

SUPPLEMENTARY MATERIAL

Title:

Treatment patterns and healthcare resource utilization among patients with atopic dermatitis – a retrospective cohort study using German health claims data

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Table S1 Operationalization of overall comorbidity of the Elixhauser Comorbidity Score

Disease	ICD-10-GM diagnosis code
Congestive heart failure	I099, I110, I130, I132, I255, I420, I425-I429, I43, I50, P290
Cardiac arrhythmias	I441-I443, I456, I459, I47-I49, R000, R001, R008, T821, Z450, Z950
Valvular disease	A520, I05-I08, I091, I098, I34-I39, Q230-Q233, Z952-Z954
Pulmonary circulation disorders	I26, I27, I280, I288, I289
Peripheral vascular disorders	I70, I71, I731, I738, I739, I771, I790, I792, K551, K558, K559, Z958, Z959
Hypertension (complicated)	I11-I13 , I15
Hypertension (uncomplicated)	I10
Paralysis	G041, G114, G801, G802, G81, G82, G830-G834, G839
Other neurological disorders	G10-G13, G20-G22, G254-G255, G312, G318, G319, G32, G35-G37, G40, G41, G931, G934, R470, R56
Chronic pulmonary disease	I278, I279, J40-J47, J60-J67, J684, J701, J703
Diabetes (complicated)	E102-E108, E112-E118, E122-E128, E132-E138, E142-E148
Diabetes (uncomplicated)	E100, E101, E109, E110, E111, E119, E120, E121, E129, E130, E131, E139, E140, E141, E149
Hypothyroidism	E00-E03 , E890
Renal failure	I120, I131, N18, N19, N250, Z490-Z492, Z940, Z992
Liver disease	B18, I85, I864, I982, K70, K711, K713-K715, K717, K72, K74, K760, K762, K769, Z944
Peptic ulcer disease (excluding bleeding)	K257, K259, K267, K269, K277, K279, K287, K289
AIDS / HIV	B20-B24, B20-B22, B24
Lymphoma	C81-C85, C88 , C96, C900, C902
Metastatic cancer	C77, C78, C79, C80
Solid tumor without metastasis	C00-C14, C15-C26, C30-C39, C40-C41, C43, C45-C49, C50, C51-C58, C60-C63, C64-C68, C69-C72, C73-C75, C76, C97
Rheumatoid arthritis/ collagen vascular diseases	L940, L941, L943, M05, M06, M08, M120, M123, M30, M310-M313 , M32, M33, M34, M35, M45, M461, M468, M469
Coagulopathy	D65, D66, D67, D68, D691, D693-D696
Obesity	E66
Weight loss	E40-E46, R634, R64
Fluid and electrolyte disorders	E222, E86, E87
Blood loss anemia	D500
Deficiency anemias	D508, D509, D51-D53
Alcohol abuse	F10, E52, G621, I426, K292, K700, K703, K709, T51, Z502, Z71, Z721
Drug abuse	F11 – F16, F18, F19, Z715, Z722
Psychoses	F20, F22-F25, F28, F29, F302, F312, F315
Depression	F204, F313-F315, F32, F33, F341, F412, F432

Table S2 Operationalization of systemic drug therapy

	ATC code	OPS code
Drug / Drug class		
<i>Agents for dermatitis, excluding corticosteroids</i>		
Dupilumab	D11AH05	6-00a.5
<i>Systemic corticosteroids (SCS)</i>		
Glucocorticoids*	H02AB	
Corticosteroids for systemic use, combinations *	H02BX	
<i>Immunosuppressants (SIS)</i>		
Ciclosporin	L04AD01	
Azathioprine	L04AX01	
Methotrexate	L04AX03	

* Consideration of all subcodes under this code

Table S3 Operationalization of concomitant TCS, TCI

Drug / Drug class	ATC code
<i>Topical corticosteroids (TCS)</i>	
Corticosteroid, pure*	D07 A
Corticosteroids, combinations with antiseptics*	D07 B
Corticosteroids, combinations with antibiotics*	D07 C
Corticosteroids, other combinations *	D07 X
<i>Topical calcineurin inhibitors (TCI)</i>	
Tacrolimus	D11AH01
Pimecrolimus	D11AH02

* Consideration of all subcodes under this code

Table S4 Operationalization of other AD-related medication

Drug / Drug class	ATC code
<i>Agents for dermatitis, excluding corticosteroids</i>	
Tacrolimus	D11AH01
Pimecrolimus	D11AH02
Cromoglicic acid	D11AH03
Alitretinoin	D11AH04
Dupilumab	D11AH05
Crisaborole	D11AH06
<i>Corticosteroids, dermatological preparations</i>	
Corticosteroids, plain*	D07A
Corticosteroids, combinations with antiseptics*	D07B
Corticosteroids, combinations with antibiotics *	D07C
Corticosteroids, other combinations*	D07X
<i>Antipruritics</i>	
Antihistamines for topical use*	D04AA
Polidocanol	D04AB11
Polidocanol, combinations	D04AB61
<i>Antifungals for dermatological, topical use*</i>	
	D01A
<i>Antibiotics and for topical use</i>	
Tetracycline and derivatives*	D06AA
Other antibiotics for topical use*	D06AX
<i>Emollients and protectives</i>	
Zinc products*	D02AB
Soft paraffin and fat products*	D02AC
Carbamide	D02AE01
Carbamide, combinations	D02AE51
<i>Corticosteroids for systemic use</i>	
Glucocorticoids*	H02AB
Corticosteroids for systemic use, combinations *	H02BX
<i>Immunosuppressants</i>	
Ciclosporin	L04AD01
Azathioprine	L04AX01
Methotrexate	L04AX03
<i>Antihistamines for systemic use *</i>	R06A

* Consideration of all subcodes under this code

Table S5 Distribution of index systemic drug therapy in 2017, stratified by sex

	Female (n=5,762)		Male (n=4,213)		All (n=9,975)	
	n	%	n	%	n	%
Index systemic drug therapy						
Glucocorticoids	5,701	98.9	4,170	99.0	9,871	99.0
Corticosteroids, fixed-dose combinations	31	0.5	9	0.2	40	0.4
Cyclosporine	9	0.2	16	0.4	25	0.3
Azathioprine	14	0.2	8	0.2	22	0.2
Azathioprine and Glucocorticoids	< 5	–	6	0.1	8	0.1
Methotrexate	< 5	–	< 5	–	< 5	–
Corticosteroids, combinations and Glucocorticoids	0	0.0	< 5	–	< 5	–
Cyclosporine and Glucocorticoids	< 5	–	< 5	–	< 5	–
Dupilumab	0	0.0	0	0.0	0	0.0

Numbers which are too low or might allow indirect calculability of too low case numbers cannot be displayed due to data protection reasons

Table S6 Switching of index systemic drug therapy during the one-year observation period (n=9,975), 90 days gap allowed

Index systemic drug therapy	n	Drug switched to	Patients switching		Days to switch	
			n	%	Mean	SD
Overall	9,963	Any other systemic medication	51	0.5	110.9	78.9
	9,963	Azathioprine	25	0.3	115.8	90.0
	9,963	Cyclosporine	12	0.1	110.3	61.7
	9,963	Dupilumab	9	0.1	123.8	77.2
	9,963	Systemic corticosteroids	5	0.1	64.0	59.7
Glucocorticoids, Corticosteroids for systemic use	9,912	Any other systemic medication	44	0.4	115.9	81.3
	9,912	Azathioprine	25	0.3	115.8	90.0
	9,912	Cyclosporine	12	0.1	110.3	61.7
	9,912	Dupilumab	7	0.1	125.4	88.7
Cyclosporine	25	Any other systemic medication	< 5	–	–	–
	25	Dupilumab	< 5	–	–	–
	25	Systemic corticosteroids	< 5	–	–	–
Azathioprine	22	Any other systemic medication	< 5	–	–	–
	22	Dupilumab	< 5	–	–	–
	22	Systemic corticosteroids	< 5	–	–	–

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SD Standard Deviation

Table S7 Use of concomitant TCS and/or TCI during the one-year observation period, stratified by age

	2-11 years (n=2,243)			12-17 years (n=417)			≥ 18 years (n=7,315)			All (n=9,975)		
	n	%	Mean DDD	n	%	Mean DDD	n	%	Mean DDD	n	%	Mean DDD
TCI												
Tacrolimus	33	1.5	37.0	24	5.8	29.6	343	4.7	27.7	400	4.0	28.6
Pimecrolimus	84	3.7	30.1	20	4.8	40.1	258	3.5	30.3	362	3.6	30.8
TCS												
Corticosteroids, plain	644	28.7	47.5	134	32.1	97.9	2,868	39.2	118.9	3,646	36.6	105.5
Corticosteroids, combinations with antiseptics	14	0.6	19.8	< 5	–	–	112	1.5	32.7	129	1.3	31.0
Corticosteroids, combinations with antibiotics	54	2.4	20.4	12	2.9	19.9	404	5.5	25.8	470	4.7	25.1
Corticosteroids, other combinations	< 5	–	–	< 5	–	–	175	2.4	55.7	179	1.8	55.6

Numbers which are too low or might allow indirect calculability of too low case numbers cannot be displayed due to data protection reasons.

DDD Defined daily dose, TCI Topical Calcineurin Inhibitor, TCS Topical Corticosteroids