Reasons for delayed compliance with the childhood vaccination schedule and some failings of computerised vaccination registers

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Abstract

Objective: To identify reasons for delay in completing the primary vaccination schedule.

Method: Brisbane, Queensland, 1995. Telephone interviews of a random sample of parents whose children according to a computerised database were fully vaccinated (100 parents) and parents whose children had commenced but not completed vaccination (200 parents).

Results: The main reason for delaying vaccinations was medical advice to do so because of false contra-indications. The most significant factor in predicting timely vaccination, was the belief that giving vaccinations at the correct time was "very important", odds ratio 2.07 (95% CI 1.32-3.26). Eighty-six per cent of the children of interviewed parents from the group recorded as not fully vaccinated were in fact fully vaccinated.

Conclusions: The most important predictors of vaccination behaviour are the advice provided by medical practitioners and parental beliefs. Computerised vaccination records can seriously underestimate vaccination rates.

Implications: Vaccination providers and the public need accurate knowledge about both the need for timely vaccination and the real contraindications to vaccination. For a vaccination register to record vaccination status with accuracy, service providers need to be highly co-operative in completing and returning vaccination records, and central data entry needs to be comprehensive and accurate.

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Vaccination rates in Australia are difficult to accurately determine, as recent surveys have relied in part on parental recall, which has been shown to overestimate the true vaccination rate.[1]

Vaccination reminder systems have been successfully used, in combination with other strategies to produce high vaccination coverage rates.[2-4]

The former Brisbane North Regional Health Authority operated a vaccination register in 1994-97, using the VACCS (Vaccine Analysis Coverage Certification System).[5] Vaccination providers notified vaccination events, on a multiple entry form, posted to the vaccination register every two weeks. The register was used as a pre-pilot to the current state-wide system which supplies Queensland data to the National Childhood Immunisation Register.[6]

This study aimed to identify:

- the accuracy of a computerised vaccination register, and
- the reasons why parents either did or did not ensure that their child was vaccinated in an age appropriate manner.

Methodology

The study population consisted of all children born in the region in June and July 1994, who had commenced vaccinations and were still resident in the region (n=918). This amounted to a birth cohort. Of these, 50.9% (467/918) were recorded as being fully vaccinated. Children were classified as fully vaccinated if they had received three doses each of diphtheria tetanus and pertussis (DTP), Hib and oral polio vaccine (OPV). Children were classified as having received age appropriate vaccination if they had received all of the above vaccinations, and received each one within one month of the recommended time.

Data was collected from the computer in March 1995, eight months after the birthdate of the youngest child. All age appropriate vaccinations should therefore have been recorded on the database. A random sample was selected of 100 children who were recorded as fully vaccinated (group one), and 200 children who were recorded as not fully vaccinated (group two).

Telephone interviews were conducted by one of the authors (AR). Parents were asked to consult their child's vaccination record book to obtain the required information. Ninety-five per cent of parents were able to refer to these records. A standardised protocol was used to ensure consistency. Information was analysed using Epi Info,[7] and Egret.[8]

Results

Seventy-five parents from group one (75%) were able to be contacted and of these 72 (96.0%) agreed to participate. One

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hundred and twenty-three parents from group two (61.5%) were able to be contacted, and of these 119 (96.7%) agreed to participate. All 72 children of the parents interviewed from group one had been fully vaccinated, with 84.7% (61/72) being vaccinated age appropriately. Of group two 85.7% (102/119) had been fully vaccinated with 58% (59/102) being vaccinated age appropriately.

The results showed that the computerised data under-estimated the true vaccination rate. Many parents had their children vaccinated later than the schedule recommended. This information was not recorded in the original data extraction, but additional data was available from the computer in 22 cases by the time that the interview data was verified.

Of the 191 parents interviewed, 182 had vaccination record books for their children. There were a total of 109 vaccination events reported from parents holding vaccination records which could not be validated by the database. These discrepancies were checked.

- In 2%, the parent claimed their child had received vaccinations outside the area, confirmation of these was not attempted.
- In 25%, the vaccination was confirmed from the original vaccination record form. The fault was either that the data was not matched, or because of a failure of data entry.
- In 25%, no notification form was found spanning the date of the alleged vaccination. In this case either: a) records had not been returned, b) records had been returned but lost, or c) the parent's information was incorrect. As 26 of the 28 parents referred to vaccination records the latter possibility seems remote.
- In 32%, the vaccination notification spanning the stated vaccination date was found, but with no record of the vaccination event. In these cases, either the provider forgot to record the vaccination event, or the parents information was incorrect. 35 of the 36 parents had vaccination records for their children. It is therefore likely that vaccination notification forms were inadequately completed.
- In 6% minor typographic errors in data-entry were responsible.

There were no false positives.

Reasons for non-compliance

Of the 16 parents whose children had not completed the schedule, two had decided against vaccination after receiving one or more doses, one had not completed because the GP was seemingly unaware of the need for a third dose of Hib, and one child had been judged too seriously ill for vaccination. The remaining 12 parents either intended to finish the schedule, or assumed they had completed it.

Reasons for failure to complete the vaccination schedule on time

While most of the children had been fully vaccinated, not all had achieved this in an age appropriate manner. In most of these there were a variety of factors which influenced behaviour. The commonest reasons given by parents were that the parent was advised by their doctor to delay the vaccinations, usually because of minor illness, prematurity or breast feeding, or the parent did not take their child to the doctor because they believed a minor illness was a contra-indication to vaccination.

Predictors of delayed vaccination

The most significant factor in predicting delayed vaccination, was not holding the belief that giving vaccinations at the correct time was "very important" as opposed to "important", "unimportant" or "didn't know" (OR 2.07, 95% CI 1.32-3.26). The other main predictor was where the parent had been advised to split vaccinations, giving Hib on one occasion and DTP and OPV on another occasion (OR 0.576, 95% CI 0.33-1.0). These two factors were statistically significant using multivariate statistical analysis.

Other predictors of delayed vaccination were; failure to keep an up to date personal health record, and not taking the personal health record to a vaccination provider on each visit for a vaccination. Being advised to delay a vaccination by a doctor and coming from a family with more than two children were other factors associated with delayed vaccinations. Because of confounding these predictors of behaviour were significant on univariate analysis, but not on multivariate analysis.

Children who had received few or none of their vaccinations at council clinics were more likely to have delayed vaccinations than those who received most or all of their vaccinations from council clinics. This did not reach statistical significance since only 13.1% (25/191) of the parents had received most or all of their vaccinations at the council clinic. Doctors at council clinics were less likely to advise splitting of vaccines than private practitioners, although this did not achieve statistical significance (OR 3.89, 95% CI 1.02-17.44).

Other factors such as socio-economic status, family income, parental occupation, work status of mothers, country of birth of parents or whether parents were from a non-English speaking background were not significant predictors of vaccination behaviour. This differs to what has been found in other studies.[9,10] Access to services was not viewed as a problem.

Discussion and conclusions

Timely vaccination is necessary for the minimisation of vaccine preventable diseases. Parents reported that members of the medical profession view minor illness, prematurity and breast feeding to be reasons to delay vaccination. These misconceptions have been described previously,[11-13] but obviously remain a significant problem. Parents also have many misconceptions about contra-indications to vaccination, possibly derived from the medical profession.

The main predictors of vaccination behaviour were the advice given by medical practitioners, and parental attitudes on vaccination. Age appropriate vaccination rates should increase, and the incidence of vaccine preventable disease decrease if the knowledge of medical practitioners and their advice to the general public improve. Clearly a need exists to better inform both vaccination providers and the public. This study also showed that for a

vaccination register to record vaccination status with acceptable accuracy, the largest possible geographic area should be monitored, service providers need to be highly co-operative in completing and returning vaccination records, and central data entry needs to be comprehensive and accurate.

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