Sponsor
Novartis Pharmaceuticals

Generic Drug Name
Omalizumab

Trial Indication(s)
Asthma

Protocol Number
CIGE025AUS55

Protocol Title
XOLAIR (omalizumab) Outcomes in pediatric Allergic Asthma patients in the United States

Clinical Trial Phase
NA

Phase of Drug Development
NA

Study Start/End Dates
Study Start Date: 01 March 2020

Study Completion Date: 01 December 2020

Reason for Termination
NA

Study Design/Methodology

This was a retrospective database pre-post cohort study, identifying asthmatic patients, aged 6-11, with omalizumab use over 12 months.

For this study, any persons from the Marketscan database with an asthma diagnosis and >= 1 omalizumab prescription/administration during the index period were identified. From this patient population the inclusion and exclusion criteria were applied, resulting in the final study cohort. Each person was assigned an index date based on their initial use of omalizumab.

Study Period: 07/07/2015 – 12/31/2019

Index Period: 07/07/2016 – 12/31/2018

Index Date: The date of the first medical or pharmacy claim of omalizumab

Baseline Period (pre-index): 12 months before index date

Follow up Period (post-index): 12 months after index date

Centers

Novartis Investigative Site

Objectives:

The primary objective of this study is:

- To evaluate real-world asthma-related outcomes and corticosteroid (ICS, OCS) use after treatment initiation with omalizumab among pediatric (6-11 yr. old) patients with asthma in both commercial and Medicaid insurance populations (analyzed as separate populations)

The secondary objective is:

- To compare real-world asthma-related outcomes and corticosteroid (ICS, OCS) use before and after treatment initiation with omalizumab among pediatric asthma in both commercial and Medicaid insurance populations (analyzed as separate populations).

Test Product (s), Dose(s), and Mode(s) of Administration

Omalizumab

Statistical Methods

Statistical analysis was conducted by the Novartis Data Science team. The Commercial and Medicaid data are analyzed and reported separately. Categorical variables are reported as counts or proportions. Continuous variables are reported as means, standard deviations, medians, first and third quartiles, interquartile ranges, minimums, and maximums. A retrospective pre-post study design was used to compare outcomes that occurred pre- and post-omalizumab initiation. Baseline demographics and clinical characteristics of patients within each cohort are assessed on all available data within the pre-index period. Outcomes were measured 12 months prior to index date during the baseline period as well as during the 12-month follow-up period post index date.

Baseline demographics and clinical characteristics of patients are presented descriptively in the pre and post periods for all primary and secondary endpoints. The Exact McNemar's test was used to test the pre vs post index values for categorical variables. The paired t-test was used to test the pre vs post index values for continuous variables.

Study Population: Key Inclusion/Exclusion Criteria

Inclusion criteria:
We used all eligible Marketscan beneficiaries with an asthma diagnosis and omalizumab use between 07/07/2016 – 12/31/2018 (index period). Continuous enrollment in the Marketscan database was required to ensure the availability of claims data to capture study outcomes and covariates.

- Omalizumab cohort was defined as ≥1 prescription claims within the index period, with the date of first dispensing deemed the index date. The following were the omalizumab codes used:
  - National Drug Codes (NDC): 50242004062; 50242004201 or
  - Healthcare Common Procedure Coding System (HCPCS): J2357.
- Asthma was defined by ≥1 diagnosis code in any available diagnosis field on or prior to index date.
  - ICD-9-CM: 493.xx OR
  - ICD-10-CM: J45.x
- 6-11 years of age at the time of index
- ≥12-months pre-index and ≥12-months post-index continuous eligibility in medical and pharmacy benefits

- Enrollment gap of ≤30 days will be considered continuous enrollment

Exclusion criteria

Patients were excluded from the study if they had one or more of the following:

- Bronchial Thermoplasty at any time during data capture.
  - Current Procedural Terminology (CPT): 31660, 31661
- Prior asthma-indicated biologic use during the 12 months pre or post-index
  - Omalizumab:
    - NDC: 50242004062; 50242004201 or
    - HCPCS: J2357; S0107; C9217
  - Mepolizumab:
    - NDC: 00173088101, 00173088185 or
    - HCPCS: J2182
  - Reslizumab:
    - NDC: 5931061031 or
    - HCPCS: J2786
  - Benralizumab:
    - NDC: 0310173030 or
    - HCPCS: C9466
  - Dupilumab:
    - NDC: 0024591400 or 0024591800

Participant Flow

Commercial Population:

After applying the inclusion and exclusion criteria, there were 116 omalizumab responders included in the main analysis. There were 133 initiators and 17 non-responders.

Medicaid Population:

After applying the inclusion and exclusion criteria, there were 322 omalizumab responders included in the main analysis of the Medicaid data. There were 378 initiators and 56 non-responders.

Baseline Characteristics

Commercial Population Baseline Demographic Characteristics

	Initiators[1]	Responders[2]	Non-responders[3]
Number of patients: N	**133**	**116**	**17**
Age:			
Mean (StdDev)	8.91 (1.69)	8.95 (1.68)	8.65 (1.77)
Median (IQR)	9 (2)	9 (2)	9 (3)
Min (Max)	6 (11)	6 (11)	6 (11)
Sex: N(%)			
Male	87 (65.4%)	73 (62.9%)	14 (82.4%)
Female	46 (34.6%)	43 (37.1%)	3 (17.6%)
Geographic region: N(%)			
Northeast Region	24 (18.0%)	18 (15.5%)	6 (35.3%)
North Central Region	22 (16.5%)	18 (15.5%)	4 (23.5%)
South Region	64 (48.1%)	59 (50.9%)	5 (29.4%)
West Region	23 (17.3%)	21 (18.1%)	2 (11.8%)
Index year: N(%)			
2016	31 (23.3%)	27 (23.3%)	4 (23.5%)
2017	46 (34.6%)	39 (33.6%)	7 (41.2%)
2018	56 (42.1%)	50 (43.1%)	6 (35.3%)
Season[4] of index date: N(%)			
Fall	38 (28.6%)	32 (27.6%)	6 (35.3%)
Spring	33 (24.8%)	29 (25.0%)	4 (23.5%)
Summer	34 (25.6%)	31 (26.7%)	3 (17.6%)
Winter	28 (21.1%)	24 (20.7%)	4 (23.5%)

1. Initiators: Patients with >= 1 Xolair claims
2. Responders: Patients with >= 4 Xolair claims
3. Non-responders: Patients with [1,3] (inclusive) Xolair claims
4. Season: Winter: Dec 22 - Mar 19; Spring: Mar 20 - June 20; Summer: June 21 - Sept 22; Fall: Sept 23 - Dec 21;

Medicaid Population Baseline Demographic Characteristics

	Initiators[1]		Responders[2]		Non-responders[3]
Number of patients: N	**378**		**322**		**56**
Age:					
Mean (StdDev)	8.98 (1.55)		9 (1.55)		8.98 (1.55)
Median (IQR)	9 (2)		9 (2)		9 (2)
Min (Max)	6 (11)		6 (11)		6 (11)
Sex: N(%)					
Male	238 (63.0%)		211 (65.5%)		27 (48.2%)
Female	140 (37.0%)		111 (34.5%)		29 (51.8%)
Race: N(%)					
White	82 (21.7%)		65 (20.2%)		17 (30.4%)
Black	232 (61.4%)		200 (62.1%)		32 (57.1%)
Hispanic	12 (3.2%)		11 (3.4%)		1 (1.8%)
Unknown/Others	52 (13.7%)		46 (14.3%)		6 (10.7%)
Index year: N(%)					
2016	82 (21.7%)		67 (20.8%)		15 (26.8%)
2017	159 (42.1%)		139 (43.2%)		20 (35.7%)
2018	137 (36.2%)		116 (36.0%)		21 (37.5%)
Season[4] of index date: N(%)					
Fall	121 (32.0%)		101 (31.4%)		20 (35.7%)
Spring	80 (21.2%)		67 (20.8%)		13 (23.2%)
Summer	109 (28.8%)		95 (29.5%)		14 (25.0%)
Winter	68 (18.0%)		59 (18.3%)		9 (16.1%)

Commercial Population Clinical Descriptive Statistics (Responders)

	Responders		
	Baseline		**Follow-up**
Number of Xolair responders: N	**116**		**116**
Comorbid conditions[1]: N(%)			
Allergic rhinitis	104 (89.7%)		100 (86.2%)
Anaphylaxis history	21 (18.1%)		16 (13.8%)
Atopic dermatitis	40 (34.5%)		28 (24.1%)
Chronic Idiopathic Urticaria (CIU)	10 (8.6%)		12 (10.3%)
Food Allergy	41 (35.3%)		27 (23.3%)
Gastroesophageal reflux disease	10 (8.6%)		21 (18.1%)
Nasal Polyps	1 (0.9%)		1 (0.9%)
Respiratory infections	86 (74.1%)		77 (66.4%)
Sinusitis	35 (30.2%)		30 (25.9%)
Acute	26 (22.4%)		16 (13.8%)
Chronic	19 (16.4%)		23 (19.8%)
Specific medication usage[2]: N(%)			
Anticholinergics	29 (25.0%)		24 (20.7%)
ICS monotherapy	63 (54.3%)		38 (32.8%)
ICS/LABA combination	79 (68.1%)		68 (58.6%)
LABA	0 (0.0%)		0 (0.0%)
Leukotriene modifiers	81 (69.8%)		66 (56.9%)

Mast cell stabilizers	1 (0.9%)		2 (1.7%)
Methylxanthines	0 (0.0%)		0 (0.0%)
OCS	94 (81.0%)		70 (60.3%)
SABA	104 (89.7%)		93 (80.2%)
Other	0 (0.0%)		0 (0.0%)

Number of Xolair prescriptions[3]			
Mean(StdDev)			12.53 (6.02)
Median(IQR)			11 (7)
Min(Max)			4 (26)
Xolair dayssupply[4] [NB1]			
Mean(StdDev)			280.15 (70.32)
Median(IQR)			300.50 (99.50)
Min(Max)			84 (393)

1. Comorbid conditions: Comorbid conditions will be identified by ≥1 ICD-9/10 diagnosis code in any position during the pre-index and post-index period.
2. Medication usage: Medication dispensing events will be identified during the pre-index and post-index period for all medications within each of the following drug classes. Patients with ≥1 medication dispensing will be flagged in the respective drug group.
3. Number of Xolair prescriptions is counted as the number of distinct dispense/administration dates for Xolair without deduplicating the records
4. Days of supply for Xolair is counted by imputing HCPCS claims with 28 days of supply and additionally:
 •Consider ONLY one claim among two/more claims in one day.
 •Ignore Xolair HCPCS claims that are within three weeks of Xolair NDC claims if their associated payment was <= $50"
 • Remove overlapping periods of remaining HCPCS claims. (This criterion will specifically target biweekly HCPCS claims.)

Medicaid Population Clinical Descriptive Statistics (Responders)

	Responders		
	Baseline		Follow-up
	N/Mean/Min (%/StdDev/IQR/Max)		N/Mean/Min (%/StdDev/IQR/Max)
Number of Xolair responders: N	322		322
Comorbid conditions[1]: N(%)			
Allergic rhinitis	298 (92.5%)		276 (85.7%)
Anaphylaxis history	24 (7.5%)		20 (6.2%)
Atopic dermatitis	105 (32.6%)		99 (30.7%)
Chronic Idiopathic Urticaria (CIU)	10 (3.1%)		10 (3.1%)
Food Allergy	98 (30.4%)		73 (22.7%)
Gastroesophageal reflux disease	57 (17.7%)		45 (14.0%)
Nasal Polyps	2 (0.6%)		1 (0.3%)
Respiratory infections	242 (75.2%)		191 (59.3%)
Sinusitis	95 (29.5%)		67 (20.8%)
Acute	72 (22.4%)		49 (15.2%)
Chronic	46 (14.3%)		36 (11.2%)
Specific medication usage[2]: N(%)			
Anticholinergics	97 (30.1%)		99 (30.7%)
ICS monotherapy	154 (47.8%)		98 (30.4%)
ICS/LABA combination	300 (93.2%)		298 (92.5%)
LABA	1 (0.3%)		0 (0.0%)
Leukotriene modifiers	293 (91.0%)		276 (85.7%)
Mast cell stabilizers	3 (0.9%)		0 (0.0%)
Methylxanthines	2 (0.6%)		3 (0.9%)
OCS	302 (93.8%)		256 (79.5%)
SABA	317 (98.4%)		306 (95.0%)
Other	0 (0.0%)		0 (0.0%)
Number of Xolair prescriptions[3]			
Mean(StdDev)			11.79 (5.95)

Median(IQR)			11 (5)
Min(Max)			4 (37)
Xolair days of supply[4]			
Mean(StdDev)			256.71 (78.02)
Median(IQR)			271 (125)
Min(Max)			56 (368)

1. Comorbid conditions: Comorbid conditions will be identified by ≥1 ICD-9/10 diagnosis code in any position during the pre-index and post-index period.
2. Medication usage: Medication dispensing events will be identified during the pre-index and post-index period for all medications within each of the following drug classes. Patients with ≥1 medication dispensing will be flagged in the respective drug group.
3. Number of Xolair prescriptions is counted as the number of distinct dispense/administration dates for Xolair without deduplicating the records
4. Days of supply for Xolair is counted by imputing HCPCS claims with 28 days of supply and additionally:
 •Consider ONLY one claim among two/more claims in one day.
 •Ignore Xolair HCPCS claims that are within three weeks of Xolair NDC claims if their associated payment was <= $50"
 • Remove overlapping periods of remaining HCPCS claims. (This criterion will specifically target biweekly HCPCS claims.)

Commercial Population Descriptive Statistics (Non-responders)[NB2]

	Non-responders	
	Baseline	Follow-up
	N/Mean/Min (%/StdDev/IQR/Max)	N/Mean/Min (%/StdDev/IQR/Max)
Number of Xolair responders: N	17	17
Comorbid conditions[1]: N(%)		
Allergic rhinitis	17 (100.0%)	13 (76.5%)
Anaphylaxis history	6 (35.3%)	3 (17.6%)
Atopic dermatitis	4 (23.5%)	3 (17.6%)
Chronic Idiopathic Urticaria (CIU)	1 (5.9%)	1 (5.9%)
Food Allergy	9 (52.9%)	7 (41.2%)
Gastroesophageal reflux disease	1 (5.9%)	2 (11.8%)
Nasal Polyps	0 (0.0%)	0 (0.0%)
Respiratory infections	12 (70.6%)	10 (58.8%)
Sinusitis	3 (17.6%)	4 (23.5%)
Acute	2 (11.8%)	3 (17.6%)
Chronic	1 (5.9%)	1 (5.9%)
Specific medication usage[2]: N(%)		
Anticholinergics	3 (17.6%)	1 (5.9%)
ICS monotherapy	6 (35.3%)	3 (17.6%)
ICS/LABA combination	13 (76.5%)	11 (64.7%)
LABA	0 (0.0%)	0 (0.0%)
Leukotriene modifiers	10 (58.8%)	10 (58.8%)
Mast cell stabilizers	0 (0.0%)	1 (5.9%)
Methylxanthines	0 (0.0%)	0 (0.0%)
OCS	14 (82.4%)	9 (52.9%)
SABA	17 (100.0%)	15 (88.2%)
Other	0 (0.0%)	0 (0.0%)

Number of Xolair prescriptions[3]				
Mean(StdDev)				1.94 (0.90)
Median(IQR)				2 (2)
Min(Max)				1 (3)
Xolair days of supply[4]				
Mean(StdDev)				74.94 (66.52)
Median(IQR)				48 (56)
Min(Max)				28 (252)

1. Comorbid conditions: Comorbid conditions will be identified by ≥1 ICD-9/10 diagnosis code in any position during the pre-index and post-index period.
2. Medication usage: Medication dispensing events will be identified during the pre-index and post-index period for all medications within each of the following drug classes. Patients with ≥1 medication dispensing will be flagged in the respective drug group.
3. Number of Xolair prescriptions is counted as the number of distinct dispense/administration dates for Xolair without deduplicating the records
4. Days of supply for Xolair is counted by imputing HCPCS claims with 28 days of supply and additionally:
 •Consider ONLY one claim among two/more claims in one day.
 •Ignore Xolair HCPCS claims that are within three weeks of Xolair NDC claims if their associated payment was <= $50"
 •Remove overlapping periods of remaining HCPCS claims. (This criterion will specifically target biweekly HCPCS claims.)

Medicaid Population Clinical Descriptive Statistics (Non-responders)

	Non-responders		
	Baseline		Follow-up
	N/Mean/Min (%/StdDev/IQR/Max)		N/Mean/Min (%/StdDev/IQR/Max)
Number of Xolair responders: N	56		56
Comorbid conditions[1]: N(%)			
Allergic rhinitis	51 (91.1%)		46 (82.1%)
Anaphylaxis history	8 (14.3%)		4 (7.1%)
Atopic dermatitis	23 (41.1%)		18 (32.1%)
Chronic Idiopathic Urticaria (CIU)	2 (3.6%)		1 (1.8%)
Food Allergy	16 (28.6%)		13 (23.2%)
Gastroesophageal reflux disease	10 (17.9%)		7 (12.5%)
Nasal Polyps	0 (0.0%)		2 (3.6%)
Respiratory infections	35 (62.5%)		33 (58.9%)
Sinusitis	15 (26.8%)		10 (17.9%)
Acute	11 (19.6%)		7 (12.5%)
Chronic	7 (12.5%)		5 (8.9%)
Specific medication usage[2]: N(%)			
Anticholinergics	18 (32.1%)		17 (30.4%)
ICS monotherapy	24 (42.9%)		17 (30.4%)
ICS/LABA combination	51 (91.1%)		46 (82.1%)
LABA	0 (0.0%)		0 (0.0%)
Leukotriene modifiers	47 (83.9%)		46 (82.1%)
Mast cell stabilizers	1 (1.8%)		0 (0.0%)
Methylxanthines	1 (1.8%)		0 (0.0%)
OCS	55 (98.2%)		39 (69.6%)
SABA	55 (98.2%)		53 (94.6%)
Other	0 (0.0%)		0 (0.0%)
Number of Xolair prescriptions[3]			
Mean(StdDev)			1.84 (0.80)

Median(IQR)			2 (1.25)
Min(Max)			1 (3)
Xolair days of supply[4]			
Mean(StdDev)			49.63 (21.43)
Median(IQR)			52.50 (29.50)
Min(Max)			28 (84)

1. Comorbid conditions: Comorbid conditions will be identified by ≥1 ICD-9/10 diagnosis code in any position during the pre-index and post-index period.
2. Medication usage: Medication dispensing events will be identified during the pre-index and post-index period for all medications within each of the following drug classes. Patients with ≥1 medication dispensing will be flagged in the respective drug group.
3. Number of Xolair prescriptions is counted as the number of distinct dispense/administration dates for Xolair without deduplicating the records
4. Days of supply for Xolair is counted by imputing HCPCS claims with 28 days of supply and additionally:
   •Consider ONLY one claim among two/more claims in one day.
   •Ignore Xolair HCPCS claims that are within three weeks of Xolair NDC claims if their associated payment was <= $50
   •Remove overlapping periods of remaining HCPCS claims. (This criterion will specifically target biweekly HCPCS claims.)

Primary and Secondary Outcome Results(s)

Commercial Population: Pre- and Post-Index Changes in Asthma Outcomes

	Baseline		Follow-up		Difference[11] (Follow-up vs. Baseline)			
	N/Mean/Min (%/StdDev/IQR/Max)		N/Mean/Min (%/StdDev/IQR/Max)		Mean	95% Lower CI	95% Upper CI	P-Value[1] [1]
Number of Xolair responders: N	**116**		**116**					
Patients with uncontrolled asthma[1] N (%)	83 (71.6%)		64 (55.2%)		-19	NA	NA	0.007
Patients with uncontrolled asthma (based only on risk-based criteria)[2]	83 (71.6%)		61 (52.6%)		-22	NA	NA	0.002
Patients with exacerbations requiring IP visits	15 (12.9%)		8 (6.9%)		-7	NA	NA	0.07
Patients with exacerbations requiring ED visits	35 (30.2%)		20 (17.2%)		-15	NA	NA	0.001
Patients with exacerbations requiring OCS prescriptions	74 (63.8%)		55 (47.4%)		-19	NA	NA	0.011
Number of total exacerbations[12,13]								
Mean(StdDev)	2.77 (3.59)		1.60 (2.72)		-1.16	-1.71	-0.62	<0.001
Median(IQR)	2 (4)		1 (2)					
Min(Max)	0 (21)		0 (19)					
Patients with uncontrolled asthma (based only on impairment-based criteria)[3]	37 (31.9%)		21 (18.1%)		-16	NA	NA	0.002

Number of SABA prescriptions[13]							
Mean(StdDev)	4.41 (3.49)	3.20 (3.61)		-1.22	-1.83	-0.60	<0.001
Median(IQR)	4 (5)	2 (3)					
Min(Max)	0 (14)	0 (20)					
ICS Use							
Mean Daily ICS dose[4]							
Mean(StdDev)	0.21 (0.49)	0.19 (0.54)		-0.02	-0.09	0.06	0.67
Median(IQR)	0.05 (0.09)	0.04 (0.08)					
Min(Max)	0 (3.85)	0 (4.02)					
Patients with a reduction in daily ICS dose[5]: N (%)	NA	62 (53.4%)		NA	NA	NA	NA
OCS Use							
Cumulative OCS dose[6]							
Mean(StdDev)	3068.77 (10433.15)	1619.74 (6543.97)		-1449.04	-2325.52	-572.56	0.001
Median(IQR)	895 (2588.75)	290 (930)					
Min(Max)	0 (107,250)	0 (67,500)					
OCS days of supply[7]							
Mean(StdDev)	22.93 (37.50)	11.50 (21.93)		-11.43	-18.30	-4.56	0.001
Median(IQR)	14.50 (18.25)	5 (15.25)					
Min(Max)	0 (240)	0 (180)					

Number of OCS prescriptions[8]							
Mean(StdDev)	2.88 (3.05)	1.55 (2.29)	-1.33	-1.81	-0.85	<0.001
Median(IQR)	2 (3)	1 (2)				
Min(Max)	0 (17)	0 (19)				
Patients with a reduction in total prescriptions of OCS[9]: N (%)	NA	75 (64.7%)	NA	NA	NA	NA
Specific medication usage: N(%)						
Total number of asthma-specific prescriptions[10]						
Mean(StdDev)	15.42 (10.37)	11.36 (10.25)	-4.06	-5.53	-2.59	<0.001
Median(IQR)	14 (11.75)	9 (11)				
Min(Max)	0 (66)	0 (61)				

1. Uncontrolled asthma is identified through risk-based criteria or impairment-based criteria
2. Risk-based criteria is defined as ≥1 unique exacerbation(s) in 12 months, including asthma-related ED visits or hospitalizations (emergency or hospital care with a diagnosis of asthma in the first position only [ICD-9 code 493.xx, ICD-10 code J45.xx]) or an OCS dispensing within 7 days AFTER an outpatient visit with an asthma diagnosis in ANY position.
3. Impairment-based criteria is defined as ≥6 SABA prescriptions dispensed in 12 months.
4. Mean daily dose is defined as the summation of strength times quantity divided by total days of supply. Also see the dose conversion appendix table.
5. Reduction in daily ICS dose is measured at patient level by comparing the average of daily doses between the two periods.
6. Cumulative OCS dose is the summation of doses within the period. Also, see the dose conversion table for OCS.
7. OCS days of supply is measured by the summation of days of supply on OCS claims
8. Number of OCS prescriptions is the count of OCS prescription claims
9. Reduction in total prescriptions of OCS is measured at patient level by comparing the number of prescriptions in the baseline and Follow-up period
10. Number of prescriptions: Total number of asthma-related prescriptions
11. The Pre vs Post index statistical tests will be reported for the following outcomes
    - Dichotomous variables (Exact McNemar's test)
    - Interval/Numeric variables (Paired t-test)
12. The following dates are considered for counting exacerbations:
    - IP visits: distinct admission dates are considered
    - ED visits: distinct service dates
    - OP visits with OCS prescription: distinct service dates for outpatient visits"
13. The population size for the sample mean and the standard deviation is the number of Xolair responders

Medicaid Population: Pre- and Post-Index Changes in Asthma Outcomes

	Baseline		Follow-up		Difference[11] (Follow-up vs. Baseline)			
	N/Mean/Min (%/StdDev/IQR /Max)		N/Mean/Min (%/StdDev/IQR /Max)		Mean	95% Lower CI	95% Upper CI	P-Value[11]
Number of Xolair responders: N	**322**		**322**					
Patients with uncontrolled asthma[1] N, %	306 (95.0%)		271 (84.2%)		-35	NA	NA	<0.001
Patients with uncontrolled asthma (based only on risk-based criteria)[2]	294 (91.3%)		239 (74.2%)		-55	NA	NA	<0.001
Patients with exacerbations requiring IP visits	71 (22.0%)		29 (9.0%)		-42	NA	NA	<0.001
Patients with exacerbations requiring ED visits	190 (59.0%)		114 (35.4%)		-76	NA	NA	<0.001
Patients with exacerbations requiring OCS prescriptions	279 (86.6%)		226 (70.2%)		-53	NA	NA	<0.001
Number of total exacerbations[12,13]								
Mean(StdDev)	4.70 (3.87)		2.65 (3.16)		-2.04	-2.42	-1.67	<0.001
Median(IQR)	4 (4.75)		2 (4)					
Min(Max)	0 (19)		0 (20)					
Patients with uncontrolled asthma (based only on impairment-based criteria)[3]	231 (71.7%)		183 (56.8%)		-48	NA	NA	<0.001

Number of SABA prescriptions[13]								
Mean(StdDev)	9.66 (6.26)		7.69 (5.83)		-1.97	-2.48	-1.46	<0.001
Median(IQR)	9 (8)		6 (7)					
Min(Max)	0 (31)		0 (33)					
ICS Use								
Mean Daily ICS dose[4]								
Mean(StdDev)	0.14 (0.25)		0.15 (0.29)		0.01	-0.02	0.03	0.61
Median(IQR)	0.06 (0.07)		0.07 (0.07)					
Min(Max)	0 (2.02)		0 (2)					
Patients with a reduction in daily ICS dose[5]: N (%)	NA		103		NA	NA	NA	NA
OCS Use								
Cumulative OCS dose[6]								
Mean(StdDev)	3342.10 (3227.34)		1888.34 (2711.05)		-1453.76	-1777.12	-1130.40	<0.001
Median(IQR)	2,270 (3827.50)		815 (2,200)					
Min(Max)	0 (19,115)		0 (14,651)					
OCS days of supply[7]								
Mean(StdDev)	29.45 (31.00)		19.62 (39.56)		-9.82	-13.42	-6.23	<0.001
Median(IQR)	23 (30)		10 (18)					

Min(Max)	0 (280)		0 (421)				
Number of OCS prescriptions[8]							
Mean(StdDev)	4.58 (3.22)		2.71 (2.92)		-1.86	-2.18	-1.54	<0.001
Median(IQR)	4 (5)		2 (3)					
Min(Max)	0 (18)		0 (19)					
Patients with a reduction in total prescriptions of OCS[9]: N (%)	NA		218		NA	NA	NA	NA
Specific medication usage: N(%)							
Total number of asthma-specific prescriptions[10]							
Mean(StdDev)	28.06 (13.39)		23.79 (13.13)		-4.27	-5.41	-3.13	<0.001
Median(IQR)	27 (18)		22 (14)					
Min(Max)	1 (89)		0 (77)					

1. Uncontrolled asthma is identified through risk-based criteria or impairment-based criteria
2. Risk-based criteria is defined as ≥1 unique exacerbation(s) in 12 months, including asthma-related ED visits or hospitalizations (emergency or hospital care with a diagnosis of asthma in the first position only [ICD-9 code 493.xx, ICD-10 code J45.xx]) or an OCS dispensing within 7 days AFTER an outpatient visit with an asthma diagnosis in ANY position.
3. Impairment-based criteria is defined as ≥6 SABA prescriptions dispensed in 12 months.
4. Mean daily dose is defined as the summation of strength times quantity divided by total days of supply. Also see the dose conversion appendix table.
5. Reduction in daily ICS dose is measured at patient level by comparing the average of daily doses between the two periods.
6. Cumulative OCS dose is the summation of doses within the period. Also, see the dose conversion table for OCS.
7. OCS days of supply is measured by the summation of days of supply on OCS claims
8. Number of OCS prescriptions is the count of OCS prescription claims
9. Reduction in total prescriptions of OCS is measured at patient level by comparing the number of prescriptions in the baseline and Follow-up period
10. Number of prescriptions: Total number of asthma-related prescriptions
11. The Pre vs Post index statistical tests will be reported for the following outcomes
    - Dichotomous variables (Exact McNemar's test)
    - Interval/Numeric variables (Paired t-test)
12. The following dates are considered for counting exacerbations:

- IP visits: distinct admission dates are considered
- ED visits: distinct service dates
- OP visits with OCS prescription: distinct service dates for outpatient visits

13. The population size for the sample mean and the standard deviation is the number of Xolair responders.

Other relevant findings

None

Safety Results

Not applicable

Conclusion

In Medicaid and commercially insured children with allergic asthma, treatment with omalizumab is associated with significant improvement in asthma control and a reduction in exacerbations and OCS exposure. The results support the benefit of targeted and optimal treatment with omalizumab for children with allergic asthma.

Date of Clinical Study Report

19 November 2020