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Supplemental Materials

Supplemental Table 1. Trends in the prevalence of cost-related nonadherence to medications among US adults with asthma

| Outcomes | Cost-related nonadherence to medications | | | Components of cost-related nonadherence to medications | | | | | | | | |
| | | | | Skipped medication doses to save money | | | Took less medication to save money | | | Delayed refilling medications to save money | | |
Year	N [a]	% [b]	SE [c]	N [a]	% [b]	SE [c]	N [a]	% [b]	SE [c]	N [a]	% [b]	SE [c]
2011	365,090	23.2	1.0	251,569	16.0	0.9	264,111	16.8	0.9	314,800	20.0	0.9
2012	335,472	21.5	1.2	236,027	15.1	1.0	252,940	16.2	0.9	289,471	18.6	1.1
2013	260,221	22.7	1.1	181,723	15.9	1.1	188,594	16.5	1.1	220,378	19.2	1.1
2014	233,123	19.1	1.0	154,359	12.7	0.9	169,840	13.9	0.9	195,702	16.0	1.0
2015	227,013	17.6	1.0	147,725	11.5	0.8	166,063	12.9	0.8	192,298	14.9	1.0
2016	240,620	17.1	1.0	155,938	11.1	0.9	157,240	11.2	0.9	209,608	14.9	1.0
2017	241,160	18.1	1.1	162,317	12.2	1.0	165,248	12.4	1.0	204,514	15.3	1.0
2018	231,006	16.9	1.0	155,311	11.4	0.9	151,722	11.1	0.9	194,233	14.2	0.9
2019	241,720	16.8	1.0	144,591	10.1	0.8	164,640	11.5	0.9	209,487	14.6	0.9
2020	228,054	15.6	1.1	139,265	9.5	0.8	149,041	10.2	0.9	186,644	12.8	0.9
2021	177,955	12.5	0.8	107,119	7.5	0.6	125,158	8.8	0.7	157,159	11.1	0.8
2022	204,447	13.1	0.9	113,248	7.3	0.7	122,466	7.9	0.7	162,138	10.4	0.8

[a] *N*: The number of the weighted population.

[b] %: The percentage of the weighted population.

[c] SE: The standard error of the percentage.

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Supplemental Table 2. Trends in the prevalence of cost-related nonadherence to medications among U.S. adults with asthma: results from the joinpoint regression analysis.

	Segment 1			Segment 2			Segment 3			Full range	
	Period	APC	95% CI	Period	APC	95% CI	Period	APC	95% CI	AAPC	95% CI
Cost-related nonadherence to medications	2011-2015	-6.5	(-13.4, 1.1)	2015-2019	-2.1	(-15.8, 13.9)	2019-2022	-9.5	(-24.3, 8.2)	-5.0	(-6.1, -3.8)
Skipped medication dose to save money	2011-2015	-7.9	(-14.8, -0.4)	2015-2018	-1.1	(-27.8, 35.6)	2018-2022	-11.5	(-20.6, -1.3)	-6.5	(-7.9, -5.1)
Took less medication to save money	2011-2016	-7.2	(-10.8, -3.5)	2016-2019	-1.7	(-22.0, 23.9)	2019-2022	-11.7	(-22.1, 0.04)	-6.2	(-7.3, -5.1)
Delayed refilling medications to save money	2011-2015	-6.7	(-11.9, -1.2)	2015-2019	-1.7	(-12.0, 9.8)	2019-2022	-10.9	(-21.4, 1.0)	-5.1	(-6.2, -4.0)
Abbreviations: APC, annual percent change; AAPC, average annual percent change; CI, confidence interval.											

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Supplemental Table 3. Characteristics associated with cost-related nonadherence to medications among US adults with asthma: results from the adjusted multivariable logistic regression model

Characteristic	Odds ratio	95% CI
Age (years)		
>60	Reference	Reference
41-60	1.94	(1.72-2.19)
18-40	1.81	(1.57-2.08)
Sex		
Male	Reference	Reference
Female	1.48	(1.34-1.63)
Race/ethnicity		
Non-Hispanic White	Reference	Reference
Hispanic	1.03	(0.89-1.20)
Non-Hispanic Black	0.92	(0.82-1.04)
Others	0.84	(0.68-1.04)
Region		
Northeast	Reference	Reference
Midwest	1.42	(1.25-1.61)
South	1.42	(1.26-1.60)
West	1.35	(1.19-1.54)
Educational level		
Less than high school	Reference	Reference
High school and higher	1.33	(1.17-1.52)
Health insurance		
Covered	Reference	Reference
Not covered	3.44	(3.00-3.94)
Poverty status		
FPL ≥400%	Reference	Reference
FPL 200%-<400%	2.40	(2.12-2.73)
FPL 100%-<200%	2.95	(2.55-3.42)
FPL <100%	2.26	(1.93-2.65)
Work status		
Employed	1.25	(1.12-1.40)
Unemployed	Reference	Reference
Smoking status		
Non-smoker	Reference	Reference
Former smoker	1.16	(1.05-1.29)

Current smoker	1.53	(1.36-1.71)
Perceived health status		
Poor	Reference	Reference
Good	0.56	(0.49-0.64)
Marital status		
Married or living with partner	Reference	Reference
Single or living alone	1.04	(0.95-1.14)
Comorbidities, *n*		
0	Reference	Reference
1	1.23	(1.07-1.40)
≥2	1.82	(1.59-2.07)

Abbreviations: CI, confidence interval; FPL, federal poverty level.

Supplemental Table 4. Characteristics associated with cost-related nonadherence to medications among US adults with asthma: results from the sensitivity analyses

Outcomes	Components of cost-related nonadherence to medications					
	Skipped medication doses to save money		Took less medication to save money		Delayed refilling medications to save money	
Characteristics	Odds ratio	95% CI	Odds ratio	95% CI	Odds ratio	95% CI
Age (years)						
>60	Reference	Reference	Reference	Reference	Reference	Reference
41-60	1.89	(1.64-2.19)	1.96	(1.72-2.24)	2.05	(1.80-2.33)
18-40	1.67	(1.41-1.99)	1.73	(1.47-2.04)	1.95	(1.67-2.27)
Sex						
Male	Reference	Reference	Reference	Reference	Reference	Reference
Female	1.47	(1.30-1.67)	1.45	(1.29-1.62)	1.52	(1.36-1.69)
Race/ethnicity						
Non-Hispanic White	Reference	Reference	Reference	Reference	Reference	Reference
Hispanic	1.12	(0.94-1.34)	0.96	(0.81-1.15)	1.00	(0.86-1.17)
Non-Hispanic Black	0.87	(0.76-1.01)	0.86	(0.75-0.98)	0.91	(0.80-1.03)
Others	0.90	(0.71-1.15)	0.90	(0.71-1.14)	0.80	(0.63-1.02)
Region						
Northeast	Reference	Reference	Reference	Reference	Reference	Reference
Midwest	1.34	(1.14-1.58)	1.36	(1.17-1.59)	1.45	(1.26-1.68)
South	1.32	(1.13-1.54)	1.40	(1.21-1.62)	1.46	(1.28-1.67)

West	1.27	(1.07-1.51)	1.28	(1.09-1.50)	1.44	(1.25-1.67)
Educational level						
Less than high school	Reference	Reference	Reference	Reference	Reference	Reference
High school and higher	1.21	(1.04-1.42)	1.26	(1.08-1.46)	1.33	(1.16-1.54)
Health insurance						
Covered	Reference	Reference	Reference	Reference	Reference	Reference
Not covered	3.39	(2.93-3.92)	3.43	(2.98-3.94)	3.36	(2.92-3.87)
Poverty status						
FPL ≥400%	Reference	Reference	Reference	Reference	Reference	Reference
FPL 200%-<400%	2.19	(1.87-2.57)	2.20	(1.83-2.64)	2.45	(2.06-2.92)
FPL 100%-<200%	2.75	(2.30-3.28)	2.77	(2.34-3.27)	3.04	(2.59-3.57)
FPL <100%	2.25	(1.86-2.73)	2.29	(1.97-2.66)	2.54	(2.22-2.91)
Work status						
Employed	1.21	(1.07-1.38)	1.17	(1.04-1.32)	1.30	(1.15-1.45)
Unemployed	Reference	Reference	Reference	Reference	Reference	Reference
Smoking status						
Non-smoker	Reference	Reference	Reference	Reference	Reference	Reference
Former smoker	1.13	(1.00-1.28)	1.18	(1.04-1.34)	1.16	(1.04-1.30)
Current smoker	1.48	(1.29-1.69)	1.63	(1.43-1.86)	1.59	(1.41-1.80)
Perceived health status						
Poor	Reference	Reference	Reference	Reference	Reference	Reference
Good	0.58	(0.50-0.68)	0.60	(0.51-0.70)	0.56	(0.48-0.65)

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Marital status						
Married or living with partner	Reference	Reference	Reference	Reference	Reference	Reference
Single or living alone	1.12	(1.01-1.25)	1.05	(0.94-1.17)	1.05	(0.95-1.16)
Comorbidities, *n*						
0	Reference	Reference	Reference	Reference	Reference	Reference
1	1.34	(1.13-1.58)	1.34	(1.15-1.56)	1.23	(1.07-1.42)
≥2	1.97	(1.68-2.32)	1.90	(1.64-2.21)	1.85	(1.61-2.14)

Abbreviations: CI, confidence interval; FPL, federal poverty level.

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Supplemental Table 5. Association between cost-related nonadherence to medications and asthma-related adverse events among US adults
with asthma: results from the sensitivity analyses

| | Asthma-related adverse events | | | | |
| | Asthma attacks | | | ER visits for asthma | |
Components of cost-related nonadherence to medications	Odds ratio	95% CI		Odds ratio	95% CI
Skipped medication doses to save money					
Yes	2.05	(1.84-2.28)		1.66	(1.44-1.90)
No	Reference	Reference		Reference	Reference
Took less medication to save money					
Yes	2.10	(1.90-2.33)		1.60	(1.40-1.83)
No	Reference	Reference		Reference	Reference
Delayed refilling medications to save money					
Yes	1.96	(1.78-2.15)		1.66	(1.46-1.89)
No	Reference	Reference		Reference	Reference

Abbreviations: CI, confidence interval; ER, emergency room.

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Supplementary Table 6. Trends in the prevalence of cost-related nonadherence to medications among U.S. adults with asthma: stratified by the region.

	Cost-related nonadherence to medications											
Region	Northeast				Midwest				South			West
Year	N [a]	% [b]	SE [c]		N [a]	% [b]	SE [c]		N [a]	% [b]	SE [c]		N [a]	% [b]	SE [c]
2011	47207	15.8	2.2		80612	22.7	1.9		144140	26.9	1.8		93131	24.4	2.1
2012	65166	19.8	2.9		78405	21.6	2.8		127961	24.5	1.8		63941	18.6	1.8
2013	36922	15.0	2.1		59720	22.2	2.2		107591	29.2	2.3		55988	21.3	2.1
2014	29443	13.1	2.2		63875	21.6	2.1		86365	20.1	1.8		53440	19.7	1.9
2015	29372	13.4	2.0		62134	21.0	2.0		85534	18.6	1.8		49974	15.9	1.9
2016	29902	10.4	2.2		53807	15.4	1.7		108596	23.9	2.1		48315	15.4	1.9
2017	32890	13.2	2.2		68303	21.7	2.4		90837	19.0	1.9		49130	16.8	2.2
2018	34766	13.0	1.9		54871	18.8	2.1		93845	20.4	2.0		47524	13.8	2.2
2019	34294	12.5	1.7		59900	20.2	2.4		94655	17.8	1.7		52871	15.8	2.0
2020	26942	10.4	2.0		42672	13.8	1.8		97519	18.1	1.9		60921	17.2	2.4
2021	18767	7.4	1.3		45790	14.1	1.9		77952	15.5	1.4		35446	10.4	1.5
2022	30637	9.9	1.5		45116	14.0	1.9		84989	15.3	1.6		43704	11.8	1.6

[a] N: The number of the weighted population.

[b] %: The percentage of the weighted population.

[c] SE: The standard error of the percentage.

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Supplementary Table 7. Trends in the prevalence of cost-related nonadherence to medications among U.S. adults with asthma, stratified by region: results from the joinpoint regression analysis.

	Segment 1			Segment 2			Segment 3			Full range	
Cost-related nonadherence to medications	Period	APC	95% CI	Period	APC	95% CI	Period	APC	95% CI	AAPC	95% CI
Region											
Northeast	2011-2016	-7.2	(-19.3, 6.7)	2016-2019	0.3	(-48.5, 95.5)	2019-2022	-11.3	(-38.4, 27.8)	-5.4	(-8.2, -2.8)
Midwest	2011-2016	-4.1	(-5.3, -2.9)	2016-2019	0.1	(-6.3, 6.8)	2019-2022	-12.3	(-15.6, -8.7)	-5.3	(-6.7, -3.9)
South	2011-2015	-6.6	(-18.9, 7.6)	2015-2018	-1.4	(-42.7, 69.6)	2018-2022	-7.2	(-22.6, 11.2)	-5.0	(-7.0, -3.2)
West	2011-2016	-7.6	(-15.9, 1.6)	2016-2020	-0.5	(-24.3, 30.9)	2020-2022	-16.6	(-54.0, 51.3)	-5.6	(-8.6, -3.2)
Abbreviations: APC, annual percent change; AAPC, average annual percent change; CI, confidence interval.											

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