

Supplemental materials for

Pace W, Callen E, Villarreal GG, Shaikh A, Yawn B. Adverse Outcomes Associated With Inhaled Corticosteroid Use in Individuals With Chronic Obstructive Pulmonary Disease. *Ann Fam Med.* 2025;23(2):127-135.

Supplemental Table 1. COPD ICD9 and ICD10 codes

Condition Name	Coding System	ICD code
Obstructive chronic bronchitis without exacerbation	ICD9CM	491.2
Obstructive chronic bronchitis with acute bronchitis	ICD9CM	491.22
Obstructive chronic bronchitis	ICD9CM	491.2
Obstructive chronic bronchitis with (acute) exacerbation	ICD9CM	491.21
Chronic obstructive pulmonary disease with (acute) exacerbation	ICD10CM	J44.1
Other chronic obstructive pulmonary disease	ICD10CM	J44
Unspecified chronic bronchitis	ICD10CM	J42
Emphysema, unspecified	ICD10CM	J43.9
Unilateral pulmonary emphysema [MacLeod's syndrome]	ICD10CM	J43.0
Simple chronic bronchitis	ICD10CM	J41.0
Emphysema	ICD10CM	J43
Other emphysema	ICD10CM	J43.8
Chronic obstructive pulmonary disease, unspecified	ICD10CM	J44.9
Panlobular emphysema	ICD10CM	J43.1
Simple and mucopurulent chronic bronchitis	ICD10CM	J41
Mucopurulent chronic bronchitis	ICD10CM	J41.1
Centrilobular emphysema	ICD10CM	J43.2
Mixed simple and mucopurulent chronic bronchitis	ICD10CM	J41.8
Chronic obstructive pulmonary disease with (acute) lower respiratory infection	ICD10CM	J44.0

Supplemental Table 2. Demographics after Genetic Matching

Prevalent Cohort (COPD Only)							Inception Cohort (COPD Only)					
Characteristic	Match 1:2		Match 1:1		Match 1:3		Match 1:2		Match 1:1		Match 1:3	
	Long-term ICS exposure	Short-term ICS Exposure	Long-term ICS exposure	Intermediate-term ICS Exposure	Intermediate-term ICS Exposure	Short-term ICS Exposure	Long-term ICS exposure	Short-term ICS Exposure	Long-term ICS exposure	Intermediate-term ICS Exposure	Intermediate-term ICS Exposure	Short-term ICS Exposure
Gender												
Female	53.5 (34,736)	53.5 (69,472)	53.6 (27,931)	53.6 (27,931)	52.6 (26,074)	52.6 (78,222)	53.6 (22,830)	53.6 (45,660)	53.3 (18,387)	53.3 (18,387)	52.7 (14,983)	52.7 (44,949)
Male	46.5 (30,221)	46.5 (60,442)	46.4 (24,216)	46.4 (24,216)	47.4 (23,509)	47.4 (70,527)	46.4 (19,796)	46.4 (39,592)	46.7 (16,102)	46.7 (16,102)	47.3 (13,438)	47.3 (40,314)
Race												
White	65.3 (42,405)	65.3 (84,810)	59.4 (30,985)	59.4 (30,985)	59.4 (29,442)	59.4 (88,326)	64.6 (27,543)	64.6 (55,086)	58.1 (20,046)	58.1 (20,046)	59.1 (16,798)	59.1 (50,394)
African-American	5.1 (3,315)	5.1 (6,630)	4.6 (2,415)	4.6 (2,415)	4.7 (2,312)	4.7 (6,936)	5.2 (2,213)	5.2 (4,426)	4.7 (1,604)	4.7 (1,604)	4.8 (1,352)	4.8 (4,056)
Other	1.8 (1,145)	1.8 (2,290)	1.6 (807)	1.6 (807)	1.7 (857)	1.7(2571)	1.6 (670)	1.6 (1,340)	1.3 (431)	1.3 (431)	1.3 (371)	1.3 (1,113)
Unknown	27.9 (18,092)	27.9 (36,184)	34.4 (17,940)	34.4 (17,940)	34.2 (16,972)	34.2 (50,916)	28.6 (12,200)	28.6 (24,400)	36.0 (12,408)	36.0 (12,408)	34.8 (9,900)	34.8 (29,700)
Ethnicity												
Non-Hispanic	66.7 (43,331)	66.7 (86,662)	61.4 (32,034)	61.4 (32,034)	61.6 (30,554)	61.6 (91,662)	66.1 (28,157)	66.1 (56,314)	60.3 (20,798)	60.3 (20,798)	2.7 (754)	2.7 (2,262)
Hispanic	3.0 (1,942)	3.0 (3,884)	2.7 (1,393)	2.7 (1,393)	2.8 (1,383)	2.8 (4,149)	2.9 (1,247)	2.9 (2,494)	2.4 (835)	2.4 (835)	60.6 (17,209)	60.6 (51,627)
Unknown	30.3 (19,684)	30.3 (39,368)	35.9 (18,720)	35.9 (18,720)	35.6 (17,646)	35.6 (52,938)	31.0 (13,222)	31.0 (26,444)	37.3 (12,856)	37.3 (12,856)	36.8 (10,458)	36.8 (31,374)
Smoking Status												
Never smoker	11.0 (7,122)	11.0 (14,244)	10.7 (5,561)	10.7 (5,561)	9.9 (4,910)	9.9 (14,730)	12.1 (5,147)	12.1 (10,294)	11.2 (3,862)	11.2 (3,862)	11.3 (3,223)	11.3 (9,669)
Past smoker	30.9 (20,074)	30.9 (40,148)	35.6 (18,587)	35.6 (18,587)	31.7 (15,731)	31.7 (47,193)	32.9 (14,026)	32.9 (28,052)	36.2 (12,477)	36.2 (12,477)	33.4 (9,485)	33.4 (28,455)
Current smoker	19.9 (12,902)	19.9 (25,804)	21.1 (11,005)	21.1 (11,005)	24.0 (11,898)	24.0 (35,694)	24.4 (10,418)	24.4 (20,836)	22.4 (7,708)	22.4 (7,708)	25.1 (7,139)	25.1 (21,417)
Unknown	38.3 (24,859)	38.3 (49,718)	32.6 (16,994)	32.6 (16,994)	34.4 (17,044)	34.4 (51,132)	30.6 (13,035)	30.6 (26,070)	30.3 (10,442)	30.3 (10,442)	30.2 (8,574)	30.2 (25,722)
BMI category												

<20	4.5 (2,923)	4.5 (5,846)	4.4 (2,272)	4.4 (2,272)	4.1 (2,030)	4.1 (6,090)	4.9 (2,093)	4.9 (4,186)	4.3 (1,486)	4.3 (1,486)	4.4 (1,241)	4.4 (3,723)
20-29	25.6 (16,646)	25.6 (33,292)	24.3 (1,2649)	24.23 (12,649)	23.0 (11,410)	23.0 (34,230)	28.4 (12,095)	28.4 (24,190)	25.3 (8,724)	25.3 (8,724)	26.4 (7,508)	26.4 (22,524)
30-34	10.3 (6,706)	10.3 (13,412)	10.0 (5,204)	10.0 (5,204)	9.4 (4,648)	9.4 (13,944)	11.6 (4,947)	11.6 (9,894)	10.5 (3,627)	10.5 (3,627)	11.0 (3,127)	11.0 (9,381)
>35	9.8 (6,364)	9.8 (12,728)	9.6 (5,025)	9.6 (5,025)	9.1 (4,487)	9.1 (13,461)	11.1 (4,722)	11.1 (9,444)	10.2 (3,531)	10.2 (3,531)	10.5 (2,985)	10.5 (8,955)
Missing	49.8 (32,318)	49.8 (64,636)	51.8 (26,997)	51.8 (26,997)	54.5 (27,008)	54.5 (81,024)	44.0 (18,769)	44.0 (37,538)	49.6 (17,121)	49.6 (17,121)	47.7 (13,560)	47.7 (40,680)
Charlson-Deyo Index												
Score (at index)												
<=2	77.9 (50,625)	77.9 (101,250)	80.9 (42,165)	80.9 (42,165)	78.7 (39,006)	78.7 (117,018)	74.4 (31,699)	74.4 (63,398)	79.3 (27,339)	79.3 (27,339)	74.2 (21,086)	74.2 (63,258)
>2	22.1 (14,332)	22.1 (28,664)	19.1 (9,982)	19.1 (9,982)	21.3 (10,577)	21.3 (31,731)	25.6 (10,927)	25.6 (21,854)	20.7 (7,150)	20.7 (7,150)	25.8 (7,335)	25.8 (22,005)

Note: Long-Term ICS Exposure and Short-Term ICS Exposure: 1:2 matching; Long-Term ICS Exposure and Intermediate ICS Exposure: 1:1 matching; Intermediate ICS Exposure and Short-Term ICS Exposure: 1:3.

Supplemental Table 3. Univariate Analysis for Directionality. Tables show all outcomes, Prevalent and Inception cohorts without asthma (primary cohorts), comparison between all ICS exposure groups matched.

Prevalence Cohort (COPD Only)		All Matched			Match #1		Match #2		Match #3	
		Long-term ICS exposure	Intermediate- term ICS Exposure	Short-term ICS Exposure	Long-term ICS Exposure	Intermediat e-term ICS Exposure	Long-term ICS Exposure	Short- term ICS Exposure	Intermediat e-term ICS Exposure	Short-term ICS Exposure
Diabetes	N, %	8644, 13.53%	2600, 5.25%	5179, 3.53%	5932, 11.97%	2508, 5.33%	8324, 13.53%	4086, 3.86%	2477, 5.57%	4184, 3.21%
	Total	63904	49519	146757	49538	47023	61540	105750	44480	130390
	Test	X2(2)=112203; p<0.001			X2(1)=1333; p<0.001		X2(1)=5286.8; p<0.001		X2(1)=503.49; p<0.001	
Osteoporosis	N, %	5188, 7.90%	1295, 2.48%	4163, 2.63%	3680, 7.25%	1260, 2.54%	5017, 7.93%	3261, 2.69%	1203, 2.55%	3316, 2.38%
	Total	65669	52304	157993	50729	49582	63250	121191	47125	139349
	Test	X2(2)=3799.7; p<0.001			X2(1)=1188.5; p<0.001		X2(1)=2662; p<0.001		X2(1)=4.3919; p=0.036	
Fractures	N, %	1862, 2.78%	503, 0.93%	2146, 1.26%	1321, 2.55%	489, 0.95%	1802, 2.79%	1634, 1.28%	468, 0.96%	1663, 1.14%
	Total	66963	54217	169807	51766	51415	64483	127347	48865	145942
	Test	X2(2)=893.17; p<0.001			X2(1)=382.61; p<0.001		X2(1)=555.05; p<0.001		X2(1)=11.01; p<0.001	
Cataract	N, %	428, 0.64%	238, 0.44%	814, 0.49%	395, 0.76%	235, 0.45%	406, 0.63%	631, 0.49%	185, 0.38%	675, 0.46%
	Total	67144	54463	167177	51860	51652	64680	128371	49184	146852
	Test	X2(2)=28.793; p<0.001			X2(1)=39.734; p<0.001		X2(1)=14.671; p<0.001		X2(1)=5.693; 0.017	
Pneumonia	N, %	8554, 12.96%	3210, 6.11%	7776, 4.88%	6343, 12.45%	3054, 6.13%	8263, 13.01%	6017, 4.91%	2960, 6.25%	6222, 4.43%
	Total	65984	52534	159393	50956	49826	63530	122501	47397	140581
	Test	X2(2)=4750.9; p<0.001			X2(1)=1188.9; p<0.001		X2(1)=3866.7; p<0.001		X2(1)=252.1; p<0.001	
Herpes Zoster	N, %	802, 1.19%	232, 0.42%	841, 0.50%	599, 1.15%	218, 0.42%	782, 1.21%	669, 0.52%	211, 0.43%	667, 0.45%
	Total	67158	54648	167803	51917	51831	64673	128794	49261	147563
	Test	X2(2)=410.14; p<0.001			X2(1)=177.51; p<0.001		X2(1)=274.23; p<0.001		X2(1)=0.415; p=0.520	

Prevalence Cohort (COPD + Asthma)		All Matched			Match #1		Match #2		Match #3	
		Long-term ICS exposure	Intermediate- term ICS Exposure	Short- term ICS Exposure	Long-term ICS Exposure	Intermediate-term ICS Exposure	Long-term ICS Exposure	Short-term ICS Exposure	Intermediate-term ICS Exposure	Short-term ICS Exposure
Diabetes	N, %	12345, 14.44%	3237, 5.29%	6427, 3.76%	7894, 12.61%	3181, 5.36%	11321, 14.65%	5327, 3.79%	2954, 5.76%	5053, 3.37%
	Total	85465	61150	170990	62621	59361	77290	140489	51278	149756
	Test	X2(2)=10403; p<0.001			X2(1)=1938.1; p<0.001		X2(1)=8321; p<0.001		X2(1)=568.3; p<0.001	
Osteoporosis	N, %	7501, 8.56%	1681, 2.61%	5305, 2.87%	4891, 7.64%	1652, 2.65%	6796, 8.56%	4323, 2.85%	1470, 2.71%	4039, 2.52%
	Total	87581	64386	184613	64002	62433	79350	151462	54260	160385
	Test	X2(2)=5225.1; p<0.001			X2(1)=1606.4; p<0.001		X2(1)=3701.8; p<0.001		X2(1)=5.8301; p<0.001	
Fractures	N, %	2614, 2.92%	628, 0.94%	2806, 1.44%	1700, 2.60%	614, 0.95%	2399, 2.96%	2237, 1.40%	550, 0.98%	2068, 1.23%
	Total	89368	66866	194247	65306	64858	80923	159576	56379	168292
	Test	X2(2)=1092.4; p<0.001			X2(1)=510.38; p<0.001		X2(1)=692.77; p<0.001		X2(1)=23.303; p<0.001	
Cataract	N, %	681, 0.76%	305, 0.45%	1063, 0.54%	572, 0.87%	305, 0.47%	555, 0.68%	897, 0.56%	218, 0.38%	876, 0.52%
	Total	89593	67113	195802	65387	65092	81184	160835	56721	169211
	Test	X2(2)=73.249; p<0.001			X2(1)=80.02; p<0.001		X2(1)=14.134; p<0.001		X2(1)=15.403; p<0.001	
Pneumonia	N, %	12343, 14.04%	4072, 6.31%	10061, 5.41%	8602, 13.40%	3954, 6.32%	11263, 14.15%	8077, 5.28%	3551, 6.52%	7761, 4.80%
	Total	87920	64529	186112	64184	62591	79593	153024	54504	161631
	Test	X2(2)=6425.6; p<0.001			X2(1)=1781.8; p<0.001		X2(1)=5406; p<0.001		X2(1)=240.92; p<0.001	
Herpes Zoster	N, %	1342, 1.50%	329, 0.49%	1219, 0.62%	937, 1.43%	319, 0.49%	1209, 1.49%	998, 0.62%	283, 0.50%	945, 0.56%
	Total	89621	67335	196656	65468	65312	81159	161464	56799	170122
	Test	X2(2)=695.73; p<0.001			X2(1)=304.55; p<0.001		X2(1)=454.22; p<0.001		X2(1)=2.4865; p=0.115	

Inception Cohort (COPD Only)		<i>All Matched</i>			<i>Match #1</i>		<i>Match #2</i>		<i>Match #3</i>	
		Long-term ICS exposure	Intermediate-term ICS Exposure	Short-term ICS Exposure	Long-term ICS Exposure	Intermediate-term ICS Exposure	Long-term ICS Exposure	Short-term ICS Exposure	Intermediate-term ICS Exposure	Short-term ICS Exposure
Diabetes	N, %	6751, 14.60%	1913, 6.12%	3524, 4.09%	4265, 13.02%	1878, 6.09%	6037, 14.98%	2933, 4.03%	1680, 6.69%	2792, 3.80%
	Total	46225	31270	86112	32753	30829	40288	72752	25101	73379
	Test	X2(2)=4920.6; p<0.001			X2(1)=873.04; p<0.001		X2(1)=4256.5; p<0.001		X2(1)=359.21; p<0.001	
Osteoporosis	N, %	4004, 8.43%	974, 2.94%	2843, 3.06%	2544, 7.58%	958, 2.93%	3578, 8.63%	2361, 3.03%	828, 3.09%	2158, 2.75%
	Total	47512	33161	92891	33566	32642	41450	78039	26808	78444
	Test	X2(2)=2338.5; p<0.001			X2(1)=711.58; p<0.001		X2(1)=1800.5; p<0.001		X2(1)=8.140; p=0.004	
Fractures	N, %	1454, 3.00%	392, 1.14%	1501, 1.52%	922, 2.70%	386, 1.14%	1295, 3.06%	1246, 1.51%	336, 1.20%	1091, 1.31%
	Total	48407	34460	98602	34202	33919	42253	82904	27898	83065
	Test	X2(2)=510.98; p<0.001			X2(1)=218.61; p<0.001		X2(1)=342.5; p<0.001		X2(1)=1.871; p=0.171	
Cataract	N, %	345, 0.71%	180, 0.52%	490, 0.49%	313, 0.91%	178, 0.52%	293, 0.69%	417, 0.50%	133, 0.47%	401, 0.48%
	Total	48590	34666	99910	34294	34125	42437	84014	28148	83865
	Test	X2(2)=29.548; p<0.001			X2(1)=36.171; p<0.001		X2(1)=18.677; p<0.001		X2(1)=0.005; p=0.945	
Pneumonia	N, %	6555, 13.75%	2193, 6.60%	4994, 5.31%	4402, 13.09%	2155, 6.59%	5828, 14.01%	4144, 5.24%	1858, 6.91%	3770, 4.75%
	Total	47677	33207	94057	33635	32702	41591	79159	26877	79399
	Test	X2(2)=3230.2; p<0.001			X2(1)=785.2; p<0.001		X2(1)=2771.5; p<0.001		X2(1)=187.2; p<0.001	
Herpes Zoster	N, %	658, 1.36%	175, 0.50%	555, 0.55%	440, 1.28%	168, 0.49%	593, 1.40%	465, 0.55%	145, 0.52%	429, 0.51%
	Total	48545	34749	100265	34287	34207	42388	84227	28155	84305
	Test	X2(2)=316.71; p<0.001			X2(1)=121.24; p<0.001		X2(1)=243.05; p<0.001		X2(1)=0.006; p=0.939	

Inception Cohort (COPD + Asthma)		All Matched			Match #1		Match #2		Match #3	
		Long-term ICS exposure	Intermediate- term ICS Exposure	Short- term ICS Exposure	Long-term ICS Exposure	Intermediate- term ICS Exposure	Long-term ICS Exposure	Short- term ICS Exposure	Intermediate- term ICS Exposure	Short- term ICS Exposure
Diabetes	N, %	11391, 15.79%	2414, 6.15%	4047, 4.22%	5596, 13.49%	2394, 6.14%	11135, 15.78%	2672, 4.22%	2024, 6.85%	3430, 3.98%
	Total	72162	39248	95948	41494	39008	70570	63341	29564	86262
	Test	X2(2)=7376.1; p<0.001			X2(1)=1213.8; p<0.001		X2(1)=4822.6; p<0.001		X2(1)=403.52; p<0.001	
Osteoporosis	N, %	6853, 9.27%	1289, 3.10%	3228, 3.12%	3455, 8.14%	1278, 3.10%	6689, 9.25%	2186, 3.22%	1043, 3.30%	2657, 2.87%
	Total	73938	41537	103561	42440	41230	72296	67972	31568	92450
	Test	X2(2)=3770.9; p<0.001			X2(1)=994.95; p<0.001		X2(1)=2152.7; p<0.001		X2(1)=14.884; p<0.001	
Fractures	N, %	2422, 3.21%	490, 1.13%	1715, 1.56%	1254, 2.90%	484, 1.13%	2356, 3.20%	1143, 1.58%	406, 1.23%	1367, 1.39%
	Total	75373	43265	110066	43290	42947	73714	72356	32934	98063
	Test	X2(2)=831.83; p<0.001			X2(1)=341.04; p<0.001		X2(1)=407.38; p<0.001		X2(1)=4.680; p=0.031	
Cataract	N, %	616, 0.81%	235, 0.54%	620, 0.56%	457, 1.05%	235, 0.54%	613, 0.83%	412, 0.56%	163, 0.49%	543, 0.55%
	Total	75640	43483	111212	43401	43163	73976	73135	33226	98857
	Test	X2(2)=54.965; p<0.001			X2(1)=69.929; p<0.001		X2(1)=37.03; p<0.001		X2(1)=1.503; p=0.220	
Pneumonia	N, %	11007, 14.83%	2847, 6.86%	5899, 5.64%	6027, 14.17%	2822, 6.85%	10804, 14.89%	3855, 5.60%	2291, 7.25%	4804, 5.15%
	Total	74206	41486	104595	42536	41191	72561	68878	31607	93340
	Test	X2(2)=4771.7; p<0.001			X2(1)=1184.9; p<0.001		X2(1)=3283.6; p<0.001		X2(1)=194.32; p<0.001	
Herpes Zoster	N, %	1250, 1.65%	256, 0.59%	744, 0.67%	697, 1.61%	252, 0.58%	1238, 1.67%	491, 0.67%	201, 0.61%	626, 0.63%
	Total	75592	43578	111695	43417	43260	73933	73346	33205	99423
	Test	X2(2)=538.95; p<0.001			X2(1)=208.41; p<0.001		X2(1)=319.71; p<0.001		X2(1)=0.200; p=0.655	

Supplemental Table 4. Cox Regression Analysis

Cohort: Prevalent COPD Only

Groups: Long-Term and No ICS Exposure

Parameter	Parameter Estimate	Chi-Square	Sig.	Hazard Ratio
<i>Overall Regression with Long-Term ICS Exposure and No ICS Exposure</i>				
Group	0.999	26454.442	<0.001	2.716
Age at Index	0.007	866.323	<0.001	1.007
Index Year	0.277	56536.768	<0.001	1.319
Steroid Count	-0.057	2191.608	<0.001	0.944
Gender	0.019	15.173	<0.001	1.019
Race	0.059	628.623	<0.001	1.060
Ethnicity	0.012	3.865	0.049	1.012
Smoking	-0.011	22.422	<0.001	0.989
BMI	-0.015	983.606	<0.001	0.986
Charlson-Deyo	-0.134	475.978	<0.001	0.874
<i>Diabetes Regression with Long-Term ICS Exposure and No ICS Exposure</i>				
Group	0.958	25237.134	<0.001	2.606
Age at Index	0.007	1000.289	<0.001	1.007
Index Year	0.277	53871.020	<0.001	1.320
Steroid Count	-0.046	1737.001	<0.001	0.955
Gender	0.025	24.528	<0.001	1.025
Race	0.057	549.100	<0.001	1.058
Ethnicity	0.015	5.292	0.021	1.015
Smoking	-0.011	21.018	<0.001	0.989
BMI	-0.014	886.397	<0.001	0.986
Charlson-Deyo	-0.124	331.582	<0.001	0.884
<i>Osteoporosis Regression with Long-Term ICS Exposure and No ICS Exposure</i>				
Group	0.936	26435.577	<0.001	2.550
Age at Index	0.007	1051.013	<0.001	1.007
Index Year	0.284	60171.127	<0.001	1.328
Steroid Count	-0.047	1914.673	<0.001	0.954
Gender	0.010	4.773	0.029	1.010
Race	0.054	559.011	<0.001	1.055
Ethnicity	0.010	2.771	0.096	1.010

Parameter	Parameter Estimate	Chi-Square	Sig.	Hazard Ratio
Smoking	-0.010	18.088	<0.001	0.990
BMI	-0.014	993.585	<0.001	0.986
Charlson-Deyo	-0.117	396.267	<0.001	0.890
<i>Cataract Regression with Long-Term ICS Exposure and No ICS Exposure</i>				
Group	0.914	27605.053	<0.001	2.495
Age at Index	0.007	1135.041	<0.001	1.007
Index Year	0.285	65356.373	<0.001	1.330
Steroid Count	-0.042	1869.411	<0.001	0.959
Gender	0.020	19.259	<0.001	1.020
Race	0.053	593.574	<0.001	1.055
Ethnicity	0.005	0.856	0.355	1.005
Smoking	-0.012	30.051	<0.001	0.988
BMI	-0.013	942.259	<0.001	0.987
Charlson-Deyo	-0.114	422.905	<0.001	0.892
<i>Pneumonia Regression with Long-Term ICS Exposure and No ICS Exposure</i>				
Group	0.926	25274.056	<0.001	2.524
Age at Index	0.007	883.629	<0.001	1.007
Index Year	0.287	60465.941	<0.001	1.332
Steroid Count	-0.052	2108.792	<0.001	0.949
Gender	0.015	9.283	0.002	1.015
Race	0.057	611.579	<0.001	1.058
Ethnicity	0.012	3.802	0.051	1.012
Smoking	-0.009	13.768	<0.001	0.991
BMI	-0.015	1083.268	<0.001	0.985
Charlson-Deyo	-0.130	483.331	<0.001	0.878
<i>Fracture Regression with Long-Term ICS Exposure and No ICS Exposure</i>				
Group	0.913	27002.086	<0.001	2.492
Age at Index	0.007	1029.448	<0.001	1.007
Index Year	0.285	64540.318	<0.001	1.330
Steroid Count	-0.044	1904.507	<0.001	0.957
Gender	0.022	22.862	<0.001	1.022
Race	0.055	618.281	<0.001	1.057
Ethnicity	0.009	2.622	0.105	1.009
Smoking	-0.009	17.759	<0.001	0.991
BMI	-0.014	998.267	<0.001	0.986

Parameter	Parameter Estimate	Chi-Square	Sig.	Hazard Ratio
Charlson-Deyo	-0.115	418.858	<0.001	0.891
<i>Herpes Zoster Regression with Long-Term ICS Exposure and No ICS Exposure</i>				
Group	0.914	27506.609	<0.001	2.493
Age at Index	0.007	1120.090	<0.001	1.007
Index Year	0.284	65073.209	<0.001	1.329
Steroid Count	-0.042	1865.065	<0.001	0.959
Gender	0.020	19.691	<0.001	1.020
Race	0.053	587.011	<0.001	1.055
Ethnicity	0.007	1.494	0.222	1.007
Smoking	-0.011	26.396	<0.001	0.989
BMI	-0.013	942.393	<0.001	0.987
Charlson-Deyo	-0.114	419.856	<0.001	0.892
<i>Recurrent Outcome Regression with Long-Term ICS Exposure and No ICS Exposure</i>				
Group	0.999	26444.5351	<0.001	2.716
Age at Index	0.007	881.127	<0.001	1.007
Index Year	0.276	56008.642	<0.001	1.318
Steroid Count	-0.059	2264.230	<0.001	0.943
Gender	0.019	15.841	<0.001	1.020
Race	0.059	629.364	<0.001	1.060
Ethnicity	0.013	4.257	0.039	1.013
Smoking	-0.012	23.206	<0.001	0.989
BMI	-0.015	1011.436	<0.001	0.985
Charlson-Deyo	-0.138	499.563	<0.001	0.872
<i>Recurrent Pneumonia Regression with Long-Term ICS Exposure and No ICS Exposure</i>				
Group	1.269	648.921	<0.001	3.558
Age at Index	0.020	98.920	<0.001	1.020
Index Year	0.190	388.723	<0.001	1.209
Steroid Count	-0.186	223.134	<0.001	0.830
Gender	0.067	2.269	0.132	1.069
Race	0.040	3.075	0.080	1.041
Ethnicity	-0.105	3.327	0.068	0.901
Smoking	-0.010	0.228	0.633	0.990
BMI	-0.116	612.793	<0.001	0.890
Charlson-Deyo	-0.165	11.302	<0.001	0.848
<i>Recurrent Fracture Regression with Long-Term ICS Exposure and No ICS Exposure</i>				

Parameter	Parameter Estimate	Chi-Square	Sig.	Hazard Ratio
Group	0.678	34.554	<0.001	1.970
Age at Index	0.025	21.201	<0.001	1.025
Index Year	0.299	131.340	<0.001	1.349
Steroid Count	-0.107	23.614	<0.001	0.899
Gender	0.231	4.013	0.045	1.259
Race	0.038	0.411	0.521	1.039
Ethnicity	-0.288	4.578	0.032	0.750
Smoking	-0.020	0.147	0.702	0.981
BMI	-0.068	42.354	<0.001	0.935
Charlson-Deyo	-0.013	0.012	0.912	0.987

Supplemental Figure 1 – Time to First Event – Inception Cohort Short-term ICS vs Long-term ICS

