

## SUPPLEMENTARY MATERIAL

### HEALTHCARE RESOURCE UTILIZATION AND DIRECT COST OF ATOPIC DERMATITIS PATIENTS IN DUBAI, UNITED ARAB EMIRATES: A RETROSPECTIVE COHORT STUDY

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## SUPPLEMENTARY TABLES

**Table S1: Evaluability Criteria for Inclusion and Exclusion of Patients in the Mild-to-Moderate AD Cohort**

Feasibility Assessment Criteria	Included		Excluded	
	N	%	N	%
<b>Broader Inclusion Criteria</b>				
Patient with AD diagnosis (L20.x) anytime during the study period <sup>a</sup>	850,867	NA	NA	NA
Patient with at least 2 AD diagnoses (L20.x) ICD-10-CM codes anytime during the study time period <sup>a</sup>	442,956	52.1%	407,911	47.9%
<b>Criteria for inclusion of patients in the mild-to-moderate AD cohort</b>				
Patients using pimecrolimus cream or tacrolimus ointment or Topical Corticosteroids (TCS) or Crisaborole <sup>b</sup> (Topical PDE4 inhibitor) in study time period <sup>a</sup>	335,751	75.8%	107,205	24.2%
Patients with first AD treatment of pimecrolimus cream or tacrolimus ointment or TCS in index period <sup>c</sup>	228,617	68.1%	107,134	31.9%
Patients with at least one AD diagnosis in the 12 months pre-index period	44,464	19.4%	184,153	80.6%
Patients with age $\geq 3$ months <sup>d</sup> (latest available age at the time of data abstraction). Note: Patient with all the age groups have been included <sup>e</sup> (due to limitation of the age specific variable in the database)	44,464	100.0%	-	0.0%
Continuously enrolled during study time period <sup>e</sup>	10,188	22.9%	34,276	77.1%
Patients with at least one claim for a mild-to-moderate AD treatment pimecrolimus cream or tacrolimus ointment or TCS in the index period <sup>c</sup>	10,188	100.0%	-	0.0%
Patient with no mild-to-moderate AD treatment in the 12 months pre-index diagnosis period	10,188	100.0%	-	0.0%
<b>Exclusion Criteria</b>				
Patients who received any treatment related to moderate-to-severe AD at any time during their period of continuous eligibility <sup>c</sup>				
- Systemic immunosuppressants	10,173	99.9%	15	0.1%

Feasibility Assessment Criteria	Included		Excluded	
	N	%	N	%
(Cyclosporine, Methotrexate, Azathioprine, Mycophenolate mofetil)				
- Systemic biologics (IL-4 receptor alpha antagonist): Dupilumab	10,169	100.0%	4	0.0%
- Phototherapy	10,134	99.6%	39	0.4%

Abbreviations: AD: Atopic Dermatitis; ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification; IL: interleukin; NA: Not Applicable; PDE: Phosphodiesterase; TCS: Topical Corticosteroids

<sup>a</sup> Study period was 01 January 2014 to 31 March 2020

<sup>b</sup> The Topical PDE4 inhibitor - crisaborole is not available in Dubai

<sup>c</sup> Index period was 01 January 2015 to 31 March 2019

<sup>d</sup> Patient with all the age groups have been included (due to limitation of the age specific variable in the database)

<sup>e</sup> Criteria for continuous enrollment: At least 1 activity claim for any service (medication, procedures, consultation services, and consumables) anytime during the 2 pre- & post 6-month periods in the study time period

**Table S2: Evaluability Criteria for Inclusion and Exclusion of Patients in the Moderate-to-Severe AD Cohort**

Feasibility Assessment Criteria	Included		Excluded	
	N	%	N	%
<b>Broader Inclusion Criteria</b>				
Patient with AD diagnosis (L20.x) anytime during the study period <sup>a</sup>	850,867	NA	NA	NA
Patient with at least 2 AD diagnoses (L20.x) ICD-10-CM codes anytime during the study time period <sup>a</sup>	442,956	52.1%	407,911	47.9%
<b>Criteria for inclusion of patients in the moderate-to-severe AD cohort</b>				
Patients who received treatment during study time period <sup>d</sup> with the following agents systemic biologics (IL-4 receptor alpha antagonist): dupilumab, corticosteroids (as a class), and systemic immunosuppressants: cyclosporine, methotrexate, azathioprine, mycophenolate mofetil, antihistamines (tablets, syrups, solutions, drops, injections, etc.) and phototherapy	339,532	76.7%	103,424	23.3%
Patients with first AD treatment in index period <sup>b</sup> with the above-mentioned agents	231,643	68.2%	107,889	31.8%
Patients with at least one AD diagnosis in 12 months pre-index diagnosis period	43,644	18.8%	187,999	81.2%
Patients with age $\geq 3$ months <sup>c</sup> (latest available age at the time of data abstraction). Note: Patient with all the age groups have been included <sup>d</sup> (due to limitation of the age specific variable in the database)	43,644	100.0%	0	0.0%
Continuously enrolled during study period <sup>d</sup>	10,059	23.0%	33,585	77.0%

Feasibility Assessment Criteria	Included		Excluded	
	N	%	N	%
Patients with at least 2 claims for a moderate-to-severe AD treatment in the index period <sup>b</sup>	3,515	34.9%	6,544	65.1%
Patient with no moderate-to-severe AD treatment in the 12 months pre-index diagnosis period	3,515	100.0%	-	0.0%

Abbreviations: AD: atopic dermatitis; ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification; IL: interleukin; NA: Not Applicable

<sup>a</sup> Study period was 01 January 2014 to 31 March 2020

<sup>b</sup> Index period was 01 January 2015 to 31 March 2019

<sup>c</sup> Patient with all the age groups have been included (due to limitation of the age specific variable in the database)

<sup>d</sup> Criteria for continuous enrollment: At least 1 activity claim for any service (medication, procedures, consultation services, consumables, etc.) anytime during the 2 pre & post 6-month periods in the study time period

Note: As corticosteroids were not considered as an exclusion criterion for the mild-to-moderate (exclusion criteria), there may be a chance of capturing duplicate patients in both cohorts.

**Table S3: Evaluability Criteria for Inclusion and Exclusion of Patients in the Untreated or on Drugs not Included in the Treated AD Cohort**

Feasibility Assessment Criteria	Included		Excluded	
	N	%	N	%
<b>Broader Inclusion Criteria</b>				
Patient with AD diagnosis (L20.x) anytime during the study period <sup>a</sup>	850,867	NA	NA	NA
Patient with at least 2 AD diagnoses (L20.x) ICD-10-CM codes anytime during the study time period <sup>a</sup>	442,956	52.1%	407,911	47.9%
<b>Criteria for inclusion of patients in the Untreated or on drugs not included in the treated AD cohort</b>				
Patients with AD diagnoses (L20.x) at any time during study time period <sup>a</sup>	850,867	100%	-	-
Patients with at least 2 AD diagnoses (L20.x) at any time during study time period <sup>a</sup>	442,956	52.1%	407,911	48.0%
Patients with first AD diagnosis in index period <sup>b</sup> (Index date = first diagnosed date)	306,019	69.1%	136,937	30.9%
Patients with no AD treatment during the index period <sup>b</sup>	68,223	22.3%	237,796	77.7%
Continuously enrolled during study time period <sup>c</sup>	10,806	15.8%	57,417	84.2%

Abbreviations: AD: atopic dermatitis; ICD-10-CM: International Classification of Diseases, Tenth Revision, Clinical Modification; NA: Not Applicable

<sup>a</sup> Study period was 01 January 2014 to 31 March 2020

<sup>b</sup> Index period was 01 January 2015 to 31 March 2019. For patients in the untreated or on drugs not included in the treated AD cohort, the first diagnosis date was taken as the index date

<sup>c</sup> Criteria for continuous enrollment: At least one activity claim for any service (medication, procedures, consultation services, consumables, etc.) anytime during the 2 pre & post 6-month periods in the study period

**Table S4: ICD-10-CM Diagnoses Codes for Inclusion of Patients in the Study**

Diagnosis code	Description
L20	Atopic dermatitis
L20.0	Besnier's prurigo
L20.8	Other atopic dermatitis
L20.81	Atopic neurodermatitis
L20.82	Flexural eczema
L20.83	Infantile (acute) (chronic) eczema
L20.84	Intrinsic (allergic) eczema
L20.89	Other atopic dermatitis
L20.9	Atopic dermatitis, unspecified

**Table S5: Number and Percentage of Consultation-Based Incidence Cases (Patient Age)**

Age (Years)	2014	2015	2016	2017	2018	2019	2020 (till March)
0-1	-	-	1 (11.1%)	4 (100.0%)	2 (40.0%)	349 (46.2%)	89 (12.1%)
2-5	7 (3.0%)	949 (36.1%)	3,129 (21.9%)	6,111 (15.4%)	5,556 (11.4%)	3,417 (7.9%)	439 (2.5%)
6-11	2,446 (10.0%)	3,706 (8.5%)	5,715 (8.0%)	7,294 (6.7%)	5,882 (5.7%)	4,169 (5.2%)	612 (2.0%)
12-17	953 (5.6%)	1,565 (6.1%)	2,718 (6.8%)	3,513 (6.0%)	2,668 (4.8%)	1,878 (4.3%)	285 (1.8%)
18+	6,947 (2.8%)	18,014 (4.1%)	40,758 (4.7%)	59,328 (4.2%)	47,688 (3.5%)	34,580 (3.3%)	5,257 (1.3%)
Unspecified	47,096 (3.6%)	71,244 (4.3%)	87,464 (4.4%)	91,712 (3.9%)	106,574 (3.7%)	133,177 (3.8%)	37,571 (2.0%)

**Table S6: Number and Percentage of Consultation-Based Prevalence Cases (Patient Age)**

Age (Years)	2015	2016	2017	2018	2019	2020 (till March)
0-1	-	1 (11.1%)	4 (100.0%)	4 (80.0%)	351 (46.4%)	144 (19.5%)
2-5	951 (36.1%)	3,492 (24.4%)	7,192 (18.1%)	7,450 (15.2%)	5,206 (12.0%)	910 (5.2%)
6-11	4,444 (10.2%)	7,280 (10.2%)	9,501 (8.7%)	8,353 (8.2%)	6,442 (7.9%)	1,279 (4.2%)

12-17	1,835 (7.1%)	3,299 (8.3%)	4,446 (7.5%)	3,783 (6.8%)	2,835 (6.4%)	527 (3.3%)
18+	19,501 (4.3%)	45,754 (5.2%)	68,366 (4.8%)	58,479 (4.3%)	44,150 (4.1%)	8,401 (2.1%)
Unspecified	76,671 (4.6%)	96,768 (4.9%)	102,300 (4.3%)	12,0628 (4.2%)	148,090 (4.2%)	46,356 (2.4%)

**Table S7 Antihistamines Prescribed in Treated AD Cohort (Mild-to-Moderate and Moderate-to-Severe)**

<b>Drug Class</b>	<b>AD - Mild-to-Moderate (N = 10,134)</b>	<b>AD - Moderate-to-Severe (N = 3,515)</b>
Patients with Antihistamines (Tablets, Syrups, solutions, drops, Injections, etc.) in study time period	6,282 (62.0%)	2,633 (74.9%)

Abbreviations: AD: atopic dermatitis

**Table S8: Healthcare Resource Utilization (AD-related) Per patient by Specialty (Top 3) and Costs**

<b>AD-related HCRU and associated cost (in USD) per member by specialty</b>	<b>Treated AD cohort – Mild-to-Moderate</b>	<b>Treated AD cohort - Moderate-to-Severe</b>	<b>Untreated or on Drugs not included in the treated AD cohort</b>
<b>Mean (SD) disease-specific HCRU inpatient visits</b>			
Dermatology	4.4 (5.2)	4.4 (5.2)	1.3 (0.6)
Pediatrics	3.4 (4.5)	4.0 (4.9)	1.4 (0.5)
General Practice/Family Medicine	4.6 (5.6)	5.2 (5.8)	1.4 (0.6)
<b>Mean (SD) disease-specific HCRU outpatient visits</b>			
Dermatology	5.0 (5.1)	6.7 (6.1)	1.8 (1.7)
Pediatrics	4.7 (4.8)	6.4 (5.5)	1.7 (1.3)
General Practice/Family Medicine	4.8 (4.9)	6.4 (5.8)	1.8 (1.5)
<b>Mean (SD) disease-specific HCRU emergency visits</b>			
Dermatology	3.3 (1.8)	3.8 (1.7)	2.0 (1.8)

<b>AD-related HCRU and associated cost (in USD) per member by specialty</b>	<b>Treated AD cohort – Mild-to-Moderate</b>	<b>Treated AD cohort - Moderate-to-Severe</b>	<b>Untreated or on Drugs not included in the treated AD cohort</b>
Pediatrics	3.2 (1.6)	3.5 (1.5)	1.9 (1.5)
General Practice/Family Medicine	3.1 (1.7)	3.7 (1.6)	1.8 (1.3)
<b>Mean (SD) healthcare resource costs (USD) for dermatology, overall</b>			
Gross Cost	371.3 (1626.8)	518.3 (2061.4)	147.8 (278.4)
Patient share	36.9 (62.7)	46.7 (73.1)	17.0 (29.7)
Net cost <sup>a</sup>	334.9 (1514.7)	471.4 (1929.9)	133.5 (264.3)
<b>Mean (SD) healthcare resource costs (USD) for pediatrics, overall</b>			
Gross Cost	360.0 (2632.6)	493.6 (3272.6)	123.8 (192.8)
Patient share	34.8 (50.0)	44.9 (58.5)	14.6 (18.6)
Net cost <sup>a</sup>	322.7 (2625.7)	444.4 (3263.5)	109.3 (178.6)
<b>Mean (SD) healthcare resource costs (USD) for General Practice/Family Medicine, overall</b>			
Gross Cost	395.5 (2472.1)	549.5 (3086.6)	140.8 (266.8)
Patient share	37.5 (80.1)	48.7 (96.0)	16.6 (32.8)
Net cost <sup>a</sup>	359.0 (2405.1)	501.7 (3005.2)	126.7 (250.2)
<b>Mean (SD) healthcare resource costs (USD) for dermatology (by activity types), overall</b>			
Drugs	188.9 (1150.7)	248.3 (1428.7)	81.9 (237.7)
CPT <sup>b</sup>	215.6 (460.9)	307.69 (701.1)	167.73 (250.5)
HCPCS <sup>c</sup>	29.4 (76.7)	41.9 (92.5)	39.2 (112.1)
Services <sup>d</sup>	150.0 (337.6)	190.33 (400.8)	68.34 (71.3)
Unknown <sup>e</sup>	272.2 (3211.7)	337.9 (3646.2)	74.6 (131.7)
<b>Mean (SD) healthcare resource costs (USD) for pediatrics (by activity types), overall</b>			
Drugs	126.0 (249.9)	164.1 (472.1)	50.6 (96.3)
CPT <sup>b</sup>	199.8 (497.2)	257.5 (605.8)	122.8 (205.5)

<b>AD-related HCRU and associated cost (in USD) per member by specialty</b>	<b>Treated AD cohort – Mild-to-Moderate</b>	<b>Treated AD cohort - Moderate-to-Severe</b>	<b>Untreated or on Drugs not included in the treated AD cohort</b>
HCPCS <sup>c</sup>	890.6 (3379.7)	1203.5 (3947.9)	101.2 (274.4)
Services <sup>d</sup>	206.9 (2206.1)	273.9 (2702.7)	74.0 (69.4)
Unknown <sup>e</sup>	172.6 (752.8)	211.8 (883.3)	72.9 (107.2)
<b>Mean (SD) healthcare resource costs (USD) for General Practice/Family Medicine (by activity types), overall</b>			
Drugs	199.3 (1100.6)	256.5 (1357.6)	88.7 (251.5)
CPT <sup>b</sup>	208.3 (529.8)	290.2 (753.1)	133.6 (191.4)
HCPCS <sup>c</sup>	743.3 (2758.8)	1105.7 (3353.8)	98.5 (239.3)
Services <sup>d</sup>	169.3(1729.8)	224.0 (2130.1)	63.1 (68.0)
Unknown <sup>e</sup>	250.5 (2899.3)	320.7 (3384.8)	56.6 (102.1)

Abbreviations: AD: atopic dermatitis; ; CPT: current procedural terminology; HCPCS: healthcare common procedure coding system; HCRU: healthcare resource utilization; SD: standard deviation; USD: United States Dollar

<sup>a</sup> The net charge billed by the provider to the payor for the activity.

<sup>b</sup> Procedures - medical, surgical, and diagnostic services.

<sup>c</sup> Supplies and Consumables.

<sup>d</sup> Services: Consultations etc.

<sup>e</sup> Unknown: The discrepant value present in the sum of net cost by activities and total net cost as per e-claims database