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# (copd OR "Pulmonary Disease, Chronic Obstructive"[Mesh])

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**Pulm Ther**

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**. 2026 Jun 12.**

**doi: 10.1007/s41030-026-00362-1. Online ahead of print.**

## Global pMDI Use and the Potential Impact of European PFAS Legislation on Access to These Essential Inhaled Medications

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**Affiliations Expand**

- **PMID: 42283786**

- **DOI: 10.1007/s41030-026-00362-1**

**Abstract**

**Introduction: Many essential inhaled medicines recommended in guidelines are delivered to the lung via pressurized metered-dose inhalers (pMDIs). Global environmental legislation will lead to phasing out of hydrofluoroalkane propellants currently used in pMDIs, owing to their global warming potential (GWP). Furthermore, the European Chemicals Agency is reviewing proposed legislation to ban per- and polyfluoroalkyl substances (PFAS) on the basis of chemical structure, which could also impact pMDI availability. Here, we estimated pMDI use as a**

**proportion of all inhaler use in 60 countries, spanning six geographical regions, to understand the relevance of any pMDI restrictions to patients and prescribers.**

**Methods: pMDI use as a percentage of total inhaler use during 2022 was calculated by country and geographical region using inhaler sales data (a surrogate of use) from the IQVIA Quarterly MIDAS database; inhaler use for the 10-year period from 2013 to 2022 was also evaluated for these regions. Data were compared by individual inhalations. The total patient population living with asthma and/or chronic lower respiratory disease was calculated on the basis of Eurostat (the statistical office of the European Union [EU]) 2019 data and available disease prevalence statistics. Maintenance pMDI utilization was estimated by adjusting for ratio of maintenance pMDI use to total inhaler use.**

**Results: Across all countries analyzed, pMDIs accounted for the largest proportion of inhaler use in 2022 (77.3%). In 51 out of 55 countries with available country-level data, pMDIs represented > 50% of total inhaler use. After adjusting for pMDI usage, an estimated 8.1 million EU patients received a maintenance pMDI in 2022, with the greatest proportion in Germany and France.**

**Conclusions: pMDIs are vital inhalers for most patients in Europe and around the world. While transitioning to near-zero or low-GWP inhalers, it is essential to avoid unintended consequences from the proposed PFAS ban by safeguarding patient access to this essential device option.**

**Keywords: Asthma; COPD; Chronic lower respiratory disease; Global warming potential; Hydrofluoroolefin-1234ze; Maintenance therapy; Next-generation propellant; Per- and polyfluoroalkyl substances; Pressurized metered-dose inhaler; Propellant.**



**Conflict of interest statement**

**Declarations. Conflict of Interest: Janwillem Kocks reports grants, personal fees, and nonfinancial support from AstraZeneca, Boehringer Ingelheim, and GSK; grants and personal fees from Chiesi; nonfinancial support from Mundi Pharma; grants from Teva and Valneva (outside the submitted work); and personal fees from ALK-Abello, COVIS Pharma, MSD, and Teva; and holds < 5% shares of Lothar Medtec GmbH and is owner of the General Practitioners Research Institute. Tim Harrison, John P. Bell, Andy Rignall, and Mina Khezrian are employees of AstraZeneca and may hold stock and/or stock options in AstraZeneca. Omar S. Usmani reports grants and personal fees from AstraZeneca, Boehringer Ingelheim, Chiesi, and GlaxoSmithKline; personal fees from Cipla, Covis, Menarini, Mereo Biopharma, Mundipharma, Napp, Novartis, Orion, Sandoz, Takeda, Trudell Medical, and UCB; and grants from Edmond Pharma. Ethical Approval: Ethics committee approval was not required for accessing data from IQVIA MIDAS® or the Eurostat database, and the data were not identifiable. All necessary permissions were obtained by AstraZeneca for use of the IQVIA database. IQVIA did not provide any support for the analysis or interpretation of the data. The statements, findings, conclusions, views, and opinions contained and expressed in this manuscript are based, in part, on data obtained under license from IQVIA Ltd. These statements, findings, conclusions, views, and opinions are not necessarily those of IQVIA Ltd. or any of its affiliated or subsidiary entities.**

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**J Glob Health**

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**. 2026 Jun 12:16:04214.**

**doi: 10.7189/jogh.16.04214.**

# When more diagnoses do not mean more disease: a data-driven reassessment of global chronic disease trends, 2011-2025

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- **PMID: 42283247**

- **DOI: 10.7189/jogh.16.04214**

**Abstract**

**Background: Rising global numbers of chronic noncommunicable diseases (NCDs) are commonly interpreted as evidence of a growing epidemic. In 2011, we hypothesised that this perception is partly driven by population ageing, expanding diagnostic criteria, and improved detection rather than a uniform increase in underlying biological risk. This study reassesses that hypothesis using contemporary global data.**

**Methods: We conducted a descriptive, comparative epidemiological analysis using publicly available data sets from the Global Burden of Disease, World Health Organization Global Health Estimates, and the International Diabetes Federation. Absolute case counts and deaths were analysed alongside age-standardised mortality rates to distinguish demographic effects (population growth and ageing), diagnostic expansion, and changes in underlying risk. Trends were evaluated relative to 1990 and 2011 baselines.**

**Results: Absolute numbers of cases and deaths from major NCDs have continued to rise globally, largely reflecting population growth and ageing. In contrast, age-**

standardised mortality rates have declined substantially for cardiovascular disease and chronic obstructive pulmonary disease and have stabilised for other conditions. This divergence between increasing absolute burden and stable or declining age-specific risk is consistent across major diseases. Expanded diagnostic criteria, improved detection, and increased survival have further contributed to rising prevalence, particularly in older populations.

Conclusions: Rising absolute counts of NCDs are largely explained by demographic change and diagnostic expansion, while age-standardised trends suggest stable or declining risk for several major conditions. These findings support a more nuanced interpretation of global chronic disease trends, integrating demographic, diagnostic, and risk-factor perspectives. Careful use of age-standardised measures alongside absolute counts is essential for accurate monitoring and for informing public health priorities.



Conflict of interest statement

Disclosure of interest: The authors completed the ICMJE Disclosure of Interest Form (available upon request from the corresponding author) and disclose no relevant interests.



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doi: 10.1002/anr3.70066. eCollection 2026 Jan-Jun.

# Peri-operative care of patients undergoing robotic-assisted bronchoscopy under general anaesthesia - a single-centre retrospective cohort study

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Affiliations Expand

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- PMCID: PMC13251786 (available on 2027-06-10)

- DOI: 10.1002/anr3.70066

**Abstract**

Bronchoscopic procedures are increasingly performed with shape-sensing robotic-assisted bronchoscopy under general anaesthesia, allowing biopsy of small and distal pulmonary lesions. We performed a retrospective cohort study at a single centre of patients undergoing robotic bronchoscopy to describe the peri-operative care. The primary outcome measure was post-procedural length of hospital stay, with secondary outcomes including complication rates and diagnostic success of biopsy. A total of 200 patients were recruited over a 12-month period. Median ([IQR] range) post-procedural length of stay was 4 h ([2.5-24.5] 0.5-75) with 106/200 (53%) of patients performed as a day case. Cardiorespiratory comorbidities were common, 65% of patients had an ASA physical status 3 or 4. Higher ASA physical status and chronic obstructive pulmonary disease were associated with increased post-procedural admission rate. All patients underwent general anaesthesia with target-controlled infusion of propofol. Neuromuscular blocking agents were used in 194/200 (97%) and remifentanil was used for 185/200 patients (93%). Median PEEP was 10 $cmH_2O$ (range 5-15 $cmH_2O$). The incidence of peri-procedural complications requiring intervention was 6%. Our findings suggest that robotic-assisted bronchoscopy could be delivered safely as a day case procedure in a population with a high incidence of comorbidities, with low peri-procedural complication rates.

Keywords: airway; bronchoscopy; peri-operative medicine.



- 22 references

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Am J Respir Crit Care Med

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Defining disease stability in COPD: Evidence from Phase 3 clinical trials

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- PMID: 42281286

- DOI: 10.1093/ajrccm/aamag292

Abstract

Rationale: Disease stability in COPD is a low disease activity state proposed as a treatment target.

Objectives: Characterize COPD stability as a composite endpoint.

Methods: Post hoc analyses were carried out on IMPACT and FULFIL (fluticasone furoate/umeclidinium/vilanterol [FF/UMEC/VI] vs dual therapies) and MATINEE/METREX/METREO (mepolizumab added onto triple therapy). Stability was defined as "no moderate/severe exacerbations and no worsening from baseline in CAT and FEV1". We assessed whether achieving stability at Week 28 was prognostic of subsequent outcomes (time to first on-treatment moderate/severe exacerbation and time to all-cause mortality [ACM]) after Week 28 (IMPACT). Bayesian joint modeling evaluated the probability of achieving stability (IMPACT).

Measurements and main results: Stability was achieved with FF/UMEC/VI by 22% of patients in IMPACT (Week 52) and by 46% of patients in FULFIL (Week 24); stability was achieved with mepolizumab +triple therapy by 18% of patients in MATINEE/METREX/METREO (Week 52). Patients were more likely to achieve stability with triple versus dual therapy and with mepolizumab versus placebo. Many individuals achieving stability had clinically meaningful improvements in CAT and FEV1. Patients achieving stability at Week 28 (vs patients who were not stable) had a 45.7% reduction in the risk of moderate/severe exacerbations and a 51.7% reduction in the risk of ACM after Week 28. Bayesian joint modeling demonstrated a mean (SD) posterior probability of stability: 25.60% (0.66) at Week 52 (FF/UMEC/VI).

Conclusions: Our data provide further evidence for disease stability as an achievable COPD treatment target that predicts long-term clinical benefits in exacerbations and mortality.

Keywords: Chronic Obstructive Pulmonary Disease; Disease Stability; Patient-Reported Outcome Measure; Prompt Optimization; Treatment Outcome.

5

Respirology

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. 2026 Jun 11.

doi: 10.1002/resp.70273. Online ahead of print.

# Association of Airway Mucus Plugs and Physical Activity, Exercise Tolerance, Sarcopenia, and Frailty in Patients With COPD and Pre-COPD

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- PMID: 42276842

- DOI: 10.1002/resp.70273

## Abstract

**Background and objective: Airway mucus plugs on computed tomography (CT) are an imaging biomarker of chronic obstructive pulmonary disease (COPD) associated with airflow limitation, respiratory symptoms, and poor prognosis. However, clinical phenotypes relevant to mucus plugs, including sarcopenia and frailty, are not fully elucidated. This study aimed to investigate the association between mucus plugs, sarcopenia, and frailty using a prospective observational COPD-enriched smoker cohort.**

**Methods: In this cross-sectional analysis, patients with COPD and pre-COPD were classified into no-, low-, and high-mucus groups according to mucus scores on CT. The risks of frailty and sarcopenia, and relevant clinical, functional, and imaging factors including 6-min walk distance (6MWD), physical activity, body compositions via bioelectrical impedance analysis (BIA), and intra- and extrapulmonary CT indices were compared between groups.**

**Results: Among 175 patients (142 COPD, 33 pre-COPD, and n = 106, 48, and 21 in the no-, low-, and high-mucus groups), the high-mucus group was associated with increased odds ratio for sarcopenia independent of age, sex, height, smoking, and forced expiratory volume in 1 s, or emphysema and wall area percentage (WA%). The high-mucus group demonstrated increased airtrapping and WA%, reduced total airway count, and decreased muscle and fat mass (assessed by both BIA and CT), while emphysema was not different. Furthermore, 6MWD deteriorated in the high-mucus group independent of age, sex, height, and smoking, whereas physical activity did not differ.**

**Conclusion: In patients with COPD and pre-COPD, mucus plugs are associated with reduced muscle and fat mass and a heightened sarcopenia risk.**

**Keywords: COPD; frailty; mucus plugs; sarcopenia.**



- **41 references**

**Supplementary info**

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**BMJ Open**

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**. 2026 Jun 11;16(6):e115602.**

**doi: 10.1136/bmjopen-2025-115602.**

# Prevalence of PRISm and COPD and associated factors in a university medical centre spirometry unit: a cross-sectional analysis

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**Affiliations Expand**

- **PMID: 42276796**

- **DOI: 10.1136/bmjopen-2025-115602**

**Free article**

## Abstract

**Objectives: Preserved Ratio Impaired Spirometry (PRISm) is a new spirometric entity defined in international guidelines, associated with overall worse outcomes. It remains unclear whether this represents a distinct entity or an early phase of multiple other diseases, such as chronic obstructive pulmonary disease (COPD)**

and restrictive lung diseases. There is a notable scarcity of data on PRISm, particularly in Lebanon. This study aimed to evaluate the prevalence of PRISm and COPD, and their associated factors, among individuals aged 40 years and above who underwent spirometry in a single university medical centre between 2022 and 2024.

Setting: Outpatient Pulmonary Function Tests Laboratory at a Lebanese university medical centre.

Participants: All individuals aged 40 years or older who performed spirometry between 2022 and 2024 METHODS: A retrospective analysis of pulmonary function tests (PFTs) and demographics was performed. Patients were classified based on the spirometry patterns that are consistent with COPD (forced expiratory volume in the first second ($FEV_1$)/forced vital capacity (FVC)<0.7 post bronchodilator), PRISm ($FEV_1$/FVC≥0.7 and $FEV_1$<80% post bronchodilator) and normal PFTs ($FEV_1$/FVC≥0.7 and $FEV_1$≥80%). A small number of PFTs did not meet the above criteria and were classified as 'others'; they were excluded from the main analysis but retained for descriptive estimation of PRISm and COPD prevalence over the past 3 years. The prevalence and associated risk factors of PRISm and COPD were assessed. Descriptive, bivariate and multinomial regression models were performed using IBM's Statistical Package for the Social Sciences V.29.

Results: A total of 698 PFTs were performed for 639 patients. The prevalence of PRISm and COPD in the centre between 2022 and 2024 was 11% and 17%, respectively. Compared with normal PFTs, subjects with PRISm were older (adjusted OR; aOR (95% CI)=1.03 (1.002 to 1.05); p=0.03) and more likely to be ex-smokers (aOR=2.19 (1.12 to 4.30); p=0.022); patients with COPD were older (aOR 1.09 (1.07 to 1.12); p<0.001), had lower body mass index (aOR 0.95 (0.91 to 0.99); p=0.024) and were more likely to be smokers or ex-smokers.

Conclusion: These findings highlight PRISm as a potentially relevant pattern within chronic airway disease. Within the context of Sustainable Development Goal 3 on non-communicable diseases, they underscore the importance of identifying this subgroup for closer clinical attention. Further longitudinal and multicentre studies are needed to better understand the clinical significance of PRISm and its relationship to chronic airway diseases.

Keywords: Prevalence; Pulmonary Disease, Chronic Obstructive; Respiratory Function Test.



Conflict of interest statement

Competing interests: None declared.

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Heart Lung

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. 2026 Jun 11:79:102873.

doi: 10.1016/j.hrtlng.2026.102873. Online ahead of print.

# Simplified GDMT score and all-cause readmission in patients with heart failure: A retrospective cohort study

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- PMID: 42275917

- DOI: 10.1016/j.hrtlng.2026.102873

## Abstract

Background: Guideline-directed medical therapy (GDMT) is the cornerstone of evidence-based heart failure management, yet its real-world implementation remains suboptimal. We adapted a simplified GDMT score to objectively quantify GDMT intensity and provide a practical measure of therapy optimization.

Objective: To evaluate the association between a simplified GDMT score with 30-day and 6-month readmissions of HF patients.

Methods: We conducted a single-center retrospective cohort analysis including patients with HF with reduced, mildly reduced, and recovered ejection fractions. The primary outcomes were 30-day and 6-month readmissions. Logistic regression models were used to evaluate the association between the GDMT score (high: ≥5 vs. low: <5) and outcomes, with odds ratios (ORs) and 95% confidence intervals as measures of association.

Results: A high GDMT score (≥5) was significantly associated with reduced odds of both 30-day and 6-month readmissions. At 30 days, the odds ratio was 0.51 (95% CI: 0.28-0.93; p = 0.027), and at 6 months, 0.48 (95% CI: 0.29-0.79; p = 0.0055), corresponding to nearly 50% lower odds of hospital readmission. In the ischemic subgroup, the association was more pronounced, with an OR of 0.20 (95% CI: 0.07-0.55; p = 0.0022) for 30-day readmission. COPD independently predicted increased 6-month readmission risk (OR: 1.80; 95% CI: 1.07-3.03; p = 0.027). Age, sex, and BMI were not significant predictors in either model.

**Conclusion: A higher simplified GDMT score was associated with reduced 30-day and 6-month readmissions, particularly among patients with ischemic heart failure, supporting its potential utility as a pragmatic measure of GDMT optimization.**

**Keywords: Acute decompensated heart failure; Guideline-directed medical therapy; Hospital readmission; Implementation science; Quality of care; Therapeutic optimization.**



**Conflict of interest statement**

**Declaration of competing interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.**

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**Editorial**

**Thorax**

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**. 2026 Jun 10:thorax-2026-225396.**

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# Air quality, walking and COPD: preserving the benefits of physical activity in an urban world

**David C Christiani** [1]

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- **PMID: 42270333**

- **DOI: 10.1136/thorax-2026-225396**

***No abstract available***

**Keywords: COPD epidemiology.**

**Conflict of interest statement**

**Competing interests: None declared.**

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**Review**

**Respir Investig**

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**. 2026 Jun 9;64(4):101467.**

**doi: 10.1016/j.resinv.2026.101467. Online ahead of print.**

# Genetic susceptibility to COPD: Systematic review, bibliometric analysis and meta-analysis of SERPINA1, HHIP, IREB2, SFTPD, and FAM13A

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**Affiliations Expand**

- **PMID: 42269416**

- **DOI: 10.1016/j.resinv.2026.101467**

**Abstract**

**Background: Chronic obstructive pulmonary disease (COPD) is a progressive lung disorder influenced by environmental exposures and genetic susceptibility. Despite numerous studies, the effects of key susceptibility genes remain inconsistent across populations, and their overall clinical relevance is unclear.**

**Methods: Following PRISMA guidelines and registered in PROSPERO (ID: CRD420251077565), we conducted a systematic review and meta-analysis of studies published between 2010 and 2025. Eighteen unique studies were included, ranging**

from small cohorts (n = 36) to large biobank analyses (~4.5 million participants), collectively evaluating five candidate genes: SERPINA1, HHIP, IREB2, SFTPD, and FAM13A. Pooled hazard ratios (HRs) were calculated, with subgroup analyses by ethnicity and variant-level differences. Associations with spirometric parameters ($FEV_1$, $FEV_1$/FVC) were examined to assess clinical relevance.

Results: SERPINA1 demonstrated the strongest significant with COPD (HR = 2.47). A significant association was also observed for SFTPD, although based on fewer studies. Subgroup analysis by ethnicity/geographical region revealed the highest pooled risk in East Asians (HR = 2.18), significant associations in Europeans (HR = 1.46) and Americans (HR = 1.47), and a weaker or potentially protective effect in Oceania (HR = 0.67). SERPINA1 risk correlated with lung function decline ($FEV_1$: r = -0.64; $FEV_1$/FVC: r = -0.71), highlighting translational relevance.

Conclusions: SERPINA1 emerges as the most clinically relevant genetic determinant of COPD, linking susceptibility to measurable spirometric impairment, with effects varying by ethnicity. These findings emphasize the need for genetic screening integrated with lung function assessment and ethnicity-specific risk stratification to advance precision management of COPD.

Keywords: Chronic obstructive pulmonary disease; Genetic susceptibility; Lung function; Meta-analysis; SERPINA1.



Conflict of interest statement

Declaration of competing interest The authors have no conflicts of interest.

Supplementary info

Publication typesExpand

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J Cardiopulm Rehabil Prev

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. 2026 Jun 10.

doi: 10.1097/HCR.0000000000001041. Online ahead of print.

# Frailty Over Time: A 6-MONTH FOLLOW-UP OF MULTIDISCIPLINARY CARDIAC AND PULMONARY REHABILITATION IN OLDER ADULTS WITH CARDIORESPIRATORY DISEASE

Nicolò Granata [1], Martina Vigorè [2], Roberto Maestri [3], Giovanna Callegari [4], Giampaolo Guazzotti [1], Giancarlo Piaggi [4], Gioele Cremonese [1], Silvia Audifreddi [5], Antonia Pierobon [2]

Affiliations Expand

- PMID: 42268578

- DOI: 10.1097/HCR.0000000000001041

## Abstract

**Purpose: Chronic heart failure (CHF) and chronic obstructive pulmonary disease (COPD) are associated with psychological distress, reduced health-related quality of life (HRQoL), and functional decline, particularly in older adults where frailty is a growing concern. This study primarily evaluated the effects of cardiac and pulmonary rehabilitation on frailty, as measured by the Clinical Frailty Scale, while also examining secondary outcomes including psychological distress, self-efficacy, and HRQoL.**

**Methods: In this multicentric observational study, participants were evaluated through clinical, psychological, functional, and frailty measures at baseline (T 0 ), discharge (T 1 ), and 6-month follow-up (T 2 ).**

**Results: A total of 195 older inpatients (age ≥65 years) with CHF or COPD were included. Significant improvements were observed over time in psychological distress (T 0 = 3.7 ± 2.6, T 1 = 2.0 ± 2.0, T 2 = 2.1 ± 2.3; P < .0001), HRQoL (T 0 = 58.9 ± 19.7, T 1 = 68.3 ± 19.0, T 2 = 63.1 ± 20.3; P < .0001), and self-efficacy (T 0 = 18.56 ± 3.16, T 2 = 19.41 ± 2.87; P = .0005), while frailty remained stable (T 0 = 3.9 ± 1.1, T 1 = 3.8 ± 1.0, T 2 = 3.9 ± 1.0; P = .12). Regression analysis identified age, sex, Barthel Index score, Braden Scale score, HRQoL, self-efficacy, and Short Physical Performance Battery score as significant predictors of frailty at T 2 .**

**Conclusion: Despite improvements in psychological and HRQoL outcomes in older adults with CHF or COPD, frailty remains a challenge, emphasizing the need for interventions targeting physical, psychological, and functional domains. Further research is needed to explore novel or improved rehabilitation strategies and their effect on long-term outcomes.**

**Keywords: chronic heart failure; chronic obstructive pulmonary disease; frailty; older; rehabilitation.**



- 59 references

**Supplementary info**

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Am J Respir Crit Care Med

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. 2026 Jun 9:aamag288.

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# Mepolizumab Efficacy in COPD: Insights from Longitudinal Patterns of Blood Eosinophil Counts and Their Variability Across Three Clinical Trials

Gerard J Criner [1], Henrik Watz [2 3], MeiLan K Han [4], Fernando J Martinez [5], Steven Gould [6], Jeff Min [7], Arunangshu Biswas [8], Stefanie Kolterer [6], Dave Singh [9 10]

Affiliations Expand

- PMID: 42265988

- DOI: 10.1093/ajrccm/aamag288

Free article

## Abstract

Rationale: Blood eosinophil count (BEC) is a biomarker indicating type 2 (T2) inflammation in patients with chronic obstructive pulmonary disease (COPD) but can be variable.

Objectives: Evaluate mepolizumab efficacy in patients with COPD with variability of BEC patterns.

Methods: Data were pooled from Phase 3, randomized, double-blind, placebo-controlled METREX (NCT02105948), METREO (NCT02105961), and MATINEE (NCT04133909) trials. Patients receiving mepolizumab 100 mg or placebo were included. These trials documented historical BEC (within 12 months before randomization) for all patients. Outcomes included annualized rates of moderate or severe exacerbations, and exacerbations requiring an emergency department (ED) visit and/or hospitalization. Outcomes were assessed in subgroups based on BEC values in the 12 months before randomization, at screening, and at baseline.

**Measurements and main results: Annualized rates of moderate or severe exacerbations were reduced, or trended towards reduction, with mepolizumab versus placebo in patients with T2 inflammation characteristics, including those with BEC ≥ 300 cells/μL at any pre-randomization timepoint (21% reduction), persistently elevated BECs (12-27% reduction), and variable BECs over time (22-36% reduction). Across various subgroups with elevated BEC, starting from ≥ 150 cells/μL, mepolizumab reduced exacerbations requiring ED visit and/or hospitalization. Patients with persistently low BEC (<150 cells/μL) experienced no benefit with mepolizumab.**

**Conclusions: Mepolizumab improved exacerbation-related outcomes in patients with COPD and T2 inflammation, characterized by both consistently and intermittently elevated BEC. Persistent BEC elevation is not required to identify treatable eosinophilic phenotypes in COPD.**

**Keywords: Biological Products; Eosinophils; Interleukin-5; Pulmonary Disease, Chronic Obstructive.**



**12**

**Review**

**J Med Internet Res**

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**. 2026 Jun 9:28:e88708.**

**doi: 10.2196/88708.**

# Effectiveness of Digital Health Interventions to Improve Self-Care in Patients With Chronic Diseases: Systematic Review and Meta-Analysis of Randomized Controlled Trials

Jessica Longhini [1], Daniel Pedrotti [2], Federica Foladori [2], Melania Stedile [2], Francesca Stefani [2], Michela Dal Ben [2], Alessandro Froner [2], Marta Proietti Pesci [2], Stefano Toccoli [2], Anna Brugnolli [2 3]

**Affiliations Expand**

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- **DOI: 10.2196/88708**

**Free article**

**Abstract**

**Background: Chronic diseases account for most global morbidity and mortality, increasing the need for effective long-term self-care support. Digital health interventions, such as mobile apps, telemonitoring, and connected devices, are increasingly used to promote self-care; yet, their overall effectiveness across chronic conditions remains unclear.**

**Objective: This systematic review and meta-analysis evaluated whether digital health interventions improve self-care in adults with chronic diseases.**

**Methods: We searched PubMed, CINAHL, Scopus, and PsycINFO for randomized controlled trials (RCTs; January 1, 2013, to December 31, 2025) that assessed digital health interventions targeting self-care outcomes, as measured with validated instruments, in patients with chronic conditions. Standardized mean differences (SMDs) were pooled using random-effects models, while results not suitable for meta-analysis were synthesized narratively. Risk of bias was assessed with the Cochrane Risk of Bias 2.0 tool for RCTs and certainty of evidence with Grading of Recommendations Assessment, Development and Evaluation.**

**Results: A total of 55 RCTs involving 5889 participants were included. Most interventions were multicomponent and mainly based on mobile or web-based applications, telemonitoring, connected devices, and text-messaging support. In diabetes, pooled analyses showed little to no clear improvement across self-care domains measured with the Summary of Diabetes Self-Care Activities, including general diet (3 studies), specific diet (3 studies), exercise (5 studies), foot care (5 studies), and glucose monitoring (4 studies), with low to very low certainty of evidence. In heart failure, digital interventions probably improved self-care monitoring measured with the Self-Care of Heart Failure Index (5 studies, 364 participants; SMD=0.49, 95% CI 0.13-0.85; low certainty), whereas effects on self-care maintenance (5 studies) and on self-care measured with the European Heart Failure Self-Care Behaviour Scale (3 studies) were not clearly demonstrated. In other chronic conditions, narrative synthesis suggested possible benefits in some cardiovascular conditions, chronic hepatitis B, epilepsy, and hypertension, while no significant effects were found in chronic obstructive pulmonary disease and multimorbidity, and mixed findings emerged in Parkinson disease. Across 17 studies, medication adherence showed little to no overall improvement (SMD=0.06, 95% CI -0.31 to 0.42, 95% prediction interval -0.98 to 1.09; very low certainty), indicating that future studies could plausibly show either benefit or no effect. Overall, heterogeneity was substantial, and most evidence was of low or very low certainty.**

**Conclusions: This review is innovative in providing an up-to-date, cross-condition synthesis focused specifically on self-care as a multidimensional outcome, rather than on clinical end points alone or single diseases. The findings suggest that digital health interventions may be more effective for supporting self-care**

monitoring than for promoting broader behavioral maintenance or medication adherence. Evidence is limited by methodological heterogeneity, small sample sizes, short follow-up periods, and varied outcome measures. Larger designed trials using standardized self-care metrics and equity-focused approaches are needed to clarify effectiveness and guide implementation.

Keywords: chronic disease; digital; e-health; self-care; self-management; technology.



Supplementary info

Publication types, MeSH termsExpand

Full text links

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Cite

13

Eur Respir J

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. 2026 Jun 12;67(6):2600306.

doi: 10.1183/13993003.00306-2026. Print 2026 Jun.

# Clinically relevant change in airway wall thickness to identify disease activity in COPD and smokers at risk

Mustafa Abdo [1 2], Martin Reck [3], Susanne Stiebeler [3 4], Benjamin-Alexander Bollmann [5 6], Sabine Bohnet [7], Katharina May [8], Sabine Dettmer [6 9], Henrik Watz [3 7], Jens Vogel-Claussen [6 9 10]; HANSE Trial Group

Affiliations Expand

- PMID: 41887670

- DOI: 10.1183/13993003.00306-2026

Free article

*No abstract available*

**Conflict of interest statement**

**Conflict of interest: M. Abdo received travel support, consulting fees and honoraria from AstraZeneca, Sanofi and Chiesi, all outside the submitted work. M. Reck reports speaker fees and/or consultancy fees from AbbVie, Accord, Amgen, AstraZeneca, Beigene, Boehringer Ingelheim, BMS, Daiichi-Sankyo, Gilead, GSK, Lilly, Merck-Serono, MSD, Mirati, Novartis, Pfizer, PharmaMar, Pierre-Fabre, Regeneron, Roche, Sanofi and Janssen, support for attending meetings from Amgen, AstraZeneca, Beigene, Boehringer Ingelheim, BMS, Lilly, Merck, MSD, Mirati, Novartis, GSK, Pfizer, Roche, Regeneron, Sanofi, Daiichi-Sankyo and Janssen, and participation on a data safety monitoring board or advisory board with Daiichi, Sanofi and Servier. B-A. Bollmann reports consultancy fees from Siemens, payments or honoraria from Coreline, payment or honoraria for lectures, presentations, manuscript writing or educational events from AstraZeneca, Boehringer Ingelheim, BMS, MSD, Novartis, GSK, Roche, Siemens Healthineers and Daiichi-Sankyo, and support for attending meetings from AstraZeneca, Boehringer Ingelheim, MSD, Roche and Siemens Healthineers. S. Bohnet reports support for attending meetings from BMS, AstraZeneca and Roche, and participation on a data safety monitoring board or advisory board with Roche, BMS, MSD, AstraZeneca and Johnson & Johnson. S. Dettmer reports payment or honoraria for lectures, presentations, manuscript writing or educational events from Boehringer Ingelheim, Insmed and MedUpdate. J. Vogel-Claussen reports support for the present study from the German Center for Lung Research (DZL) and AstraZeneca, grants or contracts from the EU, the US National Institutes of Health, the National Research Council Canada, Siemens Healthineers, GSK, AstraZeneca and Boehringer Ingelheim, consultancy fees from the Institute for Quality and Efficiency in Health Care (IQWiG) and Siemens Healthineers, payments or honoraria for lectures, presentations, manuscript writing or educational events from Boehringer Ingelheim, Siemens Healthineers, Coreline Soft, GSK, Bayer, Pulmonx and AstraZeneca, and a patent planned, issued or pending ("Method of quantitative magnetic resonance lung imaging" number EP3107066, US-2016-0367200-A1 22.12.2016). The remaining authors have no potential conflicts of interest to disclose.**

**Supplementary info**

**Publication typesExpand**

**Full text links**



**Cite**

**14**

**Eur Respir J**

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. 2026 Jun 12;67(6):2502463.

doi: 10.1183/13993003.02463-2025. Print 2026 Jun.

# ERS technical standard on reference values for cardiopulmonary exercise testing: summary report and a call for action

Thomas Radtke [1,2], Luis Chávez [3], Lauren Duggan [3], Sanja Stanojevic [3], Piergiuseppe Agostoni [4,5], Paul Burns [6], Brenda Button [7], Christopher B Cooper [8], Jana De Brandt [9,10], Luiza Helena Degani-Costa [11,12], Monika Franczuk [13], Aisling McGowan [14,15], Jana Kivastik [16], Pierantonio Laveneziana [17,18], Zoe L Saynor [19,20], Irene Steenbruggen [21], Helge Hebestreit [22], Karl P Sylvester [23,24]; contributing GLI CPET task force members

Affiliations Expand

- PMID: 41786497

- DOI: 10.1183/13993003.02463-2025

## Abstract

**Background:** Cardiopulmonary exercise testing (CPET) assesses physiological responses to incremental exercise and identifies potential causes of exercise limitation. There have been several population-specific reference equations published, but none that span the human age range. It would be advantageous to have all-age global reference ranges. This task force aimed to derive Global Lung Function Initiative reference equations for peak oxygen uptake ($\dot{V}_{O2\ peak}$) and peak work rate ($W_{peak}$) in healthy individuals.

**Methods:** CPET data were collected retrospectively. Generalised additive models of location, shape and scale were used to develop reference ranges, including age, sex, height and weight as explanatory variables. The influence of geographic region, equipment, testing protocols and averaging methods for peak exercise data were also examined.

**Results:** Data from 5956 healthy individuals aged between 6 and 83 years across 17 sites in Europe, North and South America and Asia were analysed. There was substantial between-subject variability in both $\dot{V}_{O2\ peak}$ and $W_{peak}$, with wide confidence intervals across age groups. Heterogeneity in $\dot{V}_{O2\ peak}$ was related to geographic region, metabolic cart type, and averaging methods for peak exercise values. Controlling for these variables improved model fit, but not sufficiently to be reliable predictors for reference ranges.

**Conclusion:** Significant heterogeneity in CPET testing methodology and outcomes between sites precluded the development of reference ranges for $\dot{V}_{O2\ peak}$ and $W_{peak}$. This task force has developed a framework for prospective data collection with strictly standardised protocols and centralised data analysis to reduce variability and establish robust, clinically meaningful reference ranges for CPET outcomes.

**Conflict of interest statement**

**Conflict of interest: T. Radtke reports support for attending meetings from the European Cystic Fibrosis Society, and is co-chair of the exercise working group of the European Cystic Fibrosis Society. S. Stanojevic reports support for the present study from CIHR, consultancy fees from BiomX, payment or honoraria for lectures, presentations, manuscript writing or educational events from Vyaire Medicine and GOLD, support for attending meetings from GOLD, participation on a data safety monitoring board or advisory board with Ndd technologies, and is a member of the American Thoracic Society Pulmonary Function Testing Committee, chair of the European Respiratory Society Global Lung Function Initiative Clinical Research Collaboration, statistical editor for Thorax, associate editor for the European Respiratory Journal and a junior associate editor for the Canadian Journal of Respiratory, Critical Care and Sleep Medicine. P. Agostoni reports grants from European Union – Next Generation EU (NRRP M6C2 Investment 2.1), consultancy fees from Schiller, payment or honoraria for lectures, presentations, manuscript writing or educational events from CPX International, payment for expert testimony from AstraZeneca, and support for attending meetings from Società Italiana di Cardiologia and CPX International. B. Button reports consultancy fees from Vitalograph, payment or honoraria for lectures, presentations, manuscript writing or educational events from Vyaire, and support for attending meetings from Vyaire and Vitalograph. C.B. Cooper reports support for the present study from NIH/NHLBI, Foundation NIH and COPD Foundation, royalties or licenses from Cambridge University Press, consultancy fees from AstraZeneca, payment or honoraria for lectures, presentations, manuscript writing or educational events from GlaxoSmithKline and Chulalongkorn University, payment for expert testimony from various law firms, support for attending meetings from AstraZeneca, patents planned, issued or pending (Systems and methods for determining time constant for oxygen uptake kinetics, United States Provisional Patent Application 63/409,865), and participation on a data safety monitoring board or advisory board with Nuvaira, Horizon Therapeutics, MGC Diagnostics, Chiesi, Herbalife Nutrition Institute, Respiree, Aer Therapeutics, Genentec, RS Biotherapeutics and Verona. L.H. Degani–Costa reports payment or honoraria for lectures, presentations, manuscript writing or educational events from Chiesi, Trudell Medical International, AstraZeneca and GSK, and support for attending meetings from Oxyvie, Chiesi and Elivie. P. Laveneziana reports payment or honoraria for lectures, presentations, manuscript writing or educational events from Chiesi, Trudell Medical International, AstraZeneca and GSK, and support for attending meetings from Oxyvie, Chiesi and Elivie. Z.L. Saynor reports participation on a data safety monitoring board or advisory board with Rugby Players Association England, leadership or fiduciary role with Clinical Exercise Physiology UK, and receipt of equipment, materials, drugs, medical writing, gifts or other services from TidalSense Ltd. H. Hebestreit reports grants from Vertex Pharmaceuticals, payment or honoraria for lectures, presentations, manuscript writing or educational events from Chiesi GmbH, support for attending meetings from German Paediatric Society DGKJ, European Respiratory Society and European Reference Network LUNG, and leadership or fiduciary role with German Pediatric Society (Commission on Rare Diseases) and Working Group of Centers for Rare Diseases in Germany. The remaining authors have no potential conflicts of interest to disclose.**

# "Multimorbidity"[Mesh Terms] OR Multimorbidity[Text Word]

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Eur J Intern Med

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. 2026 Jun 12:107013.

doi: 10.1016/j.ejim.2026.107013. Online ahead of print.

## The time has come for comprehensive geriatric assessment in internal medicine

Chiara Ceolin [1], Marina De Rui [2], Sandro Giannini [3], Paolo Simioni [3], Giuseppe Sergi [4]

Affiliations Expand

- PMID: 42285876

- DOI: 10.1016/j.ejim.2026.107013

*No abstract available*

Keywords: Comprehensive geriatric assessment; Frailty; Internal medicine; Multimorbidity; Older adults; Patient-centered care.

Conflict of interest statement

Declaration of competing interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary info

Publication typesExpand

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2

**Review**

**Inflamm Res**

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**. 2026 Jun 11;75(1):140.**

**doi: 10.1007/s00011-026-02293-8.**

# Repurposing niclosamide to mitigate inflammaging: a review of multi-target mechanisms in cellular senescence and age-related decline

**Ayman Ali Mohammed Alameen [1], Hayder M Al-Kuraishy [2], Ahmed M Abdelaziz [3], Gaber El-Saber Batiha [4]**

**Affiliations Expand**

- **PMID: 42274789**

- **DOI: 10.1007/s00011-026-02293-8**

**Abstract**

**Background: Chronic low-grade inflammation, or inflammaging, drives age-related multimorbidity and cellular decline, yet pharmacological interventions targeting its root causes are lacking. Niclosamide, a WHO-listed anthelmintic with a long safety record, has recently emerged as a multi-target geroprotector with potent anti-inflammatory properties, though historical poor absorption limited its systemic use.**

**Objectives: This review consolidates molecular and preclinical evidence supporting niclosamide's repurposing for inflammaging, focusing on its ability to simultaneously engage core pathways of cellular aging and inflammation. It also evaluates recent data from reformulated oral formulations that achieve sustained plasma concentrations (0.5-3 μmol/L) sufficient for systemic effects.**

**Key findings: Niclosamide acts through six interconnected mechanisms: (1) mild reversible mitochondrial uncoupling, limiting ROS and cGAS-STING activation; (2) mTORC1 inhibition via lysosomal deacidification, with indirect IGF-1/IGF-1R modulation through AMPK activation; (3) restoration of autophagic flux and lysosomal biogenesis via TFEB nuclear translocation; (4) selective senolytic and senomorphic effects, suppressing NF-κB and STAT3 to neutralize the senescence-associated secretory phenotype (SASP) and reduce IL-6, IL-1β, and TNF-α; (5) blockade of canonical Wnt/β-catenin signaling to prevent tissue fibrosis; and (6) rebalancing of aged immune function by downregulating PD-1/PD-L1 and upregulating Vasorin to inhibit TGFβ-mediated fibrosis. Unlike single-pathway agents, niclosamide offers a unique polypharmacological profile that mitigates sterile inflammation at its source.**

**Conclusions: Reformulated niclosamide combines multi-target anti-inflammaging activity with a decades-long safety record. Randomized, placebo-controlled trials targeting inflammaging, frailty, and biological age biomarkers are now an immediate translational priority.**

**Keywords: Cellular senescence; Immunosenescence; Inflammaging; Mitochondrial uncoupling; Niclosamide; Senescence-associated secretory phenotype (SASP); mTORC1.**



**Conflict of interest statement**

**Declarations. Conflict of interest: The authors declare no conflict of interest. Ethics approval and consent to participate: Not applicable.**

- **139 references**

**Supplementary info**

**Publication typesExpand**

**Full text links**



**3**

**Review**

**J Med Internet Res**

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**. 2026 Jun 9:28:e88708.**

**doi: 10.2196/88708.**

# Effectiveness of Digital Health Interventions to Improve Self-Care in Patients With Chronic Diseases: Systematic Review and Meta-Analysis of Randomized Controlled Trials

**Jessica Longhini [1], Daniel Pedrotti [2], Federica Foladori [2], Melania Stedile [2], Francesca Stefani [2], Michela Dal Ben [2], Alessandro Froner [2], Marta Proietti Pesci [2], Stefano Toccoli [2], Anna Brugnolli [2 3]**

**Affiliations Expand**

- **PMID: 42263266**

- **DOI: 10.2196/88708**

**Free article**

**Abstract**

**Background: Chronic diseases account for most global morbidity and mortality, increasing the need for effective long-term self-care support. Digital health interventions, such as mobile apps, telemonitoring, and connected devices, are increasingly used to promote self-care; yet, their overall effectiveness across chronic conditions remains unclear.**

**Objective: This systematic review and meta-analysis evaluated whether digital health interventions improve self-care in adults with chronic diseases.**

**Methods: We searched PubMed, CINAHL, Scopus, and PsycINFO for randomized controlled trials (RCTs; January 1, 2013, to December 31, 2025) that assessed digital health interventions targeting self-care outcomes, as measured with validated instruments, in patients with chronic conditions. Standardized mean differences (SMDs) were pooled using random-effects models, while results not suitable for meta-analysis were synthesized narratively. Risk of bias was assessed with the Cochrane Risk of Bias 2.0 tool for RCTs and certainty of evidence with Grading of Recommendations Assessment, Development and Evaluation.**

**Results: A total of 55 RCTs involving 5889 participants were included. Most interventions were multicomponent and mainly based on mobile or web-based applications, telemonitoring, connected devices, and text-messaging support. In diabetes, pooled analyses showed little to no clear improvement across self-care domains measured with the Summary of Diabetes Self-Care Activities, including general diet (3 studies), specific diet (3 studies), exercise (5 studies), foot care (5 studies), and glucose monitoring (4 studies), with low to very low certainty of evidence. In heart failure, digital interventions probably improved self-care monitoring measured with the Self-Care of Heart Failure Index (5 studies, 364 participants; SMD=0.49, 95% CI 0.13-0.85; low certainty), whereas effects on self-care maintenance (5 studies) and on self-care measured with the European Heart Failure Self-Care Behaviour Scale (3 studies) were not clearly demonstrated. In other chronic conditions, narrative synthesis suggested possible benefits in some cardiovascular conditions, chronic hepatitis B, epilepsy, and hypertension, while no significant effects were found in chronic obstructive pulmonary disease and multimorbidity, and mixed findings emerged in Parkinson disease. Across 17 studies, medication adherence showed little to no overall improvement (SMD=0.06, 95% CI -0.31 to 0.42, 95% prediction interval -0.98 to 1.09; very low certainty), indicating that future studies could plausibly show either benefit or no effect. Overall, heterogeneity was substantial, and most evidence was of low or very low certainty.**

**Conclusions: This review is innovative in providing an up-to-date, cross-condition synthesis focused specifically on self-care as a multidimensional outcome, rather than on clinical end points alone or single diseases. The findings suggest that digital health interventions may be more effective for supporting self-care**

monitoring than for promoting broader behavioral maintenance or medication adherence. Evidence is limited by methodological heterogeneity, small sample sizes, short follow-up periods, and varied outcome measures. Larger designed trials using standardized self-care metrics and equity-focused approaches are needed to clarify effectiveness and guide implementation.

Keywords: chronic disease; digital; e-health; self-care; self-management; technology.



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Review

Lancet

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. 2026 Jun 13;407(10546):2444-2460.

doi: 10.1016/S0140-6736(26)00653-7. Epub 2026 Jun 3.

# Chronic kidney disease, complex conditions, and advancing therapeutics: new hope and challenges

Jennifer S Lees [1], Andrej Škoberne [2], Luxia Zhang [3], Christina Wyatt [4], June Fabian [5], Angela Y Wang [6], Louise Oni [7], Adeera Levin [8]

Affiliations Expand

- PMID: 42235560

- DOI: 10.1016/S0140-6736(26)00653-7

**Abstract**

**Chronic kidney disease (CKD) is increasingly recognised as a complex, multisystem condition that rarely occurs in isolation. This Series paper outlines major advances in therapeutics that target shared inflammatory, metabolic, and fibrotic pathways across CKD, cardiovascular disease, diabetes, obesity, and infection. Novel therapeutics, including SGLT2 inhibitors, non-steroidal mineralocorticoid receptor antagonists, and GLP receptor agonists, show substantial benefits for slowing CKD progression and improving cardiovascular outcomes, with combination strategies showing additive potential. This Series paper discusses complexities for therapeutic decision-making in CKD, highlighting multimorbidity, frailty, and polypharmacy care as major challenges for implementation in general or primary care settings. We identify under-recognised, groups of patients at high risk with infection and cancer-related CKD, in whom early detection and integrated care could markedly improve outcomes. Finally, we call for more inclusive and representative evidence generation, improved CKD screening within other disease pathways, and coordinated implementation of emerging therapies to reduce the global burden of CKD.**



**Conflict of interest statement**

**Declaration of interests JSL is personally funded by a Wellcome Trust Early Career Award (301005/Z/23/Z); and reports personal lectureship honoraria from AstraZeneca; and consulting fees from Boehringer Ingelheim, all outside the submitted work. AŠ reports lectureship honoraria from AstraZeneca, Bayer, Baxter, Boehringer Ingelheim, Johnson & Johnson, Novartis, and Stada; and consulting fees from Astellas, AstraZeneca, and Genesis Pharma, all outside the submitted work. LZ is personally funded by the National Natural Science Foundation of China (no. 72125009); and reports grants from Bayer, outside the submitted work. AYW reports honoraria from AstraZeneca, Bayer, Fresenius Kabi, and Vitaflo; and support for attending meetings from Bayer, AstraZeneca, Fresenius Kabi, and Consun Pharma; and is a scientific advisor for Consun Pharma, all outside the submitted work. JF reports a contract with Variant Bio; grants from UK Research and Innovation, and the International Society of Nephrology, outside the submitted work. LO reports consultancy fees claimed from Biocryst Pharmaceuticals, Boehringer Ingelheim, Novartis, and Roche; honoraria from Sandoz and Travere Therapeutics; an educational grant from Vifor; and advisory or leadership roles for Aurinia Pharmaceuticals, Biocryst Pharmaceuticals, Boehringer Ingelheim, Roche, and Travere Therapeutics; these have not influenced the production of this manuscript. AL receives salary support from the University of British Columbia, and Provincial Health Services Authority in British Columbia Canada; and reports honoraria, consulting fees, and grant funding from Bayer, AstraZeneca, NovoNordisk, Boehringer Ingelheim, and Novartis; and has participated in advisory boards for Novartis, AstraZeneca, and Bayer, all of which are donated to educational and research organisations.**

**Supplementary info**

**Publication types, MeSH termsExpand**

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Cell Genom

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. 2026 Jun 10;6(6):101218.

doi: 10.1016/j.xgen.2026.101218. Epub 2026 Apr 17.

# Interferon-related inflammaging links epigenetic age acceleration to multimorbidity

Zhaoli Liu [1], Athanasios Ziogas [2], Yihan Zhang [3], Manoj Kumar Gupta [3], Konstantin Föhse [4], Esther Taks [4], Elisabeth Dulfer [4], Andrei Sarlea [4], Lorenzo Ventriglia [5], Büsra Geckin [4], Mohamad Ballan [3], Nienke van Unen [3], Leonie Helder [4], Stephanie Trittel [6], Peggy Riese [6], Simone Moorlag [4], Charlotte de Bree [4], Valerie Koeken [7], Vera Mourits [4], Martin Jaeger [4], Frank Pessler [8], Carlos A Guzmán [9], Leo A B Joosten [10], Yang Li [11], Cheng-Jian Xu [3], Mihai G Netea [12]

Affiliations Expand

- PMID: 41999740

- DOI: 10.1016/j.xgen.2026.101218

Free article

## Abstract

Chronic systemic inflammation and DNA methylation changes are two major hallmarks of aging, yet their interaction is poorly known. We investigated the relation between circulating inflammatory proteome and epigenetic age acceleration as assessed by DNA methylation in four independent cohorts of different ages and health conditions. Epigenetic age scores known to predict human health span (GrimAge and PhenoAge) were more strongly associated with age-associated inflammatory proteins, frailty, and multimorbidity when compared to epigenetic age scores associated with lifespan (Horvath and Hannum). Mendelian randomization analyses showed that blood concentrations of important inflammatory cytokines associated with the interferon pathway (CXCL9, CXCL10, CCL11, and IL-18) increase with age and are causal drivers of epigenetic age acceleration and age-related diseases. Furthermore, aging was associated with dysregulation of cytokine production capacity in immune cells in response to microbial stimulation. These

findings argue that the interferon pathway may represent a target for anti-aging interventions.

Keywords: biological aging; epigenetic age acceleration; frailty; immunosenescence; inflammaging; multimorbidity.



Conflict of interest statement

Declaration of interests M.G.N. is a scientific founder of Biotrip, Lemba, TTxD, and Salvina. L.A.B.J. is a scientific founder of Lemba, TTxD, and Salvina.

# "asthma"[MeSH Terms] OR asthma[Text Word]

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Editorial

J Allergy Clin Immunol

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. 2026 Jun 12:S0091-6749(26)00411-2.

doi: 10.1016/j.jaci.2026.05.025. Online ahead of print.

## Is an inhaled biologic a better approach to treat asthma?

William W Busse [1], Ravi Viswanathan [2]

Affiliations Expand

- PMID: 42285363

- DOI: 10.1016/j.jaci.2026.05.025

*No abstract available*

Keywords: Airway inflammation; Asthma; Biologics in severe asthma; Inhaled biologics; TSLP.

Supplementary info

Publication typesExpand

Full text links

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2

Ann Allergy Asthma Immunol

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. 2026 Jun 12:S1081-1206(26)00269-3.

doi: 10.1016/j.anai.2026.06.008. Online ahead of print.

# Reductions in Immunoglobulin Levels, Atopic Disease, and Asthma Following CAR T-Cell Therapy

Ahmed Elmoursi [1], Lingxiao Zhang [2], Marcela V Maus [3], Sara Barmettler [4]

Affiliations Expand

- PMID: 42285295

- DOI: 10.1016/j.anai.2026.06.008

*No abstract available*

Keywords: Chimeric Antigen Receptor (CAR) T-Cell Therapy CD19 CAR T Cells BCMA CAR T Cells B-Cell Depletion Immunoglobulins Atopic Disease Asthma Allergic Inflammation Hypogammaglobulinemia Immune Resetting.

## Conflict of interest statement

Declaration of competing interest SB has served as a consultant for CSL Behring, Octapharma, Takeda, and Vertex, and received an investigator-initiated research grant from Bristol-Myers Squibb and Pharming unrelated to the work presented. MVM is an inventor on patents related to adoptive cell therapies held by Massachusetts General Hospital (some licensed to Promab and Luminary) and the University of Pennsylvania (some licensed to Novartis). MVM has received research support from Kite Pharma and Sobi, holds equity in Model T Bio, and has served as a compensated consultant for A2Bio, Adaptimmune, Astellas, AstraZeneca, Bristol Myers Squibb, Cabaletta Bio, In8bio, KSQ, and Lumicks. MVM reports no participation in any speaker's bureau.

## Full text links

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3

Am J Epidemiol

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. 2026 Jun 12:kwag132.

doi: 10.1093/aje/kwag132. Online ahead of print.

# Antibiotic treatment for non-specific upper respiratory tract infections and exacerbation risk in children with asthma: A target trial emulation study

Carmen Cañete Ramirez [1 2], Albina Tskhay [2 3], Ana C Blanchard [2], Amélie Forget [1], Marie-Élaine Métras [1 2], Tibor Schuster [3], Lucie Blais [1], Cristina Longo [1 2]

Affiliations Expand

- PMID: 42281381

- DOI: 10.1093/aje/kwag132

## Abstract

Antibiotics are often prescribed to children with asthma for non-specific upper respiratory tract infections (NS-URTIs), but their association with exacerbation risk in children with pre-existing asthma is unclear. We aimed to determine if antibiotics are associated with asthma exacerbation risk in the six months following NS-URTI resolution. Using Quebec administrative health and drug claims data, we emulated a series of target trials among children (0-17 years) with asthma visiting an outpatient physician for a NS-URTI. Treatment strategies were no, narrow-, or broad-spectrum antibiotics initiated within three days following the index visit. The primary outcome was exacerbation during the 6 months following an initial 10-day induction period, defined as oral corticosteroid use, emergency department visits, or hospitalizations for asthma. Risk ratios and differences were estimated using inverse probability of treatment weighted log-binomial models. Among 13 646 children (24 139 person-trials), 8.8% and 11.4% received narrow- and broad-spectrum antibiotics, respectively. Compared with no antibiotics, narrow-spectrum antibiotics were associated with a risk ratio of 1.26 (95%CI, 0.99, 1.53; RD 0.07%), while broad-spectrum antibiotics were associated with a risk ratio of 1.28 (95%CI, 1.03, 1.54; RD 0.08%). Broad-spectrum antibiotics were associated with modestly higher exacerbation risks, although absolute risk differences were small (<0.1%).

Keywords: antibiotics; exacerbation; non-specific respiratory tract infections; pediatric asthma; target trial emulation.

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Respir Res

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. 2026 Jun 11.

doi: 10.1186/s12931-026-03755-7. Online ahead of print.

# Mycoplasma pneumoniae infection impairs asthma control in pediatric patients and exacerbates allergic airway inflammation

Chao Yan [#1], Xinyu Jia [#2], Xue Ren [#2], Yujie Chen [3], Xuanfeng Liu [1], An Su [1], Bing Du [1], Hanqing Zhao [1], Yanling Feng [1], Guanhua Xue [1], Jinghua Cui [1], Yuehua Ke [1], Lin Gan [1], Junxia Feng [1], Zheng Fan [1], Tongtong Fu [1], Ziying Xu [1], Zihui Yu [1], Yang Yang [1], Tingting Zhang [1], Jing Yuan [4 5 6]

Affiliations Expand

- PMID: 42277784

- DOI: 10.1186/s12931-026-03755-7

## Abstract

Objective: To analyze the effect of Mycoplasma pneumoniae (M. pneumoniae) infection on asthma control and its underlying characteristic mechanisms, and to provide evidence-based support for the clinical management of asthma control in children with asthma.

Methods: We enrolled children with asthma and performed a retrospective medical record review, M. pneumoniae detection and isolation from respiratory samples, in vitro antibiotic susceptibility testing, and metabolomic sequencing of bacteria. An ovalbumin-induced allergic asthma model was established using BALB/c mice, which were further divided into the M. pneumoniae-infected asthma group and the non-infected asthma group. Bronchoalveolar lavage fluid from the mice was subjected to detection of M. pneumoniae DNA and 16 S rRNA gene sequencing. Lung tissues were processed for hematoxylin-eosin staining to assess

**inflammatory infiltration. Periodic acid-Schiff staining was used to evaluate mucus hypersecretion. Metabolomic profiling and transcriptomic analysis were also performed.**

**Results: We included 145 children with asthma in the clinical cohort. The uncontrolled asthma rate in patients with asthma and M. pneumoniae co-infection was significantly higher than that in patients with asthma only. Among the respiratory specimens, 28 M. pneumoniae nucleic acid-positive samples were identified as genotype M4-5-7-2, and all of these strains carried an A2063G mutation in the 23 S rRNA gene. In the murine asthma model, M. pneumoniae infection significantly exacerbated allergic asthma. Specifically, M. pneumoniae infection led to aggravated allergic symptoms, increased airway hyperresponsiveness, elevated serum immunoglobulin E levels, and higher pathological scores in lung tissue as shown by hematoxylin-eosin staining and periodic acid-Schiff staining. Consistently, 16 S rRNA gene sequencing and transcriptomic and metabolomic analyses showed that M. pneumoniae infection was accompanied by changes in respiratory microbiota composition and altered the phosphatidylinositol 3-kinase/protein kinase signaling pathway, as well as variations in butanoate metabolism profiles. Notably, the changes of butanoate metabolism may be correlated with sophorose, which is a metabolite produced by M. pneumoniae.**

**Conclusion: This study shows that M. pneumoniae infection reduces the level of asthma control in pediatric patients with asthma. In the murine asthma model, M. pneumoniae infection exacerbates allergic airway inflammation, which may be correlated with altered butanoate metabolism induced by the infection.**

**Keywords: Mycoplasma pneumoniae; Asthma; Butanoate metabolism pathway; Children; PI3K-Akt signaling pathway.**



**Conflict of interest statement**

**Declarations. Ethics approval and consent to participate: This research strictly adheres to scientific ethical guidelines. The use of all involved human patient case data was based on prior informed consent and underwent rigorous de-identification to protect patient privacy (Approval No. SHERLL2023092). The related animal experiments strictly comply with the UK's amended Animals (Scientific Procedures) Act 1986. The experimental protocols were designed to minimize the number of animals used and alleviate their suffering as much as possible, and have received ethical approval for animal experimentation from the relevant institutional committee (Approval No. DWLL2021005). The entire research process upholds a responsible research attitude, respects life, and protects the rights and interests of all participants. Consent for publication: not applicable. Competing interests: The authors declare no competing interests.**

**Supplementary info**

**Grants and fundingExpand**

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Editorial

Ann Emerg Med

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. 2026 Jun 10:S0196-0644(26)00252-0.

doi: 10.1016/j.annemergmed.2026.04.008. Online ahead of print.

# Should Nebulized Ipratropium Bromide Be Added to Standard Treatments of Pediatric Asthma Exacerbations in the Emergency Department?

Juliet Jacobson [1], Sangil Lee [2]

Affiliations Expand

- PMID: 42274434

- DOI: 10.1016/j.annemergmed.2026.04.008

*No abstract available*

Supplementary info

Publication typesExpand

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Respir Care

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. 2026 Jun 11:19433654261450214.

doi: 10.1177/19433654261450214. Online ahead of print.

# Vibrating Mesh versus Jet Nebulizers for High-Dose Albuterol in Exacerbations of COPD and Asthma

Laura Reindl [1], Sarah Bazelak [1], Brittany Steinpas [1], Sadashiv Santosh [2]

Affiliations Expand

- PMID: 42273896

- DOI: 10.1177/19433654261450214

## Abstract

**Background:** Patients presenting to the emergency department (ED) with exacerbations of COPD and asthma are often treated with high-dose albuterol, traditionally administered using a jet nebulizer (JN). Vibrating mesh nebulizers (VMNs) may enhance aerosol delivery and shorten treatment time, but data comparing VMN with JN for high-dose albuterol in exacerbations are limited.

**Methods:** We conducted a single-center, retrospective, pre and post study of adults prescribed high-dose albuterol for COPD or asthma exacerbation in the ED, comparing JN with VMN. Historically, high-dose albuterol (7.5-15 mg) was delivered over ~60 min via JN. Following a protocolized change from JN to VMN, doses were standardized to 5-10 mg and delivered rapidly over ~10 min. The primary outcome was need for repeat albuterol within 4 h. Analyses were intent-to-treat.

**Results:** Three hundred fifty-one subjects were included in the study (JN *n* = 189; VMN *n* = 162). Twenty-two (13.6%) subjects in the VMN arm received JN but were analyzed with VMN. The need for repeat albuterol within 4 h was similar in both arms: 19.6% (JN) versus 22.2% (VMN), *P* = .54; multivariate results were concordant. VMN protocol was associated with greater heart rate increases at 10 and 60 min, and the proportion with ≥20 beat-per-minute rise was substantially higher with VMN. ED stay was modestly longer with VMN. Admission rates and escalation of ventilatory support were similar. No adverse events other than tachycardia were observed.

**Conclusions:** In adults with asthma or COPD exacerbations receiving high-dose albuterol, the JN and VMN protocols resulted in similar need for repeat bronchodilator therapy. VMN therapy led to greater heart rate increases. These findings suggest that for delivery of high-dose albuterol, rapid VMN delivery does not provide benefit over traditional JN but may increase side effects. Additional prospective randomized trials are needed to further clarify the role of VMN for high-dose albuterol administration.

**Keywords:** albuterol; asthma; chronic obstructive pulmonary disease; exacerbation; jet nebulizer; nebulizer; vibrating mesh nebulizer.

Full text links

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BMC Pulm Med

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. 2026 Jun 10.

doi: 10.1186/s12890-026-04402-z. Online ahead of print.

# Unlocking the potential of bronchoalveolar lavage: a promising supplement therapy for moderate-to-severe allergic asthma

Minghui Yu [#1], Lu Zhang [#1], Zhigang Pang [2], Minna Liu [1], Rou Liu [1], Qi Yao [1], Kai Yin [1], Xiaoxue Chen [1], Lei Li [1], Huanping Zhang [3]

Affiliations Expand

- PMID: 42271286

- DOI: 10.1186/s12890-026-04402-z

Free article

## Abstract

**Background: Bronchoalveolar lavage holds potential therapeutic value for moderate-to-severe asthma that is poorly controlled with standard nebulizer therapy. To evaluate the efficacy and safety of bronchoalveolar lavage (BAL) as an adjunctive therapy in patients with moderate-to-severe allergic asthma inadequately controlled by standard inhaled corticosteroids and long-acting beta$_2$-agonists therapy.**

**Methods: In this retrospective study conducted between July 2021 and December 2024, eligible patients were allocated to a control group receiving standard high-pressure nebulizer therapy or a study group receiving additional BAL. Outcomes included changes in asthma symptom scores, pulmonary function, fractional exhaled nitric oxide (FeNO) levels, adverse events, and bronchoalveolar lavage fluid pathogen distribution.**

**Results: The study group demonstrated significantly greater improvement in subjective symptom scores and small airway function parameters compared to controls ($P < 0.05$). This superiority was particularly pronounced in a predefined subgroup with more severe impairment (FEV1% pred < 50%, FVC% pred < 80%,**

FEV1/FVC < 65%). No significant differences were observed in FeNO levels or overall adverse event incidence (P > 0.05). BALF analysis in 72 study patients identified 43 distinct pathogens (detection rate: 39.8%), predominantly bacterial species (72.1%).

Conclusion: Adjunctive BAL significantly improved lung function, especially in small airways, without increasing adverse reactions, demonstrating a favorable safety profile in patients with uncontrolled allergic asthma, supports BAL's potential as a therapeutic procedure.

Keywords: Alveolar lavage; Bronchoscopy; Moderate-to-severe allergic asthma; Pathogens; Pulmonary function.



Conflict of interest statement

Declarations. Ethics approval and consent to participate: This study was reviewed and approved by the Ethics Committee of Shanxi Bethune Hospital (YXLL-2025-045). And written informed consent was obtained from all individual participants included in the study. All experiments and procedures involving human participants were conducted in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Consent for publication: Not applicable. Competing interests: The authors declare no competing interests.

Supplementary info

Grants and fundingExpand

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Adv Ther

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. 2026 Jun 10.

doi: 10.1007/s12325-026-03623-2. Online ahead of print.

Baseline Characteristics of Patients with Asthma Initiating Dupilumab in a Real-World Setting: The REVEAL Registry

Jorge F Máspero [1], Rand K Arnaout [2], Leslie Vargas-Ramírez [3], Hassan Mobayed [4], Bassam Mahboub [5], Carla Irani [6], Amir Bar-Shai [7 8], Mariko S Koh [9], Jason Chao [10], Sherif Zaghloul [11], Jason H Kwah [12], Jennifer Dewhurst [13], Mona S Al-Ahmad [14 15]

Affiliations Expand

- PMID: 42268495

- DOI: 10.1007/s12325-026-03623-2

Abstract

Introduction: Dupilumab, a fully human monoclonal antibody, blocks the receptors for interleukins 4/13, key and central drivers of type 2 inflammation. Clinical trials demonstrated the safety and efficacy of dupilumab in patients with moderate-to-severe asthma. Here, we aim to describe baseline characteristics of patients initiating dupilumab for asthma, to characterize its safety and effectiveness in real-world clinical practice.

Methods: REVEAL (pRospEctiVe charactErization of asthma patients treated with dupilumAb in a reaL-world setting; NCT04550962) is a longitudinal, prospective, 3-year observational study of patients aged ≥12 years prescribed dupilumab for asthma in Latin America, the Middle East, Russian Federation, and Singapore per country-specific prescribing information.

Results: Of 376 patients enrolled, 374 were included in the effectiveness analysis set. Most were female (62.6%), white (50.3%), and non-Hispanic or Latino (51.3%). Mean (standard deviation [SD]) age was 47.8 (13.89) years. Tobacco use was rare; 312 (83.4%) patients were never smokers. Most were classified as Global Initiative for Asthma step 4 (17.8%) or 5 (69.5%). Mean (SD) number of prior-year severe exacerbations was 2.0 (4.53) (n = 374). Mean (SD) pre- and post-bronchodilator forced expiratory volume in 1 second ($FEV_1$) was 2.2 L (0.83) (n = 306) and 2.3 L (0.86) (n = 212), respectively. Mean (SD) pre-bronchodilator $FEV_1$/forced vital capacity (FVC) ratio was 0.7 (0.13) (n = 301). 242 (64.7%); 231 (61.8%) patients reported allergic rhinitis and chronic rhinosinusitis with nasal polyposis history. Median (Q1-Q3) blood eosinophil counts were 390.0 cells/μL (185.0-700.0) (n = 348) and fractional exhaled nitric oxide levels were 34.0 parts per billion (19.0-60.0) (n = 314).

Conclusion: Patients prescribed dupilumab in routine clinical practice were predominantly adult women with severe asthma. Frequent severe exacerbations, high prevalence of coexisting type 2 inflammatory conditions, and elevated type 2 inflammatory biomarkers suggest disease burden is high among patients initiating dupilumab for asthma.

Trial registration: ClinicalTrials.gov Identifier, NCT04550962.

Keywords: Asthma; Asthma control; Dupilumab; Lung function; Real-world evidence; Registry study.

Plain language summary

**Standard asthma treatments do not always prevent asthma attacks or improve breathing. Dupilumab is a newer prescription medicine used to treat patients with moderate-to-severe asthma who have an overreaction of their immune system called type 2 inflammation. In clinical trials, dupilumab reduced asthma attacks and improved breathing in patients with moderate-to-severe asthma. The REVEAL registry is a study observing how patients with asthma in the Middle East, Latin America, Russian Federation, and Singapore respond to dupilumab outside of clinical trial settings. The average patient had uncontrolled, severe asthma on enrollment. We summarized the characteristics of 374 enrolled patients before they started dupilumab; 60% were from the Middle East, nearly 60% were women, and half were white. More than 80% reported no history of smoking and, on average, patients were overweight. In the year before REVEAL, despite taking their medicine, patients had an average of two severe asthma attacks. Breathing tests showed moderate asthma in most patients. Most (72%) had high numbers of blood eosinophils (an inflammatory white blood cell) and 55% had elevated fractional exhaled nitric oxide (FeNO; a marker of lung inflammation in breath), indicating presence of type 2 inflammation, common in many people with asthma. Several patients had other health problems related to type 2 inflammation, most commonly allergic rhinitis (runny nose, sneezing, and itchy eyes caused by allergies), seen in 65% of patients. Overall, patients starting dupilumab in the real world had features of uncontrolled, severe asthma, including frequent asthma attacks and type 2 inflammation.**



**Conflict of interest statement**

**Declarations. Conflict of interest: Jorge F. Máspero is a consultant for AstraZeneca and Sanofi; has received speaker fees from GSK, Menarini, Novartis, and Uriach; and has received research grants from Novartis. Rand K. Arnaout has received honoraria for serving as a speaker and on advisory boards from AllergoTek, AstraZeneca, Biologix, GSK, Novartis, Pfizer, Regeneron Pharmaceuticals Inc., Sanofi, and Takeda. Leslie Vargas-Ramírez has served as a speaker for AstraZeneca, Boehringer Ingelheim, and GSK. Hassan Mobayed and Bassam Mahboub have no conflicts of interest to disclose. Carla Irani has received honoraria from Novartis, Sanofi, and Stallergenes Greer. Amir Bar-Shai reports advisory board member/consulting fees, speaker fees, institutional research grants from AstraZeneca, Boehringer Ingelheim, GSK, Kamada, and Sanofi. Mariko S. Koh has received research support from AstraZeneca and reports lecture and advisory board honoraria paid to her institution from AstraZeneca, Boehringer Ingelheim, GSK, Novartis, Roche, and Sanofi. Jason Chao is a former employee of Sanofi and may hold stock and/or stock options in the company. Sherif Zaghloul and Jennifer Dewhurst are employees of Sanofi and may hold stock and/or stock options in the company. Jason H. Kwah is an employee and shareholder of Regeneron Pharmaceuticals Inc. Mona S. Al-Ahmad has received honoraria for serving as a speaker and on advisory boards from AstraZeneca, GSK, Novartis, and Sanofi. Ethical Approval: REVEAL is being conducted in accordance with the Declaration of Helsinki, the International Conference on Harmonisation Good Clinical Practice guideline, and applicable regulatory requirements. The REVEAL protocol was reviewed and approved by the respective institutional review boards before patient recruitment. All patients provided written informed consent. For patients under the**

age of 18 years, both parental/legal guardian consent and patient assent were required.

- 34 references

Supplementary info

Associated data, Grants and fundingExpand

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Review

Expert Rev Respir Med

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. 2026 Jun 13:1-7.

doi: 10.1080/17476348.2026.2688299. Online ahead of print.

# Effect of depemokimab on asthma control and clinical outcomes: a systematic review and meta-analysis of randomized controlled trials

Shun Nakahara [1], Maria Júlia Hallack Moura [2], Sumeyye K Cengiz [3], Manoel F Filho [4], Jafar Aljazeeri [5 6 7]

Affiliations Expand

- PMID: 42268259

- DOI: 10.1080/17476348.2026.2688299

Abstract

Introduction: Patients with eosinophilic asthma are at increased risk of poor asthma control despite optimized standard therapy. Depemokimab, a novel long-acting anti-interleukin-5 monoclonal antibody, has shown efficacy in reducing exacerbations; however, its effects across clinical outcomes have not been comprehensively synthesized.

**Methods:** PubMed, Embase, Cochrane databases, and ClinicalTrials.gov were searched for randomized controlled trials (RCTs) comparing depemokimab with placebo. Outcomes included Asthma Control Questionnaire-5 (ACQ-5), asthma exacerbation rate, quality of life assessed by St. George's Respiratory Questionnaire (SGRQ), and adverse events. Results were reported as mean differences (MDs) or incidence rate ratios (IRRs) with 95% confidence intervals (CIs), and heterogeneity was assessed using the $I^2$ statistic.

**Results:** Four RCTs ($n$ = 954) were included. Depemokimab did not significantly improve ACQ-5 (MD -0.30; 95% CI -0.92 to 0.32; $I^2$ = 73.6%; $p$ = 0.23), but reduced exacerbation rates (IRR 0.47; 95% CI 0.36 to 0.59; $I^2$ = 0%; $p$ < 0.001) and modestly improved SGRQ scores without reaching the MCID (MD -2.80; 95% CI -5.38 to -0.23; $I^2$ = 0.0%; $p$ = 0.033). Safety was comparable to placebo.

**Conclusions:** Depemokimab reduced exacerbations and had a comparable safety profile, but did not improve symptom control or achieve the MCID for health-related quality-of-life.

**Registration:** The study protocol was prospectively registered in the International Prospective Register of Systematic Reviews (PROSPERO; registration number CRD420261282685).

**Keywords:** Asthma; depemokimab; eosinophilic asthma; meta-analysis; rhinosinusitis.



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**Monaldi Arch Chest Dis**

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**. 2026 Jun 9.**

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## Subclinical right ventricular dysfunction in asthma: association with disease severity and control assessed by echocardiography

Asma Bouslimi [1], Sabrine Maddeh [2], Amira Triki [3], Rana Dahmani [1], Abdelmajid Sakhri [2]

**Affiliations Expand**

- **PMID: 42267578**

- **DOI: 10.4081/monaldi.2026.3895**

**Free article**

**Abstract**

**Asthma is a chronic inflammatory airway disease that may affect the cardiovascular system, particularly the right ventricle (RV). Early subclinical RV dysfunction in asthma remains insufficiently explored. We conducted a retrospective observational study to identify clinical factors associated with subclinical RV dysfunction assessed by transthoracic echocardiography (TTE) in adult asthmatic patients without clinical signs of right heart failure. All participants underwent TTE with conventional RV parameters and RV free wall longitudinal strain (RVFWLS) assessment; body mass index (BMI) was recorded for all participants. RV dysfunction was defined by abnormal RVFWLS, pulmonary artery systolic pressure, RV hypertrophy, or fractional area change. A total of 80 patients were included (mean age 45±15.9 years; 75% women; mean BMI 27.3±4.8 kg/m²). RVFWLS was impaired in 40% of patients, whereas conventional RV indices (tricuspid annular plane systolic excursion, S') remained largely preserved. Pulmonary hypertension was observed in 16.2%. In multivariable analysis, age ≥45 years [odds ratio (OR) 5.0, 95% confidence interval (CI) 1.4-17.0], uncontrolled asthma (OR 9.7, 95% CI 3.4-27.8), and severe asthma (OR 3.8, 95% CI 1.4-10.0) were independently associated with impaired RVFWLS. Pulmonary hypertension was independently associated with late-onset asthma (OR 11.9, 95% CI 1.1-22.2) and severe asthma (OR 10.1, 95% CI 1.5-64.8). Subclinical RV dysfunction is frequent in adult asthmatics, particularly in those with uncontrolled or severe disease. RVFWLS appears to be a sensitive marker of early cardiac involvement related to asthma severity. Targeted echocardiographic evaluation may help identify high-risk patients and support multidisciplinary management.**

**Keywords: Asthma; echocardiography; pulmonary hypertension; right ventricle; strain imaging.**

- **24 references**

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Monaldi Arch Chest Dis UNIMORE

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**Editorial**

**Thorax**

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**. 2026 Jun 9:thorax-2026-225181.**

**doi: 10.1136/thorax-2026-225181. Online ahead of print.**

# Preventing severe asthma exacerbations in at-risk patients: time for a rethink

**Ran Wang [1 2], Luke Daines [3], Stephen J Fowler [4 2]**

**Affiliations Expand**

- **PMID: 42264937**

- **DOI: 10.1136/thorax-2026-225181**

***No abstract available***

**Keywords: Asthma; Asthma Guidelines; Asthma in primary care.**

**Conflict of interest statement**

**Competing interests: None declared.**

**Supplementary info**

**Publication typesExpand**

**Full text links**


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**12**

**Observational Study**

**BMJ Open Respir Res**

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**. 2026 Jun 9;13(1):e004049.**

doi: 10.1136/bmjresp-2025-004049.

# The W heezing, A sthma and V iral effects on the E pithelial S tructure and function (WAVES) birth cohort study: rationale, design and methods to understand airway development and the role of early-life respiratory viral infections on childhood asthma inception

Tina Hartert [1 2], Christian Rosas-Salazar [2], Dawn C Newcomb [3], Brittney M Snyder [4], Sergejs Berdnikovs [5], Christopher McKennan [6], Sarah Osmundson [7], Zhouwen Liu [8], Erica Tafoya [9], Wais Folad [9], Pat Simon [9], Sara Reiss [9], Kadijah Poleon [9], Jacqueline-Yvonne Cephus [9], Shelby N Kuehnle [9], Kaitlin E McKernan [9], Siyuan Ma [8], Larry J Anderson [10], Tebeb Gebretsadik [8]

Affiliations Expand

- PMID: 42264881

- DOI: 10.1136/bmjresp-2025-004049

Free article

## Abstract

**Introduction: The airway epithelial barrier continues to develop during the first year of life, representing a critical time window of susceptibility to the effects of respiratory viruses that may contribute to the development of childhood asthma. This study specifically aimed to assess the impact of respiratory syncytial virus (RSV) infection on the longitudinal development of the airway epithelium, airway metabolism, DNA methylation and subsequent childhood asthma.**

**Methods and analysis: The Wheezing, Asthma and Viral effects on the Epithelial Structure and function (WAVES) birth cohort study is a prospective, observational birth cohort that is enrolling mother-child dyads beginning in pregnancy and following children through age 5 years. It is designed as a quasi-natural randomisation of RSV infection in infancy, capturing the first RSV infection event during infancy and longitudinal nasal sampling from birth through age 5 years for multi-omic assays and assessment of clinical outcomes. The WAVES study protocol will enrol 250 pregnant women and their offspring (200 at high-risk for asthma and 50 at general-risk for asthma). The primary outcomes are pathways through which RSV infection intersects with airway epithelial development leading to asthma by age 5 years. We will employ a longitudinal systems biology approach to investigate the development of the airway epithelium following infant RSV infection in those who do and do not develop asthma. This approach will integrate single-cell and bulk RNA-sequencing gene expression, metabolomic and epigenetic data at the resolution of epithelial cell subsets.**

**Ethics and dissemination: This study has been approved by the Vanderbilt University Medical Center IRB (#222277), and study results will be communicated in peer-reviewed publications and to the study participants and lay community. By analysing these longitudinal multi-omic datasets, we aim to uncover key mechanisms driving airway epithelial development and identify how these**

**processes are altered by early-life RSV infection and contribute to the development of early-life respiratory morbidity and asthma.**

**Keywords: Airway Epithelium; Asthma; Asthma Epidemiology; Asthma Mechanisms; Viral infection.**



**Conflict of interest statement**

**Competing interests: The authors have the following relevant competing interests: TH reports grants from the NIH, serving as co-chair of the American Thoracic Society Vaccines and Immunization advisory group, and as DSMB member for RSV vaccines for Pfizer. CRS reports grants from the Francis Family Foundation and the National Institutes of Health (NIH), personal fees from AstraZeneca and The KOL Connection, and presentation or writing fees from the American Academy of Pediatrics; the American Academy of Allergy, Asthma, and Immunology; and the American Association for Respiratory Care outside the submitted work. LJA reports paid consultancies on RSV vaccines for GSK, Janssen and AstraZeneca and on RSV antiviral drugs for Enanta and on influenza virus vaccines for Pfizer and our laboratory is currently receiving funding through Emory University from Pfizer for laboratory studies for RSV surveillance studies in adults and maternal antibody transfer to the infant and Sciogen for animal studies of RSV vaccines and previously received funding from Vernagen, LLC for animal studies of RSV and other vaccines. Our laboratory has received funding from an NIH SBIR (#R41AI167226) through Razi Pharmaceuticals, LLC. I am co-inventor on several CDC patents on the RSV G protein and its CX3C chemokine motif relative to immune therapy and vaccine development and on a device to capture coughed droplets from the lung and co-inventor on Emory patent filing for use of RSV platform VLPs with the F and G proteins for vaccines and G protein constructs for RSV vaccines. The other authors have no disclosures. These funders had no role nor influence on the study.**

**Supplementary info**

**Publication types, MeSH termsExpand**

# "rhinitis"[MeSH Terms] OR rhinitis[Text Word]

**1**

**Curr Opin Allergy Clin Immunol**

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**. 2026 Jun 11.**

**doi: 10.1097/ACI.0000000000001171. Online ahead of print.**

# Probiotics in allergic disease: from adjunct supplement to immune-modifying strategy (2026 update)

Giorgio S Raho [1]

Affiliations Expand

- PMID: 42286957

- DOI: 10.1097/ACI.0000000000001171

Abstract

Purpose of review: Allergic diseases continue to increase globally, and accumulating evidence implicates early-life microbial exposures as central determinants of immune tolerance. This review synthesizes advances from 2024 to 2026 regarding probiotic-mediated immune modulation and their translational implications in allergy prevention and therapy.

Recent findings: Recent studies confirm strain-specific expansion of Foxp3+ regulatory T cells, suppression of Th2 polarization, reinforcement of epithelial barrier integrity, and durable epigenetic stabilization mediated by short-chain fatty acids such as butyrate. Clinical trials demonstrate benefit in perinatal prevention of atopic dermatitis, modulation of allergic rhinitis symptoms, early-life asthma risk reduction, and probiotic-adjuvanted oral immunotherapy.

Summary: Probiotics are evolving from adjunctive supplements to biologically active immune modulators with disease-modifying potential. Integration with allergen immunotherapy and precision microbiome profiling may redefine preventive and therapeutic strategies in allergic disease.

Keywords: allergic disease; immunotherapy; microbiome; probiotics; regulatory T cells.



- 41 references

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Adv Ther

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. 2026 Jun 10.

doi: 10.1007/s12325-026-03623-2. Online ahead of print.

# Baseline Characteristics of Patients with Asthma Initiating Dupilumab in a Real-World Setting: The REVEAL Registry

Jorge F Máspero [1], Rand K Arnaout [2], Leslie Vargas-Ramírez [3], Hassan Mobayed [4], Bassam Mahboub [5], Carla Irani [6], Amir Bar-Shai [7 8], Mariko S Koh [9], Jason Chao [10], Sherif Zaghloul [11], Jason H Kwah [12], Jennifer Dewhurst [13], Mona S Al-Ahmad [14 15]

Affiliations Expand

- PMID: 42268495

- DOI: 10.1007/s12325-026-03623-2

## Abstract

**Introduction: Dupilumab, a fully human monoclonal antibody, blocks the receptors for interleukins 4/13, key and central drivers of type 2 inflammation. Clinical trials demonstrated the safety and efficacy of dupilumab in patients with moderate-to-severe asthma. Here, we aim to describe baseline characteristics of patients initiating dupilumab for asthma, to characterize its safety and effectiveness in real-world clinical practice.**

**Methods: REVEAL (pRospEctiVe charactErization of asthma patients treated with dupilumAb in a reaL-world setting; NCT04550962) is a longitudinal, prospective, 3-year observational study of patients aged ≥12 years prescribed dupilumab for asthma in Latin America, the Middle East, Russian Federation, and Singapore per country-specific prescribing information.**

**Results: Of 376 patients enrolled, 374 were included in the effectiveness analysis set. Most were female (62.6%), white (50.3%), and non-Hispanic or Latino (51.3%). Mean (standard deviation [SD]) age was 47.8 (13.89) years. Tobacco use was rare; 312 (83.4%) patients were never smokers. Most were classified as Global Initiative for Asthma step 4 (17.8%) or 5 (69.5%). Mean (SD) number of prior-year severe exacerbations was 2.0 (4.53) (n = 374). Mean (SD) pre- and post-bronchodilator forced expiratory volume in 1 second ($FEV_1$) was 2.2 L (0.83) (n = 306) and 2.3 L (0.86) (n = 212), respectively. Mean (SD) pre-bronchodilator $FEV_1$/forced vital capacity (FVC) ratio was 0.7 (0.13) (n = 301). 242 (64.7%); 231 (61.8%) patients reported allergic rhinitis and chronic rhinosinusitis with nasal polyposis history. Median (Q1-Q3) blood eosinophil counts were 390.0 cells/μL (185.0-700.0) (n = 348) and fractional exhaled nitric oxide levels were 34.0 parts per billion (19.0-60.0) (n = 314).**

**Conclusion: Patients prescribed dupilumab in routine clinical practice were predominantly adult women with severe asthma. Frequent severe exacerbations, high prevalence of coexisting type 2 inflammatory conditions, and elevated type 2**

**inflammatory biomarkers suggest disease burden is high among patients initiating dupilumab for asthma.**

**Trial registration: ClinicalTrials.gov Identifier, NCT04550962.**

**Keywords: Asthma; Asthma control; Dupilumab; Lung function; Real-world evidence; Registry study.**

**Plain language summary**

**Standard asthma treatments do not always prevent asthma attacks or improve breathing. Dupilumab is a newer prescription medicine used to treat patients with moderate-to-severe asthma who have an overreaction of their immune system called type 2 inflammation. In clinical trials, dupilumab reduced asthma attacks and improved breathing in patients with moderate-to-severe asthma. The REVEAL registry is a study observing how patients with asthma in the Middle East, Latin America, Russian Federation, and Singapore respond to dupilumab outside of clinical trial settings. The average patient had uncontrolled, severe asthma on enrollment. We summarized the characteristics of 374 enrolled patients before they started dupilumab; 60% were from the Middle East, nearly 60% were women, and half were white. More than 80% reported no history of smoking and, on average, patients were overweight. In the year before REVEAL, despite taking their medicine, patients had an average of two severe asthma attacks. Breathing tests showed moderate asthma in most patients. Most (72%) had high numbers of blood eosinophils (an inflammatory white blood cell) and 55% had elevated fractional exhaled nitric oxide (FeNO; a marker of lung inflammation in breath), indicating presence of type 2 inflammation, common in many people with asthma. Several patients had other health problems related to type 2 inflammation, most commonly allergic rhinitis (runny nose, sneezing, and itchy eyes caused by allergies), seen in 65% of patients. Overall, patients starting dupilumab in the real world had features of uncontrolled, severe asthma, including frequent asthma attacks and type 2 inflammation.**



**Conflict of interest statement**

**Declarations. Conflict of interest: Jorge F. Máspero is a consultant for AstraZeneca and Sanofi; has received speaker fees from GSK, Menarini, Novartis, and Uriach; and has received research grants from Novartis. Rand K. Arnaout has received honoraria for serving as a speaker and on advisory boards from AllergoTek, AstraZeneca, Biologix, GSK, Novartis, Pfizer, Regeneron Pharmaceuticals Inc., Sanofi, and Takeda. Leslie Vargas-Ramírez has served as a speaker for AstraZeneca, Boehringer Ingelheim, and GSK. Hassan Mobayed and Bassam Mahboub have no conflicts of interest to disclose. Carla Irani has received honoraria from Novartis, Sanofi, and Stallergenes Greer. Amir Bar-Shai reports advisory board member/consulting fees, speaker fees, institutional research grants from AstraZeneca, Boehringer Ingelheim, GSK, Kamada, and Sanofi. Mariko S. Koh has received research support from AstraZeneca and reports lecture and advisory board honoraria paid to her institution from AstraZeneca, Boehringer Ingelheim, GSK, Novartis, Roche, and Sanofi. Jason Chao is a former employee of Sanofi and may hold stock and/or stock options in the company. Sherif Zaghloul and Jennifer Dewhurst are employees of Sanofi and may hold stock and/or stock options in the**

company. Jason H. Kwah is an employee and shareholder of Regeneron Pharmaceuticals Inc. Mona S. Al-Ahmad has received honoraria for serving as a speaker and on advisory boards from AstraZeneca, GSK, Novartis, and Sanofi. Ethical Approval: REVEAL is being conducted in accordance with the Declaration of Helsinki, the International Conference on Harmonisation Good Clinical Practice guideline, and applicable regulatory requirements. The REVEAL protocol was reviewed and approved by the respective institutional review boards before patient recruitment. All patients provided written informed consent. For patients under the age of 18 years, both parental/legal guardian consent and patient assent were required.

- 34 references

Supplementary info

Associated data, Grants and fundingExpand

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BMC Pulm Med

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. 2026 Jun 9.

doi: 10.1186/s12890-026-04394-w. Online ahead of print.

# Predicting sublingual immunotherapy efficacy in allergic rhinitis

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Affiliations Expand

- PMID: 42265665

- DOI: 10.1186/s12890-026-04394-w

Free article

## Abstract

Background: Sublingual immunotherapy (SLIT) efficacy for allergic rhinitis (AR) varies considerably, with 30%-40% of patients showing poor response. A reliable

**tool integrating multidimensional factors for individualized efficacy prediction remains lacking. This study aimed to construct an optimal prediction model incorporating clinical characteristics, environmental exposure factors, and immune-inflammatory indicators to predict SLIT efficacy in AR patients, and further establish a nomogram as an auxiliary interpretable tool for intuitive clinical application.**

**Materials and methods: A total of 346 AR patients receiving SLIT were included and randomly allocated to training (n = 242) and validation (n = 104) cohorts at a 7:3 ratio. Baseline data included demographics, clinical features, symptom scores, environmental exposures, and immune-inflammatory indicators. Univariate and multivariate logistic regression analyses were performed to screen independent predictive factors. Three models, including random forest, support vector machine, and conventional logistic regression, were developed for performance comparison. Model performance was evaluated using the area under the receiver operating characteristic curve (AUC), calibration curves, and decision curve analysis (DCA). On the basis of independent predictors, a nomogram was constructed for visual interpretation. Shapley Additive Explanations (SHAP) analysis was further applied to interpret feature importance of the optimal model.**

**Results: Multivariate logistic regression confirmed these same seven variables as independent predictors of SLIT clinical efficacy in AR: disease duration, baseline symptom score, baseline medication score, air conditioning usage time, specific immunoglobulin E/total immunoglobulin E (sIgE/tIgE) ratio, interleukin (IL)-4, and IL-10 (all $P < 0.05$). The random forest model yielded optimal predictive performance, while the nomogram built on these predictors achieved acceptable discrimination with AUCs of 0.757 (95% CI: 0.676-0.837) in the training cohort and 0.729 (95% CI: 0.596-0.862) in the validation cohort, and showed better efficacy than the support vector machine (0.739) and conventional logistic regression (0.709) models. Calibration curves demonstrated good agreement between predicted probabilities and observed risks for the nomogram. DCA indicated that the model provided a high clinical net benefit across a wide range of threshold probabilities. SHAP analysis identified disease duration, sIgE/tIgE ratio, and baseline medication score as the three most influential features contributing to model predictions.**

**Conclusion: The developed random forest model presents good discrimination, calibration, and clinical utility for predicting SLIT efficacy. The corresponding nomogram further enables intuitive individualized clinical assessment, providing a quantitative basis for personalized SLIT decision-making in AR patients.**

**Keywords: Allergic rhinitis; Efficacy prediction; Nomogram; Predictive model; Random forest; Sublingual immunotherapy.**



**Conflict of interest statement**

**Declarations. Ethics approval and consent to participate: The study was approved by the Committees for the Ethical Review of Research involving Human Subjects from Shandong Provincial Hospital Affiliated to Shandong First Medical University (Approval No. SDPH-2024-047). Written informed consent was obtained from all adult participants. For participants under the age of 16, written informed consent was obtained from their parents or legal guardians. This study was conducted in accordance with the Declaration of Helsinki. Consent for publication: Not**

applicable. Competing interests: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Sci Rep

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. 2026 Jun 9;16(1):17865.

doi: 10.1038/s41598-026-56260-8.

# Immunological effects of subcutaneous and sublingual immunotherapy in house dust mite-allergic adults: a nine-month prospective pilot study

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- PMID: 42265370
- PMCID: PMC13250062
- DOI: 10.1038/s41598-026-56260-8

## Abstract

House dust mite (HDM) allergy contributes to allergic rhinitis and asthma worldwide. Allergen-specific immunotherapy (AIT) is the only disease-modifying treatment, with immunoglobulin G4 (IgG4) and regulatory T cells (Tregs) mediating immune tolerance. Comparative immunological effects of subcutaneous (SCIT) versus sublingual (SLIT) therapy remain underexplored. To evaluate immunological changes induced by SCIT and SLIT and their association with clinical improvement in HDM-allergic patients. In this prospective cohort, 43 adults with HDM-sensitized allergic patients received SCIT (n = 22) or SLIT (n = 21) for nine months. Clinical outcomes were assessed using the Asthma Control Test (ACT) and Rhinitis Control Assessment Test (RCAT). Serum IgG4 and total IgE were measured by ELISA and

**electrochemiluminescence, respectively, and $CD4^+CD25^+FoxP3^+$ Tregs were analyzed by flow cytometry. Responders were defined as patients achieving ≥ 20% improvement in ACT or RCAT. Wilcoxon signed-rank, Mann-Whitney U, and Spearman correlation tests were used. AIT increased IgG4 (320 → 920 ng/mL; $p < 0.001$) and Tregs (3.4% → 6.3%; $p < 0.001$), with a non-significant decrease in IgE. Responders had higher IgG4 and Tregs and lower IgE than non-responders. SCIT elicited higher IgG4 levels (median 1035 vs 705 ng/mL) and a trend toward greater Treg expansion compared with SLIT, although clinical improvement was similar between groups. IgG4 correlated with ACT ($p < 0.001$) and RCAT ($p = 0.002$), and Tregs correlated positively with IgG4 ($p = 0.003$) and inversely with IgE ($p = 0.010$). Both SCIT and SLIT improve clinical outcomes in HDM-allergic patients via total IgG4 elevation and Treg expansion. SCIT may induce stronger systemic immunological responses, supporting the use of these biomarkers for early monitoring and personalized therapy. These findings should be interpreted within the context of a pilot study with a relatively small sample size.**

**Keywords: Allergen immunotherapy; Allergic rhinitis; Asthma; House dust mite; IgG4; Quality of life; Regulatory T cells.**



**Conflict of interest statement**

**Declarations. Competing Interests: The authors declare no competing interests. Ethical approval: This study was approved by the Medical Research Ethical Committee, Faculty of Medicine, Ain Shams University (Approval No. FMASU MS 665/2023). Written informed consent was obtained from all participants prior to inclusion, in accordance with the Declaration of Helsinki.**

- **40 references**
- **2 figures**

# chronic cough

**1**

**Intern Med J**

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**. 2026 Jun 11.**

**doi: 10.1111/imj.70473. Online ahead of print.**

**Essential medications in palliative care: an updated survey of Australian and New Zealand medical practitioners practising palliative care**

Jack Power [1], Tim Luckett [1], Richard McNeill [2 3], David Currow [4], Amanda Landers [5], Gregory B Crawford [6], Slavica Kochovska [4], Philip Good [7], Jessica Boyley [8], Sungwon Chang [1], Lisa Mounsey [9]

Affiliations Expand

- PMID: 42272325

- DOI: 10.1111/imj.70473

Abstract

Background: Palliative care patients experience complex symptoms requiring varied pharmacological management. Medication choice depends on the underlying aetiology of symptoms, guideline recommendations, clinician preference and medication availability.

Aim: The aim of this study was to canvass the views of practising Australian and New Zealand medical practitioners practising palliative care regarding the medications they perceive to be essential for managing prevalent end-of-life symptoms, in an update to a previous clinician survey conducted in 2000. This study also canvassed respondents' views on whether patients experienced difficulties accessing these medications.

Methods: A cross-sectional survey was conducted in 2022 among current members of the Australian and New Zealand Society of Palliative Medicine (ANZSPM). The questionnaire explored ideal pharmacological management for 19 different symptoms experienced at the end of life. A descriptive analysis of results was calculated in SPSS version 28.0.

Results: Survey reponses were received from 13.5% of ANZSPM members. For most symptoms (n = 70), a large number of medications were listed as essential. The most concordant first-ranked medications included hyoscine butylbromide for noisy breathing (48.8%), benzodiazepines for breathlessness (nominated by respondents as a class, 41.2%), dexamethasone for cachexia (36.4%) and morphine for cough (35.5%). Respondents most frequently indicated there was no essential medication for oral ulceration, dry mouth, delirium and anorexia. Lidocaine for oral ulceration was ranked the most difficult for patients to access in the community (85.7%).

Conclusions: There remains various opinions on essential medications for palliative care. This suggests the need for ongoing research to reach an evidence-based consensus for clinical practice.

Keywords: Australia; New Zealand; opioid analgesics; palliative care; surveys and questionnaires.



- 33 references

Full text links

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Review

Thorax

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. 2026 Jun 9:thorax-2024-222056.

doi: 10.1136/thorax-2024-222056. Online ahead of print.

# Holistic management of symptom burden in fibrosing interstitial lung diseases (F-ILDs)

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Affiliations Expand

- PMID: 42264936

- DOI: 10.1136/thorax-2024-222056

## Abstract

**Background: Disease modifying therapies for progressive fibrotic interstitial lung diseases (F-ILDs) slow physiological decline but have not consistently shown to improve patient-reported symptoms or health-related quality of life. Patients with F-ILD experience a substantial symptom burden that necessitates comprehensive supportive care alongside antifibrotic treatment. This review summarises the current evidence for management strategies for F-ILD to be considered in conjunction with disease-modifying therapies.**

**Symptom management: Dyspnoea, chronic cough, fatigue, anxiety and depression are highly prevalent in F-ILD and significantly impair daily functioning. Dyspnoea management includes non-pharmacological interventions, personalised self-management strategies and selective use of low dose opioids in advanced disease though overall benefit may be modest. Chronic cough may be addressed through behavioural and speech therapy, treatment of contributing comorbidities such as gastro-oesophageal reflux disease and antitussive therapies, including neuromodulators and low dose opioids for refractory symptoms. Fatigue and**

**psychological distress require routine screening, evaluation of modifiable factors and targeted interventions.**

**Oxygen therapy: Oxygen therapy remains a standard of care for patients with resting or exertional hypoxaemia. While it improves oxygenation, its effect on dyspnoea and symptoms is variable, underscoring the importance of individualised assessment and patient-centred decision making.**

**Pulmonary rehabilitation: Pulmonary rehabilitation provides evidence-based improvements in exercise capacity, symptom burden and health-related quality of life. It also offers important psychological benefits and should be integrated early and maintained as feasible throughout the disease course.**

**Palliative care: Given the unpredictable trajectory of F-ILD, early integration of palliative care is essential. Discussions regarding prognosis, advance care planning and end of life preferences, supported by a multidisciplinary care model, enable holistic, goal concordant care across the progressive disease trajectory. A multidisciplinary care model is beneficial for providing individualised, holistic care throughout the patient's progressive disease trajectory.**

**Keywords: Idiopathic pulmonary fibrosis; Long Term Oxygen Therapy (LTOT); Palliative Care; Pulmonary Rehabilitation; Symptom Assessment; Systemic disease and lungs.**



**Conflict of interest statement**

**Competing interests: None declared.**

**Supplementary info**

**Publication typesExpand**

# "bronchiectasis"[MeSH Terms] OR bronchiectasis[Text Word]

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**Eur Respir J**

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**. 2026 Jun 11:2600239.**

**doi: 10.1183/13993003.00239-2026. Online ahead of print.**

# Bridging the airway microbiome and targeted therapy in bronchiectasis: multi-omics insights, endotypes and emerging therapies

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Affiliations Expand

- PMID: 42276744

- DOI: 10.1183/13993003.00239-2026

## Abstract

Bronchiectasis is a heterogeneous chronic airway disease primarily driven by persistent infection, microbial dysbiosis and dysregulated host immunity. While culture-based microbiology has historically informed clinical management, advances in high-throughput sequencing and multi-omic technologies have transformed our understanding of the airway ecosystem, revealing that disease activity is shaped, not only by individual pathogens, but by complex and dynamic host-microbe interactions. Despite the breadth of descriptive microbiome data, translation into clinically actionable diagnostics or therapies has been limited. Importantly, cross-sectional correlations between microbiota and inflammation do not establish cause and effect, underscoring the need to embed host-microbiome profiling within both longitudinal and interventional therapeutic trials. In this review, we critically appraise current microbial and host multi-omics research in bronchiectasis, integrating microbiome studies with host inflammatory, proteomic and immunophenotyping data. We highlight themes emerging across cohorts, including low microbial diversity, pathogen dominance, loss of commensal networks and neutrophil-driven inflammation and discuss how these features align with biological endotypes associated with exacerbations and treatment response. Drawing on lessons from host-directed therapeutic successes, we examine translational roadblocks limiting microbiome-guided care. We further review emerging microbiome-modulating strategies such as pathogen-specific biologics, bacteriophage therapy, live biotherapeutic products, biofilm-targeting adjuncts and precision antibiotic stewardship. Finally, we propose a roadmap toward microbiome-informed precision medicine through harmonized methodologies, integration of host and microbial biomarkers into clinical trials and embedding multi-omics pipelines within large international registries. Collectively, these advances have the potential to shift bronchiectasis research and clinical management towards rationally designed, precision medicine-driven therapeutic strategies.

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Intern Med J

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. 2026 Jun 10.

doi: 10.1111/imj.70487. Online ahead of print.

# Diagnosing primary ciliary dyskinesia in Australian adults: 10 years of testing

P J Robinson [1 2]

Affiliations Expand

- PMID: 42268986

- DOI: 10.1111/imj.70487

## Abstract

Primary ciliary dyskinesia (PCD) is a rare inherited disorder characterised by impaired ciliary function, leading to chronic upper and lower airway disease from early life. Limited awareness of the condition contributes to delayed diagnosis, with some individuals first diagnosed in adulthood following specialised testing. We describe 91 adults referred to the PCD diagnostic service at the Royal Children's Hospital in Melbourne, Australia over a 10-year period. Twenty-eight adults were diagnosed with PCD (31% referrals). The most common reason for referral was bronchiectasis. These findings highlight the importance of considering PCD in adults presenting with features suggestive of chronic airway disease, particularly bronchiectasis.

Keywords: Primary Ciliary dyskinesia; bronchiectasis; cilia; infertility; situs.



- 12 references

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Ann Med

. 2026 Dec;58(1):2681234.

doi: 10.1080/07853890.2026.2681234. Epub 2026 Jun 9.

# Differentiating benign from malignant pulmonary nodules in the context of bronchiectasis: a retrospective study

Lin Wang [1 2 3 4], Danhui Yang [1 2 3 4], Xianglin Zhou [1 2 3 4], Ting Guo [1 2 3 4], Lv Liu [1 2 3 4], Cheng Lei [5], Hong Luo [1 2 3 4]

Affiliations Expand

- PMID: 42262976
- PMCID: PMC13250873
- DOI: 10.1080/07853890.2026.2681234

## Abstract

**Background: Pulmonary nodules are common on chest CT in bronchiectasis (BE) patients. This study identifies risk factors for nodule malignancy in BE patients with pulmonary nodules.**

**Method: We screened BE patients who underwent chest CT at Second Xiangya Hospital from Jan 1, 2019 to Mar 31, 2025. Only patients with pulmonary nodules and pathological results were enrolled. Univariate and multivariate logistic regression were performed to identify independent predictors of malignancy.**

**Results: , Of 143 patients, 28 had benign nodules and 115 had malignant nodules. Malignant nodules were more often pure ground-glass/ground glass with a solid component nodule type (73.9% vs 28.6%, p<0.001) and upper lobe located (54.8% vs 32.1%, p=0.032). Benign nodules most commonly showed inflammation (60.7%), while malignant nodules were predominantly invasive adenocarcinoma (86.9%). Pure ground-glass/ground glass with a solid component nodule type was the only independent predictor of malignancy (adjusted OR 8.53, 95% CI 3.14-25.81). Upper lobe location did not remain significant after adjustment. Reiff score and same-lobe BE-nodule coexistence were not significantly associated.**

**Conclusion: Among BE patients with pulmonary nodules, pure ground-glass/ground glass with a solid component nodule type independently predicts malignancy. This may aid clinical decision-making.**

**Keywords: Bronchiectasis; benign nodules; malignant nodules; pulmonary nodule; risk factors.**

**Conflict of interest statement**

**The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.**

- **31 references**
- **4 figures**