Estimating the effect of the 2005 change in BCG policy in England: A retrospective cohort study

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**ABSTRACT**

**Background**

In 2005, England changed from universal Bacillus Calmette–Guérin (BCG) vaccination of school-age children to targeted BCG vaccination of high-risk children at birth.

**Methods**

We combined notification data from the Enhanced Tuberculosis Surveillance system, with demographic data from the Labour Force Survey to construct retrospective cohorts of individuals in England relevant to both the universal, and targeted vaccination programmes between Jan 1, 2000 and Dec 31, 2010. For each cohort, we estimated incidence rates over a 5 year follow-up period and used Poisson and Negative Binomial regression models in order to estimate the impact of the change in policy on TB.

**Results** In the non-UK born, we found evidence for an association between a reduction in incidence rates and the change in BCG policy (school-age IRR: 0.74 (95%CI 0.61, 0.88), neonatal IRR: 0.62 (95%CI 0.44, 0.88)). We found some evidence that the change in BCG policy was associated with a increase in incidence rates in the UK born school-age population (IRR: 1.08 (95%CI 0.97, 1.19)) and weaker evidence of an association with a reduction in incidence rates in UK born neonates (IRR: 0.96 (95%CI 0.82, 1.14)). Overall, we found that the change in BCG policy was associated with directly preventing 385 (95% CI -105, 881) TB cases.

**Conclusions**

Withdrawing universal vaccination at school-age and targeting BCG vaccination towards high-risk neonates was associated with reduced incidence of TB in England. This was largely driven by reductions in the non-UK born. There was a slight increase in UK born school-age cases.

**Keywords:**

BCG, surveillance, vaccination policy, neonatal, school-age

**Contributors**

SA, HC, and EBP conceived and designed the work. NJW provided guidance on the statistical methods used. SA undertook the analysis with advice from all other authors. All authors contributed to the interpretation of the data. SA wrote the first draft of the paper and all authors contributed to subsequent drafts. All authors approve the work for publication and agree to be accountable for the work.

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**Conflicts of interest**

HC reports receiving honoraria from Sanofi Pasteur, and consultancy fees from AstraZeneca, GSK and IMS Health, all paid to her employer.

**Accessibility of data and programming code**

The code used to clean the data used in this paper can be found at: <DOI:10.5281/zenodo.2551555>

The code for the analysis contained in this paper can be found at: *DOI:* [10.5281/zenodo.2583056](https://doi.org/10.5281/zenodo.2583056)