Economic burden of pertussis among adults 50 years and above: A retrospective observational study in England

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<td>Grants/research support:</td>
<td>Study funded by GlaxoSmithKline Biologicals SA</td>
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Background and aims

Pertussis is a highly contagious bacterial respiratory infection affecting all ages. It remains under-reported and has been associated with severe complications. In recent years, there has been an increase in the proportion of pertussis cases in adults.\(^1,2\)

**Aims:**

- Estimate healthcare resource utilization (HCRU) and direct medical costs (DMC) per pertussis case, among adults ≥50 years of age in England.
- Multivariate analysis to identify risk factors associated with pertussis diagnosis in adults.
Methods & baseline characteristics

Clinical Practice Research Datalink (CPRD) linked to Hospital Episode Statistics

Observational retrospective study in adults ≥50 years old (2009-2018)

Cases matched to controls (1:1) using propensity scores:

1,480 patients with pertussis

1,480 patients without pertussis

Baseline characteristics:

- Cohorts were generally well balanced for demographic and clinical characteristics, and baseline HCRU cost after matching;
- Higher proportion of cases with chronic or persistent cough: 8.9% in cases, 2.6% in controls (p < 0.001)

HCRU: healthcare resource utilisation, p: p-value
Results: healthcare resources use

**GP and nurse consultations**

**Prescriptions**

**Accident & Emergency Visits (All Cause)**

**Outpatient Specialist Service (All Cause)**

*Unadjusted Wilcoxon rank sum test; threshold for statistical significance $P<0.001$, p-value between 0.05 and 0.001 considered suggestive of a trend; †any type, from GP only; §Months labelled according to start of each interval, e.g. utilisation reported at month 0 is the average from index day (day 0) to day 30; GP: general practitioners, NS: no statistically significant difference, p: p-value.
**Results:** The demand for GP/nurse consultations was similar at baseline but higher at all study periods in patients with pertussis vs matched controls.

Average number of consultations 4.7 times higher in pertussis cases in the month prior to diagnosis.

Distribution of GP/nurse consultations in the month prior to diagnosis:
- More than 1 in 2 cases needed to visit GP/nurse 3 or more times in one month.
- More than 1 in 6 cases needed to visit the GP/nurse 6 or more times in one month.

*Unadjusted Wilcoxon rank sum test; threshold for statistical significance $P<0.001$, p-value between 0.05 and 0.001 considered suggestive of a trend; §§Months labelled according to start of each interval, e.g. utilisation reported at month 0 is the average from index day (day 0) to day 30; GP: general practitioners, NS: no statistically significant difference
Results: mean total DMC is similar at baseline but higher in cases than controls at all other periods

Annualised costs directly prior and following index date in the propensity score matched cohorts

Total annualised costs per patient between matched cases and controls (generalized linear model, 1 month prior to 11 months after index)

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<th>Absolute difference (£)</th>
<th>Percentage difference (%)</th>
<th>p-value</th>
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<td><strong>£318.15</strong> (95% CI: 189.63 - 458.69)</td>
<td><strong>26.68%</strong> (95% CI: 15.90% - 38.47%)</td>
<td>&lt; 0.001</td>
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2019 GBP. **p-value <0.001; p-values from unadjusted Wilcoxon rank sum test; values above bars show total mean ± 95% CI annualised DMC per patient; an SMD<0.2 indicates variables are well balanced between the matched cohorts; CI: confidence interval, DMC: direct medical costs, SMD: statistical mean difference.**
Results: Diagnosis of asthma was associated with more frequent pertussis diagnosis

To assess the association of pertussis diagnosis and potential risk factors, a multivariate prediction model was developed, and covariates improving model performance were retained in a final multivariate analysis model.

Covariates with an odds ratio (OR) significantly different from 1

Asthma

OR (95% CI); p-value:

1.94 (1.52 – 2.47); p<0.0001

Diagnosis of asthma was associated with a 2-fold increased risk of pertussis diagnosis
Pertussis in adults ≥50 years of age significantly increases HCRU and DMC, starting up to 6 months before diagnosis and persisting for up to eleven months after diagnosis.

Diagnosis of asthma was associated with more frequent pertussis diagnosis.

This highlights the need for improved awareness and prevention of pertussis.

List of references:


DMC: direct medical costs, HCRU: healthcare resources utilisation.
**Funding:** GlaxoSmithKline Biologicals S.A. funded this study and all costs related to the development of the publications.

**Disclosure:** This study is based in part on data from the Clinical Practice Research Datalink obtained under license from the UK Medicines and Healthcare products Regulatory Agency. However, the interpretation and conclusions contained in this report are those of the authors alone.

**Conflict of interest:** Amit Bhavsar, Emmanuel Aris, Lauriane Harrington, Essè Ifèbi Hervé Akpo, Kinga Meszaros, Nicolas Jamet, Yan Sergerie and Piyali Mukherjee are employed by the GSK group of companies. Emmanuel Aris, Essè Ifèbi Hervé Akpo, Kinga Meszaros, Yan Sergerie and Piyali Mukherjee hold shares in the GSK group of companies. Jason C. Simeone, Anna Ramond and Dimitra Lambrelli are employed by Evidera Inc., which received funding from the GSK group of companies to complete the work disclosed in this manuscript.

**Acknowledgments:** The authors would like to thank Yves Brabant, Robert Donaldson, Evie Merinopoulou, Nicola Sawalhi-Leckebny and Elisa Turriani for contribution to the study. Authors would also like to thank Business & Decision Life Sciences platform for editorial assistance and publications coordination, on behalf of GSK. Gauhar Masgutova coordinated publications development and editorial support; Kavin Kailash provided medical writing support.