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LETTERS TO THE EDITOR

Reduction in rotavirus disease due to the infant immunisation programme in England; evidence from national surveillance

KEYWORDS
Rotavirus;
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In this journal, Glass and colleagues recently reviewed the impact of rotavirus vaccines in a number of high and middle income countries.[1] The impact of rotavirus vaccination in these countries has been remarkable, both in terms of reductions in laboratory-confirmed rotavirus infections, and declines in hospitalisations for rotavirus diarrhoea.[1] We would like to add to this body of evidence by reporting preliminary findings from England where rotavirus vaccination was recently introduced.

Rotavirus gastroenteritis in England is seasonal, occurring mainly between January and March,[2] and is responsible for an estimated 130,000 General Practitioner (GP) visits and 13,000 hospitalisations every year in children younger than 5 years.[3] On 01 July 2013, a two-dose, oral rotavirus vaccine, Rotarix®, was introduced into the national infant immunisation programme.[4] On-going real-time national surveillance during the subsequent rotavirus season (January 2014 to March 2014) indicated an unprecedented decline in the number of laboratory-confirmed rotavirus infections, which has been attributed to the immunisation programme (Supplementary Figure).[4] The Netherlands, however, reported an unexpected 58% decrease in rotavirus detections in children under 5 year olds during 2013/14 compared to previous years, with near-complete absence of winter excess in cases.[5] The Netherlands does not have a national rotavirus immunisation programme and there have been no changes in diagnostic guidelines or reimbursement policy that might have impacted rotavirus testing practices. The authors speculate mild winter, the relatively high rotavirus season in the previous year, low birth-rate and rotavirus immunisation programmes in the neighbouring countries as potential contributing mechanisms. We, therefore, further analysed data from our surveillance systems to determine whether the observed decrease was genuinely attributable to the national immunisation programme.

Sentinel surveillance for the first cohort of vaccine-eligible children using monthly coverage data from 84% to 91% of all GP practices in England during February to September 2014 averaged 92.6% (range, 91.5–93.3%) for one dose, and 87.5% (range, 86.0–88.4%) for two doses by 25 weeks of age.[6] We also analysed laboratory-confirmed rotavirus infections reported by microbiology laboratories across England to Public Health England (PHE). Reporting by diagnostic laboratories is voluntary, but a recent survey in England indicated that laboratory testing and reporting practices are generally high and consistent year-round.[2] We extracted weekly counts (by date of specimen) of laboratory-confirmed rotavirus infections for children under 5 year olds between July 2000 and June 2014. During 2000/01 to 2012/13, the rotavirus season was consistently predictable, with well-defined peaks between January to March. In 2013/14, laboratory-confirmed rotavirus infections were 67% lower than the ten-season average for the same period in the seasons 2000/01 to 2012/13.[4] Prior to routine vaccination, the number of reported rotavirus infections increased from birth and peaked at 12 months of age. In 2013/14, the most substantial reduction was observed among 2–11 month olds, the age-group targeted for immunisation (Fig. 1).

In order to identify any changes in laboratory testing practices, disaggregate data for the total number of rotavirus tests performed and test results were collected from eight sentinel NHS microbiology laboratories with the highest number of rotavirus testing in England.[6] Between January 2013 and June 2014, there were no changes in diagnostic guidelines at any of the participating sites. A total of 7681 samples were tested for rotavirus and 1214 (16%) tested positive in under 5 year olds. After the introduction of the rotavirus immunisation programme, a large volume of samples continued to be tested for rotavirus (Fig. 2A), with under 1 year olds consistently accounting for a quarter of all samples tested every month. The proportion of rotavirus test-positives, however, declined markedly during the first season after vaccine introduction, which was most marked in under 1 year-olds, but also noticeable in 1–4 year-olds who were not vaccine-eligible (Fig. 2B).

Together, the reduction in laboratory-confirmed reports, lack of evidence of a change in rotavirus testing practice

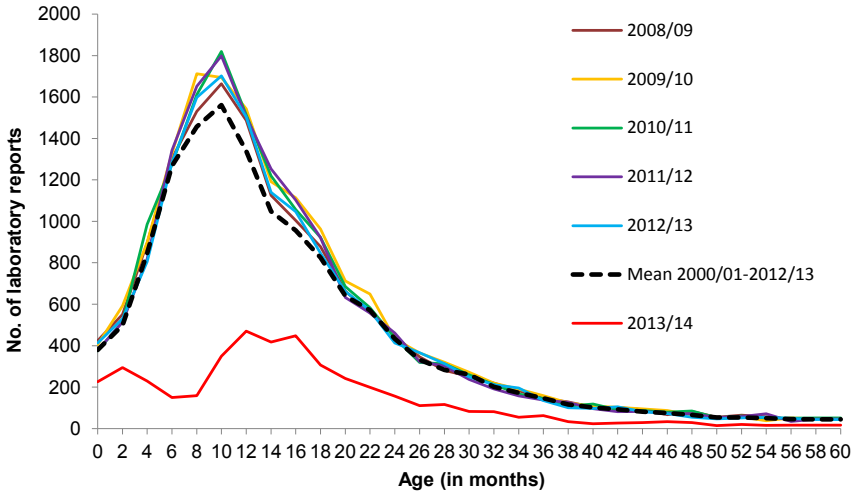

Figure 1 Weekly rotavirus laboratory reports in children younger than 5 years old by month of age, England 2000—2014. *Data are presented by month of age per epidemiological year, defined as running from July to June of the following year.

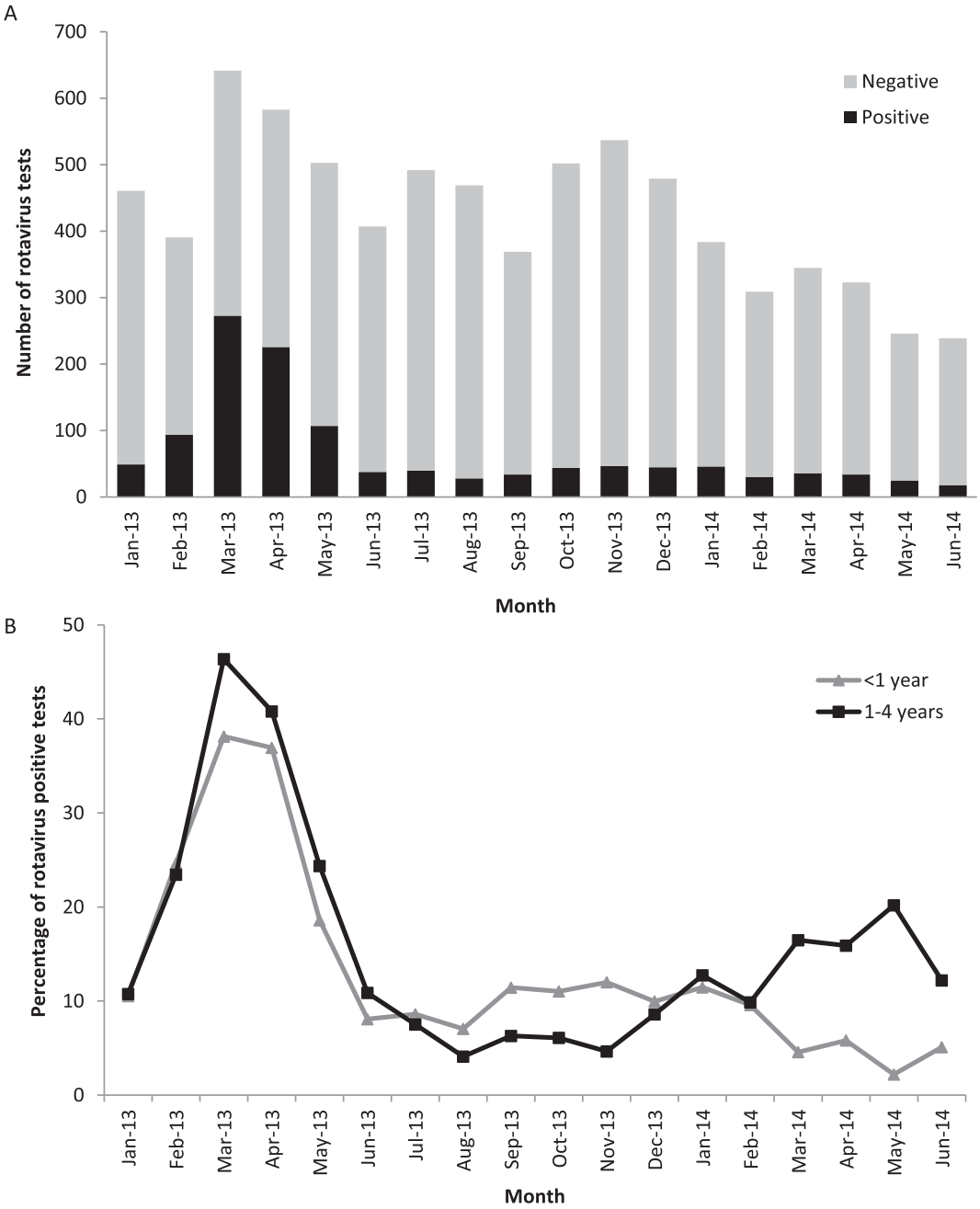

Figure 2 Sample-testing data for children younger than five years of age from eight sentinel microbiology laboratories in England between January 2013 and August 2014. (A) Number of rotavirus test-positives and total rotavirus tests per month and (B) percentage of rotavirus positive tests by age-group per month.