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Policy Evaluation: Provider Administered Biologics for Autoimmune Conditions

Purpose of the Evaluation:
This policy evaluation examines the impact of implementing a prior authorization (PA) for provider administered drugs in the Biologics for Autoimmune Conditions preferred drug list (PDL) class. This PA requierement was implemented in October 2018, and prior to this date PA had only been required for claims when billed through pharmacies rather than provider offices.

Research Questions:
1. Since implementation of the PA for provider administered biologics, has utilization of biologics for autoimmune conditions changed for new start patients?
2. Has prior utilization of Disease-Modifying Anti-Rheumatic Drug (DMARD) therapy increased for patients initiating therapy with a biologic agent?
3. Has utilization of concurrent DMARD therapy changed significantly for patients prescribed biologics?
4. What proportion of patients on prior biologic treatment had an interruption in therapy after implementation of the PA?
5. Was there any change in overall hospitalization or ER visits for the total population or for patients with an interruption in therapy?

Conclusions:
1. Biologic utilization:
    - Overall, the total number of patients with a paid or denied claim for a biologic decreased from 229 in the year prior to the policy implementation to 154 patients in the year after the PA requirement for provider administered biologic therapies for autoimmune conditions.
    - In new start patients, the proportion of patients with paid claims decreased after the policy implementation from 47% to 39%. New start patients with an initial denied claim accounted for 52% and 61% of patients in the year before and after implementation of the PA.
2. History of systemic DMARD therapy in new start patients:
    - In patients newly started on a biologic therapy, the number of patients with claims for prior DMARD therapy decreased from 36.7% (n=84) in the year before to 22.1% (n=34) in the year after the policy implementation.
3. Concurrent DMARD therapy:
    - The proportion of patients with combination biologic and DMARD therapy for at least 3 weeks decreased slightly after implementation of the PA policy for provider administered drugs from 19% to 15% in patients with an initial paid claim.
4. Interruptions in therapy:
    - In patients with a prior history of biologic use, only 2 patients (10%) with an initial denial after implementation of the PA policy for provider administered drugs did not have a subsequent paid claim within 90 days.
    - Of new start patients with an initial denied biologic claim, the proportion of patients who did not have a subsequent paid claim for a biologic and had not switched to a DMARD was unchanged after implementation of the PA for provider administered drugs. Approximately 48% to 50% of

patients did not have a subsequent paid claim for a biologic and had not switched to a systemic DMARD. The majority of these patients did not have a PA requested submitted by their provider, and it is unclear what specific diagnosis was associated with these claims. However, the most common diagnoses identified in patients with a biologic claim included psoriasis and rheumatoid arthritis. Psoriasis is classified only as funded on the Health Evidence Review Commission prioritized list when defined as severe disease which causes functional impairment and affects either more than 10% body surface area or involves mucus membranes.

5. Frequency of hospitalizations and emergency department visits:
    - Hospitalizations were infrequent in patients with claims for biologic therapy, but emergency department visits were slightly more common in the year after policy implementation. However, the proportion of emergency department visits was similar upon comparison of patients with a paid or denied index event in the year after the policy implementation (20% vs. 21%), and visits associated with autoimmune conditions occurred in only 1-3% of the population. No patients with a denied provider administered claim had a subsequent hospitalization or emergency department visit for the same diagnosis within 90 days of the denial.

Recommendations:

- No policy changes recommended based on current data. Continue to monitor trends in utilization.

Background:

In October 2018, prior authorization was implemented for biologics for autoimmune conditions when billed as a provider administered drug. Prior to October 2018, PA had only applied if the drug was billed as a pharmacy claim. However a significant proportion of drugs in this class are administered intravenously and can be billed by a provider when administered to a patient as part of an office visit. In order to minimize interruptions in therapy, the PA for provider administered claims applied only to patients initiating new therapy with a biologic. For patients with previous history of fee-for-service (FFS) claims for a provider administered biologic medication, patients are allowed to continue on their current therapy if the prescriber provides documentation of disease improvement. This review evaluates the impact of administering a PA for provider administered claims in this drug class.

Medications in this class include biologics for treatment of rheumatoid arthritis, psoriatic arthritis, plaque psoriasis, ankylosing spondylitis, Crohn's disease and ulcerative colitis. Individual medications are listed in **Appendix 1**, and the preferred biologic medications at the time of the FFS provider administered drug policy implementation were adalimumab and etanercept. Because preferred therapies are primarily self-administered, they are typically billed as a pharmacy claim, whereas non-preferred therapies may be billed via pharmacies or in provider offices depending on the drug. Current PA criteria are indication specific and require documentation of the all following information:

- Documentation that the requested agent be approved by the Food and Drug Administration for the condition,
- Documentation that the diagnosis is funded on the prioritized list (e.g., moderate to severe plaque psoriasis)
- Documentation of trial and failure or contraindication to other DMARD treatments and preferred biologic therapies when indicated
- Documented use of concomitant DMARD therapy if appropriate (e.g., rheumatoid or psoriatic arthritis)

Methods:

This uncontrolled before-and-after analysis compared utilization of biologics in a historical control group in the year prior to implementation of the PA (from 10/1/17 to 9/30/18) to patients after implementation of the policy (from 10/1/18 to 9/30/19). The index event (IE) was defined as the first biologic medication claim in the reporting period. Patients were included if they had a paid or denied FFS pharmacy claim, outpatient medical claim, or professional medical claim for a biologic in **Appendix 1** (PDL class: Biologics for Autoimmune Conditions; **Table A1**). Patients with denied pharmacy claims were only included if denial was due to a PA requirement (error 3002 'NDC requires PA' or error 3022 'Non-preferred drug'). Patients were excluded if they had denied pharmacy claims with denials

due to other reasons listed in **Appendix 1 (Table A5).** Patients with denied provider administered claims were included only if they had a denial indicating the claim was stopping for PA (error 4173) and did not have a denial for other reasons listed in **Appendix 1 (Table A4)**. Patients were excluded if they had less than 75% Medicaid enrollment during the 6 months before to 6 months after the IE to ensure completeness of reporting. Patients were excluded if they had benefit plans indicating Medicare coverage (BMM, BMD, MED) or limited drug coverage (CWM, MND, SMF, SMB).

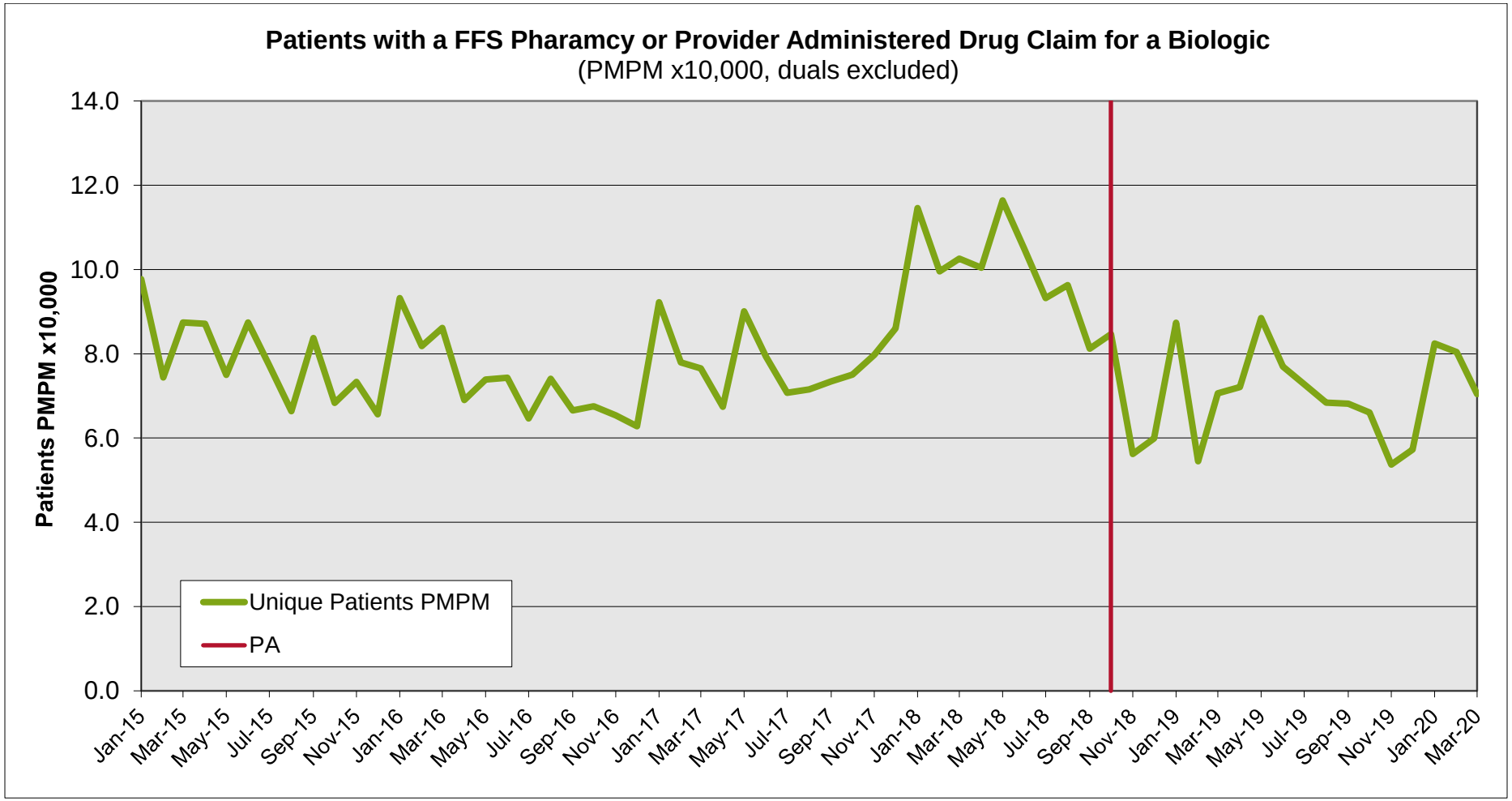
The following definitions were used for the analysis:

- New start patients: no prior biologic therapy (based on both pharmacy and provider administered claims) in the 6 months before the IE
- Patients with a prior history of biologic therapy: patients with pharmacy or provider administered claims for a biologic in the 6 months before the IE
- Prior DMARD therapy: Prior DMARD therapy was assessed based on pharmacy claims in the 6 months before the IE. DMARD therapy was evaluated based on proportion of patients with prior claims and average duration of therapy. Systemic DMARDs of interest are listed in **Appendix 1 (Table A1)**.
- Relevant diagnoses: For provider administered claims, the relevant diagnosis was identified using the diagnosis submitted with the IE. For pharmacy claims, relevant conditions were identified based on ICD-10 codes within the 6 months before or 6 months after the IE **(Table A2)**. For pharmacy claims, patients may be counted more than once if they have multiple diagnoses.
- Days' Supply: Days' supply for pharmacy claims was defined based on information submitted with the claim, and days' supply for medical claims was defined based on the estimated maintenance dose for each agent **(Table A3)**. If maintenance dose varied by condition, the longest estimate of days' supply was used to provide a more conservative estimate of treatment adherence.
- Duration of therapy: Duration was defined using the number of covered days in the 6 months following the IE.
- Combination DMARD therapy: Combination therapy was defined as patients with paid claims for at least 21 days of overlapping therapy for both a systemic DMARD and biologic in the 6 months following the index event with no more than a 7 day gap in coverage. Analysis of concomitant DMARDs was limited to pharmacy claims as most therapies oral or self-injectable.

Results:

Figure 1 shows the month over month trend of patients with paid claims for a biologic. The PA policy for provider administered drugs was implemented in October 2018. Compared to the number of patients prescribed biologic therpy in the year prior to policy implementation, since October 2018 the number of patients with paid claims for biologic therapy has decreased.

Figure 1. Per-member per-month (PMPM) count of unique patients with paid pharmacy or provider administered claims for a biologic



Baseline demographics for patients prescribed a biologic for an autoimmune condition are listed in **Table 1**. The majority of patients identified were female adults. Sixty-five to 75% of patients were classified as new starts with no history of biologic therapy within the 6 months before their first claim. Provider administered claims accounted for 35% of all biologic claims before and 27% of claims after the policy implementation.

Table 1. Baseline demographics

	Before		After	
	Total IE		Total IE	
N=	**303**	**%**	**235**	**%**
Age (years)				
Average (min - max)	37	(3-64)	38	(6-63)
<18 years	33	10.9%	15	6.4%
≥19 years	270	89.1%	220	93.6%
Female	204	67.3%	154	65.5%
Ethnicity				
White	117	38.6%	89	37.9%
American Indian/Alaskan Native	89	29.4%	80	34.0%
Unknown	70	23.1%	54	23.0%
Other	27	8.9%	12	5.1%
New Start	229	75.6%	154	65.5%
Prior Biologic Therapy	74	24.4%	81	34.5%
Index Event Type				
Pharmacy	196	64.7%	170	72.3%
Provider Administered	107	35.3%	65	27.7%

Table 2 shows the proportion of paid and denied claims before and after policy implementation. Overall, the total number of patients prescribed a biologic decreased in the year after policy implementation (229 vs. 154 patients in the year after implementation). Similarly, the proportion of patients with paid claims decreased after implementation of the policy from 47% to 39% in new start patients and from 89% to 75% in patients with a prior history of biologic therapy.

Table 2. Changes in proportion of paid and denied biologic claims before and after policy implementation

	New Start Patients				Prior Biologic Therapy			
	Before		After		Before		After	
N=	**229**	**%**	**154**	**%**	**74**	**%**	**81**	**%**
Paid IE	108	47.2%	60	39.0%	66	89.2%	61	75.3%
Denied IE	121	52.8%	94	61.0%	8	10.8%	20	24.7%

Approval and denial rates in a subgroup of patients with a prior history of DMARD therapy are shown in **Table 3**. In new start patients, there were fewer patients with a history of DMARD therapy in the year after policy implementation (n=34 vs. 84 patients in the year before the policy) and a greater proportion of those patients had denied claims compared to before the policy implementation (75% vs. 57%). In patients with a prior history of biologic therapy, the proportion of patients with a denied claim increased by 24% after policy implementation. In accordance with current guidelines, renewal criteria for ongoing treatment of rheumatoid or psoriatic arthritis requires concomitant use of both a biologic and DMARD therapy unless the patient has contraindications or intolerances to systemic DMARDs.

Table 3. Use of prior DMARD therapy

	New Start Patients				Prior Biologic Therapy			
	Before		After		Before		After	
N=	84		34		28		29	
Paid IE	36	42.9%	8	23.5%	28	100%	22	75.9%
Denied IE	48	57.1%	26	76.5%	0	0%	7	24.1%

Common diagnoses in patients with claims for biologic therapy are listed in **Table 4**. Diagnoses must be submitted on provider administered claims, but are not present on pharmacy claims. Therefore, diagnoses were categorized by the first 3 digits of the ICD-10 code on the IE for provider administered claims and based on any relevant diagnosis of interest in the 6 months before or 6 months after the IE for pharmacy claims. The most common conditions included psoriasis, rheumatoid arthritis, and Crohn's disease. Overall, there was a larger proportion of denied claims for patients with a diagnosis of psoriasis. Psoriasis is classified only as funded on the Health Evidence Review Commission prioritized list when defined as severe disease which causes functional impairment and affects either more than 10% body surface area or involves mucus membranes. The proportion of patients with paid versus denied claims for each condition was overall similar before and after the policy implementation.

Table 4. Common diagnosis occurring in at least 1% of patients during the reporting period

			Before						After					
			Total IE		Paid IE		Denied IE		Total IE		Paid IE		Denied IE	
		N=	303	%	174	%	129	%	235	%	121	%	114	%
Diagnosis														
1	L40	Psoriasis	75	24.8%	27	15.5%	48	37.2%	59	25.1%	24	19.8%	35	30.7%
2	M06	Other rheumatoid arthritis	68	22.4%	41	23.6%	27	20.9%	50	21.3%	27	22.3%	23	20.2%
3	M05	Rheumatoid arthritis with rheumatoid factor	47	15.5%	21	12.1%	26	20.2%	40	17.0%	17	14.0%	23	20.2%
4	K50	Crohn's disease [regional enteritis]	52	17.2%	38	21.8%	14	10.9%	37	15.7%	19	15.7%	18	15.8%
5	M45	Ankylosing spondylitis	11	3.6%	3	1.7%	8	6.2%	15	6.4%	6	5.0%	9	7.9%
6	K51	Ulcerative colitis	21	6.9%	18	10.3%	3	2.3%	12	5.1%	9	7.4%	3	2.6%
7	M08	Juvenile arthritis	13	4.3%	2	1.1%	11	8.5%	8	3.4%	4	3.3%	4	3.5%
8	G35	Multiple sclerosis	9	3.0%	9	5.2%		0.0%	8	3.4%	8	6.6%		0.0%
9	Z51	Encounter for other aftercare and medical care	3	1.0%	3	1.7%		0.0%	5	2.1%	5	4.1%		0.0%
10	C83	Non-follicular lymphoma	2	0.7%	2	1.1%		0.0%	3	1.3%	3	2.5%		0.0%
11	M32	Systemic lupus erythematosus (SLE)	3	1.0%	3	1.7%		0.0%	2	0.9%	2	1.7%		0.0%

Table 5 shows changes in utilization for preferred and non-preferred products. PA is required for both preferred and non-preferred therapies, but preferred therapies are subcutaneously administered and more likely to be billed as a pharmacy claim compared to some non-preferred IV therapies which are more likely to be administered in a provider office. Overall, the proportion of requests for preferred and non-preferred products did not change for either new start patients or patients with a history of biologic use after implementation of the PA for provider administered drugs. For new start patients, preferred biologics accounted for 42-44% of patient requests and non-preferred therapies represented 56-58% of requests. Interestingly, in patients with a prior history of biologic use, there was a higher proportion of patients with claims for preferred therapy (54-56%) compared to the new start population.

After implementation of the policy, there was little change in the proportion of new start patients with a paid claim for a preferred or non-preferred biologic. Preferred subcutaneous products are most likely to be dispensed via pharmacy claims and may be unaffected by implementation of this policy. However, for new start patients requesting a non-preferred product, the proportion of denials was slightly higher after implementation of the policy (37%) compared to before PA implementation (26%). Many non-preferred products are intravenous and are more likely to be affected by a PA for provider administered drugs. The largest changes were observed in patients with claims for adalimumab and infliximab.

In patients with a history of biologic use, the proportion of patients with paid claims was unchanged for preferred and non-preferred. Prior to policy implementation, providers were encouraged to submit PA requests for patients on current therapy, and patients were grandfathered if the provider attested to ongoing benefit with their current therapy. For patients with a history of biologic use, patients with denied claims were infrequent but more than doubled after implementation of a PA for provider administered claims (n=8 patients before and 20 patients after the policy implementation). After implementation of PA for provider administered drugs, 11 patients had denials for preferred products and 9 had denials for non-preferred products. The small number of patients included in this analysis significantly limits interpretation of these results.

Table 5. Preferred and non-preferred utilization of pharmacy and provider administered claims

		Before						After					
		Total IE		Paid IE		Denied IE		Total IE		Paid IE		Denied IE	
New Start Patients	**N=**	**229**	**%**	**108**	**%**	**121**	**%**	**154**	**%**	**560**	**%**	**94**	**%**
Preferred biologics		101	44.1%	11	10.2%	90	74.4%	65	42.2%	6	10.0%	59	62.8%
adalimumab		71	31.0%	9	8.3%	**62**	**51.2%**	37	24.0%	4	6.7%	**33**	**35.1%**
etanercept		30	13.1%	2	1.9%	28	23.1%	28	18.2%	2	3.3%	26	27.7%
Non-preferred biologics		128	55.9%	97	89.8%	31	25.6%	89	57.8%	54	90.0%	35	37.2%
rituximab		21	9.2%	21	19.4%		0.0%	21	13.6%	21	35.0%		0.0%
infliximab		47	20.5%	**45**	**41.7%**	2	1.7%	20	13.0%	**16**	**26.7%**	4	4.3%
certolizumab pegol		9	3.9%	2	1.9%	7	5.8%	7	4.5%	1	1.7%	6	6.4%
secukinumab		2	0.9%		0.0%	2	1.7%	6	3.9%	1	1.7%	5	5.3%
vedolizumab		8	3.5%	8	7.4%		0.0%	4	2.6%	3	5.0%	1	1.1%
natalizumab		6	2.6%	5	4.6%	1	0.8%	5	3.2%	3	5.0%	2	2.1%
tocilizumab		6	2.6%	6	5.6%		0.0%	1	0.6%	1	1.7%		0.0%
other non-preferred biologics*		29	12.7%	10	9.3%	19	15.7%	25	16.2%	8	13.3%	17	18.1%

Patients with a prior history of biologic use	N=	74	%	66	%	8	%	81	%	61	%	20	%
Preferred biologics		40	54.1%	37	56.1%	3	37.5%	45	55.6%	34	55.7%	11	55.0%
adalimumab		18	24.3%	17	25.8%	1	12.5%	21	25.9%	17	27.9%	4	20.0%
etanercept		22	29.7%	20	30.3%	2	25.0%	24	29.6%	17	27.9%	7	35.0%
Non-preferred biologics		34	45.9%	29	43.9%	5	62.5%	36	44.4%	27	44.3%	9	45.0%
infliximab		12	16.2%	12	18.2%		0.0%	12	14.8%	11	18.0%	1	5.0%
other non-preferred biologics*		22	29.7%	17	25.8%	5	62.5%	24	29.6%	16	26.2%	8	40.0%

* The proportion of patients with claims for other biologics in the class was less than 2% for each other drug

Table 6 describes duration of combination DMARD therapy. Of the patients with a claim for a biologic drug for an autoimmune condition, approximately 15% to 19% of patients had concomitant use of a systemic DMARD for at least 21 days. The average duration of combination therapy was 73 to 80 days in the 6 months following a paid index event. The majority of patients with combination DMARD therapy had a diagnosis of rheumatoid or psoriatic arthritis. However, these patients accounted for only 29% to 33% of all patients with a diagnosis of rheumatoid or psoriatic arthritis who were prescribed biologic therapy.

Table 6. Concurrent DMARD therapy in the 6 months after the IE (new start and continuous users).

		Before				After			
		Paid IE		Denied IE		Paid IE		Denied IE	
	N=	174	%	129	%	121	%	114	%
All patients with combination DMARD therapy		33	19.0%	13	10.1%	18	14.9%	11	9.6%
Mean duration of combination DMARD therapy (days)		80		54		73		52	
Median duration (days) (interquartile range)		52	(30-138)	53	(30-62)	57	(28-89)	33	(29-57)
Patients with diagnosis of rheumatoid or psoriatic arthritis		72	41.4%	72	55.8%	52	43.0%	60	52.6%
…And with combination DMARD therapy		24	33.3%	10	13.9%	15	28.8%	7	11.7%

Of new start patients with an initial denied claim, approximately 41% to 43% of patients had a paid claim for a biologic within 30 days (**Table 7**). In patients with a history of prior biologic use, the proportion of patients with a subsequent paid claim for a biologic was slightly higher (62-65%). Only a small proportion of patients (1-2%) switched to a systemic DMARD therapy after requesting a biologic drug. In the majority of patients without a subsequent paid claim, a PA was never requested. In new start patients, about 12-15% of patients had a PA approved, but no claims were ever billed in the 90 days following an initial denial. Hospitalizations were infrequent, but for patients who never received therapy, emergency department visits occurred in 8% of patients (n=10) before implementation of the policy and 11% of patients (n=10) after implementation of the policy.

Table 7. PA status for denied IE

	Before				After			
	New Start		Prior Biologic		New Start		Prior Biologic	
N (Denied IE) =	**121**	**%**	**8**	**%**	**94**	**%**	**20**	**%**
IE Denied Claim								
Biologic claim paid within 30 days	49	40.5%	5	62.5%	40	42.6%	13	65.0%
Biologic claim paid within 31-90 days	10	8.3%	2	25.0%	4	4.3%	4	20.0%
IE Denied with no paid biologic claim within 90 days	**62**	**51.2%**	**1**	**12.5%**	**50**	**53.2%**	**3**	**15.0%**
Switch to DMARD* within 30 days	2	1.7%	0	0.0%	1	1.1%	0	0.0%
Switch to DMARD* within 31-90 days	2	1.7%	0	0.0%	2	2.1%	0	0.0%
IE Denied with no paid biologic AND not switched to DMARD within 90 days	**58**	**47.9%**	**1**	**12.5%**	**47**	**50.0%**	**3**	**15.0%**
PA not requested 5 days before or 90 days after the denied claim	40	33.1%	1	12.5%	36	38.3%	2	10.0%
PA denied in the 5 days before or 90 days after the initial denied claim	0	0.0%	0	0.0%	0	0.0%	0	0.0%
PA approved in the 5 days before or 90 days after the initial denied claim	18	14.9%	0	0.0%	11	11.7%	1	5.0%
Never received drug and had diagnosis of cancer on the IE¥	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Hospitalization within 90 days of the denied IE	0	0.0%	0	0.0%	1	1.1%	0	0.0%
Emergency department visit within 90 days of the denied IE	10	8.3%	1	12.5%	10	10.6%	0	0.0%

*Switching therapy was defined as patients having a paid pharmacy claim for a new DMARD following a biologic denial in patients with no prior DMARD therapy in the 6 months before the denial.

¥Cancer diagnoses defined as ICD-10 codes beginning with C

Overall incidence of hospitalizations and emergency department visits in the 90 days following the IE are listed in **Table 8**. Hospitalizations were infrequent, and emergency department visits were only slightly more common in patients with a denied IE the year after policy implementation. However, the proportion of emergency department visits was similar between patients with paid or denied index events in the year after the policy implementation, and the proportion of visits due to autoimmune conditions was small with similar rates before and after the policy implementation. No patients with a denied provider administered claim had a subsequent hospitalization or emergency department visit for the same diagnosis. For provider administered claims, diagnoses were matched based on the first 3 letters of the ICD-10 code. This indicates that emergency department visits and hospitalizations were likely unrelated to the current policy.

Table 8. Assessment of potential unintended harms and safety signals after implementation of the policy.

	Before				After			
	Paid IE		Denied IE		Paid IE		Denied IE	
N=	174	%	129	%	121	%	114	%
Any hospitalization	8	4.6%	0	0.0%	7	5.8%	1	0.9%
Any emergency department visit	40	23.0%	20	15.5%	24	19.8%	24	21.1%
Hospitalization due to an autoimmune condition	4	2.3%	0	0.0%	2	1.7%	0	0.0%
Emergency department visit due to an autoimmune condition	2	1.1%	1	0.8%	3	2.5%	1	0.9%
Provider Administered Claims Only								
Hospitalization with same diagnosis as IE	5	2.9%	0	0.0%	3	2.5%	0	0.0%
Emergency Department visit with same diagnosis as IE	4	2.3%	0	0.0%	2	1.7%	0	0.0%

Limitations:

There are several inherent limitations for claims-based analyses:

- Potential for inaccurate or missing data: This analysis was based on paid and denied claims for biologic therapy. However, provider administered claims can only be billed after administration of the medication to the patient. In order to get a guarantee of payment from an insurance, the provider will request a prior authorization before administering the medication. However, if this PA request is denied, the provider likely will not bill for the service. Because this analysis was based on paid or denied claims, there is potential for missing data in which a provider submitted a PA and no subsequent provider administered claims were billed. The observed decrease in utilization after implementation of the policy may be at least partially due to this data, which was not captured in this analysis. An evaluation was conducted for patients with denied PAs, and no patients were identified who were not already captured in this analysis. However, it is possible that there could be methodological limitations with identification of denied provider administered PAs.
- Delays in billing: Decrease in utilization after implementation of the policy may be due to lag in billing rather than change in prescribing patterns. While the majority of provider administered claims are billed within 6 months of the provider visit and should be captured in this analysis, providers may continue to submit medical claims after that date. Similarly, there may be a lag in billing for medical visits including emergency department visits and hospitalizations.
- Days' supply estimates: Days' supply for medical claims was defined based on the estimated maintenance dose for each agent which may be inaccurate. For pharmacy claims, duration of therapy estimates were based on the days' supply submitted by the pharmacy, and for medications with infrequent dosing, there could be variability in how pharmacies estimate days' supply for the medication. In particular, days' supply for concomitant DMARD therapy may be inaccurate (e.g., methotrexate is typically given weekly rather than daily).
- Limitations for combination DMARD therapy: Many systemic DMARDs are self-administered, and evaluation of combination DMARD and biologic use did not include patients who were getting provider administered DMARD therapy such as injectable methotrexate.
- Diagnostic accuracy: Diagnoses are required on provider administered claims, but are not available for pharmacy claims. For pharmacy claims, diagnoses identified may not accurately reflect the patient's true diagnoses and may be inaccurate or incomplete. For provider administered claims, claims are submitted with a single primary diagnoses which may not reflect all relevant conditions for patients with multiple diagnoses.

- Confounding factors: There may be many other, unidentified factors associated with billing or prescribing patterns which could impact or influence the observed trends in claims. For example, this analysis does not account for changes in Medicaid provider enrollement or the patient's disease severity, both of which may have a significant impact on prescribing. Because this population is small, a few prescribers may have a significant impact on prescribing patterns in this population, and analysis of individual prescribers was not assessed in this policy evaluation. Similarly, changes in overall Medicaid or FFS enrollment could influence the number of patients with claims for a biologic for autoimmune conditions. In order to assess for changes in Medicaid enrollment, the rough number of enrolled FFS members and the number of members with FFS medical claims for an autoimmune condition was evaluated. Overall, the monthly average number of enrolled FFS members per month was unchanged in the year before and after the policy implementation. There was a slight decrease in the number of patients with at least one FFS medical claim for an autoimmune condition (1045 in the year before implementation and 953 in the year after implementation). While this difference is not substantial, it may account for some of the prescribing trends observed in this population.
- Population size: This analysis included only a small number of patients with provider administered claims. In the year before and after policy implementation, the number of patients with claims for a provider administered biologics for an autoimmune condition was only 107 and 65, respectively. The majority of claims in this class continue to be billed through the pharmacy rather than in provider offices, which limits the ability to discern changes in prescribing for provider administered drugs.
- Switching therapy: The number and proportion of patients who switched therapy from one biologic treatment to another was not evaluated. Changing therapy may be due to ineffectiveness of treatment, adverse events, comorbid conditions, or patient preference.

Appendix 1. Coding Information

Table A1. Coding for biologics and DMARDs

Category	HSN	Generic
Biologics for Autoimmune Conditions	037825	abatacept
Biologics for Autoimmune Conditions	033411	abatacept/maltose
Biologics for Autoimmune Conditions	024800	adalimumab
Biologics for Autoimmune Conditions	022953	anakinra
Biologics for Autoimmune Conditions	040967	apremilast
Biologics for Autoimmune Conditions	044296	baricitinib
Biologics for Autoimmune Conditions	037462	belimumab
Biologics for Autoimmune Conditions	044102	brodalumab
Biologics for Autoimmune Conditions	036497	canakinumab/PF
Biologics for Autoimmune Conditions	035554	certolizumab pegol
Biologics for Autoimmune Conditions	018830	etanercept
Biologics for Autoimmune Conditions	036278	golimumab
Biologics for Autoimmune Conditions	044418	guselkumab
Biologics for Autoimmune Conditions	018747	infliximab
Biologics for Autoimmune Conditions	044432	infliximab-abda
Biologics for Autoimmune Conditions	043249	infliximab-dyyb
Biologics for Autoimmune Conditions	043193	ixekizumab
Biologics for Autoimmune Conditions	026750	natalizumab
Biologics for Autoimmune Conditions	016848	rituximab
Biologics for Autoimmune Conditions	044183	sarilumab
Biologics for Autoimmune Conditions	041715	secukinumab
Biologics for Autoimmune Conditions	044823	tildrakizumab-asmn
Biologics for Autoimmune Conditions	036466	tocilizumab
Biologics for Autoimmune Conditions	039768	tofacitinib citrate
Biologics for Autoimmune Conditions	036187	ustekinumab
Biologics for Autoimmune Conditions	036187	ustekinumab
Biologics for Autoimmune Conditions	041146	vedolizumab
Systemic DMARDs	004523	azathioprine
Systemic DMARDs	004524	cyclosporine
Systemic DMARDs	010086	cyclosporine, modified
Systemic DMARDs	007827	acitretin
Systemic DMARDs	003906	methotrexate
Systemic DMARDs	003905	methotrexate sodium
Systemic DMARDs	024819	methotrexate sodium/PF
Systemic DMARDs	040683	methotrexate/PF
Systemic DMARDs	004074	sulfasalazine

Systemic DMARDs	004151	hydroxychloroquine sulfate
Systemic DMARDs	018694	leflunomide
Systemic DMARDs	003908	mercaptopurine

Table A2. Diagnosis Codes for relevant conditions of interest

Condition	ICD-10 Diagnosis Codes
Ankylosing spondylitis	M45xxx
Crohn's Disease	K50xxx
Juvenile Idiopathic Arthritis	M08xxx
Plaque psoriasis	L400x-L404x, L408x, L409x
Psoriatic arthritis	L405x
Rheumatoid Arthritis	M05xxx, M06xxx
Ulcerative colitis	K51xxx

Table A3. Days' Supply Estimates for Medical Claims

Procedure Code	Drug Name	Procedure Description	Days' Supply
C9026	vedolizumab	Injection, Vedolizumab, 1 Mg	56 days
C9029	guselkumab	Injection, Guselkumab, 1 Mg	56 days
C9487	ustekinumab	Ustekinumab, For Intravenous Injection, 1 Mg	56 days
J0129	abatacept	Injection, Abatacept, 10 Mg (Code May Be Used For Medicare When Drug Administered Under The Direct S	7 days
J0129	abatacept/maltose	Injection, Abatacept, 10 Mg (Code May Be Used For Medicare When Drug Administered Under The Direct S	28 days
J0135	adalimumab	Injection, Adalimumab, 20 Mg	14 days
J0490	belimumab	Injection, Belimumab, 10 Mg	28 days
J0638	canakinumab/PF	Injection, Canakinumab, 1 Mg	28 days
J0717	certolizumab pegol	Injection, Certolizumab Pegol, 1 Mg (Code May Be Used For Medicare When Drug Administered Under The	28 days
J0718	certolizumab pegol	Injection, Certolizumab Pegol, 1 Mg	28 days
J1438	etanercept	Injection, Etanercept, 25 Mg (Code May Be Used For Medicare When Drug Administered Under The Direct	7 days
J1602	golimumab	Injection, Golimumab, 1 Mg, For Intravenous Use	56 days
J1745	infliximab	Injection, Infliximab, Excludes Biosimilar, 10 Mg	56 days
J2323	natalizumab	Injection, Natalizumab, 1 Mg	28 days
J3262	tocilizumab	Injection, Tocilizumab, 1 Mg	28 days
J3357	ustekinumab	Ustekinumab, For Subcutaneous Injection, 1 Mg	84 days
J3358	ustekinumab	Ustekinumab, For Intravenous Injection, 1 Mg	56 days

J3380	vedolizumab	Injection, Vedolizumab, 1 Mg	56 days
J9310	rituximab	Injection, Rituximab, 100 Mg	168 days
J9312	rituximab	Injection, Rituximab, 10 Mg	168 days
Q2044	belimumab	Injection, Belimumab, 10 Mg	28 days
Q4079	natalizumab	Injection, Natalizumab, 1 Mg	28 days
Q5102	infliximab-abda	Injection, Infliximab, Biosimilar, 10 Mg	56 days
Q5102	infliximab-dyyb	Injection, Infliximab, Biosimilar, 10 Mg	56 days
Q5103	infliximab-dyyb	Injection, Infliximab-Dyyb, Biosimilar, (Inflectra), 10 Mg	56 days
Q5104	infliximab-abda	Injection, Infliximab-Abda, Biosimilar, (Renflexis), 10 Mg	56 days
Q9989	ustekinumab	Ustekinumab, For Intravenous Injection, 1 Mg	56 days

Table A4. Error Codes to Exclude for Denied Provider Administered Drug Claims

Error Code	Description
3334	CAWEM: not emergency
4244	COVERAGE/RULE NOT FOUND FOR THE DIAGNOSIS/BP
4021	COVERAGE/RULE NOT FOUND FOR THE PROCEDURE/BP
4227	COVERAGE/RULE NOT FOUND FOR THE REVENUE/BP
264	DETAIL FROM DATE OF SERVICE IS MISSING
526	DETAIL FROM DOS IS AFTER HEADER THROUGH DATE
400	DETAIL UNITS OF SERVICE MUST BE GREATER THAN ZERO
3542	DIAGNOSIS REIMBURSABLE W/DIAGNOSTIC PROCEDURES ONL
4024	INVALID HCPCS/NDC COMBINATION
2807	MATCH CODE INVALID
3320	MEDICARE SERVICE NOT COVERED FOR QMB RECIPIENT
1036	PERFORMING PROV TYPE/CLAIM TYPE MIS MATCH
2504	RECIPIENT COVERD BY PRIVATE INSURANC(NO ATTACHMNT)
2502	RECIPIENT COVERED BY MEDICARE B (NO ATTACHMENT)
2503	RECIPIENT COVERED BY MEDICARE B (WITH ATTACHMENT)
2003	RECIPIENT INELIGIBLE ON DETAIL DATE OF SERVICE
2017	RECIPIENT SERVICES COVERED BY HMO PLAN
1007	RENDERING PROVIDER I.D. NOT ON FILE

Table A5. Error Codes to Exclude for Denied Pharmacy Claims

Error Code	Description
1000	BILLING PROVIDER ID NOT ON FILE

576	CLAIM HAS THIRD-PARTY PAYMENT
503	DATE DISPENSED AFTER BILLING DATE
502	DATE DISPENSED EARLIER THAN DATE PRESCRIBED
500	DATE PRESCRIBED AFTER BILLING DATE
2809	DOB IS INVALID
2807	MATCH CODE INVALID
3022	Non-Pref Drug. Prior Authorization Required.
1026	PRESCRIBING PHYSICIAN ID NOT ON FILE
1040	PRESCRIBING PHYSICIAN NOT ENROLLED
1033	PRESCRIBING PROV TYPE/CLAIM TYPE MIS MATCH
2509	RECIPIENT COVERED BY MEDICARE
2508	RECIPIENT COVERED BY PRIVATE INSURANCE (PHARMACY)
2507	RECIPIENT HAS MORE THAN ONE INSURANCE CARRIER
513	RECIPIENT NAME AND NUMBER DISAGREE
238	RECIPIENT NAME IS MISSING
2002	RECIPIENT NOT ELIGIBLE FOR HEADER DATE OF SERVICE
2017	RECIPIENT SERVICES COVERED BY HMO PLAN
505	THIRD PARTY PAYMENT AMOUNT MORE THAN CLAIM CHARGE
4999	THIS DRUG IS COVERED BY MEDICARE PART D