

Impact of plan-level access restrictions on adherence and effectiveness of biologics among patients with rheumatoid or psoriatic arthritis

PharmacoEconomics

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Online Resource 3: Full results of multivariate models of the effect of access restrictions on medication adherence and effectiveness for both rheumatoid arthritis (RA) patients and psoriatic arthritis (PsA) patients

	Any access restrictions vs. no access restrictions			
	RA Patients		PsA Patients	
	Medication Adherence	Treatment Effectiveness	Medication Adherence	Treatment Effectiveness
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Any access restrictions vs. no access restrictions	0.90 (0.77-1.05)	0.93 (0.78-1.10)	0.82 (0.64-1.06)	0.87 (0.67-1.14)
Age group (ref: 55-64)				
18-34	0.67 (0.50-0.89)	0.67 (0.49-0.91)	0.68 (0.44-1.03)	0.78 (0.50-1.21)
35-44	0.80 (0.65-1.00)	0.83 (0.65-1.05)	1.05 (0.76-1.46)	1.16 (0.83-1.63)
45-54	1.04 (0.88-1.22)	1.04 (0.87-1.24)	1.03 (0.78-1.37)	1.04 (0.77-1.41)
Male	1.24 (1.05-1.46)	1.26 (1.05-1.51)	1.32 (1.05-1.67)	1.31 (1.02-1.67)
Region (ref: Northeast)				
North Central	0.94 (0.73-1.20)	0.97 (0.75-1.26)	0.98 (0.67-1.44)	0.95 (0.64-1.43)
South/unknown	0.69 (0.56-0.86)	0.71 (0.56-0.90)	0.89 (0.64-1.24)	0.91 (0.64-1.30)
West	0.87 (0.67-1.14)	0.87 (0.65-1.16)	1.09 (0.71-1.66)	1.16 (0.75-1.81)
Rural/unknown (vs. urban)	0.87 (0.71-1.07)	0.94 (0.75-1.18)	1.47 (1.06-2.03)	1.34 (0.95-1.89)
EPO/PPO (vs. other insurance plan type)	1.00 (0.87-1.15)	1.03 (0.88-1.20)	0.86 (0.68-1.09)	0.85 (0.66-1.08)
Pre-index comorbidities				
Anemia	0.90 (0.67-1.21)	0.86 (0.62-1.21)	0.74 (0.39-1.41)	0.38 (0.16-0.90)
Anxiety or depression	0.75 (0.60-0.94)	0.72 (0.56-0.92)	0.78 (0.54-1.12)	0.74 (0.50-1.10)
CVD	0.73 (0.53-1.01)	0.71 (0.49-1.03)	0.95 (0.57-1.60)	0.71 (0.38-1.30)
Respiratory condition	1.07 (0.85-1.36)	0.97 (0.75-1.27)	0.67 (0.41-1.08)	0.53 (0.30-0.92)
Diabetes (type 1 or 2)	0.91 (0.73-1.14)	0.76 (0.59-0.98)	1.01 (0.71-1.44)	1.08 (0.75-1.57)
Dyslipidemia	1.01 (0.81-1.25)	1.02 (0.80-1.30)	0.95 (0.69-1.33)	1.00 (0.70-1.42)
Fibromyalgia	0.82 (0.65-1.04)	0.74 (0.56-0.97)	0.64 (0.39-1.06)	0.70 (0.41-1.20)
Hypertension	0.86 (0.72-1.02)	0.82 (0.67-0.99)	0.87 (0.65-1.16)	0.88 (0.65-1.20)
Low back pain	0.90 (0.70-1.14)	0.77 (0.58-1.02)	0.80 (0.55-1.17)	0.72 (0.47-1.10)
Malignancy	0.82 (0.53-1.28)	1.10 (0.70-1.73)	0.77 (0.38-1.58)	0.75 (0.34-1.64)
Osteoarthritis	0.92 (0.77-1.09)	0.88 (0.73-1.07)	0.90 (0.66-1.22)	0.82 (0.59-1.15)
Osteoporosis	0.94 (0.66-1.33)	0.99 (0.67-1.45)	1.01 (0.35-2.90)	1.02 (0.33-3.21)

Psoriasis	0.81 (0.51-1.28)	0.96 (0.59-1.56)	1.03 (0.82-1.29)	0.98 (0.77-1.24)
Pre-index bDMARD or tsDMARD	1.42 (1.02-1.99)	1.08 (0.74-1.57)	2.13 (1.32-3.43)	1.28 (0.75-2.17)
Pre-index healthcare costs	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)
Number of pre-index rheumatologist visits	0.98 (0.92-1.06)	1.01 (0.93-1.09)	1.27 (1.12-1.44)	1.20 (1.06-1.37)
Pre-index glucocorticoid	1.01 (0.86-1.17)	0.82 (0.70-0.97)	1.20 (0.95-1.52)	1.10 (0.86-1.41)

	PA only vs. step therapy or no access restrictions			
	RA Patients		PsA Patients	
	Medication Adherence	Treatment Effectiveness	Medication Adherence	Treatment Effectiveness
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
PA only vs. step therapy^a or no access restrictions	1.18 (0.93-1.50)	1.24 (0.96-1.60)	1.29 (0.85-1.95)	1.42 (0.92-2.18)
Age group (ref: 55-64)				
18-34	0.67 (0.50-0.88)	0.66 (0.49-0.91)	0.67 (0.44-1.02)	0.77 (0.50-1.20)
35-44	0.80 (0.65-1.00)	0.83 (0.65-1.05)	1.05 (0.76-1.45)	1.16 (0.82-1.63)
45-54	1.04 (0.88-1.22)	1.04 (0.87-1.24)	1.02 (0.77-1.36)	1.04 (0.76-1.41)
Male	1.24 (1.05-1.46)	1.26 (1.05-1.51)	1.33 (1.06-1.68)	1.31 (1.03-1.68)
Region (ref: Northeast)				
North Central	0.96 (0.75-1.22)	0.99 (0.76-1.29)	0.98 (0.67-1.44)	0.95 (0.64-1.43)
South/unknown	0.69 (0.55-0.86)	0.71 (0.56-0.89)	0.85 (0.61-1.19)	0.89 (0.62-1.26)
West	0.84 (0.64-1.11)	0.84 (0.62-1.12)	1.00 (0.65-1.53)	1.06 (0.67-1.66)
Rural/unknown (vs. urban)	0.83 (0.68-1.03)	0.90 (0.72-1.14)	1.40 (1.02-1.92)	1.29 (0.92-1.81)
EPO/PPO (vs. other insurance plan type)	0.99 (0.86-1.15)	1.02 (0.87-1.19)	0.88 (0.70-1.11)	0.86 (0.67-1.09)
Pre-index comorbidities				
Anemia	0.90 (0.66-1.21)	0.86 (0.61-1.21)	0.75 (0.40-1.43)	0.39 (0.16-0.92)
Anxiety or depression	0.75 (0.60-0.93)	0.72 (0.56-0.92)	0.77 (0.54-1.10)	0.74 (0.50-1.09)
CVD	0.72 (0.53-1.00)	0.71 (0.49-1.02)	0.95 (0.57-1.60)	0.70 (0.38-1.29)
Respiratory condition	1.06 (0.84-1.35)	0.97 (0.74-1.26)	0.66 (0.41-1.07)	0.52 (0.30-0.91)
Diabetes (type 1 or 2)	0.91 (0.73-1.14)	0.76 (0.58-0.98)	1.02 (0.72-1.45)	1.09 (0.75-1.58)
Dyslipidemia	1.01 (0.81-1.25)	1.02 (0.80-1.29)	0.95 (0.68-1.32)	0.99 (0.69-1.40)
Fibromyalgia	0.82 (0.65-1.04)	0.74 (0.57-0.97)	0.63 (0.39-1.04)	0.69 (0.41-1.19)
Hypertension	0.85 (0.71-1.01)	0.81 (0.67-0.98)	0.85 (0.64-1.14)	0.87 (0.64-1.18)
Low back pain	0.90 (0.70-1.14)	0.77 (0.58-1.02)	0.81 (0.55-1.19)	0.73 (0.48-1.11)
Malignancy	0.82 (0.53-1.28)	1.10 (0.70-1.73)	0.79 (0.39-1.63)	0.77 (0.35-1.69)
Osteoarthritis	0.92 (0.77-1.09)	0.88 (0.73-1.07)	0.89 (0.66-1.22)	0.82 (0.59-1.15)
Osteoporosis	0.93 (0.65-1.33)	0.98 (0.67-1.45)	1.07 (0.37-3.06)	1.08 (0.35-3.39)
Psoriasis	0.80 (0.50-1.27)	0.95 (0.59-1.54)	1.02 (0.82-1.28)	0.97 (0.77-1.23)
Pre-index bDMARD or tsDMARD	1.40 (1.00-1.96)	1.06 (0.72-1.55)	2.16 (1.34-3.48)	1.31 (0.77-2.22)
Pre-index healthcare costs	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)

Number of pre-index rheumatologist visits	0.98 (0.92-1.06)	1.01 (0.93-1.09)	1.28 (1.13-1.44)	1.21 (1.06-1.37)
Pre-index glucocorticoid	1.00 (0.86-1.17)	0.82 (0.70-0.97)	1.19 (0.94-1.49)	1.09 (0.85-1.39)

	Step therapy vs. PA only or no access restrictions			
	RA Patients		PsA Patients	
	Medication Adherence	Treatment Effectiveness	Medication Adherence	Treatment Effectiveness
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Step therapy^a vs. PA only or no access restrictions	0.81 (0.68-0.96)	0.81 (0.67-0.98)	0.71 (0.54-0.94)	0.73 (0.54-0.98)
Age group (ref: 55-64)				
18-34	0.67 (0.50-0.89)	0.67 (0.49-0.91)	0.69 (0.45-1.05)	0.80 (0.51-1.24)
35-44	0.80 (0.65-1.00)	0.83 (0.65-1.05)	1.06 (0.77-1.47)	1.17 (0.83-1.65)
45-54	1.04 (0.88-1.23)	1.04 (0.87-1.24)	1.03 (0.78-1.38)	1.05 (0.77-1.42)
Male	1.24 (1.05-1.47)	1.26 (1.06-1.51)	1.32 (1.05-1.66)	1.30 (1.02-1.66)
Region (ref: Northeast)				
North Central	0.95 (0.74-1.21)	0.98 (0.75-1.27)	0.99 (0.68-1.45)	0.96 (0.64-1.44)
South/unknown	0.70 (0.57-0.87)	0.72 (0.57-0.91)	0.92 (0.66-1.28)	0.95 (0.66-1.35)
West	0.86 (0.65-1.12)	0.86 (0.64-1.15)	1.05 (0.69-1.60)	1.13 (0.73-1.77)
Rural/unknown (vs. urban)	0.87 (0.71-1.07)	0.95 (0.76-1.19)	1.50 (1.09-2.08)	1.38 (0.98-1.94)
EPO/PPO (vs. other insurance plan type)	0.98 (0.85-1.14)	1.01 (0.87-1.19)	0.84 (0.67-1.07)	0.82 (0.64-1.05)
Pre-index comorbidities				
Anemia	0.90 (0.67-1.22)	0.86 (0.62-1.21)	0.74 (0.39-1.41)	0.38 (0.16-0.90)
Anxiety or depression	0.75 (0.60-0.94)	0.72 (0.56-0.92)	0.78 (0.55-1.12)	0.75 (0.51-1.11)
CVD	0.73 (0.53-1.00)	0.71 (0.49-1.02)	0.94 (0.56-1.59)	0.70 (0.38-1.28)
Respiratory condition	1.07 (0.85-1.36)	0.98 (0.75-1.28)	0.66 (0.41-1.07)	0.52 (0.30-0.92)
Diabetes (type 1 or 2)	0.92 (0.73-1.15)	0.76 (0.59-0.99)	1.01 (0.71-1.43)	1.08 (0.74-1.56)
Dyslipidemia	1.01 (0.81-1.25)	1.02 (0.80-1.29)	0.96 (0.69-1.33)	1.00 (0.70-1.42)
Fibromyalgia	0.82 (0.65-1.03)	0.73 (0.56-0.96)	0.65 (0.39-1.06)	0.71 (0.41-1.21)
Hypertension	0.86 (0.72-1.02)	0.82 (0.68-1.00)	0.87 (0.66-1.17)	0.89 (0.65-1.21)
Low back pain	0.90 (0.70-1.14)	0.77 (0.58-1.02)	0.80 (0.54-1.17)	0.71 (0.47-1.09)
Malignancy	0.82 (0.53-1.28)	1.10 (0.70-1.73)	0.77 (0.38-1.59)	0.75 (0.34-1.64)
Osteoarthritis	0.93 (0.78-1.10)	0.89 (0.73-1.08)	0.91 (0.67-1.23)	0.83 (0.59-1.16)
Osteoporosis	0.93 (0.65-1.33)	0.98 (0.67-1.45)	1.02 (0.36-2.93)	1.02 (0.33-3.21)
Psoriasis	0.80 (0.51-1.27)	0.96 (0.59-1.55)	1.03 (0.82-1.30)	0.98 (0.77-1.25)
Pre-index bDMARD or tsDMARD	1.41 (1.01-1.97)	1.07 (0.73-1.56)	2.15 (1.33-3.46)	1.29 (0.76-2.19)
Pre-index healthcare costs	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)
Number of pre-index rheumatologist visits	0.98 (0.91-1.06)	1.01 (0.93-1.09)	1.27 (1.13-1.44)	1.20 (1.06-1.37)
Pre-index glucocorticoid	1.01 (0.87-1.18)	0.83 (0.70-0.97)	1.20 (0.95-1.52)	1.10 (0.86-1.41)

	Step therapy vs. no access restrictions and PA only vs. no access restrictions			
	RA Patients		PsA Patients	
	Medication Adherence	Treatment Effectiveness	Medication Adherence	Treatment Effectiveness
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Step therapy^a vs. no access restrictions	0.82 (0.69-0.98)	0.83 (0.68-1.01)	0.73 (0.55-0.96)	0.75 (0.56-1.02)
Prior authorization only vs. no access restrictions	1.12 (0.88-1.43)	1.18 (0.91-1.53)	1.18 (0.78-1.81)	1.32 (0.85-2.04)
Age group (ref: 55-64)				
18-34	0.67 (0.50-0.89)	0.67 (0.49-0.91)	0.69 (0.45-1.05)	0.80 (0.51-1.24)
35-44	0.80 (0.65-1.00)	0.83 (0.65-1.05)	1.06 (0.77-1.47)	1.17 (0.83-1.65)
45-54	1.04 (0.88-1.23)	1.04 (0.87-1.24)	1.03 (0.78-1.37)	1.04 (0.77-1.42)
Male	1.24 (1.05-1.47)	1.27 (1.06-1.51)	1.32 (1.05-1.66)	1.30 (1.02-1.66)
Region (ref: Northeast)				
North Central	0.96 (0.75-1.22)	0.99 (0.76-1.29)	0.99 (0.68-1.45)	0.96 (0.64-1.44)
South/unknown	0.70 (0.57-0.88)	0.72 (0.57-0.91)	0.91 (0.65-1.28)	0.94 (0.66-1.35)
West	0.84 (0.64-1.11)	0.84 (0.62-1.12)	1.02 (0.66-1.56)	1.08 (0.69-1.69)
Rural/unknown (vs. urban)	0.86 (0.69-1.06)	0.93 (0.74-1.16)	1.49 (1.08-2.06)	1.36 (0.96-1.92)
EPO/PPO (vs. other insurance plan type)	0.98 (0.85-1.13)	1.01 (0.86-1.18)	0.84 (0.67-1.07)	0.82 (0.64-1.05)
Pre-index comorbidities				
Anemia	0.90 (0.67-1.22)	0.86 (0.62-1.21)	0.75 (0.39-1.42)	0.38 (0.16-0.91)
Anxiety or depression	0.75 (0.60-0.94)	0.72 (0.56-0.92)	0.78 (0.55-1.12)	0.75 (0.51-1.11)
CVD	0.72 (0.53-1.00)	0.71 (0.49-1.02)	0.94 (0.56-1.58)	0.69 (0.38-1.27)
Respiratory condition	1.07 (0.84-1.36)	0.97 (0.74-1.27)	0.66 (0.41-1.07)	0.52 (0.30-0.91)
Diabetes (type 1 or 2)	0.92 (0.73-1.15)	0.76 (0.59-0.99)	1.01 (0.71-1.43)	1.08 (0.74-1.56)
Dyslipidemia	1.01 (0.81-1.25)	1.02 (0.80-1.29)	0.96 (0.69-1.33)	1.00 (0.70-1.42)
Fibromyalgia	0.82 (0.65-1.04)	0.74 (0.56-0.96)	0.65 (0.39-1.06)	0.70 (0.41-1.20)
Hypertension	0.86 (0.72-1.02)	0.82 (0.67-0.99)	0.87 (0.65-1.16)	0.89 (0.65-1.21)
Low back pain	0.90 (0.70-1.14)	0.77 (0.58-1.02)	0.80 (0.54-1.17)	0.72 (0.47-1.09)
Malignancy	0.82 (0.53-1.28)	1.10 (0.70-1.73)	0.78 (0.38-1.60)	0.76 (0.35-1.66)
Osteoarthritis	0.93 (0.78-1.10)	0.89 (0.73-1.08)	0.91 (0.67-1.24)	0.83 (0.60-1.17)
Osteoporosis	0.93 (0.65-1.33)	0.98 (0.67-1.45)	1.04 (0.36-2.98)	1.05 (0.34-3.30)
Psoriasis	0.80 (0.50-1.27)	0.95 (0.58-1.54)	1.03 (0.82-1.30)	0.98 (0.77-1.25)
Pre-index bDMARD or tsDMARD	1.40 (1.00-1.96)	1.06 (0.72-1.55)	2.16 (1.34-3.48)	1.30 (0.77-2.21)
Pre-index healthcare costs	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)	1.00 (1.00-1.00)
Number of pre-index rheumatologist visits	0.98 (0.91-1.06)	1.01 (0.93-1.09)	1.28 (1.13-1.44)	1.21 (1.06-1.37)
Pre-index glucocorticoid	1.01 (0.86-1.18)	0.82 (0.70-0.97)	1.20 (0.95-1.51)	1.10 (0.86-1.40)

Notes: ^awith or without PA. Abbreviations: bDMARD, biologic DMARD; CI, confidence interval; DMARD, disease-modifying antirheumatic drug; EPO, exclusive provider organization;

OR, odds ratio; PA, prior authorization; PPO, preferred provider organization; tsDMARD, targeted synthetic DMARD; light green: $p < 0.05$; dark green: $p < 0.01$