Pragmatic and Observational Research

Dovepress
Taylor & Francis Group

Open Access Full Text Article

ORIGINAL RESEARCH

The Potential Impact of GLP-1 Receptor Agonists on Exacerbation Risk in Patients with COPD and Type 2 Diabetes: A Real-World Population-Based Observational Study

Bernardino Alcázar-Navarrete[1], Heath Heatley[2], Alan Kaplan[3], Lee Tze Tan[4], Mariko Siyue Koh[5], Naveed Sattar[6], John Townend[2], Derek Skinner[2], Victoria Carter[2], David Price[2]

[1]Professor at Department of Medicine. Respiratory Department. Hospital Universitario Virgen de Las Nieves. Ibs, Granada, University of Granada, Granada, Spain; [2]Observational and Pragmatic Research Institute, Singapore, Singapore; [3]Family Physician Airways Group of Canada, Stouffville, Ontario, Canada; [4]National University Health System, Department of Family Medicine, Singapore, Singapore; [5]Department of Respiratory and Critical Care Medicine, Singapore General Hospital, Singapore, Singapore; [6]Professor of Cardiometabolic Medicine at the School of Cardiovascular & Metabolic Health at the University of Glasgow, Glasgow, UK

Correspondence: David Price, Observational and Pragmatic Research Institute, 22 Sin Ming Lane, #06-76, Midview City, Singapore, Singapore, 573969, Tel +65 3105 1489, Email dprice@opri.sg

Introduction: There is limited evidence on the impact of glucagon-like peptide-1 receptor agonists (GLP-1 RAs) in patients with chronic obstructive pulmonary disease (COPD).

Material and Methods: We conducted a retrospective matched cohort study including patients aged ≥40 years with COPD and T2D. Patients initiating GLP-1 RAs were matched 1:1 with GLP-1 naïve controls based on age, sex, smoking status, COPD treatment (LABA/LAMA/ICS), and exacerbation history. The index date was defined as the first GLP-1 RA prescription, control's index date was a COPD consultation within 186 days of matched patient index. The primary outcome was the number of COPD exacerbations during the 12 months following the index date. Secondary outcomes included oral corticosteroid (OCS) prescriptions and hospital resource utilization (HCRU). Poisson regression models adjusted for BMI and other confounders were used to estimate incidence rate ratios (IRR).

Results: A total of 4479 matched patients were included. There were no significant differences between groups in exacerbation rates or OCS use in the year prior to the index date. During follow-up, patients treated with GLP-1 RAs had significantly fewer exacerbations (adjusted IRR [aIRR] 0.84, 95% CI: 0.79–0.89) and fewer OCS prescriptions (aIRR 0.86, 95% CI: 0.77–0.95) compared with controls. A significant delay in time to first OCS prescription was also observed.

Conclusion: In this real-world cohort, initiation of GLP-1 RA treatment in patients with COPD and T2D was associated with lower COPD exacerbations and OCS use. These findings suggest a potential role for GLP-1 RAs in modifying the course of COPD in this comorbid population, warranting randomised trials.

Keywords: COPD, obesity, COPD outcomes, GLP-1 RA

Introduction

Chronic Obstructive Pulmonary Disease (COPD) and type 2 diabetes mellitus (T2D) are prevalent chronic diseases that frequently coexist, particularly in older adults. The coexistence of these two conditions is more than coincidental, as both share pathophysiological pathways involving systemic inflammation, and metabolic dysfunction and obesity.[1,2] Individuals with both COPD and T2D experience worse clinical outcomes than those with either disease alone, including higher exacerbation rates, increased hospitalization risk, and elevated mortality.[3,4]

https://doi.org/10.2147/POR.S550543
Received: 30 June 2025
Accepted: 14 January 2026
Published: 30 January 2026

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) are a class of medications primarily used in the management of T2D. These agents, including liraglutide, semaglutide, and dulaglutide, have demonstrated cardiovascular and kidney benefits beyond glycemic control.[5] Emerging evidence suggests potential anti-inflammatory and pulmonary benefits in terms of exacerbation reduction of GLP-1 RAs compared to other T2D treatments.[6,7]

Experimental data indicate that GLP-1 RAs may exert protective effects on the respiratory system by attenuating airway inflammation, improving lung mechanics, and reducing weight, which may be especially relevant in patients who are overweight or living with obesity with COPD.[8,9] Recently published data also suggest that patients receiving GLP-1 RAs for diabetes also experienced improved lung function in asthma populations[10] Given the growing use of GLP-1 RAs in clinical practice, particularly in patients with cardiometabolic comorbidities, it is crucial to evaluate their potential benefits in populations beyond glycemic control.[11] While prior studies have suggested potential benefits of GLP-1 RAs on respiratory outcomes, robust real-world evidence in patients with established COPD remains scarce.

The present study aims to investigate whether the initiation of GLP-1 RA therapy in patients with both COPD and T2D is associated with lower COPD exacerbations and related outcomes, using real-world data from the UK-based Optimum Patient Care Research Database (OPCRD).

Materials and Methods

Study Design

This was a retrospective cohort study utilizing anonymized patient-level data from the Optimum Patient Care Research Database (OPCRD), a large UK primary care database that includes diagnostic, prescription, and consultation data from general practices.

Study Population

The study population included adults aged ≥40 years with a documented diagnosis of both COPD and T2D. Patients were included if they had at least 12 months of continuous data prior to the index date and at least one COPD-related consultation within the baseline year.

GLP-1 RA users (cases) were identified as patients who received a new prescription of a GLP-1 RA (eg, dulaglutide, liraglutide, semaglutide, etc). The index date was defined as the date of their first GLP-1 RA prescription. Each case was matched 1:1 with a control patient (GLP-1 naïve) based on age (±1 year), sex, smoking status, COPD treatment class (LABA, LAMA, ICS), and exacerbation history in the prior year (0, 1, 2, or ≥3 exacerbations). The index date for the controls was the date of a COPD related consultation within 186 days of the index date for each individually matched GLP1-RA user.

Inclusion and Exclusion Criteria

Inclusion criteria were: (1) age ≥40 years at index; (2) ≥12 months of medical records prior to index; (3) diagnosis of both COPD and T2D; (4) active COPD treatment during baseline. Exclusion criteria included prior GLP-1 RA use in the control group or insufficient follow-up data.

Outcomes

The primary outcome was the number of COPD exacerbations during the 12 months following the index date. Exacerbations were classified using two definitions: specific (recorded diagnosis of COPD or chest infection plus an OCS or antibiotic) and sensitive (prescription of OCS or antibiotic alone, with or without a diagnostic code).

Secondary outcomes included the number of oral corticosteroid (OCS) prescriptions and hospital resource utilization (HCRU), including COPD-related hospital visits or admissions.

Statistical Analysis

Descriptive statistics were used to summarize baseline characteristics. Poisson regression models adjusted for BMI and other potential confounders were used to estimate adjusted incidence rate ratios (aIRRs) for primary and secondary

outcomes. Robust variance estimates and sensitivity analyses using negative binomial models were applied to account for potential overdispersion, Time to first OCS prescription was analyzed using Kaplan-Meier curves and Log rank tests.

All analyses were conducted using STATA (version 14.2) and adhered to a predefined statistical analysis plan.

Results

Study Population

A total of 4479 patients were included in each group (GLP-1 RA users and matched controls). Baseline characteristics, including age, sex, BMI, smoking status, COPD treatment, and exacerbation history, were 'generally well balanced, although small differences remained (SMD > 0.1 for some variables) (Table 1). No significant differences were observed

Table 1 Baseline Characteristics of the Exposed and Unexposed

	Variables	**n=**	**Cases**			**Controls**			**SMD**
			4479			**4479**			
Patient Demographics	**Age**	Mean (SD)	65.9	8.2		66.0	8.2		0.004
		Median (IQR)	66.0	60.0	72.0	66.0	60.0	72.0	
	Gender	Male (%)	2602	58.1%		2602	58.1%		0.000
	Ethnicity								0.048
	White	n (% non missing)	3688	95.8%		3666	95.9%		
	Black		12	0.3%		7	0.2%		
	Asian		52	1.4%		68	1.8%		
	Mixed/Others		36	0.9%		32	0.8%		
	Recorded Unknow/Missing		60	1.6%		50	1.3%		
	Missing	n (% total)	631	14.1%		656	14.6%		
	BMI Recorded or calculated	Mean (SD)	36.3	6.0		36.1	6.0		0.043
		Median (IQR)	35.6	32.1	39.9	35.4	31.8	39.9	
	<18.5	n (% non missing)	0	0.0%		0	0.0%		
	18.5 to <25		61	1.4%		68	1.6%		
	25 to <30		551	12.5%		542	12.4%		
	30 to <35		1372	31.1%		1427	32.8%		
	35 to <40		1333	30.2%		1256	28.8%		
	40 to <80		1099	24.9%		1064	24.4%		
	Missing	n (% total)	63	1.4%		122	2.7%		
	Smoking								0.065
	Current	n (% non missing)	475	10.6%		491	11.0%		
	Ex		3366	75.2%		3451	77.1%		
	Non Smoker		633	14.1%		535	11.9%		
	Missing	n (% total)	5	0.1%		2	0.0%		

(*Continued*)

Table 1 (Continued).

	Variables	n=	Cases			Controls			SMD
			4479			4479			
	IMD Decile								0.096
	1 (Most deprived)	n (% non missing)	620	14.1%		681	15.6%		
	2		690	15.7%		773	17.7%		
	3		541	12.3%		554	12.7%		
	4		544	12.4%		539	12.3%		
	5		363	8.3%		364	8.3%		
	6		408	9.3%		383	8.8%		
	7		399	9.1%		376	8.6%		
	8		287	6.5%		240	5.5%		
	9		340	7.7%		279	6.4%		
	10 (Least Deprived)		200	4.6%		181	4.1%		
	Missing	n (% total)	87	1.9%		109	2.4%		
	Patients post time in the database	Mean (SD)	4.2	3.3		4.3	3.5		0.012
	(Index date to end of data)	Median (IQR)	3.3	1.8	5.9	3.3	1.7	6.0	
	Max Eosinophil (5 years prior)	Mean (SD)	373.0	327.3		354.9	250.4		0.298
		Median (IQR)	300.0	200.0	430.0	300.0	200.0	410.0	
	<150	n (% non missing)	43	1.0%		67	1.6%		
	150 to <300		1712	39.6%		1756	41.5%		
	≥300		2568	59.4%		2411	56.9%		
	Missing	n (% total)	156	3.5%		245	5.5%		
	MRC Dysponea score (5 years prior)								0.057
	1	n (% non missing)	191	4.8%		204	4.8%		
	2		788	19.8%		868	20.6%		
	3		1205	30.3%		1251	29.7%		
	4		1315	33.0%		1315	31.2%		
	5		484	12.2%		577	13.7%		
	Missing	n (% total)	496	11.1%		264	5.9%		
	FEV1/FVC (5 years prior)	Mean (SD)	0.68	0.14	0.15	0.66			0.135
		Median (IQR)	0.68	0.60	0.76	0.67	0.58	0.75	
		n <0.7 (% non missing)	1655	56.8%		1900	62.0%		
	Missing	n (% total)	1564	34.9%		1414	31.6%		

(*Continued*)

Table 1 (Continued).

	Variables	n=	Cases			Controls			SMD
			4479			4479			
	FEV1/FVC (ever prior)	Mean (SD)	0.69	0.14	0.16	0.67			0.120
		Median (IQR)	0.68	0.61	0.76	0.67	0.58	0.75	
		n <0.7 (% non missing)	2025	55.7%		2279	60.7%		
	Missing	n (% total)	846	18.9%		722	16.1%		
	GOLD Stage (% Predicted FEV1 5 years prior)								0.132
	1: Mild (≥80%)	n (% non missing)	585	21.4%		586	20.5%		
	2: Moderate (≥50% to79%)		1664	61.0%		1634	57.3%		
	3: Severe (≥30% to 49%)		418	15.3%		517	18.1%		
	4: Very Severe (<30%)		63	2.3%		117	4.1%		
	Missing	n (% total)	1749	39.0%		1625	36.3%		
	GOLD Stage (% Predicted FEV1 ever prior)								0.136
	1: Mild (≥80%)	n (% non missing)	711	22.6%		702	21.7%		
	2: Moderate (≥50% to79%)		1898	60.3%		1821	56.3%		
	3: Severe (≥30% to 49%)		458	14.6%		579	17.9%		
	4: Very Severe (<30%)		79	2.5%		135	4.2%		
	Missing	n (% total)	1333	29.8%		1242	27.7%		
	GOLD Group (A,B,E [2023])								0.026
	A	n (% non missing)	361	9.1%		413	9.8%		
	B		2618	65.7%		2756	65.4%		
	E		1006	25.2%		1048	24.9%		
	Missing	n (% total)	494	11.0%		262	5.8%		
	CAT score (5 years prior)								0.072
	Normal (0 to <6)	n (% non missing)	105	5.8%		123	6.5%		
	Low (6 to <10)		156	8.6%		193	10.1%		
	Medium (10 to <21)		582	32.1%		594	31.2%		
	High (21 to <31)		641	35.4%		632	33.2%		
	Very High (31 to <41)		329	18.1%		361	19.0%		
	Missing	n (% total)	2666	59.5%		2576	57.5%		
Prescribing	**Treatments in the year prior**								
	LABA	n (% total)	143	3.2%		192	4.3%		0.058
	LAMA		1733	38.7%		1808	40.4%		0.034
	LABA/ICS		1961	43.8%		2016	45.0%		0.025

(*Continued*)

Table 1 (Continued).

	Variables	n=	Cases			Controls			SMD
			4479			4479			
	LABA/LAMA		611	13.6%		631	14.1%		0.013
	LABA/LAMA/ICS		1771	39.5%		1854	41.4%		0.038
	None of the above		1736	38.8%		1736	38.8%		0.059
Comorbidity	*Asthma*	% ever	1636	36.5%		1558	34.8%		0.036
		% a diag in the last year	308	6.9%		322	7.2%		0.012
	Hypertension	% ever	2936	65.6%		2689	60.0%		0.114
		% a diag in the last year	511	11.4%		614	13.7%		0.069
	Heart Failure	% ever	865	19.3%		750	16.7%		0.067
		% a diag in the last year	129	2.9%		157	3.5%		0.036
	Ischaemic Heart Disease	% ever	604	13.5%		519	11.6%		0.057
		% a diag in the last year	198	4.4%		218	4.9%		0.021
	Chronic Kidney Disease	% ever	947	21.1%		817	18.2%		0.073
		% a diag in the last year	263	5.9%		190	4.2%		0.074
	Type 2 Diabetes	% ever	3444	76.9%		3063	68.4%		0.192
		% a diag in the last year	2502	55.9%		1470	32.8%		0.477
	Osteoporosis	% ever	150	3.3%		172	3.8%		0.026
		% a diag in the last year	18	0.4%		23	0.5%		0.017
	Depression and Anxiety	% ever	1786	39.9%		1583	35.3%		0.094
		% a diag in the last year	182	4.1%		177	4.0%		0.006

Notes: 1. BMI nearest within 3 years prior to the index date. Either recorded or calculated (when height and weight recordings are within 1 month of each other). N.B. BMI<10 and >80, height <40 and >220, and weight<2 and >400 excluded. 2. Smoking nearest, and within 3 years prior to index date. 3. The IMD ranks GP practices based upon the broad themes including income, employment, education, health, crime, barriers to housing and services, and the living environment. 4. Maximum Medical Research Council Breathlessness Scale reading prior index date. 5. Spirometry readings nearest the index date are used, multiple same day spirometry readings are averaged, calculated FEV1/FVC values based on same day FEV1 and FVC values only, FEV1 values >4 excluded, FVC values >7 excluded, ratios of <0.2 and > 4 excluded. 6. Maximum CAT score within the year as defined in the CAT time period. 7. Patients may have received multiple drugs on the same "initial treatment" period, combination product counts do not include multiple single items, patients classed as none may receive other drug classes not included in this list, eg short-acting β-agonists, etc.

in the number of COPD exacerbations or oral corticosteroid (OCS) prescriptions in the year prior to the index date. Hospitalization rates were slightly lower in the GLP-1 RA group during the baseline year (Table 2).

Primary Outcome

During the 12-month follow-up period, patients treated with GLP-1 RAs had significantly fewer COPD exacerbations compared to matched controls. The adjusted incidence rate ratio (aIRR) for total COPD exacerbations was 0.84 (95% CI: 0.79–0.89, $p < 0.001$) (Table 2). The reduction was consistent for both specific and sensitive exacerbation definitions.

Table 2 COPD Control Outcomes

		GLP1 Patients Mean Rate	Non GLP1 Patients Mean Rate	IRR	95% CI		P value
Exac (Specific)	Post	0.77	0.917	0.84	0.79	0.89	< 0.001
	Prior	0.897	0.918	0.98	0.95	1.01	0.347
Exac (Sensitive)	Post	1.578	1.782	0.89	0.84	0.94	< 0.001
	Prior	1.801	1.792	1.01	0.96	1.06	0.818
OCS Rx's	Post	1.254	1.47	0.86	0.77	0.95	0.002
	Prior	1.422	1.542	0.92	0.84	1.01	0.176
Hospitalisations	Post	0.108	0.175	0.61	0.51	0.74	< 0.001
	Prior	0.115	0.169	0.68	0.57	0.81	0.001

Abbreviation: IRR, Adjusted incidence rate ratios (GLP1-RA patients vs controls).

Secondary Outcomes

GLP-1 RA users had a significantly lower number of OCS prescriptions compared to controls (aIRR 0.86, 95% CI: 0.77–0.95, p = 0.002) (Table 2). The time to first OCS prescription was significantly delayed in the GLP-1 RA group, as demonstrated by Kaplan-Meier analysis (log-rank p < 0.001) (Figure 1). Hospital resource utilization, including COPD-related hospital admissions, were also lower among those prescribed GLP-1 RA vs those not (aIRR 0.61, 95% CI: 0.51–0.74, p < 0.001).

Sensitivity Analyses

Sensitivity analyses restricted to patients without an active asthma (n = 3901) yielded similar results, confirming the robustness of the primary and secondary outcomes. No significant interaction effects were observed for age, sex, or smoking status.

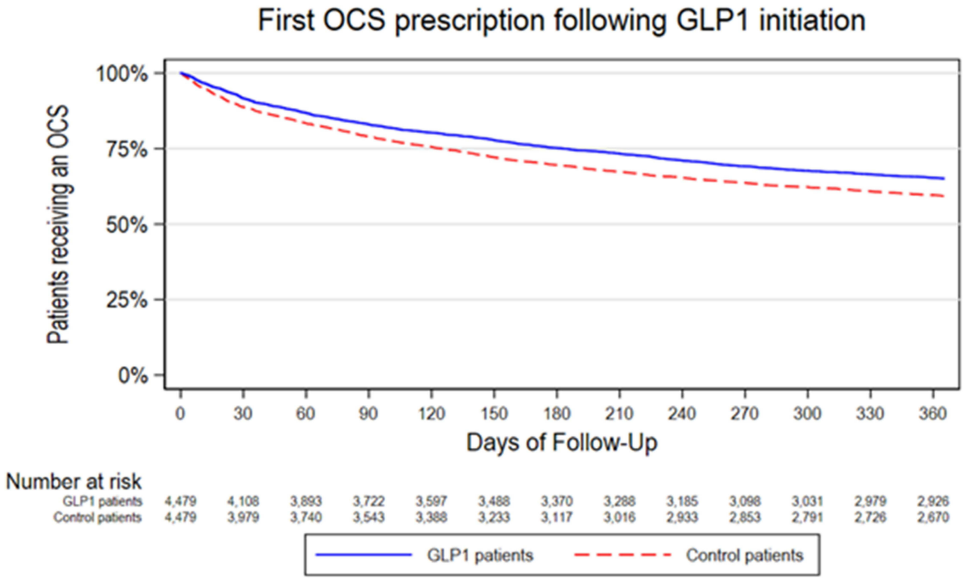

Figure 1 Time to first OCS following GLP1-RA initiation.

https://doi.org/10.2147/POR.S550543

Discussion

This real-world study provides new evidence that GLP-1 receptor agonist (RA) therapy might be associated with a lower risk for COPD exacerbations in patients with comorbid type 2 diabetes. Using a large UK primary care database with over 29 million patients, we observed that patients initiating GLP-1 RA therapy experienced fewer COPD exacerbations and OCS prescriptions, with a significant delay in time to first exacerbation event. These findings suggest a potential protective effect of GLP-1 RAs on respiratory health and provide a rationale for future randomised clinical trials.

Our results align with emerging mechanistic data indicating that GLP-1 RAs may exert anti-inflammatory effects in the lungs, modulate immune responses, and improve pulmonary function.[10,12] Although previous studies have focused on cardiovascular and metabolic outcomes, the potential respiratory benefits of GLP-1 RAs are gaining attention.[13] Notably, GLP-1 receptors are expressed in airway epithelial and smooth muscle cells, and animal models have demonstrated reduced airway hyperresponsiveness and eosinophilic inflammation with GLP-1 RA therapy.[14] Since nearly all GLP-1RAs lower weight to modest or greater extents, a potential contribution of weight loss to lower excerbations risks cannot be excluded.

The magnitude of risk reduction reported in this study, with an approximately 20% lower risk for exacerbations and corticosteroid prescriptions, is clinically meaningful, especially in a population with high multimorbidity burden. These findings, if replicated in randomised trials, may inform treatment strategies for patients with both COPD and T2D, particularly in those with frequent exacerbations or systemic inflammation.[15]

However, several limitations should be considered. This was an observational study, and although we employed rigorous matching and adjusted for key confounders, residual confounding cannot be excluded. The definitions of exacerbation were based on coding and prescription patterns and may not fully capture all clinically relevant events. Lung function data and biomarkers of inflammation were not available in the database, limiting mechanistic interpretation.Despite these limitations, the strength of our study lies in the large, well-characterized cohort, the real-world setting, and the consistency of findings across sensitivity analyses. Our results extend previous studies in the field of COPD suggesting a role for GLP-1RA in exacerbation prevention.[6,13,16] As compared to other T2D therapies,[17] GLP-1 RA may provide a benefit in terms of exacerbation reduction.[7] These findings should be interpreted with caution, and independent replication would strengthen confidence in these results.

Future research should aim to validate these findings in randomized clinical trials. Additionally, mechanistic investigations into the pulmonary actions of GLP-1 RAs could further elucidate their role in respiratory disease modification.[18]

Conclusions

GLP-1 RA therapy was associated with lower risk for COPD exacerbations and systemic corticosteroid use in patients with comorbid COPD and T2D. These results warrant further mechanistic and interventional randomised trials to explore the potential role of GLP-1 RAs in COPD management. ‘These results, derived from a UK primary-care cohort, may not directly extrapolate to other healthcare systems or populations.

Data Sharing Statement

The dataset supporting the conclusions of this article was derived from the Optimum Patient Care Research Database (www.opcrd.co.uk). The OPCRD has ethical approval from the National Health Service (NHS) Research Authority to hold and process anonymised research data (Research Ethics Committee reference: 15/EM/0150). This study was approved by the Anonymised Data Ethics Protocols and Transparency (ADEPT) committee – the independent scientific advisory committee for the OPCRD. The authors do not have permission to give public access to the study dataset; researchers may request access to OPCRD data for their own purposes. Access to OCPRD can be made via the OCPRD website (https://opcrd.co.uk/our-database/data-requests/) or via the enquiries Email info@opcrd.co.uk.

Ethical Approval

The OPCRD is approved by the Health Research Authority for clinical research use and governed by the Anonymized Data Ethics and Protocols Transparency Committee (ADEPT). This study was approved by the ADEPT committee

(ADEPT0923) as an independent body of experts and regulators commissioned by the Respiratory Effectiveness Group to govern the standard of research conducted on internationally recognized databases.

Acknowledgments

Writing, editorial support, and/or formatting assistance in the development of this manuscript was provided by Shilpa Suresh, MSc of the Observational and Pragmatic Research Institute, Singapore.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Funding

No funding or sponsorship was received for this study or publication of this article.

Disclosure

Bernardino Alcázar-Navarrete reports grants, personal fees and/or non-financial support from CSL, GSK, AstraZeneca, Boehringer Ingelheim, Chiesi, Laboratorios Menarini, Bial, Zambon, MSD, PulmonX corporation and Sanofi, outside the submitted work. Naveed Sattar has consulted for and/or received speaker honoraria from Abbott Laboratories, AbbVie, Amgen, AstraZeneca, Boehringer Ingelheim, Carmot Therapeutics, Eli Lilly, GlaxoSmithKline, Hanmi Pharmaceuticals, Menarini-Ricerche, Metsera, Novartis, Novo Nordisk, Pfizer, and Roche; and received grant support paid to his University from AstraZeneca, Boehringer Ingelheim, Novartis, and Roche outside the submitted work. Alan Kaplan is a member of the advisory board of, or speakers bureau for, ALK, AstraZeneca, Belus, Boehringer Ingelheim, Covis, Eisai, GlaxoSmithKline, Idorsia, Merck Frosst, Moderna, Novo Nordisk, Novartis, Pfizer, Purdue, Sanofi, Teva, Trudel and Valeo. Heath Heatley, John Townend, Derek Skinner and Victoria Carter are employees of Observational & Pragmatic Research Institute, Singapore. Tze Lee Tan is an advisory Board Member for Boehringer Ingelheim, AstraZeneca, Takeda, GlaxoSmithKline, Merck Sharp & Dohme, Mundipharma, and Janssen. Honoraria were received for these advisory boards. Honoraria were received for speaking at CMEs for AstraZeneca in the past. Conference sponsorships from AstraZeneca, Boehringer Ingelheim, Merck Serono, GlaxoSmithKline, Norvatis, Mundipharma and Merck Sharp & Dohme. Research grants from Merck Serono (Concor Study), Merck Sharp & Dohme (Apbord study). Mariko Siyue Koh reports grant support from AstraZeneca, and honoraria for lectures and advisory board meetings paid to her hospital (Singapore General Hospital) from GlaxoSmithKline, AstraZeneca, Novartis, Sanofi, and Boehringer Ingelheim, outside the submitted work. David B. Price has advisory board membership with AstraZeneca, Boehringer Ingelheim, Chiesi, GlaxoSmithKline, Novartis, Viatris, Teva Pharmaceuticals; consultancy agreements with AstraZeneca, Boehringer Ingelheim, Chiesi, GlaxoSmithKline, Novartis, Viatris, Teva Pharmaceuticals; grants and unrestricted funding for investigator-initiated studies (conducted through Observational and Pragmatic Research Institute Pte Ltd) from AstraZeneca, Chiesi, Viatris, Novartis, Regeneron Pharmaceuticals, Sanofi Genzyme, and UK National Health Service; payment for lectures/speaking engagements from AstraZeneca, Boehringer Ingelheim, Chiesi, Cipla, Inside Practice, GlaxoSmithKline, Medscape, Viatris, Novartis, Regeneron Pharmaceuticals and Sanofi Genzyme, Teva Pharmaceuticals; payment for travel/accommodation/meeting expenses from AstraZeneca, Boehringer Ingelheim, Novartis, Medscape, Teva Pharmaceuticals.; owns 74% of the social enterprise Optimum Patient Care Ltd (Australia and UK) and 92.61% of Observational and Pragmatic Research Institute Pte Ltd (Singapore); is peer reviewer for grant committees of the UK Efficacy and Mechanism Evaluation Programme, and Health Technology Assessment; and he was an expert witness for GlaxoSmithKline. The authors report no other conflicts of interest in this work.

References

1. Agustí A, Hogg JC. Update on the pathogenesis of chronic obstructive pulmonary disease. *N Engl J Med*. 2019;381:1248–1256. doi:10.1056/NEJMra1900475
2. Hillary RF, McCartney DL, Smith HM, et al. Blood-based epigenome-wide analyses of 19 common disease states: a longitudinal, population-based linked cohort study of 18,413 Scottish individuals. *PLoS Med*. 2023;20:e1004247. doi:10.1371/journal.pmed.1004247
3. Smith C, Hasselgren M, Sandelowsky H, Ställberg B, Hiyoshi A, Montgomery S. Disproportionately raised risk of adverse outcomes in patients with COPD and comorbid type 2 diabetes or depression: swedish register-based cohort study. *Respir Res*. 2025;26:84. doi:10.1186/s12931-025-03160-6
4. Raslan AS, Quint JK, All-Cause CS. Cardiovascular and respiratory mortality in people with type 2 diabetes and chronic obstructive pulmonary disease (COPD) in England: a cohort study using the clinical practice research datalink (CPRD). *Int J Chron Obstruct Pulmon Dis*. 2023;18:1207–1218. doi:10.2147/COPD.S407085
5. Yao H, Zhang A, Li D, et al. Comparative effectiveness of GLP-1 receptor agonists on glycaemic control, body weight, and lipid profile for type 2 diabetes: systematic review and network meta-analysis. *BMJ*. 2024;384:e076410. doi:10.1136/bmj-2023-076410
6. Foer D, Strasser ZH, Cui J, et al. Association of GLP-1 receptor agonists with chronic obstructive pulmonary disease exacerbations among patients with type 2 diabetes. *Am J Respir Crit Care Med*. 2023;208:1088–1100. doi:10.1164/rccm.202303-0491OC
7. Pradhan R, Lu S, Yin H, et al. Novel antihyperglycaemic drugs and prevention of chronic obstructive pulmonary disease exacerbations among patients with type 2 diabetes: population based cohort study. *BMJ*. 2022;379:e071380. doi:10.1136/bmj-2022-071380
8. Toki S, Goleniewska K, Reiss S, et al. Glucagon-like peptide 1 signaling inhibits allergen-induced lung IL-33 release and reduces group 2 innate lymphoid cell cytokine production in vivo. *J Allergy Clin Immunol*. 2018;142:1515–1528.e8. doi:10.1016/j.jaci.2017.11.043
9. Bara JK, Gandhi P, Verma P. Revisiting the markers interleukin-6 and glucagon-like peptide-1 for targeting low-grade inflammation in type 2 diabetes: a meta-analysis and our lab experience. *Acta Diabetol*. 2024;62:811–818. doi:10.1007/s00592-024-02398-8
10. Kaplan A, Heatley H, Townend J, et al. The real-world impact of glucagon-like peptide 1 receptor agonists on asthma control in people with high-risk asthma and obesity. *Adv Ther*. 2025;42:2950–2956. doi:10.1007/s12325-025-03175-x
11. de Miguel-Díez J, Núñez Villota J, Santos Pérez S, et al. Multidisciplinary management of patients with chronic obstructive pulmonary disease and cardiovascular disease. *Arch Bronconeumol*. 2024;60:226–237. doi:10.1016/j.arbres.2024.01.013
12. Morrow NM, Morissette A, Mulvihill EE. Immunomodulation and inflammation: role of GLP-1R and GIPR expressing cells within the gut. *Peptides*. 2024;176:171200. doi:10.1016/j.peptides.2024.171200
13. Yen F-S, Hsu -C-C, Wei J-C-C, et al. Glucagon-like peptide-1 receptor agonists may benefit cardiopulmonary outcomes in patients with COPD. *Thorax*. 2024;79:1017–1023. doi:10.1136/thorax-2023-221040
14. Sun Y-H, He L, Yan M-Y, et al. Overexpression of GLP-1 receptors suppresses proliferation and cytokine release by airway smooth muscle cells of patients with chronic obstructive pulmonary disease via activation of ABCA1. *Mol Med Rep*. 2017;16:929–936. doi:10.3892/mmr.2017.6618
15. Wang W, Mei A, Qian H, et al. The role of glucagon-like peptide-1 receptor agonists in chronic obstructive pulmonary disease. *Int J Chron Obstruct Pulmon Dis*. 2023;18:129–137. doi:10.2147/COPD.S393323
16. See XY, Xanthavanij N, Lee Y-C, et al. Pulmonary outcomes of incretin-based therapies in COPD patients receiving single-inhaler triple therapy. *ERJ Open Res*. 2025;11:1.
17. Figueira-Gonçalves JM, Golpe R. Impact of oral antidiabetics agents in the prevention of COPD exacerbations. *Arch Bronconeumol*. 2023;59:412–413. doi:10.1016/j.arbres.2022.12.004
18. Cazzola M, Rogliani P, Calzetta L, Lauro D, Page C, Matera MG. Targeting mechanisms linking COPD to type 2 diabetes mellitus. *Trends Pharmacol Sci*. 2017;38:940–951. doi:10.1016/j.tips.2017.07.003