

Supplementary Materials

FF/UMEC/VI Initiation Following a COPD Exacerbation: Benefits of Prompt Initiation on COPD Outcomes

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Supplementary Table S1 Baseline demographics and clinical characteristics of the unweighted patient cohorts

Characteristics	Unweighted cohorts		
	Prompt (<i>n</i> = 2057)	Delayed (<i>n</i> = 3364)	Std. diff. ^{a,b} , %
Mean (SD) observation period ^c , years	1.7 (1.0)	1.8 (1.1)	13.1
Mean (SD) age ^d , years	61.5 (8.4)	62.4 (8.8)	10.5
Female ^d , <i>n</i> (%)	1054 (51.2)	1688 (50.2)	2.1
Year of index date, <i>n</i> (%)			
2017	5 (0.2)	92 (2.7)	20.6
2018	324 (15.8)	815 (24.2)	21.2
2019	507 (24.6)	782 (23.2)	3.3
2020	368 (17.9)	591 (17.6)	0.8
2021	671 (32.6)	817 (24.3)	18.5
2022	182 (8.8)	267 (7.9)	3.3
Region ^d , <i>n</i> (%)			
South	1088 (52.9)	1672 (49.7)	6.4
Midwest	599 (29.1)	1011 (30.1)	2.0

Northeast	244 (11.9)	449 (13.3)	4.5
West	122 (5.9)	227 (6.7)	3.4
Unknown	4 (0.2)	5 (0.1)	1.1
Insurance plan type^d, <i>n</i> (%)			
PPO	1385 (67.3)	2248 (66.8)	1.1
HMO	504 (24.5)	861 (25.6)	2.5
POS	128 (6.2)	185 (5.5)	3.1
CDHC	29 (1.4)	52 (1.5)	1.1
Indemnity/traditional	9 (0.4)	17 (0.5)	1.0
Unknown	2 (0.1)	1 (0.0)	2.7
Mean (SD) Quan-CCI score^{e,f}	1.8 (1.8)	2.0 (1.9)	9.1
Asthma, <i>n</i> (%)	339 (16.5)	597 (17.7)	3.4
Type of COPD exacerbation^d, <i>n</i> (%)			
Moderate ^g	1634 (79.4)	2472 (73.5)	14.0
Severe ^h	423 (20.6)	892 (26.5)	14.0
Multiple	481 (23.4)	848 (25.2)	4.3
Baseline respiratory medications^e, <i>n</i> (%)			

Systemic corticosteroids	1251 (60.8)	2125 (63.2)	4.8
SABA	1184 (57.6)	2068 (61.5)	8.0
ICS/LABA	617 (30.0)	1250 (37.2)	15.2
LAMA/LABA	292 (14.2)	484 (14.4)	0.5
Leukotriene modifiers	277 (13.5)	485 (14.4)	2.7
SAMA/SABA	241 (11.7)	484 (14.4)	7.9
LAMA (single inhaler)	215 (10.5)	529 (15.7)	15.6
MITT	118 (5.7)	355 (10.6)	17.6
ICS (single inhaler)	100 (4.9)	220 (6.5)	7.2
SAMA	43 (2.1)	59 (1.8)	2.5
PDE-4 inhibitors	15 (0.7)	33 (1.0)	2.7
Methylxanthines	11 (0.5)	22 (0.7)	1.6
LABA (single inhaler)	10 (0.5)	19 (0.6)	1.1
Biologic agents	8 (0.4)	14 (0.4)	0.4
Mean (SD) baseline HCRU^e			
<i>All cause</i>			
Hospitalizations	0.36 (0.67)	0.43 (0.70)	10.3

ED visits	0.94 (1.55)	1.02 (1.52)	4.9
Outpatient visits	17.45 (20.05)	18.16 (19.98)	3.6
<i>COPD relatedⁱ</i>			
Hospitalizations	0.16 (0.38)	0.21 (0.43)	12.2
ED visits	0.18 (0.45)	0.22 (0.50)	8.7
Outpatient visits	1.47 (1.95)	1.53 (1.99)	2.9
Mean (SD) baseline medical costs^{e,i}, \$US 2022			
<i>All cause</i>			
Total medical costs	18,041 (37,646)	22,153 (60,663)	8.1
Hospitalization costs	8963 (25,696)	12,237 (50,220)	8.2
ED visit costs	1342 (3518)	1472 (3812)	3.5
Outpatient visit costs	7736 (22,052)	8444 (\$30,204)	2.7
<i>COPD relatedⁱ</i>			
Total medical costs	4246 (14,251)	6467 (40,643)	7.3
Hospitalization costs	3542 (14,204)	5723 (40,619)	7.2
ED visit costs	342 (1355)	405 (1462)	4.5
Outpatient visit costs	362 (1197)	339 (971)	2.1

Prompt and delayed initiators were weighted using the inverse probability of treatment weighting approach based on the PS. Covariates used in the PS calculation included: age, sex, year and quarter of index date, US region, type of insurance plan (i.e., PPO, HMO, POS, or other), Quan-CCI score (categories of 0, 1, 2, and 3+), asthma diagnosis, type of COPD exacerbation on the index date, patients with multiple events at the index exacerbation, respiratory medication use, all-cause and COPD-related HCRU and medical costs (hospitalization, ED, and outpatient constituents), and comorbidities (with ≥5% prevalence in either cohort)

CDHC consumer-driven healthcare, *COPD* chronic obstructive pulmonary disease, *ED* emergency department, *HCRU* healthcare resource utilization, *HMO* health maintenance organization, *ICS* inhaled corticosteroid, *LABA* long-acting β_2 -agonist, *LAMA* long-acting muscarinic antagonist, *MITT* multiple-inhaler triple therapy, *PDE-4* phosphodiesterase-4, *POS* point of service, *PPO* preferred provider organization, *Quan-CCI* Quan-Charlson comorbidity index, *SABA* short-acting β_2 -agonist, *SAMA* short-acting muscarinic antagonist, *SD* standard deviation, *Std. diff.* standardized difference

^aFor continuous variables, the std. diff. was calculated by dividing the absolute difference in means of the control and the case by the pooled SD of both groups. The pooled SD is the square root of the average of the squared SDs

^bFor dichotomous variables, the std. diff. was calculated using the following equation, where P is the respective proportion of participants in each group: $| (P_{\text{case}} - P_{\text{control}}) | / \sqrt{[(P_{\text{case}}(1 - P_{\text{case}}) + P_{\text{control}}(1 - P_{\text{control}})) / 2]}$

^cThe observation period extended from the index date until the earliest of health-plan disenrollment or the end of data availability

^dAssessed at the index date

^eAssessed during the 12-month baseline period

^fQuan et al. 2005 [1]

^gModerate COPD exacerbation: an outpatient or ED visit with a COPD exacerbation diagnosis code in the primary position and ≥ 1 dispensing/administration of a systemic corticosteroid or guideline-recommended antibiotic within 5 days before or after the visit

^hSevere COPD exacerbation: hospitalization with a diagnosis code for COPD exacerbation in the primary position

ⁱCOPD-related HCRU and costs were those for any claim with a primary diagnosis of COPD

^jCosts were inflation-adjusted to 2022 US dollars using the US Medical Care Consumer Price Index from the Bureau of Labor Statistics, US Department of Labor [2]

Supplementary Table S2 Baseline comorbidities

Comorbidities	Overall (<i>N</i> = 5421)	Unweighted			Weighted ^a		
		Prompt (<i>n</i> = 2057)	Delayed (<i>n</i> = 3364)	Std. diff. ^{b,c} , %	Prompt (<i>n</i> = 2057)	Delayed (<i>n</i> = 3364)	Std. diff. ^{b,c} , %
Elixhauser comorbidities, <i>n</i> (%)							
Chronic pulmonary disease	4630 (85.4)	1665 (80.9)	2965 (88.1)	19.9	1750 (85.1)	2885 (85.8)	2.0
Hypertension	3492 (64.4)	1317 (64.0)	2175 (64.7)	1.3	1325 (64.4)	2164 (64.3)	0.1
Hypertension, uncomplicated	2768 (51.1)	1055 (51.3)	1713 (50.9)	0.7	1057 (51.4)	1711 (50.9)	1.1
Hypertension complicated	724 (13.4)	262 (12.7)	462 (13.7)	2.9	267 (13.0)	454 (13.5)	1.4
Cardiac arrhythmias	1297 (23.9)	468 (22.8)	829 (24.6)	4.4	501 (24.4)	808 (24.0)	0.8
Diabetes	1127 (20.8)	441 (21.4)	686 (20.4)	2.6	436 (21.2)	704 (20.9)	0.6
Diabetes, uncomplicated	442 (8.2)	175 (8.5)	267 (7.9)	2.1	165 (8.0)	282 (8.4)	1.3
Diabetes, complicated	685 (12.6)	266 (12.9)	419 (12.5)	1.4	270 (13.1)	422 (12.5)	1.8
Depression	1123 (20.7)	428 (20.8)	695 (20.7)	0.4	438 (21.3)	690 (20.5)	1.8
Obesity	1072 (19.8)	368 (17.9)	704 (20.9)	7.7	402 (19.5)	665 (19.8)	0.6
Congestive heart failure	851 (15.7)	316 (15.4)	535 (15.9)	1.5	325 (15.8)	527 (15.7)	0.4

Peripheral vascular disorders	834 (15.4)	295 (14.3)	539 (16.0)	4.7	314 (15.3)	516 (15.3)	0.2
Valvular disease	677 (12.5)	269 (13.1)	408 (12.1)	2.9	253 (12.3)	415 (12.3)	0.2
Solid tumor without metastasis	525 (9.7)	180 (8.8)	345 (10.3)	5.1	199 (9.7)	327 (9.7)	0.1
Renal failure	437 (8.1)	158 (7.7)	279 (8.3)	2.3	165 (8.0)	270 (8.0)	0.0
Liver disease	417 (7.7)	149 (7.2)	268 (8.0)	2.7	152 (7.4)	257 (7.6)	1.0
Rheumatoid arthritis/collagen vascular disease	382 (7.0)	155 (7.5)	227 (6.7)	3.1	148 (7.2)	238 (7.1)	0.4
Pulmonary circulation disorder	368 (6.8)	133 (6.5)	235 (7.0)	2.1	141 (6.8)	228 (6.8)	0.3
Deficiency anemias	349 (6.4)	128 (6.2)	221 (6.6)	1.4	135 (6.6)	218 (6.5)	0.4
Weight loss	313 (5.8)	108 (5.3)	205 (6.1)	3.6	117 (5.7)	195 (5.8)	0.6
Alcohol abuse	304 (5.6)	102 (5.0)	202 (6.0)	4.6	115 (5.6)	190 (5.6)	0.2
Other neurologic disorders	300 (5.5)	99 (4.8)	201 (6.0)	5.1	111 (5.4)	186 (5.5)	0.6
Drug abuse	280 (5.2)	90 (4.4)	190 (5.6)	5.8	106 (5.1)	175 (5.2)	0.3
DSM-5 comorbidities, <i>n</i> (%)							
Substance-related and addictive disorders	1982 (36.6)	751 (36.5)	1231 (36.6)	0.2	752 (36.6)	1229 (36.5)	0.0
Anxiety disorders	1320 (24.3)	483 (23.5)	837 (24.9)	3.3	501 (24.3)	819 (24.3)	0.0

Sleep-wake disorders	1382 (25.5)	471 (22.9)	911 (27.1)	9.7	523 (25.4)	862 (25.6)	0.5
Depressive disorders	1027 (18.9)	384 (18.7)	643 (19.1)	1.1	390 (19.0)	638 (19.0)	0.0
Other conditions that may require a focus of clinical attention ^d	769 (14.2)	268 (13.0)	501 (14.9)	5.4	294 (14.3)	479 (14.3)	0.1

COPD chronic obstructive pulmonary disease, *DSM-5* Diagnostic and Statistical Manual of Mental Disorders 5th Edition, *ED* emergency

department, *HCRU* healthcare resource utilization, *HMO* health maintenance organization, *POS* point of service, *PPO* preferred provider

organization, *PS* propensity score, *Quan-CCI* Quan-Charlson comorbidity index, *SD* standard deviation, *std. diff.* standardized difference

^aPrompt and delayed initiators were weighted using the inverse probability of treatment weighting approach based on the PS. The numbers of patients provided for the weighted cohorts are based on the weighted pseudo-population, which was normalized by the mean weight to ensure that the weighted cohorts had the same numbers of patients as the unweighted cohorts. Covariates used in the PS calculation included: age, sex, year and quarter of index date, US region, type of insurance plan (i.e., PPO, HMO, POS, or other), Quan-CCI score (categories of 0, 1, 2, and 3+), asthma diagnosis, type of COPD exacerbation on the index date, patients with multiple events at the index exacerbation, respiratory medication use, all-cause and COPD-related HCRU and medical costs (hospitalization, ED, and outpatient constituents), and comorbidities (with ≥5% prevalence in either cohort)

^bFor dichotomous variables, the std. diff. was calculated using the following equation, where P is the respective proportion of participants in each group: $| (P_{\text{case}} - P_{\text{control}}) | / \sqrt{[(P_{\text{case}}(1 - P_{\text{case}}) + P_{\text{control}}(1 - P_{\text{control}})) / 2]}$

^cFor continuous variables, the std. diff. was calculated by dividing the absolute difference in means of the control and the case by the pooled SD of both groups. The pooled SD is the square root of the average of the squared SDs

^dThese conditions refer to other conditions and problems that may be a focus of clinical attention or that may otherwise affect the diagnosis, course, prognosis, or treatment of a patient's mental disorder. These conditions include relation problems, abuse and neglect, educational and occupational problems, housing and economic problems, other problems related to the social environment, other health service encounters for counseling and medical advice, and other circumstances of personal history

Supplementary Table S3 Respiratory medication use following index and prior to initiation of FF/UMEC/VI – weighted analysis

	Prompt (n = 2057)	Delayed (n = 3364)
Mean (SD) time from index to FF/UMEC/VI initiation, days	15.7 (9.3)	97.6 (43.3)
Respiratory medications^a, n (%)		
SCS	830 (40.3)	2526 (75.1)
SABA	435 (21.1)	1795 (53.4)
SABA/SAMA	163 (7.9)	646 (19.2)
ICS/LABA	133 (6.5)	1083 (32.2)
Leukotriene modifiers	83 (4.0)	488 (14.5)
LAMA	62 (3.0)	523 (15.5)
LAMA/LABA	54 (2.6)	524 (15.6)
ICS	38 (1.9)	172 (5.1)
MITT	29 (1.4)	342 (10.2)
SAMA	25 (1.2)	73 (2.2)
LABA	8 (0.4)	18 (0.5)
PDE-4 inhibitors	4 (0.2)	33 (1.0)
Methylxanthines	4 (0.2)	30 (0.9)
Biologic agents	4 (0.2)	7 (0.2)

FF/UMEC/VI fluticasone furoate, umecclidinium, and vilanterol, *ICS* inhaled corticosteroid, *LABA* long-acting β_2 -agonist, *LAMA* long-acting muscarinic antagonist, *MITT* multiple-inhaler triple therapy, *PDE-4* phosphodiesterase-4, *SABA* short-acting β_2 -agonist, *SAMA* short-acting muscarinic antagonist, *SCS* systemic corticosteroids, *SD* standard deviation

^aEvaluated from the index date to the date of FF/UMEC/VI initiation

Supplementary Table S4 Rates of COPD-related exacerbations – continuous time to FF/UMEC/VI initiation (analysis for the overall follow-up period)

COPD-related exacerbations	Number of events	Rate (per person-year)	% increase in exacerbation rate associated with a 1-day delay in FF/UMEC/VI initiation^{a,b,c} (95% CI)	P-value^c
Mean (SD) observation period^d, years	1.7 (1.1)			
Total person-years	9478			
Overall exacerbations	7676	0.81	0.27 (0.20–0.33)	<0.001
Moderate exacerbations ^e	6129	0.65	0.27 (0.20–0.34)	<0.001
Severe exacerbations ^f	1547	0.16	0.27 (0.14–0.39)	<0.001

CI confidence interval, *COPD* chronic obstructive pulmonary disease, *ED* emergency department, *FF/UMEC/VI* fluticasone furoate, umecclidinium, and vilanterol, *HCRU* healthcare resource utilization, *HMO* health maintenance organization, *POS* point of service, *PPO* preferred provider organization, *Quan-CCI* Quan-Charlson comorbidity index, *SD* standard deviation

^aThe percentage change in exacerbation rate associated with a 1-day delay in FF/UMEC/VI initiation was calculated using the coefficient on time to FF/UMEC/VI from a Poisson regression model with log-link, which controlled for the following baseline characteristics: age, sex, year

and quarter of index date, US region, type of insurance plan (i.e., PPO, HMO, POS, and other types), Quan-CCI score (categories of 0, 1, 2, and 3+), asthma diagnosis, type of COPD-related exacerbation on the index date, patients with multiple events at the index exacerbation, respiratory medication use, all-cause and COPD-related HCRU and medical costs, and comorbidities (those with $\geq 5\%$ prevalence)

^bTime to FF/UMEC/VI was defined as the time from the index date to the initiation of FF/UMEC/VI. All patients in the sample initiated FF/UMEC/VI in the 6 months following the index date

^cCI and *P*-values were calculated using non-parametric bootstrap procedures with 999 replications

^dThe observation period spanned from the index date until the earliest of health-plan disenrollment or end of data availability

^eModerate COPD-related exacerbations were defined as an outpatient or ED visit with a COPD exacerbation diagnosis code in the primary position and at least one dispensing/administration of a systemic corticosteroid or guideline-recommended antibiotic within 5 days following, or prior to, the visit

^fSevere COPD-related exacerbation defined as an inpatient hospitalization with a diagnosis code for COPD exacerbation in the primary position

Supplementary Table S5 Healthcare costs in the weighted prompt and delayed cohorts (analysis for the overall follow-up period)

Healthcare costs	Prompt cohort [A] <i>n</i> = 2057	Delayed cohort [B] <i>n</i> = 3364	Cost difference, [A] – [B] (95% CI) ^a	<i>P</i> -value ^a
Mean (SD) observation period ^b , years	1.7 (1.1)	1.7 (1.1)		
Mean (SD) healthcare costs ^c , \$US 2022 PPPY				
<i>All cause</i>				
Total costs (medical + pharmacy)	31,793 (52,823)	33,277 (57,395)	–1484 (–4496, 1767)	0.350
Total medical costs	22,103 (48,388)	22,610 (51,830)	–507 (–3340, 2440)	0.677
Hospitalization costs	9285 (32,749)	9905 (34,537)	–620 (–2533, 1394)	0.488
Outpatient visit costs	11,535 (27,628)	11,329 (31,589)	206 (–1390, 1796)	0.859
ED visit costs	1282 (3834)	1376 (3605)	–93 (–320, 136)	0.422
Pharmacy costs	9690 (16,152)	10,667 (19,051)	–977 (–1996, –10)	0.048
<i>COPD related^d</i>				
Total costs (medical + pharmacy)	8245 (23,480)	9225 (23,196)	–981 (–2431, 663)	0.236
Total medical costs	4358 (22,889)	5087 (22,893)	–728 (–2087, 944)	0.326
Hospitalization costs	3522 (22,287)	4001 (22,054)	–479 (–1801, 1104)	0.468
Outpatient visit costs	621 (1946)	804 (3914)	–183 (–379, –19)	0.024

ED visit costs	214 (1132)	282 (1154)	−67 (−127, −6)	0.030
Pharmacy costs	3887 (3217)	4139 (3043)	−252 (−481, −26)	0.036

Prompt and delayed initiators were weighted using the inverse probability of treatment weighting approach based on the PS. Covariates used in the PS calculation included: age, sex, year and quarter of index date, US region, type of insurance plan (i.e., PPO, HMO, POS, or other), Quan-CCI score (categories of 0, 1, 2, and 3+), asthma diagnosis, type of COPD exacerbation on the index date, patients with multiple events at the index exacerbation, respiratory medication use, all-cause and COPD-related HCRU and medical costs (hospitalization, ED, and outpatient constituents), and comorbidities (with $\geq 5\%$ prevalence in either cohort)

CI confidence interval, *COPD* chronic obstructive pulmonary disease, *ED* emergency department, *HMO* health maintenance organization, *HCRU* healthcare resource utilization, *POS* point of service, *PPO* preferred provider organization, *PPY* per person-year, *PS* propensity score, *Quan-CCI* Quan-Charlson comorbidity index, *SD* standard deviation

^aCI and *P*-values were calculated using non-parametric bootstrap procedures with 999 replications

^bThe observation period extended from the index date to the earliest of health-plan disenrollment or the end of data availability

^cAll costs were inflation-adjusted to 2022 US dollars based on the medical care component of the Consumer Price Index

^dCOPD-related cost: any claim associated with a primary diagnosis of COPD

Supplementary Table S6 Healthcare costs – continuous time to FF/UMEC/VI (analysis for the overall follow-up period)

Healthcare costs	Patients N = 5421	\$ increase in costs associated with a 1-day delay in FF/UMEC/VI initiation^{a,b,c} (95% CI)	P-value^d
Mean (SD) observation period^d, years	1.7 (1.1)		
Mean (SD) healthcare costs^e, \$US 2022 PPPY			
All cause			
Total costs (medical + pharmacy)	37,193 (67,130)	11.6 (−15.6, 39.5)	0.398
Total medical costs	26,599 (62,267)	8.9 (−14.5, 34.3)	0.456
Hospitalization costs	11,908 (42,538)	6.7 (−9.5, 22.7)	0.398
ED visit costs	1505 (4,205)	1.7 (−0.4, 4.2)	0.148
Outpatient visit costs	13,186 (36,400)	0.5 (−12.5, 14.6)	0.929
Pharmacy costs	10,594 (19,067)	2.7 (−5.7, 10.8)	0.571
COPD related^f			
Total costs (medical + pharmacy)	9585 (28,169)	9.8 (−2.5, 21.6)	0.108

Total medical costs	5718 (27,899)	9.1 (−2.9, 20.5)	0.134
Hospitalization costs	4627 (27,146)	6.7 (−4.7, 17.5)	0.254
ED visit costs	288 (1428)	0.8 (0.2, 1.4)	0.016
Outpatient visit costs	803 (3259)	1.6 (0.0, 3.6)	0.048
Pharmacy costs	3866 (3035)	0.8 (−1.1, 2.5)	0.400

CI confidence interval, *COPD* chronic obstructive pulmonary disease, *ED* emergency department, *FF/UMEC/VI* fluticasone furoate, umecclidinium, and vilanterol, *HCRU* healthcare resource utilization, *HMO* health maintenance organization, *POS* point of service, *PPO* preferred provider organization, *PPPY* per patient per year, *Quan-CCI* Quan-Charlson comorbidity index, *SD* standard deviation

^aThe dollar increase in cost associated with a 1-day delay in FF/UMEC/VI initiation was calculated using the coefficient on time to FF/UMEC/VI from a linear regression model, which controlled for the following baseline characteristics: age, sex, year and quarter of index date, US region, type of insurance plan (i.e., PPO, HMO, POS, and other types), Quan-CCI score (categories of 0, 1, 2, and 3+), asthma diagnosis, type of COPD-related exacerbation on the index date, patients with multiple events at the index exacerbation, respiratory medication use, all-cause and COPD-related HCRU and medical costs, and comorbidities (those with ≥5% prevalence in either cohort)

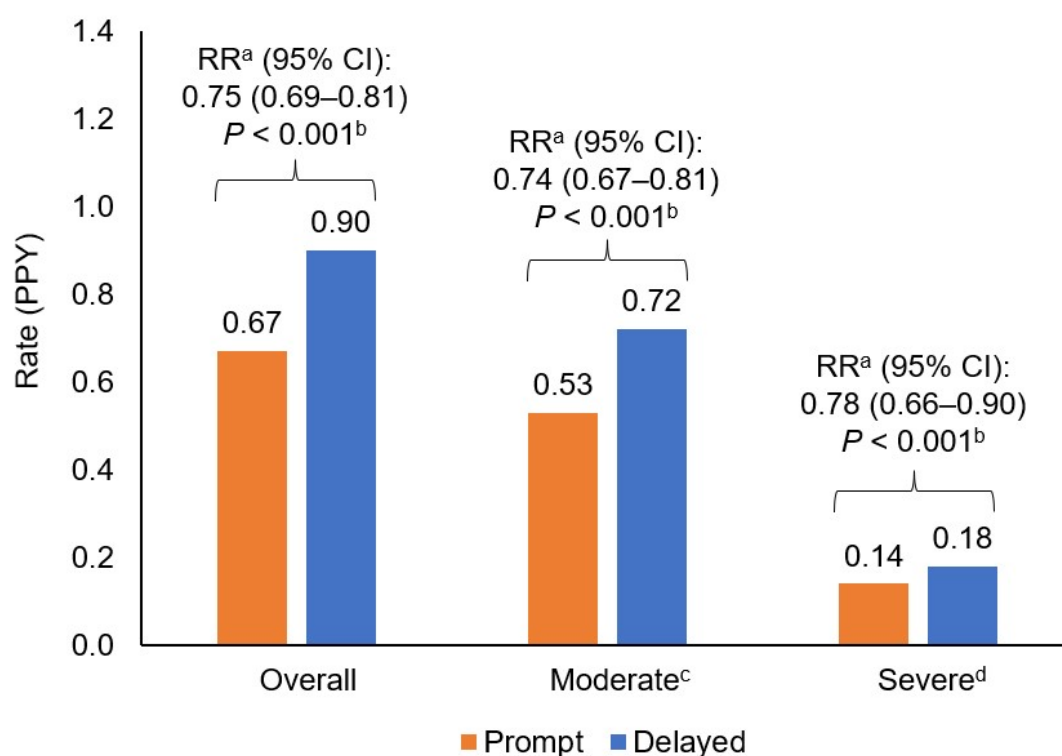
^bTime to FF/UMEC/VI was defined as the time from the index date to the initiation of FF/UMEC/VI. All patients in the sample initiated FF/UMEC/VI in the 6 months following the index date

^cCI and *P*-values were calculated using non-parametric bootstrap procedures with 999 replications

^dThe observation period spanned from the index date until the earliest of health-plan disenrollment or end of data availability

^eAll costs were inflation-adjusted to 2022 US dollars based on the medical care component of the Consumer Price Index

^fCOPD-related costs were identified as any claim with a primary diagnosis of COPD



Supplementary Fig. S1 Rates of COPD exacerbations in the weighted prompt and delayed cohorts (analysis for the overall follow-up period)^e. Prompt and delayed initiators were weighted using the inverse probability of treatment weighting approach based on the PS. Covariates used in the PS calculation included: age, sex, year and quarter of index date, US region, type of insurance plan (i.e., PPO, HMO, POS, or other), Quan-CCI score (categories of 0, 1, 2, and 3+), asthma diagnosis, type of COPD exacerbation on the index date, patients with multiple events at the index exacerbation, respiratory medication use, all-cause and COPD-related HCRU and medical costs (hospitalization, ED, and outpatient constituents), and comorbidities (with $\geq 5\%$ prevalence in either cohort). ^aRRs were calculated from Poisson regression models with log-link. ^bCI and p-values were calculated using non-parametric bootstrap procedures with 999 replications. ^cModerate COPD exacerbations: an outpatient or ED visit with a COPD diagnosis code in the primary position and ≥ 1 dispensing or administration of a systemic corticosteroid or guideline-recommended antibiotic within 5 days before or after the visit. ^dSevere COPD exacerbations: hospitalization with a diagnosis for COPD exacerbation in the primary position. ^eThe observation period extended from the

index date until the earliest of health-plan disenrollment or the end of data availability. *CI* confidence interval, *COPD* chronic obstructive pulmonary disease, *ED* emergency department, *HMO* health maintenance organization, *HCRU* healthcare resource utilization, *POS* point of service, *PPO* preferred provider organization, *PPY* per person-year, *PS* propensity score, *Quan-CCI* Quan-Charlson comorbidity index, *RR* rate ratio

Supplementary References

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