Comment

These findings show the expected rapid reduction in the numbers of invasive *H influenzae* type b infections after the introduction of vaccination. The rate of decline has closely followed the increase in vaccine coverage and has been greatest in children aged under 5. This survey suggests that the United Kingdom vaccination schedule has been as effective at reducing numbers of cases as those schedules adopted in the USA^{3,4} and northern European countries.⁵ The increase in non-type b strains may reflect improved case ascertainment, perhaps because of increased awareness of haemophilus disease after the vaccination campaign. Nevertheless, there is a need to continue to monitor all invasive infections to determine whether these trends will be maintained in both the vaccinated and unvaccinated populations.

This survey was coordinated by the haemophilus working group of the Public Health Laboratory Service. We acknow-

ledge the help of all contributing microbiologists, the regional coordinating microbiologists, and the staff at the haemophilus reference units in Oxford and Bangor. Dr Paddy Farrington gave statistical advice and Dr Mayon-White read the manuscript.

Funding: Haemophilus working group.

Conflict of interest: None.

- 1 Slack MPE, Crook DWM, Jordens JZ, Anderson EC, Falla T, Leaves NI, *et al*. Molecular and epidemiological aspects of *Haemophilus influenzae* infection. *PHLS Microbiology Digest* 1993;10:122-8.
- 2 Anderson EC, Begg NT, Crawshaw SC, Hargreaves RM, Howard AJ, Slack MPE. Epidemiology of invasive *Haemophilus influenzae* in the pre-vaccination era. *Epidemiol Infect* 1995;115:89-100.
- 3 American Academy of Pediatrics. *Haemophilus influenzae* type b conjugate vaccines: Recommendations for immunization of infants and children 2 months of age and beyond. *Paediatrics* 1991;88:169-72.
- 4 Adams WG, Deaver KA, Cochli SL, Plikaytis BD, Zell ER, Broome CV, *et al*. Decline of childhood. *Haemophilus influenzae* type b (Hib) disease in the Hib vaccine era. *JAMA* 1993;269:221-6.
- 5 Peltola H, Kilpi T, Anttila M. Rapid disappearance of *Haemophilus influenzae* type b meningitis after routine childhood immunisation with conjugate vaccines. *Lancet* 1992;340:592-4.

(Accepted 1 November 1995)

Congenital rubella in south India: diagnosis using saliva from infants with cataract

M B Eckstein, D W G Brown, A Foster, A F Richards, C E Gilbert, P Vijayalakshmi

Department of Preventive Ophthalmology, Institute of Ophthalmology, London EC1V 9EL
M B Eckstein, research fellow
A Foster, senior lecturer
C E Gilbert, lecturer

PHLS Virus Reference Division, Colindale, London NW9 5HT
D W G Brown, director
enteric and respiratory virus laboratory
A F Richards, medical laboratory scientific officer

Aravind Eye Hospital and Postgraduate Institute of Ophthalmology, Madurai, south India
P Vijayalakshmi, consultant

Correspondence to:
Dr Eckstein.

BMJ 1996;312:161

Table 1—Characteristics of 25 cases of serologically proved cataract due to congenitally acquired rubella. Values are numbers (percentages)

Characteristic	
Maternal history of fever and rash	12 (48)
Cardiac disease	13 (52)
Deafness	7 (28)
Severe developmental delay	7 (28)
Ocular features in 50 eyes (25 patients):	
Microphthalmos	38 (76)
Corneal clouding	10 (20)
Glaucoma	2 (4)

Congenital rubella is a preventable disease which has been largely controlled by immunisation in the developed world.¹ Serological surveys in India indicate that up to 45% of women of childbearing age are susceptible to rubella and potentially at risk of infection during pregnancy.² We tested affected infants to see whether detection of rubella specific IgM from saliva is as reliable as from serum for diagnosing rubella infection and whether rubella is an important cause of congenital cataract in south India.

Patients, methods, and results

We studied 95 consecutive infants with congenital cataract presenting to the paediatric department of the Aravind Eye Hospital in 1993-4. Thirty six age matched children attending the same clinic over the same period with a diagnosis of watering eyes acted as controls. Serum samples were taken from 61 children with cataract and saliva samples from all 131 children. Saliva samples rich in crevicular fluid were collected using the Orasure device (Epitope Inc, Beaverton) according to the manufacturer's instructions. Serum and saliva samples were tested for rubella specific IgM by antibody capture.^{3,4} Specimens were considered positive if the test to negative control ratio exceeded 3:1.

The mean (range) age of the 95 cases was 6.2 months (1-11) and of the 36 controls 7.3 months (1-11). Rubella specific IgM was detected in saliva and serum in 17 paired samples and was absent in 44 paired samples (sensitivity 100%, 95% confidence interval 80.5% to 100%; specificity 100%, 95% confidence interval 92% to 100%). Saliva testing gave no false positive and no false negative results compared with serum.

Twenty five of the 95 infants with cataract (26.3%) had congenital rubella infection confirmed by detection of rubella specific IgM in saliva. None of the controls had raised rubella specific IgM ($\chi^2=11.71$, $P<0.005$). Congenital rubella was suspected clinically in 19 of the 25 cases of congenital cataract in which

rubella specific IgM was detected (sensitivity 76%, specificity 100%). The other six children had clinical features compatible with congenital rubella syndrome but rubella had not been diagnosed before laboratory confirmation. The general and ocular characteristics of the 25 children with rubella cataract are shown in table 1.

Sequential saliva samples taken from seven infants with congenital rubella showed that in all cases raised concentrations of rubella specific IgM persisted up to 6 months of age and in five they persisted up to 14 months.

Comment

This study showed excellent agreement between test results in saliva and serum in the 61 paired samples, suggesting that saliva is as reliable as serum in allowing the detection of rubella specific IgM in infants. Although the infants tested had few teeth and therefore produced little crevicular fluid, adequate saliva samples were collected from all cases. The storage and transport of samples was not ideal, but this study indicates the potential of the Orasure device for undertaking studies remote from testing centres.

The study also suggests that congenital rubella is a significant cause of congenital cataract in south India. Nevertheless, this group of children admitted to hospital may not be representative of all children with congenital cataract in the community and therefore more extensive studies will be needed to establish the true scale of the problem.

Improved surveillance is required for congenital rubella in developing countries. The identification of rubella specific IgM in saliva offers a simple, non-invasive test that can be used in infants to enhance surveillance based on clinical case finding.

We thank Epitope Inc for supplying the Orasure devices.

Funding: This study was supported by a grant from Sight Savers International and the British Council for Prevention of Blindness.

Conflict of interest: None.

- 1 Banatvala JE, Best JM. Rubella. In: Parker MT, Collier LH, eds. *Topley and Wilson's principles of bacteriology, virology and immunity*. 8th ed. London: Edward Arnold, 1990:502-31.
- 2 Seth P, Manjunath N, Balaya S. Rubella infection: the Indian scene. *Rev Infect Dis* 1985;7:64-7.
- 3 Faraclegan H, Quinn T, Polk BF. Detection of antibodies to human immunodeficiency virus in dried blood on filter papers. *J Infect Dis* 1987;155:1073-4.
- 4 Perry KR, Brown DWG, Parry JV, Panday S, Pipkin C, Richards A. Detection of measles, mumps, and rubella antibodies in saliva using antibody capture radioimmunoassay. *J Med Virol* 1993;40:235-40.

(Accepted 1 November 1995)