Introduction**: Objective cough frequency is vital in evaluating chronic cough therapies. This study compares the established VitaloJak system to the AI-driven SIVA system for continuous cough monitoring in a Phase 2a trial. • **Methodology**: Cough frequency from 15 patients across 77 days was assessed using both systems. SIVA data were valid with ≥8 hours/day wear. Day-to-day variability during the screening phase was also analyzed. • **Results:** SIVA and VitaloJak showed strong agreement (Lin's CCC = 0.959). Intra-patient relative standard deviation was 33.7%, indicating high natural variability in untreated cough. • **Conclusions:** SIVA accurately quantifies cough frequency. Extended monitoring enhances detection of true treatment effects by reducing variability noise.

Notable Presentations at ATS 2025
AI / ML (7/30)

Date	Title	Author	Summary
18 May 2025	Validation of a Digital Stethoscope for Recording and Identification of Pediatric Breath Sounds to Aid in Development of a Machine Learning Algorithm	Jennifer Nestor	• **Introduction**: Pediatric pulmonary auscultation is subjective and variable. This study evaluates the validity of using digital stethoscopes and expert consensus to develop machine learning algorithms for breath sound classification. • **Methodology**: Breath sounds from 10 thoracic locations were recorded in pediatric inpatients using a digital stethoscope and classified in real time. Blinded expert reviewers assessed interrater and intrarater reliability using Cohen's and Fleiss kappa. • **Results:** Of 1,000 planned recordings, 257 were collected. Fleiss kappa among three raters was 0.36; Cohen's kappa ranged from 0.33 to 0.43, indicating fair to moderate agreement. • **Conclusions:** Preliminary data support concurrent validity of digital auscultation. This foundational dataset may enable FDA-cleared AI tools for pediatric respiratory diagnostics.
18 May 2025	Multicenter Comparison of Cerner Sepsis Alerts to an Advanced AI General Early Warning Score for Identifying Sepsis in the Hospital	Dana Edelson	• **Introduction**: While sepsis guidelines advocate rapid antibiotic initiation, optimal alerting remains a challenge. This study compares eCARTv5, a general AI/ML early warning system, with the SIRS-based Cerner sepsis alert for identifying sepsis prior to treatment. • **Methodology**: A retrospective study of 215,823 ED/inpatient encounters across 13 hospitals assessed PPV and sensitivity of both tools within 48 hours before antibiotic administration in sepsis-confirmed cases. • **Results:** eCART flagged 67.4% of sepsis cases versus 24.3% for Cerner, with comparable PPVs (≈68–79%). eCART consistently showed higher sensitivity across all timeframes prior to antibiotics • **Conclusions:** eCARTv5 outperforms the SIRS-based alert, supporting its use as a unified tool for early detection of sepsis and overall deterioration.

Notable Presentations at ATS 2025
AI / ML (8/30)

Date	Title	Author	Summary
18 May 2025	Integrating Deep Learning and CT Radiomics to Predict COPD Mortality: A 10-year Survival Analysis	Muhammad Faizyab Ali Chaudhary	• **Introduction**: COPD remains a leading global cause of death; current prognostic tools like the BODE index inadequately predict all-cause mortality. This study evaluates whether CT-based radiomics with deep learning improves prognostication. • **Methodology**: Radiomics features (n=88) were extracted from inspiratory chest CTs of 9,115 COPDGene participants. A deep Cox proportional hazards model was trained and adjusted for key covariates. Performance was assessed via c-index over 50 bootstraps and compared to BODE. • **Results:** The deep learning model achieved a c-index of 0.76 (95% CI: 0.76–0.77), outperforming BODE (0.72; 95% CI: 0.70–0.73). • **Conclusions:** CT radiomics-based deep survival modeling enhances 10-year mortality prediction in COPD beyond traditional tools.
18 May 2025	Development and Validation of Machine-learned Algorithms for Diagnosing ASMD Among Patients With Unexplained ILD	Imre Noth	• **Introduction**: ASMD is a rare, progressive lysosomal storage disease frequently presenting with ILD and often misdiagnosed. This study aimed to develop decision tree (DT) models to identify potential ASMD cases among patients with unexplained ILD. • **Methodology**: Two DTs were trained on EHR data using 31 ASMD cases and 620 controls, then validated on large external datasets. DT#1 used lab data and neurodegeneration; DT#2 used clinical features only. • **Results:** DT#1 showed higher accuracy in training (sensitivity 80.7%, specificity 99.6%) than DT#2. External validation performance declined (DT#1 sensitivity 20.6%). DT#1 flagged 1.9–5.3% of unexplained ILD patients ≤50 years as possible ASMD. • **Conclusions:** While promising, DT performance is limited by rare disease data constraints; further refinement and broader validation are needed.

Notable Presentations at ATS 2025
AI / ML (9/30)

Date	Title	Author	Summary
18 May 2025	Developing a Deep Learning Algorithm to Quantify Pulmonary Vascular Remodeling in a Pre-clinical Model of Pulmonary Arterial Hypertension and Comparing Performance to Formal Histopathological Assessment	Thea Joseph	• **Introduction**: PAH is a rare arteriopathy marked by vascular remodeling; histologic evaluation in preclinical models is essential but subjective and inconsistent. This study aimed to develop a deep learning model for automated, objective pulmonary arteriole assessment in the SuHx rat model. • **Methodology**: DeepLabV3+ was trained on annotated Masson Trichrome-stained lung sections (SuHx: n=15, control: n=11) to classify arteriole walls, airways, and background. Validation used independent sections (SuHx: n=3, control: n=2). • **Results:** The model showed stronger performance in SuHx tissue; false positives often reflected valid arterioles omitted by design constraints. Dice scores exceeded 0.7 in key regions. • **Conclusions:** Deep learning enables feasible lung vessel segmentation in PAH models; refining criteria and expanding validation data will improve reliability and generalizability.
19 May 2025	Quantitative CT and Machine Learning-derived Hyper- and Hypo- Functional Regions Associate Heterogeneous Ventilation and Reduced Deformation With PFT and Smoking in COPD	Yonghyun Lee	• **Introduction**: COPD alters regional lung function, but quantifying local impairments is complex due to natural anatomical variability. This study uses qCT and machine learning to define individual-specific normal ranges for lung deformation and ventilation to identify functional excess or deficiency. • **Methodology**: qCT features (Jacobian, Δy, Δz, RRAVC) were extracted from 79 COPD patients and 26 healthy controls. A LightGBM model predicted normal local function; deviations beyond ±1 SD defined hyper- and hypo-function. Correlations with PFTs and smoking history were analyzed. • **Results:** COPD patients showed widespread hypo-deformation and both hyper/hypo-ventilation. These abnormalities strongly correlated with FEV1%, FEV1/FVC, FEF25–75%, and smoking pack-years (all $p<0.001$). • **Conclusions:** Machine learning-enhanced qCT metrics sensitively quantify COPD-related regional lung dysfunction and correlate robustly with clinical severity and smoking burden.

Notable Presentations at ATS 2025
AI / ML (10/30)

Date	Title	Author	Summary
19 May 2025	Research on the Development of a Real-time Clinical Decision Support System Utilizing Artificial Intelligence for the Analysis of Clinical Phenotypes, Quantitative Grading, and Prognostic Prediction in Combined Pulmonary Fibrosis and Emphysema Syndrome	Jinhe Yuan	• **Introduction**: CPFE is frequently underdiagnosed and lacks accurate assessment tools despite its poor prognosis. This study introduces an AI-based system to automatically identify and quantify fibrosis, emphysema, and thick-walled cysts in chest CT scans. • **Methodology**: CT data from 100 CPFE patients were segmented and annotated using CVAT and a TransUnet deep learning model. The model quantified disease-specific patterns, and clustering was used to correlate imaging phenotypes with clinical outcomes. • **Results:** In the test set, the model achieved Dice scores of 0.84 (fibrosis), 0.76 (emphysema), and 0.87 (cysts), with strong recall and acceptable HD metrics. Lesion progression correlated with pulmonary decline and mortality. • **Conclusions:** This AI model enables automated, accurate CPFE assessment, supporting earlier diagnosis, phenotypic stratification, and prognosis prediction.
19 May 2025	Machine Learning Reveals the Clinical Features of Eosinophilic Acute Exacerbation of Chronic Obstructive Pulmonary Disease: A Multicenter Cross-Sectional Study	Tao Zhu	• **Introduction**: COPD is a heterogeneous disease; blood eosinophils (EOS) are an emerging biomarker for treatment guidance. This study uses machine learning to characterize clinical traits and risk factors of eosinophilic AECOPD (EOS-AECOPD). • **Methodology**: From 1,360 AECOPD patients, 806 EOS-AECOPD (EOS ≥ 300 cells/μL) and 188 NEOS-AECOPD were analyzed. Five ML models identified predictive variables, followed by logistic regression and validation via nomogram, ROC, calibration, and decision curves. • **Results:** Eight clinical features were independently associated with EOS-AECOPD. Model 2 ($P < 0.1$ variables) outperformed Model 1 in prediction accuracy. EOS-AECOPD was linked to milder disease and possible viral etiology. • **Conclusions:** EOS-AECOPD is less severe than NEOS-AECOPD and may reflect viral-driven exacerbations. ML-based profiling supports personalized COPD management.

Notable Presentations at ATS 2025
AI / ML (11/30)

Date	Title	Author	Summary
19 May 2025	A Multicentre Study to Evaluate the Diagnostic Accuracy of a CAD AI Software Decxpert in Detecting COPD on Chest X-Rays	Saumya Shukla	• **Introduction**: COPD causes ~3 million deaths annually, with early detection essential to improving outcomes. This study evaluates an AI-based CAD system (DecXpert) for COPD detection on chest X-rays, compared to spirometry. • **Methodology**: In a prospective study of 500 patients (250 with COPD, 250 without), DecXpert's diagnostic performance was assessed via sensitivity, specificity, and agreement with spirometry, using features like hyperinflation and bullae. • **Results:** The AI-CAD system achieved 80% sensitivity, 85% specificity, and strong concordance with spirometry ($\kappa = 0.80$). • **Conclusions:** DecXpert shows high diagnostic accuracy for COPD on CXR and could enhance early detection, particularly in low-resource settings.
19 May 2025	A Pilot Feasibility Study of LAMFit: A Remote, Community-based Digital Exercise Program for Lymphangioleiomyomatosis	Claire E. Child	• **Introduction**: LAM patients face limited access to pulmonary rehabilitation; this study assessed the safety and feasibility of LAMFit, a fully-remote, community-based digital fitness program. • **Methodology**: Twenty-five women with LAM (mean age 52.6) completed a 12-week aerobic/resistance program with goal setting, wearable monitoring, and virtual assessments (6MWT, ATAQ-LAM, MFI-20). • **Results:** Adherence was high (81% aerobic; 73% MVPA goal). Significant improvements were observed in 6MWT (+37 m, p=0.001), dyspnea, HRQoL, and fatigue scores. No adverse events occurred; all participants opted to continue. • **Conclusions:** LAMFit is a safe, effective, and scalable digital alternative to center-based rehab, supporting broader adoption for LAM patients.

Notable Presentations at ATS 2025
AI / ML (12/30)

Date	Title	Author	Summary
19 May 2025	Analysis of Patients With COPD and Pulmonary Hypertension (COPD-PH) Phenotypes Using Artificial Intelligence (AI) Based Software of CT Chest Imaging	Ahmad Raza	• **Introduction**: AI-driven quantitative CT offers novel insights into pulmonary vasculature in COPD-associated pulmonary hypertension (COPD-PH), which varies by clinical phenotype. • **Methodology**: In 45 COPD-PH patients confirmed by right heart catheterization, CT-based vascular (BV5, TVV) and parenchymal (emphysema%) metrics were compared across three phenotypes: vascular, parenchymal, and mixed. • **Results:** The vascular phenotype showed significantly lower BV5 (64.1 mm^2) and TVV (126.1 cm^3) than the parenchymal phenotype (BV5: 107.2 mm^2; TVV: 193.8 cm^3; $p<0.001$), and less emphysema (13.9% vs. 26.6%). • **Conclusions:** Quantitative CT reveals distinct structural profiles across COPD-PH phenotypes, supporting phenotype-specific imaging biomarkers for targeted evaluation.
19 May 2025	Diagnostic Accuracy of an Artificial Intelligence (AI) Based Quantitative CT Scan Software in Differentiating Various Phenotypes of COPD-PH	Ahmad Raza	• **Introduction**: COPD-associated pulmonary hypertension (COPD-PH) presents in distinct phenotypes with differing clinical and imaging characteristics. This study evaluates whether quantitative CT (qCT) can accurately differentiate these phenotypes. • **Methodology**: In 45 COPD-PH patients confirmed by right heart catheterization, qCT software (VIDA Lung Print) quantified vascular and parenchymal metrics. ROC analysis assessed BV5/TVV ratio for predicting PVR > 5 WU and emphysema percentage for FEV1 < 50%. • **Results:** BV5/TVV ratio strongly predicted elevated PVR (AUC = 0.94; cutoff = 0.48; $p<0.001$). Emphysema percentage predicted severe obstruction (AUC = 0.74; $p=0.001$). qCT showed high specificity (≥86%) but lower sensitivity across phenotypes. • **Conclusions:** qCT-derived metrics effectively differentiate COPD-PH phenotypes, especially for vascular involvement. Broader validation is needed to confirm diagnostic utility.

Notable Presentations at ATS 2025
AI / ML (13/30)

Date	Title	Author	Summary
19 May 2025	Heart Failure-induced Changes in Lungs: Insights From AI-augmented Quantitative Analysis of Photon-counting Computer Tomography	Dominik Jenca	• **Introduction**: Heart failure with reduced ejection fraction (HFrEF) induces structural lung changes contributing to type 2 pulmonary hypertension (PH), yet underlying mechanisms remain unclear. This study used AI-based quantitative CT (qCT) to characterize pulmonary alterations. • **Methodology**: 153 subjects (124 HFrEF, 29 controls) without primary lung disease underwent imaging and hemodynamic assessment. qCT (VIDA Diagnostics) quantified lung volumes, densities, textures, and vessel sizes. • **Results:** HFrEF patients showed higher lung density, reduced small vessel volume (<2 mm²), and increased ground-glass opacities (GGO) and reticulations versus controls (all p<0.001). GGO and reticulation mass correlated with mPAP and PCWP. • **Conclusions:** qCT reveals distinct lung structural and vascular changes in HFrEF, with GGO, vessel pruning, and density shifts as key markers linked to PH severity.
19 May 2025	Novel Deep Learning Predictability Models Examine Impact of Antibiotic Administration Per Surviving Sepsis Campaign Guidelines	Allison Donahue	• **Introduction**: The 2021 SSC guidelines advocate stratified antibiotic timing for sepsis, yet real-world impact remains unclear. This study used deep learning to prospectively classify patients and assess mortality by timing of antibiotic administration. • **Methodology**: In 28,108 ED patients meeting Sepsis-3 criteria, COMPOSER and Shock-Net AI models stratified individuals into four sepsis/shock groups. Time to antibiotics and mortality were analyzed per SSC-defined risk categories. • **Results:** In shock-absent groups, median antibiotic times were longer (3–5 h) with low mortality (1.87–3.68%). In shock-present groups, faster treatment (<4 h) correlated with higher mortality (14.7–19.2%). • **Conclusions:** Shock-absent patients may safely tolerate delayed antibiotics, supporting guideline-aligned, risk-based timing to optimize care and reduce overtreatment.

Notable Presentations at ATS 2025
AI / ML (14/30)

Date	Title	Author	Summary
19 May 2025	Early Diagnosis of OSAS From Cranial Features: Based on an Facial Recognition AI Model	Xiaoyan Yao	• **Introduction**: OSAS is a common, high-risk disorder linked to obesity, age, and lifestyle factors, yet current diagnostics like polysomnography are costly, time-consuming, and error-prone. • **Methodology**: Data from 200 patients with snoring symptoms—including facial images and sleep studies—were used to train an AI model for OSAS detection. Patients were categorized into mild, moderate, or severe OSAS. • **Results:** The AI model achieved 74% sensitivity and 88% specificity, outperforming physician assessment based on facial features. • **Conclusions:** This image-based AI system offers a non-invasive, efficient OSAS screening tool, with potential to improve early diagnosis and reduce healthcare burden.
19 May 2025	Using Generative AI to Reliably Retrieve and Summarize Symptoms From Electronic Health Records in Sleep Apnea	Sajila Wickramaratne	• **Introduction**: Sleep apnea symptom data are often embedded in unstructured EHR clinical notes. This study evaluated whether large language models (LLMs) can accurately extract and structure key symptoms relevant to sleep apnea phenotyping. • **Methodology**: Clinical notes from 64 suspected sleep apnea patients were processed via OCR and anonymized. Llama 3.1 (405B) was prompted to extract general and 19 specific symptoms, with performance compared across smaller models and validated against expert annotations. • **Results:** Llama 3.1 405B produced structured, source-referenced outputs with high accuracy, outperforming smaller models. Limitations included difficulty with incomplete notes and complex terms. • **Conclusions:** Generative AI can reliably extract sleep apnea symptom clusters from clinical notes, supporting future automation of patient phenotyping and diagnosis.

Notable Presentations at ATS 2025
AI / ML (15/30)

Date	Title	Author	Summary
19 May 2025	Personalization of AI-enabled PAP Therapy (CMAP®) Algorithm Shows Improvement in Prediction of Respiratory Events and Preliminary Success in Further Reduction of Therapy Pressure	Hamed Hanafi	• **Introduction**: OSA affects ~900 million globally, yet PAP adherence remains poor. High pressure discomfort is a major barrier. cMAP®, an AI-driven pressure modulation system, reduces pressure while preserving efficacy. This study explores personalizing cMAP® via transfer learning to further improve performance. • **Methodology**: Using prior data from 45 long-term PAP users, personalized cMAP® models were trained via transfer learning and tested against general cMAP® using F1-score for event detection. Two patients trialed personalized cMAP® for 7 nights to assess pressure and AHI outcomes. • **Results:** Personalization improved event detection by 38% ($p<0.001$). In pilot deployment, therapy pressures dropped significantly while maintaining AHI <5 events/hr. • **Conclusions:** Personalized AI-based PAP therapy enhances comfort without sacrificing efficacy, supporting individualized OSA management.
19 May 2025	Artificial Intelligence (AI) and Asthma	Sarang Patil	• **Introduction**: Artificial intelligence (AI) offers promising potential for enhancing early detection and management of asthma exacerbations. This study evaluates AI's role in predictive diagnosis and its cost-effectiveness in asthmatic patients. • **Methodology**: In this 6-month study, 100 asthmatic patients (≥18 years) recorded PEFR data twice daily and shared geolocation. An Artificial Neural Network analyzed PEFR and climate data to predict exacerbation risk. • **Results:** AI interventions led to early alerts in 40 patients, inhaler adjustments in 50, and only 5 hospitalizations. Exacerbations were reduced by ~60%, significantly lowering healthcare costs. • **Conclusions:** AI-enabled monitoring improves asthma control, reduces exacerbations, and enhances cost-effective healthcare delivery.

Notable Presentations at ATS 2025
AI / ML (16/30)

Date	Title	Author	Summary
19 May 2025	A Pilot Study of Pulmonologists' Receptivity to Artificial Intelligence Use	Thomas Philip. Meehan	• **Introduction**: AI holds promise in transforming cancer care, but adoption is hindered by a trust gap. This study assesses pulmonologists' perceptions of AI use in lung cancer management through a pilot survey. • **Methodology**: An AI trustworthiness-based survey, including clinical vignettes, was administered to pulmonology fellows and faculty (N=24). Responses were analyzed using descriptive statistics. • **Results:** While 66.7% used AI in daily life, 79.2% had not applied it clinically. Key concerns included transparency, fairness, and safety. Despite overall caution, 95.8% would use AI for imaging/histology support, but most rejected AI-guided decisions against invasive staging. • **Conclusions:** Pulmonologists show cautious openness to AI, with strong reservations around explainability and safety. Broader validation is ongoing via a national VA survey.
19 May 2025	Machine Learning Predicts Critical Illness in Cirrhosis: The Role of Laboratory Assay at the Time of Admission	Patricia Riano Rivero	• **Introduction**: Cirrhosis frequently leads to hospitalization, with risk of progression to critical illness (PCI). Traditional scores like MELD and FIB-4 lack precision in predicting acute decompensation due to limited incorporation of comorbid complexity. • **Methodology**: In 3,435 cirrhosis inpatients stratified by severity (mild vs. moderate-severe), demographics, labs, and administrative data were analyzed via LASSO regression and logistic modeling. PCI (ICU admission, hospice discharge, or death within 28 days) was the primary outcome. • **Results:** PCI occurred in 18% of mild and 24% of moderate-severe patients. MELD and FIB-4 alone were insufficient; additional lab markers significantly improved prediction in most subgroups. • **Conclusions:** A multi-modal machine learning model outperforms conventional scores for PCI prediction in cirrhosis, supporting more personalized and timely care strategies.

Notable Presentations at ATS 2025
AI / ML (17/30)

Date	Title	Author	Summary
19 May 2025	AI-assisted Lung Cancer Screening: Results From REALITY, A Pivotal Validation Study of an AI/ML-based Algorithm	Anil Vachani	• **Introduction**: Lung cancer remains the leading cause of cancer death in the U.S., but AI-enhanced screening may improve early-stage detection and reduce mortality. This study validates an AI/ML algorithm for detecting and characterizing pulmonary nodules on LDCT. • **Methodology**: A retrospective multicenter study of 1,147 patients meeting USPSTF criteria was conducted across the U.S. and EU. AI performance was benchmarked against histopathology or ≥12-month stability, with metrics calculated at the maximum Youden Index. • **Results:** The AI achieved patient-level AUC of 0.904, sensitivity 80.1%, specificity 86.6%. Sensitivity for Stage I cancers and nodules <10 mm was 80.4% and 91.4%, respectively. FROC sensitivity reached 92.6% with 0.801 FP/scan. • **Conclusions:** This AI/ML tool reliably detects and characterizes lung nodules across sizes and stages, showing strong potential to enhance early lung cancer diagnosis and management.
19 May 2025	Machine Learning Identifies Seven Pneumonia Subphenotypes Based on Pulmonary Histopathology	Amulya Shastry	• **Introduction**: Pneumonia elicits diverse immune and pathological lung responses. This study aimed to define histopathologic subphenotypes in human pneumonia and evaluate how well mouse models reflect this heterogeneity. • **Methodology**: Lung tissue from 276 elderly humans with pneumonia and 100 mice infected with bacterial or viral pathogens was scored across 18 histologic features. Immune cell profiling (mfIHC) and machine learning were used to define and compare subphenotypes. • **Results:** Seven distinct human pneumonia subphenotypes were identified, each with unique histologic and immune profiles. Mouse models captured several human-like clusters, though some human features (e.g., abscess, granuloma) were absent in mice. • **Conclusions:** Pneumonia comprises histologically distinct subphenotypes. While mouse models replicate key patterns, refinement is needed to fully model human pathological diversity.

Notable Presentations at ATS 2025
AI / ML (18/30)

Date	Title	Author	Summary
20 May 2025	Dose-Dependent Change of Inhaled Pirfenidone Seen in Lung Volume and Fibrosis Quantification in Patients With IPF: A Deep Learning Image-Based Analysis of Data From the ATLAS Phase 1b Trial	Elliott Bussell	• **Introduction**: The ATLAS Phase 1b trial evaluated inhaled pirfenidone (AP01) in IPF patients intolerant or unwilling to use oral antifibrotics. This analysis used AI-derived imaging biomarkers to assess dose-dependent effects on lung structure and fibrosis progression. • **Methodology**: HRCTs were analyzed using Qureight's AI platform to quantify lung, airway, vessel, and fibrosis volumes. Patients were randomized to 50 mg QD or 100 mg BID AP01. Changes were assessed via t-tests and regression analyses. • **Results:** At 36 weeks, the 100 mg group showed significantly less lung volume loss (+25 ml vs. −413 ml, p=0.043) and reduced fibrosis progression at 24 weeks (−41.5 ml vs. +19.3 ml, p=0.027). Trends toward lower fibrosis extent progression were observed. • **Conclusions:** AI-based imaging confirmed a dose-dependent effect of inhaled AP01 in IPF, supporting its potential to reduce fibrosis progression and preserve lung volume.
20 May 2025	Deep Learning Quantitative Computed Tomography Analysis in the Australian Idiopathic Pulmonary Fibrosis Registry	John Mackintosh	• **Introduction**: IPF is a progressive lung disease with variable outcomes; precise prognostication remains difficult. This study applied validated deep learning algorithms to baseline CTs from the Australian IPF Registry to quantify imaging biomarkers and assess their prognostic value. • **Methodology**: AI-derived lung, airway, vascular, and fibrosis volumes were analyzed in 282 IPF patients. Associations with lung function, 12-month progression, and transplant-free survival were evaluated, including stratification by antifibrotic use and disease severity. • **Results:** Fibrosis, airway, and vascular volumes negatively correlated with FVC% and DLCO%. Fibrosis and airway volumes independently predicted transplant-free survival (HR = 1.03 and 3.16, p<0.001). Prognostic relevance varied by FVC threshold. • **Conclusions:** Deep learning-based CT biomarkers are strong, independent predictors of IPF outcomes. Airway volume is more prognostic in advanced disease, while fibrosis burden predicts outcomes in early disease.

Notable Presentations at ATS 2025
AI / ML (19/30)

Date	Title	Author	Summary
20 May 2025	Quantitative in Vivo Microscopic Assessment and Computer Aided Diagnosis of Early Interstitial Lung Disease Using Artificial Intelligence Based Endobronchial Optical Coherence Tomography	Sreyankar Nandy	• **Introduction**: EB-OCT offers high-resolution imaging to detect early interstitial lung disease (ILD), but manual interpretation is time-intensive. This study developed a deep learning-based AI framework for rapid, quantitative EB-OCT analysis and computer-aided diagnosis. • **Methodology**: EB-OCT datasets from ILD and control subjects were manually annotated for key features (e.g., fibrosis, honeycombing). A multiclass CNN was trained for 2D segmentation, with performance validated against ground truth and extended to 3D feature mapping. Pathologists reviewed AI-derived 3D maps to classify UIP vs. non-UIP ILD. • **Results:** The AI model achieved ≥0.9 balanced accuracy for all ILD features. AI-based diagnosis showed 100% sensitivity/specificity for UIP and clinical IPF, while reducing training time by 75% and interpretation time by 88%. • **Conclusions:** This AI-driven EB-OCT analysis framework enables rapid, accurate ILD diagnosis and quantitative assessment, supporting its clinical integration for early disease detection and monitoring.
20 May 2025	Integrating Advanced Computational and Artificial Intelligence-based Methodologies for the Discovery of Ubiquitin Specific Protease 21 (USP21) Inhibitors as Lung Cancer Therapeutics: An FDA-approved and Investigational Drug Repurposing Study	Tarek Kanan	• **Introduction**: USP21 is overexpressed in NSCLC and stabilizes PD-L1, promoting immune evasion. Targeting the USP21/PD-L1 axis is a novel therapeutic strategy to overcome treatment resistance. • **Methodology**: A machine learning-enhanced structural approach using Phenix-AlphaFold and DynamicBind refined the USP21 structure. 6,877 FDA-approved and investigational compounds were screened via docking, followed by MD simulations and MM/GBSA binding energy calculations to identify top candidates. • **Results:** 150 ligands showed strong binding (≤ −7.5 kcal/mol). Top hits included anti-infectives, hormones, and antineoplastics. Eighteen molecules, including all antineoplastics with ΔG < −70.6 kcal/mol, were selected for 100 ns MD simulation and further in vitro testing. • **Conclusions:** This integrated repurposing strategy identified promising USP21-targeting candidates, offering a cost-effective approach to advance NSCLC therapeutics and promote health equity.

Notable Presentations at ATS 2025
AI / ML (20/30)

Date	Title	Author	Summary
20 May 2025	Deep Learning Predictions of T Cell Receptor Epitope Affinity in COVID-19 Inform Repertoire Biases Associated With Disease Severity	Christopher Vincent. Cosgriff	• **Introduction**: COVID-19 presents with diverse clinical outcomes. TCR-epitope interactions influence immune responses, and suboptimal TCR selection may underlie severe disease. This study used deep learning to explore TCR affinities and their association with COVID-19 severity. • **Methodology**: In 302 PCR-confirmed COVID-19 patients, single-cell RNA-seq and TCR profiling were analyzed using TCRconv to predict epitope affinities. Associations between TCRβ V/J usage and disease severity were modeled, adjusting for age, sex, and infection status. • **Results:** Of 85,355 TCRs, 18% were predicted to target SARS-CoV-2, with 548 high-confidence sequences. Among 78 V/J combinations linked to severity, only 38.5% targeted SARS-CoV-2. TRBJ genes drove epitope specificity, while TRBV5 genes were most strongly associated with severe disease. • **Conclusions:** COVID-19 severity correlates with TCR repertoire features, particularly TRBV5-driven responses with poor epitope specificity, implicating suboptimal TCR selection in worse outcomes.
20 May 2025	A Machine Learning-based Approach for Predicting Pulmonary Function Testing Parameters Using Spectral Oscillometry	Seyed Nabavi	• **Introduction**: Full PFTs, including plethysmography, are the gold standard for assessing hyperinflation and gas trapping in COPD but are resource-intensive. Oscillometry offers a simpler alternative, though its diagnostic equivalence remains underexplored. • **Methodology**: In 17 GOLD 1 and 4 COPD patients, spectral oscillometry parameters (R5, R19, X5, AX) and full PFTs (TLC, RV/TLC) were collected. A convolutional neural network (CNN) was trained to predict hyperinflation and gas trapping. • **Results:** The CNN model, optimized with demographic data, predicted TLC and RV/TLC with 92% and 88% accuracy, respectively. • **Conclusions:** Oscillometry combined with AI can accurately estimate lung hyperinflation and gas trapping, offering a viable, less burdensome alternative to full PFTs.

Notable Presentations at ATS 2025
AI / ML (21/30)

Date	Title	Author	Summary
20 May 2025	Evaluation of the Impact of a Digital Peak Flow Meter-linked Asthma App on Adherence to Peak Flow Measurement	Yuma Sakai	• **Introduction**: Peak expiratory flow (PEF) monitoring aids asthma management, but adherence to traditional methods is poor. This study assessed whether digital PEF meters (DPEFM) paired with smartphone apps improve adherence and clinical correlation. • **Methodology**: In a crossover study, 80 asthma patients used both conventional PEF meters (CPEFM) with paper diaries and DPEFMs. Adherence, preferences, and correlations with spirometry and asthma control (ACQ) were evaluated. • **Results:** DPEFM use significantly increased PEF adherence. Ninety percent of patients preferred DPEFM, which showed stronger correlation with spirometry and ACQ scores, capturing meaningful daily variability. • **Conclusions:** DPEFMs enhance adherence and clinical relevance in asthma management, supporting their broader integration into care.
20 May 2025	Machine Learning Driven Prediction of Chronic Respiratory Failure in COPD Using Multiple Biomarkers: A Bioprognostic Index	Pranai Tandon	• **Introduction**: COPD has a heterogeneous clinical course, and existing tools like GOLD grades and FEV1 inadequately predict long-term patient-centered outcomes. This study assessed whether a machine learning (ML) model integrating plasma biomarkers improves prognostication. • **Methodology**: In 931 COPD patients from the Mount Sinai BioMe Biobank, a Random Forest classifier was trained to predict a composite endpoint (oxygen/NIPPV dependence, tracheostomy, or nursing home placement) using clinical data and a custom biomarker panel. • **Results:** The ML model achieved a test AUC of 0.70, outperforming GOLD Grade (AUC 0.59) and FEV1 (AUC 0.63). Eight of the top ten predictive features were biomarkers. • **Conclusions:** ML integrating plasma biomarkers enhances prediction of chronic respiratory failure outcomes in COPD, offering a path toward personalized risk stratification.

Notable Presentations at ATS 2025
AI / ML (22/30)

Date	Title	Author	Summary
20 May 2025	Development of Fully Automated 3D Pectoralis Muscle Measurements on Computed Tomography Imaging for Chronic Obstructive Pulmonary Disease Using Deep Learning	Daniel Genkin BEng	• **Introduction**: Pectoralis muscle area (PMA) on CT is a surrogate for muscle loss in COPD, but single-slice 2D measures have anatomical limitations. This study developed a deep learning-based 3D pectoralis muscle volume (PMV) segmentation model to evaluate its utility versus PMA. • **Methodology**: A 3D U-Net model was trained on 96 CT scans and externally validated on COPD cohorts (N=1325 total). Associations of PMV and PMA with FEV_1 and $V'O_2peak$ were assessed using adjusted regression models. • **Results:** The model achieved high segmentation accuracy (DSC ≥0.92). PMV correlated more strongly than PMA with FEV_1 ($Radj^2$=0.58 vs. 0.56) and $V'O_2peak$ ($Radj^2$=0.57 vs. 0.55; $p<0.05$). • **Conclusions:** Automated PMV is a robust, superior biomarker of COPD-related muscle loss and functional impairment, outperforming traditional PMA measurements.
20 May 2025	Improvement in Deep Learning for RALE Score Prediction Through Annotations, Data Science and Computer Vision	Ellen Hughes	• **Introduction**: The RALE score quantifies lung edema on chest x-rays (CXR) but is underused clinically due to its manual scoring burden. This study evaluated deep learning (DL) models for automated RALE scoring, incorporating data science and computer vision (CV) preprocessing. • **Methodology**: A dataset of 5,690 annotated CXRs was used to train three CNN architectures—Siamese CNN, QR-CNN, and QC-CNN—with and without CV preprocessing. Models predicted total and quadrant-level RALE scores. • **Results:** Without preprocessing, ICC ranged 0.74–0.76. With CV preprocessing, the Siamese CNN achieved excellent agreement with physicians (ICC=0.85, MSE=31.78). • **Conclusions:** DL with CV preprocessing enables accurate, automated RALE scoring, supporting scalable clinical use in assessing radiographic edema.

Notable Presentations at ATS 2025
AI / ML (23/30)

Date	Title	Author	Summary
20 May 2025	Evaluation of User Attitudes Affecting Adoption of a Machine Learning Decision Support Tool for Ventilator Weaning	Aaron Shpiner	• **Introduction**: Adoption of machine learning (ML) tools in critical care depends on clinician attitudes. This study assessed end-user perceptions of a planned ML ventilator liberation tool using the Technology Acceptance Model 2 (TAM2). • **Methodology**: A 14-item TAM2-based survey was completed by 51 MICU staff (21 RN, 10 RT, 20 MD/APP). Domains included Perceived Usefulness (PU), Ease of Use (PEOU), Subjective Norms (SN), Output Quality (OQ), and Behavior Intention to Use (BIU). • **Results:** RNs showed higher BIU than MD/APPs (5.60 vs. 5.03, p=0.03). Key BIU drivers were PU (β=0.54, p=0.001) and SN (β=0.23, p=0.02); OQ was non-significant. • **Conclusions:** Early perceptions were favorable. PU and SN drove BIU, highlighting the importance of peer influence and usability in ML adoption.
20 May 2025	Utilizing Artificial Intelligence for Enhanced Interpretation of Endotracheal Tube Position in Chest Radiographs	Ming-Ju Tsai	• **Introduction**: Timely identification of endotracheal tube (ETT) malposition on chest radiographs in the ICU is often delayed due to competing diagnostic priorities. • **Methodology**: Using 2,278 training and 253 test chest radiographs, a YOLOv5-based AI model was developed to detect the carina and ETT, measuring tip-to-carina distance and flagging suboptimal placements (<3 cm or >5 cm). External validation was performed by critical care physicians. • **Results:** The model achieved high performance (accuracy: 96.2%, mAP@50: 96.6%) and 90.4% accuracy in external validation. Integration reduced ETT malposition duration from 3.00 to 2.00 days • **Conclusions:** This AI model enhances ICU safety by enabling early detection and correction of ETT malpositions.

Notable Presentations at ATS 2025
AI / ML (24/30)

Date	Title	Author	Summary
20 May 2025	Lung Ultrasound-based Artificial Intelligence Prediction of Congestive Heart Failure Readmission	Laura Hutchins	• **Introduction**: Congestive heart failure (CHF) is a major health burden, with persistent volume overload at discharge contributing to readmissions. Lung ultrasound (LUS) is valuable for volume assessment but remains operator-dependent. • **Methodology**: In 25 hospitalized CHF patients, serial LUS imaging and clinical data were collected over 72 hours. Expert annotations of LUS features were used to train CNN-based AI models on 17 patients; 8 patients formed the test set to evaluate AI prediction of 30-day readmissions. • **Results:** Models using either clinical or LUS annotation data achieved 75% accuracy, while the combined model improved accuracy to 87.5% and achieved 100% recall for readmissions. • **Conclusions:** AI integrating LUS and clinical data shows promise in predicting early CHF readmissions, supporting personalized care to reduce hospital recidivism.
20 May 2025	A Temporal Deep Learning Algorithm for Predicting Extubation Failures in Critical Care Patients	Jiawei Shen	• **Introduction**: Predicting extubation failure is crucial for improving outcomes in critical care. Traditional models based on static clinical data fail to capture the dynamic nature of patients' conditions. • **Methodology**: The study utilized the MIMIC-III dataset to train the TrAcE deep learning model, incorporating both static and temporal data with a 1-hour resolution. The model was validated internally and externally using the PKUPH dataset. The Captum algorithm was applied for model interpretation. • **Results:** TrAcE outperformed other models, achieving AUROCs of 0.823 and 0.859 in validation and test sets, respectively. Temporal feature contributions varied over time, enhancing the predictive power. • **Conclusions:** TrAcE, by integrating static and temporal data, improves prediction accuracy for extubation failure and supports real-time clinical decision-making.

Notable Presentations at ATS 2025
AI / ML (25/30)

Date	Title	Author	Summary
20 May 2025	Evaluation of a Novel Mandibular Advancement Splint Sensor Technology for Nightly Monitoring of Compliance and Efficacy	Anna Mohammadieh	• **Introduction**: Current oral appliance therapy for OSA lacks access to nightly therapy data, unlike CPAP. This pilot study aims to evaluate a novel intra-oral sensory array embedded within a mandibular advancement splint (MAS) device for monitoring OSA therapy. • **Methodology**: Patients on MAS therapy underwent two polysomnography (PSG) studies, with and without mandibular protrusion, while using the Rest Assure® sensor device. The study assessed correlations in apnoea hypopnea index (AHI), total sleep time (TST), compliance, and sleep position between PSG and the device. • **Results:** High correlations were found between Rest Assure and PSG for AHI (r=0.74-0.81), TST (r=0.8), and sleep position. Both methods detected a significant AHI reduction with mandibular advancement, with no significant difference between the two. • **Conclusions:** Rest Assure demonstrated high accuracy in estimating critical therapy data, offering potential to improve oral appliance therapy acceptance. Further validation is needed with a larger cohort and longer follow-up.
20 May 2025	Machine Learning-Assisted Metabolomics for Developing Predictive Models of 1-Year Overall Survival in Lung Cancer Patients With Malignant Pleural Effusion	Sufei Wang	• **Introduction**: Malignant pleural effusion (MPE) is a common complication of lung cancer with poor prognosis. Accurate prediction of survival remains challenging. This study aimed to develop machine learning models using metabolomics to diagnose MPE and predict 1-year mortality in affected patients. • **Methodology**: The study involved 140 participants (85 with MPE, 55 with benign pleural effusion, BPE) in the discovery cohort and 69 in the independent validation cohort. Machine learning algorithms (DL, DRF, GBM, GLM, XGBoost, XRT) were employed to identify metabolites associated with MPE diagnosis and mortality. Stacked ensemble models were created for validation. • **Results:** 71 metabolites differentiated MPE from BPE, with key metabolites like linoleic acid and citric acid. 26 metabolites were associated with survival, including palmitic acid (PA), which showed therapeutic potential by inhibiting lung cancer cell proliferation and migration. • **Conclusions:** Machine learning-based metabolomics effectively differentiates MPE from BPE and predicts survival outcomes. Targeting PA metabolism may offer a promising therapeutic approach for lung cancer patients with MPE.

Notable Presentations at ATS 2025
AI / ML (26/30)

Date	Title	Author	Summary
20 May 2025	Large Language Model-Derived Digital Twins for Predicting Medication Treatments in the Intensive Care Unit	Majid Afshar	• **Introduction**: Digital twins, computational representations of physical entities, have the potential to enhance ICU decision-making by integrating real-time data. This study aims to develop medical digital twins using a large language model (LLM) trained on ICU physician notes to improve treatment recommendations. • **Methodology**: Discharge summaries from the MIMIC-III dataset were used, focusing on medical, cardiothoracic, and surgical ICU notes. A supervised fine-tuning (SFT) approach with Low-Rank Adapters (LoRA) trained the LLaMA-3 LLM to predict masked medications. The model's performance was evaluated using BERTScore and ROUGE-L metrics. • **Results:** The best performance was seen in models trained on medical ICU notes (BERTScore 0.820), surpassing models trained on other ICU specialties and untrained LLMs, which showed lower accuracy. • **Conclusions:** LLMs trained specifically for the ICU context show promise in improving medication prediction accuracy. This work supports the use of digital twins in clinical decision support systems, aiding providers with personalized recommendations.
20 May 2025	Predicting Discharge to Long-term Acute Care (LTAC) Facility With Machine Learning Using Electronic Health Record Data	Caroline Canning	• **Introduction**: The increasing costs associated with ICU services, particularly for chronically critically ill patients requiring long-term life support, necessitate improved resource management. This study aims to develop a machine-learning model to predict patient discharge to long-term acute care (LTAC) facilities based on early clinical indicators. • **Methodology**: An observational cohort study was conducted on adult ICU patients, excluding those who died during hospitalization. Data from the first 48 hours, including vital signs, laboratory results, and nursing assessments, were extracted from the EHR. A LightGBM model was trained to predict LTAC discharge at the 48-hour mark. • **Results:** Of 22,436 hospitalizations, 1,079 (4.81%) resulted in LTAC discharge. The model achieved an AUC of 0.90 and a Brier Score of 0.028. Key predictors included length of hospital stay, presence of tracheostomy, albumin levels, and FiO2. • **Conclusions:** The model demonstrates high accuracy in predicting LTAC discharge within the first 48 hours of ICU admission, aiding in resource optimization and potentially reducing healthcare costs.

Notable Presentations at ATS 2025
AI / ML (27/30)

Date	Title	Author	Summary
21 May 2025	Leveraging Hybrid Natural Language Processing Techniques for Large-scale Pulmonary Embolism Identification: Development and Validation of an Iterative and Novel Machine Learning and Rule-based Pipeline	Syed Moin Hassan	• **Introduction**: Pulmonary embolism (PE) remains a clinical challenge due to its varied presentation and potential for rapid deterioration. Manually identifying PE cases from unstructured data in EHRs is labor-intensive. Hybrid natural language processing (NLP) methods combining machine learning and rule-based techniques offer a solution for automating this task. • **Methodology**: A hybrid NLP pipeline was developed, combining machine learning with a rule-based algorithm, trained on 1,040 CT pulmonary angiogram (CTPA) reports from Brigham and Women's Hospital (BWH). It was validated on a larger dataset from the Mass General Brigham healthcare system. • **Results:** The machine learning model initially achieved 91% accuracy on the BWH dataset, which decreased to 85% on the larger dataset. Incorporating the rule-based algorithm improved performance to 94.8% accuracy, 96.4% sensitivity, and 96.5% negative predictive value (NPV). • **Conclusions:** The hybrid NLP pipeline demonstrated high performance and reduced the need for large annotated datasets. It offers significant potential for large-scale PE research and clinical decision support across diverse healthcare settings.
21 May 2025	Artificial Intelligence-Based Deep Learning Model for Detecting Central and Upper Airway Obstruction on Flow-Volume Loops	Jennifer Prevot MD	• **Introduction**: Diagnosing intrathoracic and extrathoracic airway obstructions through pulmonary function testing (PFT) is hindered by low sensitivity of current diagnostic criteria, particularly in flow-volume (FV) loops. This study aims to develop an AI deep learning model capable of automatically detecting plateau patterns in FV loops, indicative of airway obstruction. • **Methodology**: The study analyzed FV loops from 187 patients, including healthy controls, patients with fixed airway obstruction, and those with COPD. Data were pre-processed and used to train a Long Short-Term Memory (LSTM) model. Model performance was evaluated using precision, recall, and F1 scores. • **Results:** The model achieved high performance overall (Pr=88.6%, Re=91.5%, F1=89.3%), particularly in detecting fixed airway obstruction (Pr=75.4%, Re=94.6%, F1=83.9%). However, it struggled to differentiate between COPD and fixed airway obstruction due to equal emphasis on the inspiratory spike. • **Conclusions:** The AI model demonstrated strong potential for identifying airway obstructions in FV loops, with high recall and F1 scores. Future model refinements should focus on improving precision for differentiating similar conditions like COPD and fixed airway obstruction.

Notable Presentations at ATS 2025
AI / ML (28/30)

Date	Title	Author	Summary
21 May 2025	Quantitative CT and Computational Fluid Dynamics-based Machine Learning Phenotypes of Lung Structure-function Abnormality	Jiwoong Choi	• **Introduction**: Subclinical lung structural-functional abnormalities can be challenging to detect in a normal-appearing population. This study aims to phenotype these abnormalities using quantitative computed tomography (qCT) and computational fluid dynamics (CFD) analysis of inspiratory and expiratory chest CTs in a cohort of healthy adults. • **Methodology**: Chest CTs and demographic data from 264 Korean adults were analyzed, using commercial and in-house software to extract 186 lung structure-function features. Principal component analysis, k-means clustering, and Random Forest were employed to identify and predict subtypes based on these features. • **Results:** Five phenotypes were identified, with significant differences in airway resistance, lung density, and deformation. Clusters varied by gender and lung abnormalities, with small airways disease and airway wall thickness as key classifiers, achieving 90.5% accuracy. • **Conclusions:** qCT/CFD analysis revealed distinct lung phenotypes, offering insights into subclinical abnormalities such as airway remodeling and small airway disease, which could lead to new diagnostic and therapeutic targets.
21 May 2025	AI-guided Generation and Development of HXN-1011, A Highly Potent Anti-TSLP Biparatopic Antibody	Hao Ran PhD	• **Introduction**: TSLP is a key target in inflammatory diseases, activating its receptor complex via two distinct epitopes, Site I and Site II. A fusion protein targeting both sites has shown superior inhibition of TSLP activity. This study aims to engineer the biparatopic antibody HXN-1011, which targets both TSLP binding sites, for improved clinical efficacy. • **Methodology**: AI-guided epitope mapping and affinity assessments via SPR were performed. In vitro validation included TSLP-induced assays, Baf3 proliferation, and CCL17 release from PBMCs. In vivo efficacy was tested using an OVA-induced asthma model with hTSLP/hTSLPR/hIL7Rα transgenic mice. • **Results:** HXN-1011 binds to both TSLP sites, with an affinity 100 times higher than Tezepelumab. It demonstrated 15-100 times more potent inhibition in vitro. In vivo, HXN-1011 significantly reduced lung inflammation and outperformed Tezepelumab and GSK5784283. • **Conclusions:** HXN-1011 shows potent TSLP inhibition and potential for treating asthma, COPD, and other inflammatory diseases. Preclinical studies are ongoing.

Notable Presentations at ATS 2025
AI / ML (29/30)

Date	Title	Author	Summary
21 May 2025	Artificial Intelligence (AI)-powered Chest X-ray in Primary Care Accelerates Time to Lung Cancer Diagnosis	Prince C Franco	• **Introduction**: Lung cancer remains the leading cause of cancer-related deaths, with early diagnosis challenging, particularly in high tuberculosis (TB) burden areas. AI-based software in primary care may help reduce diagnostic delays, yet its real-world impact on lung cancer detection has not been widely explored. • **Case Presentation**: A 38-year-old male with a productive cough and dyspnoea presented to a rural primary care centre. AI (qXR) flagged a suspicious nodule on his chest X-ray (CXR), and TB was ruled out. A subsequent CT scan confirmed an enhancing lesion, and biopsy revealed adenocarcinoma. The time from CXR to cancer diagnosis was 5 days. • **Novelty and Importance:** This case illustrates the impact of AI-driven CXR in primary care, especially in rural settings, enabling early referral and lung cancer detection. AI integration could reduce diagnostic delays, particularly in countries with high TB prevalence, and aid in identifying malignancies in low-risk populations.
21 May 2025	Detecting Mirror Patients in Clinical Trials: An AI-based Approach for Identifying Implausible Similarities Across Patients	Benoit Cuyvers	• **Introduction**: Identifying implausible data similarity in clinical trials is crucial to ensuring participant uniqueness and data integrity. Spirometry data offers a distinctive "signature" for each subject, allowing AI-driven models to detect anomalies and duplicative profiles, enhancing Risk-Based Monitoring (RBM) frameworks. • **Methodology**: The approach involves three steps: (1) feature extraction from patient spirometry data, (2) a random forest classifier predicting similarity scores, and (3) clustering of similar patients. The model was trained on 14,599 spirometry sessions from 1,463 patients and validated using simulated trial data across 15 sites. • **Results:** The model identified 14 out of 15 simulated sites with 100% sensitivity and 88% specificity, successfully flagging clusters with unusually high similarity as potentially duplicative. • **Conclusions:** This AI-based methodology effectively detects duplicate enrollments in clinical trials, supporting data integrity by identifying high-risk subjects or sites for further expert review.

Notable Presentations at ATS 2025
AI / ML (30/30)

Date	Title	Author	Summary
21 May 2025	Common Biomarkers of Idiopathic Pulmonary Fibrosis and Systemic Sclerosis Based on WGCNA and Machine Learning	Ning Shan	• **Introduction**: Interstitial lung disease (ILD), especially IPF, is a major complication of systemic sclerosis (SSc). This study aims to identify common biomarkers between IPF and SSc using bioinformatics tools. • **Methodology**: Datasets for IPF and SSc were analyzed using weighted gene co-expression, PPI, and machine learning methods to identify key genes. Further analysis included GSEA and single-cell RNA sequencing. • **Results:** CCL2 was identified as a key hub gene in both diseases, linked to chemokine and lipid metabolism pathways. High CCL2 expression correlated with worse lung function in IPF and decreased after treatment in SSc. • **Conclusions:** CCL2 serves as a common biomarker for IPF and SSc, revealing shared disease mechanisms and potential therapeutic targets.
21 May 2025	Contrastive Machine Learning Reveals the Molecular Profile of Omalizumab Responders in Type 2 Asthma	Jonathan Isaac. Witonsky	• **Introduction**: Asthma's heterogeneity complicates treatment, with biomarkers like BEC and IgE showing variable predictive accuracy. • **Methodology**: We developed a machine-learning method (PACA) using DNA methylation data from pediatric asthma cohorts to predict bronchodilator response (BDR) and omalizumab treatment response. • **Results:** BEC and IgE predicted BDR only in patients with high DNAm scores, particularly in T2-high asthma. High DNAm scores correlated with clinical features linked to biologic therapy response, including higher exacerbations and lower lung function. • **Conclusions:** The DNAm stratification score improves biomarker utility and patient stratification, advancing precision medicine in asthma.

Strategic Insights and Strategy Development is our focus