

Healthcare Resource Utilization and Costs Related to Pertussis in Adults With and Without Underlying Conditions: A German Claims Data Analysis



Pertussis leads to **increased healthcare related costs** both during **infection** and in **subsequent months**.

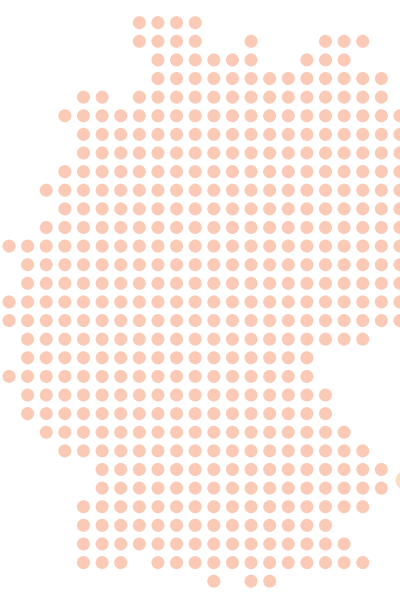
Digital poster
Supplemental data



SCAN ME

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¹Vandage GmbH, Bielefeld, Germany; ²Amaris Consulting, Lisbon, Portugal, c/o GSK Wavre; ³GSK, Munich, Germany

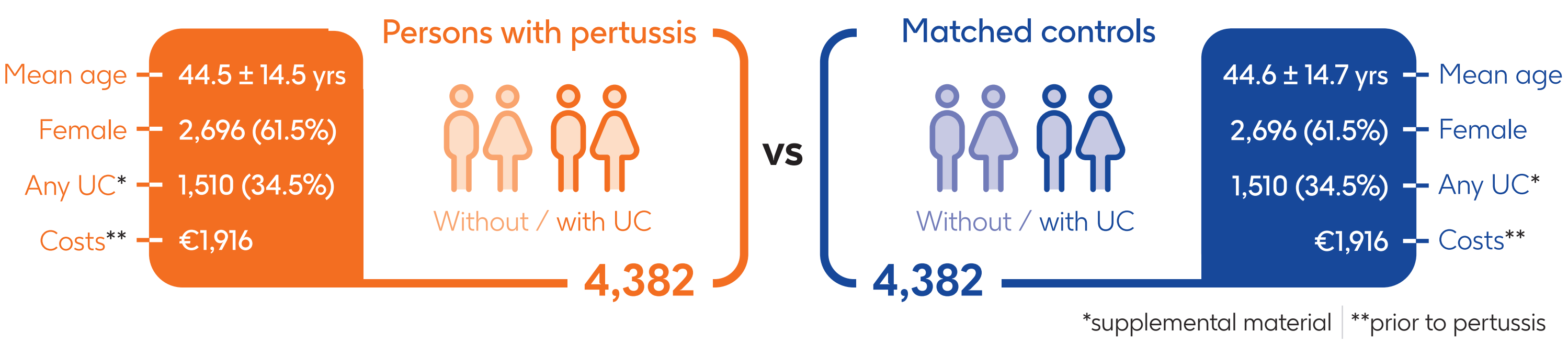
Aims



In the German adult population with and without underlying condition (UC):

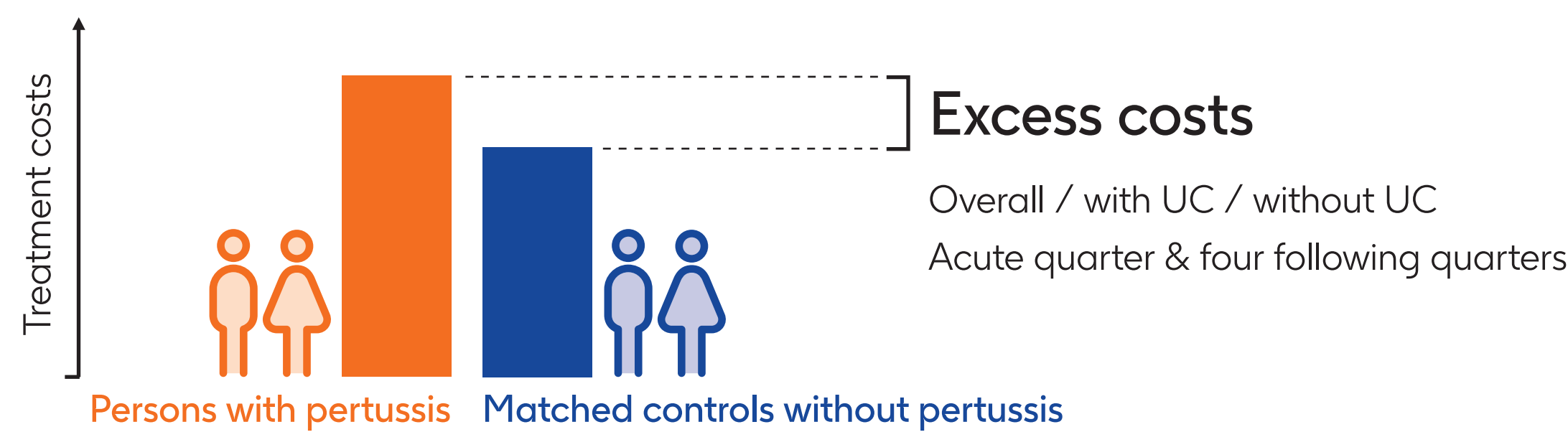
- Calculate health care resource utilization (HCRU) and costs in **patients with pertussis**.
- Compare observed HCRU and costs with **persons without pertussis infection**.

Demographics



Study Design

- Retrospective cohort study using German statutory health insurance claims data.
- Years under study:** 2016-2019. Data from 2015 is used as a washout period to ensure that pertussis cases in 2016 are incident cases.
- Outcomes:** Excess HCRU and costs related to medication, inpatient hospital visits and outpatient physician contacts. Given the matching approach, any excess was attributed to pertussis infection or a deterioration of the UC due to pertussis.
- Observational period:** Acute quarter of pertussis and four follow-up quarters.



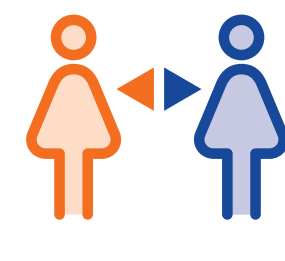
Identification of patients

Pertussis patient identification and UC definitions are based on ICD-10 codes*.



Eligibility criteria

≥ 18 years old
Continuous enrollment with health insurance over three years.



Exact 1:1 matching*

Age, Sex, UCs (prior to pertussis), and overall costs in the year prior to pertussis (+/- 10%).

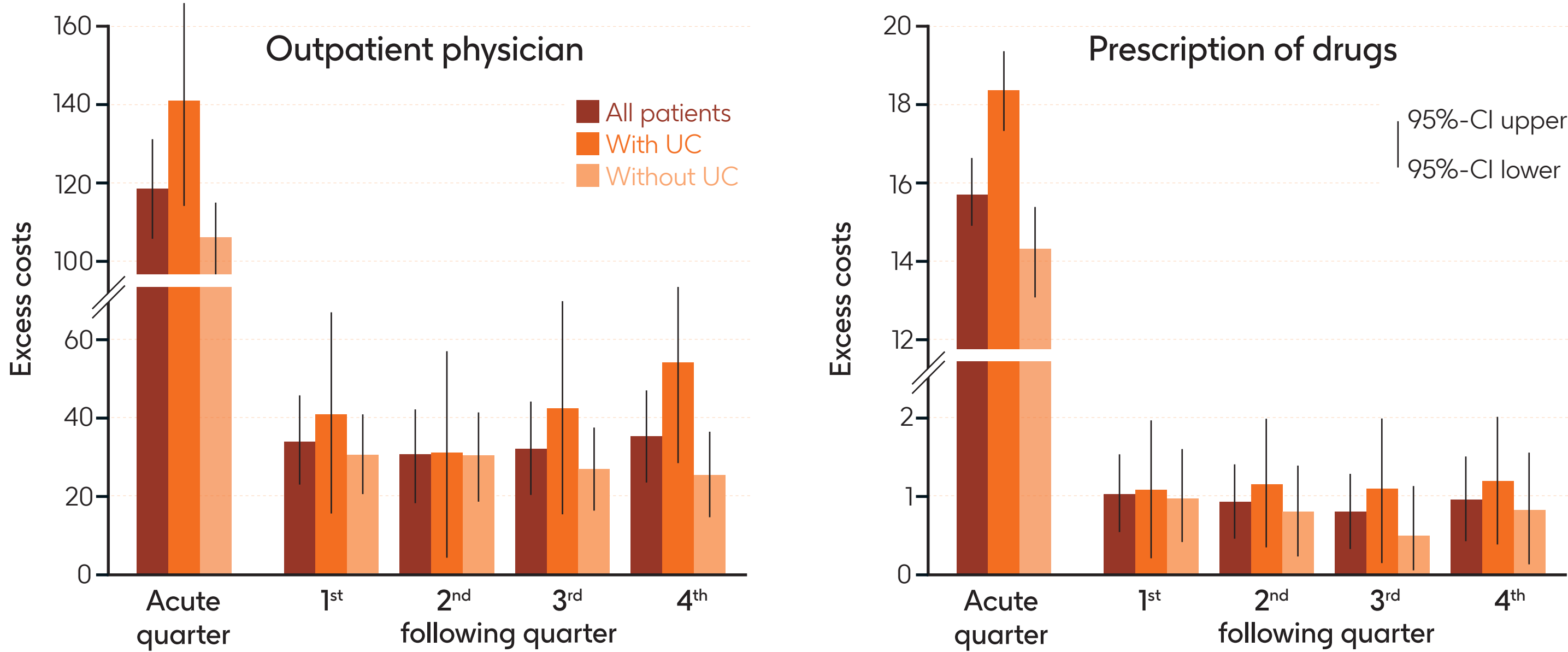


Database

- GWQ ServicePlus AG (anonymized database including data from multiple mid-size German public statutory health insurers (SHI)).
 - Claims data of up to 6.3 million insured people, depending on the year (5%-6% of the total SHI population in Germany per year).
- *supplemental material

Results

Excess costs during the acute quarter and the subsequent four quarters following a pertussis infection (in €)*



Note: Shown values of excess costs for outpatient physician and prescription of drugs are significant with p-values ranging from <0.03 to <0.0001.

Hospitalization costs of pertussis infection, primary diagnoses (in €)

Sector	Population	Cases	Mean	SD	Median	Min.	Max.
Inpatient	Overall	49	2,761.42	1,055.09	2,716.80	1,319.94	9,205.35
	With UC	30	2,954.97	1,261.61	2,843.18	1,438.38	9,205.35
	Without UC	19	2,466.00	527.56	2,545.05	1,319.94	3,266.69

Length of hospitalization (LOS) in patients with pertussis, primary diagnosis (in days)

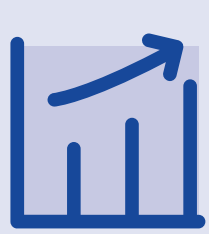
Sector	Population	Cases	Mean	SD	Median	Min.	Max.
Inpatient	Overall	49	5.6	3.7	4	1	15
	With UC	30	6.3	3.4	6	2	14
	Without UC	19	4.5	4.0	3	1	15

*supplemental material

Background

- Pertussis is a contagious bacterial respiratory infection impacting individuals of all ages, particularly adults and those with UC.
- Current evidence suggests that 50+ patients and those with certain UCs, i.e., chronic illnesses, are at higher risk of hospitalization and complications from pertussis^{1,2}.
- Yet, little is known about the economic effects of pertussis.

Conclusions



Pertussis leads to **increased healthcare service utilization** not only **during the infection** but also in **subsequent months**.



These costs remain high over a prolonged period with an increase in **patients with UC**.



Direct **hospital costs** related to pertussis and **LOS** were also **higher in patients with UC**.

Abbreviations

CI: Confidential interval; HCRU: Health care resource utilization
ICD-10: ICD-10: International Classification of Diseases 10th Revision; LOS: Length of stay; Max.: Maximum; Min.: Minimum; SD: Standard deviation; SHI: Statutory health insurer; UC: Underlying condition

References

- Jenkins VA, Savic M, Kandeil W. Pertussis in high-risk groups: an overview of the past quarter-century. *Hum Vaccin Immunother* 2020; 16(11): 2609-17 [https://doi.org/10.1080/21645515.2020.1738168] [PMID: 32298213]
- Macina D, Evans KE. Pertussis in Individuals with Co-morbidities: A Systematic Review. *Infect Dis Ther* 2021; 10(3): 1141-70 [https://doi.org/10.1007/s40121-021-00465-z] [PMID: 34117998]

Disclosures

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Supplemental material

Matched cohort with pertussis diagnosis

	Population “with UC”			Population “without UC”			Population “total”		
	Pertussis infection	No pertussis infection	SMD	Pertussis infection	No pertussis infection	SMD	Pertussis infection	No pertussis infection	SMD
Number of patients	1,510	1,510	-	2,872	2,872	-	4,382	4,382	-
Age (years)									
Mean (SD)	51.25 (14.67)	51.23 (14.96)	0.0011	40.95 (13.08)	41.10 (13.22)	0.0080	44.50 (14.50)	44.59 (14.66)	0.0043
Age (groups)									
18-29	138 (9.1%)	138 (9.1%)	-	643 (22.4 %)	643 (22.4 %)	-	781 (17.8 %)	781 (17.8 %)	-
30-39	229 (15.2%)	229 (15.2%)	-	724 (25.2 %)	724 (25.2 %)	-	953 (21.7 %)	953 (21.7 %)	-
40-49	298 (19.7%)	298 (19.7%)	-	787 (27.4 %)	787 (27.4 %)	-	1,085 (24.8 %)	1,085 (24.8 %)	-
50-59	409 (27.1%)	409 (27.1%)	-	503 (17.5 %)	503 (17.5 %)	-	912 (20.8 %)	912 (20.8 %)	-
60-69	272 (18.0%)	272 (18.0%)	-	159 (5.5 %)	159 (5.5 %)	-	431 (9.8 %)	431 (9.8 %)	-
70-79	145 (9.6%)	145 (9.6%)	-	51 (1.8 %)	51 (1.8 %)	-	196 (4.5 %)	196 (4.5 %)	-
80-89	19 (1.3%)	19 (1.3%)	-	5 (0.2 %)	5 (0.2 %)	-	24 (0.6 %)	24 (0.6 %)	-
≥90	0	0	-	0	0	-	0	0	-
Sex									
Female	1,005 (66.6%)	1,005 (66.6%)	-	1,691 (58.9%)	1,691 (58.9%)	-	2,696 (61.5 %)	2,696 (61.5 %)	-
Male	505 (33.4%)	505 (33.4%)	-	1,181 (41.4%)	1,181 (41.4%)	-	1,686 (38.5 %)	1,686 (38.5 %)	-
Comorbidities									
No comorbidities	0	0	-	2,872 (100%)	2,872 (100%)	-	2,872 (65.5 %)	2,872 (65.5 %)	-
Any	1,510 (100%)	1,510 (100%)	-	0	0	-	1,510 (34.5 %)	1,510 (34.5 %)	-
Asthma	378 (25.0 %)	328 (21.7 %)	0.0554	0	0	-	378 (8.6 %)	328 (7.5 %)	0.0554
COPD	167 (11.1 %)	143 (9.5 %)	0.0370	0	0	-	167 (3.8 %)	143 (3.3 %)	0.0370
Osteoporosis	105 (7.0 %)	93 (6.2 %)	0.0227	0	0	-	105 (2.4 %)	93 (2.1 %)	0.0227
Rheumatoid arthritis	74 (4.9 %)	53 (3.5 %)	0.0490	0	0	-	74 (1.7 %)	54 (1.2 %)	0.0490
Depression	611 (40.5 %)	605 (40.1 %)	0.0057	0	0	-	611 (13.9 %)	605 (13.8 %)	0.0057
Immunodeficiency	392 (26.0 %)	351 (23.2 %)	0.0446	0	0	-	392 (8.9 %)	353 (8.1 %)	0.0446
Heart failure	55 (3.6 %)	58 (3.8 %)	0.0074	0	0	-	55 (1.3 %)	58 (1.3 %)	0.0074
Chronic heart disease	156 (10.3 %)	173 (11.5 %)	0.0256	0	0	-	156 (3.6 %)	173 (3.9 %)	0.0256
Chronic kidney disease	73 (4.8 %)	59 (3.9 %)	0.0321	0	0	-	73 (1.7 %)	59 (1.3 %)	0.0321
Type-2-diabetes	246 (16.3 %)	294 (19.5 %)	0.0587	0	0	-	246 (5.6 %)	294 (6.7 %)	0.0587
Type-1-diabetes	22 (1.5 %)	46 (3.0 %)	0.0759	0	0	-	22 (0.5 %)	46 (1.0 %)	0.0759
Overall costs in the four quarters prior to the index quarter (in €)									
Mean	3,704.35	3,708.88	0.0000	975.84	976.70	0.0002	1,916.07	1,916.47	0.0001
SD	8,084.16	8,078.67	-	3,014.04	3,031.20	-	5,490.50	5,493.76	-
Median	1,480.30	1,480.27	-	358.72	358.71	-	585.94	585.94	-
Outpatient costs									
Mean	984.66	903.06	0.0436	301.39	279.75	0.0240	301.39	279.75	0.031
SD	1,435.07	1,203.88	-	654.68	618.86	-	654.68	618.86	-
Median	767.14	652.26	-	277.27	259.81	-	277.27	259.81	-
Inpatient costs									
Mean	1,420.49	1,456.78	0.0042	467.16	476.70	0.0026	467.16	476.70	0.0032
SD	6,047.92	6,149.44	-	2,564.96	2,583.46	-	2,564.96	2,583.46	-
Median	0.00	0.00	-	0.00	0.00	-	0.00	0.00	-
Rx costs (pharmaceuticals)									
Mean	1,299.20	1,344.04	0.0073	207.29	220.25	0.0055	207.29	220.25	0.0058
SD	4,217.12	4,434.61	-	1,558.83	1,768.57	-	1,558.83	1,768.57	-
Median	300.02	342.18	-	57.35	54.83	-	57.35	54.83	-

Abbreviations

CI: Confidence interval; COPD: Chronic Obstructive Pulmonary Disease; HCRU: Health care resource utilization; SD: Standard Deviation; SMD: Standardized mean difference; UC: Underlying condition

Acknowledgements

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Disclosures

Conflicts of interest: Pavo Marijic, Alexander Heiseke and Maria Waize are employed by GSK. Alexander Heiseke holds financial equities in GSK. Manuel Batram, Bastian Surmann and Julian Witte are employees of Vandage, which received funding from GSK to perform this study. Vandage also received payments from Janssen-Cilag GmbH, Moderna, MSD Sharp & Dohme GmbH, Pfizer Pharma GmbH, Sanofi-Aventis Deutschland GmbH, Seqirus GmbH and Viartis; and consulting fees and grants from AOK Rheinland/Hamburg, BARMER, DAK-Gesundheit, German Federal Joint Committee, and Techniker Krankenkasse. Victoria Genovez is a GSK-full contingent worker for Amaris Consulting. The authors declare no other financial and non-financial relationships and activities.

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Supplemental material

Outpatient HCRU and costs: excess costs in the overall population, all patients (in €)

Sample size			Index quarter				1 st following quarter				2 nd following quarter				3 rd following quarter				4 th following quarter			
Groups	Cases	Controls	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value
Overall	4,382	4,382	119.32	107.50	131.14	0.0000	34.55	22.94	46.17	0.0000	31.30	19.05	43.55	0.0000	32.72	20.52	44.91	0.0000	35.92	23.94	47.89	0.0000
18-29	781	781	108.06	86.74	129.38	0.0000	24.04	2.15	45.93	0.0314	36.85	14.62	59.08	0.0012	17.62	-3.82	39.05	0.1072	36.85	15.62	58.08	0.0007
30-39	953	953	120.68	87.42	153.94	0.0000	28.86	1.22	56.51	0.0407	22.39	-3.79	48.58	0.0936	20.44	-6.45	47.33	0.1361	16.23	-9.96	42.43	0.2243
40-49	1,085	1,085	115.21	91.49	138.92	0.0000	24.33	1.52	47.15	0.0366	15.11	-11.23	41.45	0.2607	29.41	2.43	56.40	0.0327	33.45	6.78	60.13	0.0140
50-59	912	912	129.60	107.87	151.33	0.0000	37.37	15.69	59.06	0.0007	40.35	19.88	60.82	0.0001	44.89	21.79	68.00	0.0001	48.70	24.67	72.74	0.0001
60-69	431	431	130.18	97.79	162.58	0.0000	65.47	23.36	107.59	0.0024	35.77	-12.02	83.56	0.1422	54.19	11.39	96.98	0.0131	34.37	-8.52	77.26	0.1161
70-79	196	196	102.55	48.12	156.97	0.0002	71.47	1.31	141.62	0.0459	63.21	-19.36	145.79	0.1331	68.89	-7.96	145.74	0.0787	92.09	32.59	151.58	0.0025
80-89	24	24	168.89	55.15	282.63	0.0045	100.18	-119.94	320.30	0.3644	251.03	-50.91	552.97	0.0997	16.80	-79.91	113.51	0.7276	-18.38	-144.22	107.47	0.7696
≥90	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Outpatient HCRU and costs: excess costs in the overall population, patients with any UC (in €)

Sample size			Index quarter				1 st following quarter				2 nd following quarter				3 rd following quarter				4 th following quarter			
Groups	Cases	Controls	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value
Overall	1,510	1,510	140.99	114.59	167.38	0.0000	41.60	15.39	67.81	0.0019	31.72	4.85	58.60	0.0207	43.26	15.46	71.06	0.0023	55.13	28.81	81.44	0.0000
18-29	138	138	189.10	107.90	270.30	0.0000	46.53	-36.00	129.06	0.2679	83.39	3.35	163.42	0.0412	42.49	-33.18	118.16	0.2699	70.30	2.92	137.67	0.0409
30-39	229	229	179.51	67.18	291.84	0.0018	34.85	-59.38	129.09	0.4674	-21.33	-103.89	61.24	0.6117	10.69	-74.31	95.69	0.8048	28.97	-60.58	118.53	0.5250
40-49	298	298	122.44	59.41	185.47	0.0002	39.05	-24.75	102.85	0.2297	16.94	-59.75	93.64	0.6645	23.71	-54.23	101.65	0.5505	47.23	-19.32	113.79	0.1638
50-59	409	409	138.53	102.05	175.01	0.0000	34.19	0.59	67.80	0.0461	47.28	15.57	78.99	0.0035	66.74	25.47	108.01	0.0016	66.86	25.03	108.69	0.0018
60-69	272	272	131.88	90.58	173.18	0.0000	56.96	-2.21	116.12	0.0591	25.07	-35.43	85.57	0.4160	44.79	-15.79	105.37	0.1470	36.86	-23.20	96.91	0.2285
70-79	145	145	91.45	23.02	159.88	0.0090	47.05	-37.27	131.38	0.2730	34.04	-54.97	123.04	0.4520	72.20	-20.33	164.73	0.1257	105.48	30.38	180.59	0.0061
80-89	19	19	179.56	39.83	319.29	0.0133	25.15	-202.50	252.79	0.8235	270.32	-89.64	630.29	0.1337	0.16	-106.62	106.94	0.9976	8.69	-123.43	140.81	0.8944
≥90	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Outpatient HCRU and costs: excess costs in the overall population, patients without UC (in €)

Sample size			Index quarter				1 st following quarter				2 nd following quarter				3 rd following quarter				4 th following quarter			
Groups	Cases	Controls	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value
Overall	2,872	2,872	107.93	97.02	118.83	0.0000	30.84	20.44	41.25	0.0000	31.07	19.44	42.71	0.0000	27.17	16.35	37.99	0.0000	25.82	14.67	36.96	0.0000
18-29	643	643	90.66	72.60	108.73	0.0000	19.21	0.12	38.31	0.0486	26.86	6.51	47.21	0.0097	12.28	-7.67	32.24	0.2275	29.67	8.82	50.52	0.0053
30-39	724	724	102.07	77.73	126.41	0.0000	26.97	7.49	46.45	0.0067	36.22	14.54	57.90	0.0011	23.53	1.22	45.83	0.0387	12.20	-6.18	30.58	0.1930
40-49	787	787	112.47	90.78	134.15	0.0000	18.76	-0.43	37.95	0.0554	14.41	-6.57	35.40	0.1781	31.57	9.91	53.24	0.0043	28.24	2.19	54.28	0.0336
50-59	503	503	122.34	97.27	147.41	0.0000	39.96	12.74	67.18	0.0040	34.72	9.30	60.14	0.0075	27.13	3.95	50.31	0.0218	33.94	9.03	58.84	0.0076
60-69	159	159	127.28	75.81	178.74	0.0000	80.05	29.53	130.56	0.0020	54.07	-22.63	130.77	0.1664	70.26	20.37	120.16	0.0060	30.11	-21.90	82.13	0.2556
70-79	51	51	134.11	67.44	200.78	0.0001	140.89	16.45	265.33	0.0269	146.17	-49.07	341.41	0.1399	59.50	-74.89	193.90	0.3797	54.00	-20.02	128.02	0.1508
80-89	<8	<8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
≥90	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Abbreviations

CI: Confidence interval; diff: Difference; HCRU: Healthcare resource utilization; UC: Underlying condition

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Supplemental material

Pharmaceutical costs: excess costs in the overall population, all patients (in €)

Sample size			Index quarter				1 st following quarter				2 nd following quarter				3 rd following quarter				4 th following quarter			
Groups	Cases	Controls	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value
Overall	4,382	4,382	15.74	14.87	16.62	0.0000	1.04	0.54	1.55	0.0001	0.94	0.45	1.42	0.0001	0.81	0.32	1.30	0.0013	0.97	0.42	1.52	0.0006
18-29	781	781	14.01	12.09	15.94	0.0000	0.97	-0.19	2.14	0.1015	1.17	0.20	2.14	0.0178	0.58	-0.35	1.50	0.2237	0.96	-0.25	2.17	0.1202
30-39	953	953	15.45	13.49	17.42	0.0000	1.00	-0.13	2.12	0.0818	0.63	-0.26	1.53	0.1645	0.29	-0.91	1.48	0.6409	1.20	-0.32	2.71	0.1208
40-49	1,085	1,085	15.34	13.50	17.17	0.0000	1.06	0.12	2.00	0.0268	0.86	-0.14	1.86	0.0910	0.64	-0.28	1.56	0.1741	0.38	-0.57	1.32	0.4350
50-59	912	912	17.52	15.65	19.39	0.0000	1.60	0.41	2.78	0.0082	1.15	-0.09	2.39	0.0702	1.16	-0.03	2.35	0.0565	1.21	0.05	2.37	0.0402
60-69	431	431	16.69	13.94	19.43	0.0000	0.54	-1.05	2.13	0.5037	1.16	-0.40	2.72	0.1435	2.30	0.77	3.84	0.0034	0.78	-1.00	2.55	0.3907
70-79	196	196	16.11	11.61	20.61	0.0000	-0.15	-2.63	2.32	0.9029	1.24	-1.25	3.73	0.3285	1.11	-0.98	3.20	0.2988	2.47	0.57	4.37	0.0111
80-89	24	24	14.88	5.46	24.31	0.0027	2.23	-5.09	9.54	0.5413	-5.83	-12.07	0.41	0.0659	-5.64	-12.64	1.37	0.1103	1.36	-3.91	6.63	0.6034
≥90	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pharmaceutical costs: excess costs in the overall population, patients with any UC (in €)

Sample size			Index quarter				1 st following quarter				2 nd following quarter				3 rd following quarter				4 th following quarter			
Groups	Cases	Controls	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value
Overall	1,510	1,510	18.42	17.19	19.65	0.0000	1.10	0.21	2.00	0.0159	1.17	0.34	2.01	0.0059	1.11	0.16	2.06	0.0226	1.21	0.38	2.04	0.0042
18-29	138	138	15.81	11.51	20.12	0.0000	1.11	-1.43	3.64	0.3911	4.48	0.98	7.98	0.0124	0.62	-1.36	2.59	0.5407	2.89	0.51	5.27	0.0174
30-39	229	229	19.86	16.72	23.00	0.0000	0.58	-2.31	3.48	0.6915	0.41	-1.50	2.31	0.6748	0.08	-3.31	3.48	0.9613	2.04	-0.74	4.82	0.1502
40-49	298	298	18.38	15.56	21.20	0.0000	2.41	0.35	4.46	0.0218	1.36	-0.61	3.32	0.1747	0.08	-1.52	1.68	0.9185	-0.82	-2.59	0.96	0.3676
50-59	409	409	19.80	17.52	22.07	0.0000	1.92	0.27	3.57	0.0223	0.91	-0.65	2.47	0.2519	1.86	-0.15	3.87	0.0702	2.19	0.58	3.79	0.0076
60-69	272	272	17.42	14.48	20.35	0.0000	0.17	-1.53	1.88	0.8424	1.19	-0.49	2.88	0.1642	2.26	0.11	4.41	0.0393	-0.26	-2.00	1.49	0.7736
70-79	145	145	17.31	13.10	21.51	0.0000	-1.43	-4.62	1.77	0.3799	0.49	-2.56	3.54	0.7525	1.97	-0.37	4.32	0.0984	2.42	0.12	4.72	0.0389
80-89	19	19	13.82	3.06	24.59	0.0135	1.96	-7.23	11.16	0.6659	-5.89	-13.38	1.59	0.1169	-6.34	-15.16	2.48	0.1494	1.72	-4.93	8.37	0.6004
≥90	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Pharmaceutical costs: excess costs in the overall population, patients without UC (in €)

Sample size			Index quarter				1 st following quarter				2 nd following quarter				3 rd following quarter				4 th following quarter			
Groups	Cases	Controls	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value	Mean diff	95%-CI upper	95%-CI lower	p-value
Overall	2,872	2,872	14.34	13.17	15.51	0.0000	1.01	0.41	1.62	0.0011	0.81	0.22	1.40	0.0069	0.65	0.10	1.21	0.0214	0.84	0.12	1.57	0.0218
18-29	643	643	13.63	11.47	15.78	0.0000	0.94	-0.36	2.25	0.1565	0.46	-0.43	1.35	0.3122	0.57	-0.48	1.61	0.2871	0.54	-0.83	1.92	0.4392
30-39	724	724	14.06	11.67	16.44	0.0000	1.13	-0.04	2.29	0.0575	0.71	-0.31	1.72	0.1714	0.35	-0.81	1.51	0.5550	0.93	-0.86	2.72	0.3067
40-49	787	787	14.18	11.90	16.47	0.0000	0.55	-0.46	1.57	0.2854	0.67	-0.48	1.82	0.2528	0.85	-0.27	1.97	0.1362	0.83	-0.28	1.94	0.1434
50-59	503	503	15.67	12.89	18.45	0.0000	1.33	-0.35	3.01	0.1199	1.34	-0.52	3.20	0.1587	0.59	-0.79	1.97	0.4011	0.42	-1.22	2.06	0.6159
60-69	159	159	15.45	9.95	20.94	0.0000	1.17	-2.01	4.35	0.4691	1.11	-1.99	4.21	0.4829	2.38	0.43	4.32	0.0170	2.54	-1.25	6.33	0.1877
70-79	51	51	12.70	0.19	25.21	0.0468	3.46	0.67	6.25	0.0159	3.38	-0.80	7.56	0.1111	-1.36	-5.92	3.20	0.5546	2.61	-0.76	5.97	0.1272
80-89	<8	<8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
≥90	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Abbreviations

CI: Confidence interval; diff: Difference; UC: Underlying condition

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Healthcare Resource Utilization and Costs Related to Pertussis in Adults With and Without Underlying Conditions: A German Claims Data Analysis



Pertussis leads to **increased healthcare related costs** both during **infection** and in **subsequent months**.

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Supplemental material

Inpatient HCRU and costs in the index quarter: excess costs in the overall population, all patients

Sample size		Costs pertussis case (in €)					Length of stay in days				
Groups	Cases	Median	Min.	Max.	Mean	SD	Median	Min.	Max.	Mean	SD
Overall	49	2,716.80	1,319.94	9,205.35	2,761.42	1,055.09	4.00	1.00	15.00	5.57	3.72
18-29	<8	-	-	-	-	-	-	-	-	-	-
30-39	10	2,671.00	1,474.47	3,013.40	2,603.95	446.34	2.50	1.00	11.00	4.00	3.53
40-49	9	2,458.16	1,438.38	2,933.83	2,422.42	429.40	5.00	2.00	10.00	5.00	2.40
50-59	9	2,805.42	2,354.24	2,936.70	2,759.41	198.45	4.00	2.00	15.00	5.22	4.02
60-69	11	2,713.72	1,319.94	3,716.30	2,704.30	610.05	6.00	1.00	13.00	6.27	4.15
70-79	<8	-	-	-	-	-	-	-	-	-	-
80-89	0	-	-	-	-	-	-	-	-	-	-
≥90	0	-	-	-	-	-	-	-	-	-	-

Inpatient HCRU and costs in the index quarter: excess costs in the overall population, patients with any UC

Sample size		Costs pertussis case (in €)					Length of stay in days				
Groups	Cases	Median	Min.	Max.	Mean	SD	Median	Min.	Max.	Mean	SD
Overall	30	2,843.18	1,438.38	9,205.35	2,954.97	1,261.61	6.00	2.00	14.00	6.27	3.44
18-29	<8	-	-	-	-	-	-	-	-	-	-
30-39	<8	-	-	-	-	-	-	-	-	-	-
40-49	<8	-	-	-	-	-	-	-	-	-	-
50-59	<8	-	-	-	-	-	-	-	-	-	-
60-69	<8	-	-	-	-	-	-	-	-	-	-
70-79	<8	-	-	-	-	-	-	-	-	-	-
80-89	0	-	-	-	-	-	-	-	-	-	-
≥90	0	-	-	-	-	-	-	-	-	-	-

Inpatient HCRU and costs in the index quarter: excess costs in the overall population, patients without UC

Sample size		Costs pertussis case (in €)					Lenth of stay in days				
Groups	Cases	Median	Min.	Max.	Mean	SD	Median	Min.	Max.	Mean	SD
Overall	19	2,545.05	1,319.94	3,266.69	2,466.00	527.56	3.00	1.00	15.00	4.47	3.98
18-29	<8	-	-	-	-	-	-	-	-	-	-
30-39	<8	-	-	-	-	-	-	-	-	-	-
40-49	<8	-	-	-	-	-	-	-	-	-	-
50-59	<8	-	-	-	-	-	-	-	-	-	-
60-69	<8	-	-	-	-	-	-	-	-	-	-
70-79	0	-	-	-	-	-	-	-	-	-	-
80-89	0	-	-	-	-	-	-	-	-	-	-
≥90	0	-	-	-	-	-	-	-	-	-	-

Abbreviations

HCRU: Health care resource utilization;
Max.: Maximum; Min.: Minimum;
SD: Standard deviation; UC:
Underlying condition

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