The 4CMenB vaccine was introduced into the UK national immunisation schedule at 2, 4 and 12 month immunisation episodes in September 2015 for prevention of capsular group B meningococcal disease. Routine 12 month doses began in May 2016.

Due to high vaccine reactogenicity, Public Health England advises a three-dose course of prophylactic paracetamol following the infant doses.

However, an increase in presentations to Oxfordshire Accident and Emergency (A&E) departments for adverse events following immunisation (AEFI) was observed in the first year post-4CMenB. This increase (from an annual average of 13 infants with probable/possible vaccine reactions in 2013/14, to 38 infants in 2015/2016) was observed at 2 months (increase from 1.03 to 3.4 per 1000 immunisations) and 4 months (increase 0.14 to 1.13 per 1000 immunisations), but not at 3 months.

A study from Belfast also showed higher rates of admission (8 per 1000 vaccine-eligible infants) despite 94% receiving prophylactic paracetamol, and high proportions of unscheduled admissions, vaccinations and cultures. A Scottish study also showed an increased risk of hospitalisation for AEFI in the post-introduction model following immunisation at 2 and 4 months, but not at 3 months. This extrapolated to an additional 1430 hospitalisations across the UK.

Aim: To ascertain whether this increase in infant A&E presentations would continue into the second year post-4CMenB introduction, and be apparent in the first cohort receiving a 12-month booster dose (an age at risk of febrile convulsions). To also determine rates of prophylactic paracetamol use in children who present.

METHODOLOGY

• Retrospective study evaluating presentations of infants 1 to 6 months old at the Oxford University Hospital NHS Trust (Paediatric Emergency Departments at John Radcliffe, Oxford and Horton Hospital, Banbury) from 1 September 2016 – 31 August 2017 (2nd post-4CMenB year). This was compared to 1st year post-4CMenB (2015-16), and 2 years pre-4CMenB (2013-14, 2014-15).
• Also evaluating presentations of all children aged 11 to 16 months between 1 January 2015 and 31 August 2017 (16 months before and after introduction of 4CMenB immunisation for 12 month-olds).
• Control groups of children presenting with confirmed urinary tract infections (UTIs) were used for all groups, and A&E discharge diagnoses, immunisation history and patient discharge summaries were analysed.
• Participants were separated into groups depending on whether their symptoms were probably related to immunisation, possibly related to immunisation or unrelated to immunisation.

RESULTS - Summary

• Of 1737 infants aged 1 to 6 months old presenting to Oxfordshire A&E’s from September 2016 to August 2017, 708 with diagnoses of interest were reviewed. 598/1718 toddlers aged 11 to 16 month olds from January 2015 to August 2017, 2158 with diagnoses of interest were reviewed as per Fig 1.
• Figures 2–4 show the number of presentations for infants, toddlers and the rates of clinical investigations and interventions per 1000 doses of vaccine. Figures 5 & 7 show numbers and rates of admissions. Figures 8 & 9 show rates of clinical interventions for infants and toddlers, and figure 10 shows WBC and CRP counts for 2 & 4 weeks.
• A sustained increase in presentations for AEFI was observed in the 1-6 month infant population in the second year post-4CMenB.
• The overall rates of AEFI’s presenting per 1000 doses of vaccine increased in 2 & 4 month olds from 0.57 to 2.80 (p<0.001, OR 4.84).
• Rates were not significantly raised at 3 months (0.47 to 0.72, p>0.021, IQR 0.004-0.16), UTI control groups unchanged.
• For 12 month-olds, there were 9 presentations including 1 case of febrile convulsion pre-4CMenB, and 14 presentations including 3 cases of febrile convulsions post-4CMenB.
• Among ‘probable’ and ‘possible’ reactions, 54.1% of infants and 30.4% of toddlers were admitted for further management, with subsequent increases in invasive investigations and IV antibiotic use.
• Figure 11 depicts infant and toddler attendances across each hour of the day. 88% infants and 74% infants presented “after hours”.

CONCLUSIONS

• There is a sustained increase in infants presenting to A&E with AEFI’s in the 2nd year post-4CMenB introduction. The increase in presentations has led to increases in admissions, invasive investigations and empirical IV antibiotics.
• There is no significant increase in toddlers presenting to A&E with AEFI’s in 16 months after first cohort received booster doses, despite this cohort not receiving prophylactic paracetamol. No specific data is recommended at this age, which is reflected in lower numbers of admissions, investigations and IV antibiotic use.
• The pilot study shows that patients are presenting despite using prophylactic paracetamol as recommended.
• While these data do not detract from the success of the 4CMenB campaign, they do highlight the need for guidelines to specifically manage fever post-4CMenB.

SUMMARY

• Overall increases in AEFI presented post-4CMenB.
• There were higher AEFI rates presenting post-4CMenB in the 2 & 4 month old age group.
• A sustained rise in presentation rates post-4CMenB.

PRESERVATIONAL STUDY

PREVIOUS PRESENTATIONS TO A&E

ADOPTIONS TO HOSPITAL

RESULTS - Infant and Toddler Study

• From July 2017, infants presenting to A&E within 48 hours of having received a vaccine were followed up with a phone call to gather more information about prophylactic paracetamol use.
• Of the 11 patients thus far, all had received their 2nd dose of 4CMenB.
• The majority received their 2nd prophylactic dose before seeing a doctor.
• 9 of 10 were given at least 3 doses of paracetamol, prophylactically and reactively.
• This data collection is ongoing.

REFERENCES

1. Nokko V, Galal U, Rutter E, Snape MD. 88% infants and 74% of infants presented “after hours” in invasive AEFIs following introduction of the first UK meningococcal vaccine on national immunisation schedule. Arch Dis Child. 2017 Jun 21