ORIGINAL ARTICLE

Missed opportunities to vaccinate children admitted to a paediatric tertiary hospital

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Background: Inequalities in vaccine uptake exist. Studies suggest paediatric inpatients have lower rates of immunisation uptake than the general population. Various UK policies advocate opportunistic immunisation.
Aim: To evaluate practice within a paediatric tertiary hospital in identifying and facilitating vaccination of inpatients who were not fully immunised.
Methods: Case notes for 225 inpatients were examined. Thirty staff of various professions and grades were interviewed. Policies, forms and documents used in the hospital were reviewed.
Results: Immunisation status was recorded for 71% of children admitted, but for 69% of these immunisations were documented as ''up-to-date'' without any further information recorded. At least 20% of inpatients were incompletely immunised, but very little was done to facilitate vaccination. There was no training for staff either in giving advice or in administering vaccines and staff views differed regarding the hospital's role in immunisations. While there were guidelines for specific groups of patients, there were no general immunisation policies. Incorrect and out-of-date immunisation schedules were found on documents.
Conclusions: Opportunities to immunise children continue to be missed by all levels of health care service provision. Tertiary centres have a role to play in supporting primary care services to ensure that these vulnerable children are appropriately immunised. Measures are being taken to address the problems identified in this study and we strongly suspect that other hospitals in the UK ought to be confronting these issues as well.

The United Kingdom has a highly successful childhood immunisation programme delivered through primary health care services.[1] However, even in areas with high immunisation coverage, certain groups of children may remain unimmunised or incompletely immunised.[2] Studies suggest lower immunisation rates among paediatric inpatients.[3–5] In addition to the commonality of risk factors for incomplete immunisation status and poor health, hospitalised children may experience additional barriers to immunisation. Children with chronic health problems are more likely to be in hospital or unwell when immunisations are due.[4] Health professionals are sometimes poorly informed about valid contraindications to immunisation and inappropriately defer immunisations for children with minor illness or chronic conditions.[5–7]

While national policies advocate opportunistic immunisation of children,[8–11] there is a lack of information regarding current practice in UK hospitals. Inpatients in paediatric tertiary centres are more likely to have risk factors for incomplete immunisation and their poorer health increases their vulnerability to such infections. We looked at the immunisation status of inpatients in Great Ormond Street Hospital for Children (GOSH) and ascertained the hospital's practice in relation to immunisations.

METHODS

Children, aged 3 months or older, admitted to GOSH (for at least an overnight stay) starting from two time points (12th January and 12th July 2004) were included in a retrospective case note review. The first 300 sequential admissions from each time point (spanning 9 or 10 days) were selected and basic demographic and health information obtained from electronic records. Case notes for the 600 admissions were sought from the medical records department. Those filed at the time of searching were included. However, limited resources prohibited repeated or wider searching for case notes, so at the outset sample size was doubled to compensate for this. A data collection form was used to collate information (from both medical and nursing notes) regarding immunisation status on admission and subsequent actions to facilitate vaccination. In addition, the entire case notes were searched for a full immunisation history. χ^2 and Mann-Whitney tests were carried out using STATA 8.2 (StataCorp, College Station, Texas, USA). A convenience sample of 30 staff of various grades (nine doctors, 17 nurses, three pharmacists and one other) including someone from each hospital unit, were interviewed to obtain qualitative information on practice and attitudes towards immunisation. Policies, guidelines, forms and documentation used in the hospital were reviewed. The following question was put to a national web-based immunisation forum: ''Does anyone know of any local policies regarding checking immunisation status of paediatric hospital in-patients and immunising opportunistically if appropriate?''. Enquiries were made with tertiary centres in the USA and Canada. Ethical approval for this study was sought but was not considered necessary.

RESULTS

Case notes for 225 admissions (37.5%) were obtained, 213 of which contained documentation pertaining to the admission of interest. Of these, the median age at admission was 6 years 2 months (range 4 months to 20 years), 115 (54%) were male, 55% were of white British ethnicity and three (1.4%) were normally resident outside of the UK. The median length of stay was 2 days (range 1–105). These children did not differ significantly from the potential study population (n = 600) with respect to age, sex or length of stay, but they had significantly fewer admissions to GOSH in the year prior to the admission of interest.

Relevant inpatient records were found in 207 sets of case notes. Medical staff had recorded immunisation status for 40%

Abbreviation: GOSH, Great Ormond Street Hospital for Children

of admissions and nursing staff for 55%. As this was sometimes documented in both sets of records (24%), overall, immunisation status was documented for only 71% of children admitted. Regarding immunisation histories, 69% were documented as ''up-to-date'' without any further information. None of the notes mentioned contraindications to vaccinations. Children whose immunisation status was ascertained, had fewer admissions ($p = 0.03$) to GOSH in the preceding year (median 0, range 0–7) than those whose status was not determined (median 1, range 0–5). These groups did not differ with respect to sex, age, ethnicity or length of stay.

As full immunisation histories (vaccines itemised and dates recorded) were seldom documented, immunisation status was categorised based on a judgement of the information available (fig 1). Overall, 20.5% (30/146) of inpatients were eligible for vaccinations. Only one child of the 30 eligible was vaccinated prior to discharge.

When each set of case notes was explored in its entirety (as opposed to just the admission of interest), a full immunisation history was still only found for 1.5% of children and a further 22% had some vaccines itemised but either vaccines were omitted or dates were missing.

While specialist vaccine advice for specific patient groups was available, interviews revealed potential barriers to opportunistic immunisation practice. Senior staff, including consultants, matrons and unit managers, reported that a full immunisation history should be taken on the first contact with any patient and subsequently updated. Vaccination leaflets suitable for parents were not available. There was no training (either in giving advice or in administering vaccines) and no mechanisms for keeping staff up to date with vaccination issues. It was clear that many staff did not know the current immunisation schedule. Views differed regarding the hospital's role in primary immunisations. Giving advice, liaison and vaccination of long-term patients were mentioned. While there was agreement that if a child was found to be incompletely immunised action should be taken to facilitate this, opinions differed as to what would be appropriate. Of staff with direct responsibilities for patients, 55% (12/22) expressed concerns or considered it inappropriate for children to be vaccinated prior to discharge from hospital. Potential barriers to opportunistic immunisation were seen as insufficient time, insufficient knowledge of staff, staff not seeing it as a priority or within their role, concerns regarding ineffective communications, non-compliance of parents and language barriers.

Immunisation guidelines existed for specific groups of patients, but there were no general immunisation policies within the hospital. While most of the nursing admission forms included a question on immunisation status, these did not allow recording of a full immunisation history. Various out-of-date and incorrect immunisation schedules were found on documents, including some intended for parents to either complete or keep as a record.

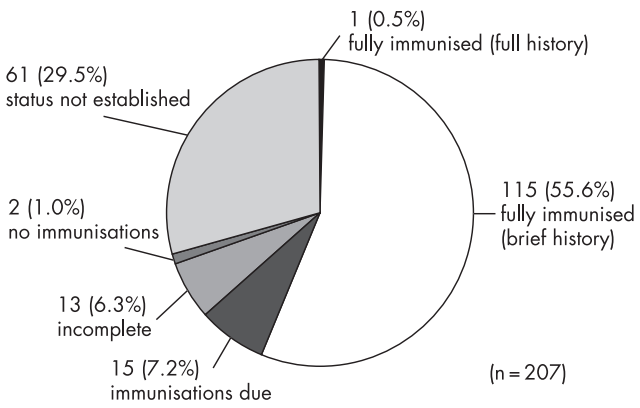

Figure 1 Immunisation status of children admitted.

We received eight responses from the question posed to the immunisation forum. One children's hospital used a proforma for A&E admissions which included immunisation status. If these were not up to date, this was discussed and vaccinations were offered. We were not informed of and were not aware of any other hospital policies or action in respect to opportunistic immunisation in the UK. Correspondence from four large paediatric tertiary centres in the USA and Canada suggested that while none of them had formal policies for opportunistic immunisation, they were more proactive than GOSH in ensuring that incompletely immunised children were vaccinated.

DISCUSSION

This study showed that over 20% of paediatric inpatients in a tertiary centre were inadequately immunised and thus susceptible to vaccine preventable infections. Very few if any of these children had contraindications to vaccinations. Because they were attending a tertiary centre, most of these children would have had prior contact with primary and/or secondary care services, which implies that opportunities to immunise had already been missed. Children then seen regularly in a tertiary centre may have less contact with routine primary care services, further reducing the chances of vaccinations being addressed. Despite national policies encouraging opportunistic immunisation, little action was taken within GOSH to facilitate this.

Due to inadequate recording of immunisation histories, it was difficult to accurately determine the immunisation status of children. If we had instituted prospective data collection during admission, this might have provided more information but may also have altered practice. Obtaining case notes proved difficult (37.5% obtained) as only those on the shelves in the medical records department could be accessed. This may have led to bias in our sample as those with chronic conditions may have been under-represented and ascertainment of immunisation status may overall have been poorer than we found. Conversely, staff may talk to parents about vaccines and fail to document it. However, findings from the case note review were consistent with those from interviews.

Opportunistic immunisation ideally relies on having a full and accurate immunisation history. At times this may require verification of immunisation status as reported by the carer. One of the easiest ways is through use of the Personal Child Health Record.[12] Vaccination enquiries can be made via the child's general practitioner, health clinic or child health records department. This can be time consuming and no one source may provide all the data necessary, highlighting the need for national electronic health records. There are three main ways in which hospitals can facilitate vaccinations for those identified as being incompletely immunised: through discussion and advising parents, by contacting the child's primary health care professionals or by giving the vaccines.

UK policies clearly advocate opportunistic immunisation. However, some of the staff we interviewed considered that tertiary centres exist to provide specialist care only and should not be involved in matters which could be managed within primary (or secondary) care. This is debatable and we would argue that these children have unmet needs which tertiary centres should act to address: there is a duty of care to patients, national guidelines should be followed, the risk of an outbreak of a vaccine preventable infection within the hospital setting would be reduced, and such action would endorse the importance of vaccinations. Many of these children will have chronic conditions and primary care professionals may be

What is already known on this topic

- Paediatric inpatients have lower rates of vaccine uptake compared to the general paediatric population.
- UK policies advocate opportunistic immunisation.

What this study adds

- At least 20% of inpatients in a paediatric tertiary centre were incompletely immunised and unnecessarily susceptible to vaccine preventable infections.
- Taking and documentation of immunisation histories is frequently inadequate.
- Opportunities to immunise are missed at all levels of health care provision.

unclear as to whether they should be immunised. The advice of specialist services may prove reassuring to parents and primary care professionals alike. While opportunistic immunisation in tertiary hospitals is unlikely to have a large impact on vaccine coverage at a population level, it can play a part in reducing inequalities in vaccine uptake and affords protection to a particularly vulnerable group of children.

As a result of this work, substantial measures are being taken within GOSH to address the problems identified. Discussions have occurred at the level of the trust's board and issues such as immunisation policies and practice, staff training, staff updates, information for parents and updating documentation are being addressed. We strongly suspect that GOSH was not unique in its immunisation practice and that other hospitals in the UK ought to be confronting these issues as well.

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REFERENCES

1 **Salisbury D**. Development of immunization policy and its implementation in the United Kingdom. *Health Aff* 2005;**24**:744–54.
2 **Health Protection Agency Centre for Infections**. *Protecting the health of England's children: the benefit of vaccines*, First national report on the current status of the universal vaccine programmes from the Centre for Infections. London: Health Protection Agency Centre for Infections, 2005.
3 **Conway SP**. Opportunistic immunisation in hospital. *Arch Dis Child* 1999;**81**:422–5.
4 **Samad L**, Tate AR, Dezateux C, *et al*. Differences in risk factors for partial and no immunisation in the first year of life: prospective cohort study. *BMJ* 2006;**332**:1312–13.
5 **Riley DJ**, Mughal MZ, Roland J. Immunisation state of young children admitted to hospital and effectiveness of a ward based opportunistic immunisation policy. *BMJ* 1991;**302**:31–3.
6 **Peckham C**, Bedford H, Senturia Y, *et al*. *The Peckham Report. National Immunisation Study: factors influencing immunisation uptake in childhood*. Horsham, UK: Action Research for the Crippled Child, 1989.
7 **Henderson R**, Oates K, Macdonald H, *et al*. General practitioners' concerns about childhood immunisation and suggestions for improving professional support and vaccine uptake. *Commun Dis Public Health* 2004;**7**:260–6.
8 **Department of Health**. *Getting the right start: national service framework for children. Standard for hospital services*. London: Department of Health, 2003.
9 **Department of Health**. *Choosing health: making healthier choices easier*. London: Department of Health, 2004.
10 **Department of Health**. Eds Salisbury D, Ramsay M, Noakes K. *Immunisation against infectious disease*. London: Stationery Office, 2006.
11 **Hall D**, Elliman D. *Health for all children*, 4th edn. Oxford: Oxford University Press, 2003.
12 **Walton S**, Bedford H, Dezateux C, *et al*. Use of personal child health records in the UK: findings from the millennium cohort study. *BMJ* 2006;**332**:269–70.