Impact of appointment reminders on vaccination coverage at an urban clinic
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Appointment reminders in the enhancement of vaccination coverage.

Type of intervention
Vaccination.

Economic study type
Cost-effectiveness analysis.

Study population
Children aged 4 to 18 months, scheduled sequentially for clinic appointments within a low-income community of New York.

Setting
Hospital. The economic study was set in the USA.

Dates to which data relate
Effectiveness, resource use, and cost data were collected between April and August 1997. The price year was 1997.

Source of effectiveness data
The estimates of effectiveness were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken prospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
Children aged 4 to 18 months, scheduled sequentially for clinic appointments were assigned to no reminder (n=346), postcard (n=314), telephone call (n=307), or postcard and telephone call (n=306). No power calculations or exclusion criteria were reported. 6.2% of postcards were returned. The authors were not able to reach 46.6% of the households assigned to the T group. In the PT group, 53.3% of the households did not receive both the postcard and the telephone reminders.

Study design
This was a cohort study carried out at a single centre. Those initiating appointment reminders were blinded to immunisation status.
Analysis of effectiveness
The analysis of the clinical study was based on intention to treat as well as on receipt analysis. The primary health outcomes were kept-appointment and vaccination coverage rates. At analysis, groups were shown to be comparable in terms of age, gender, Medicaid coverage, and the proportion of children who were up-to-date before the appointment.

Effectiveness results
The effectiveness results were as follows:

Children assigned to any reminder group were significantly more likely to keep their appointments than controls, (p=0.003).

The effectiveness of the reminders on appointment keeping was higher among those who received them, (p=0.005).

Children who were not up-to-date before their appointment were significantly less likely to keep their appointments than children who were up-to-date at baseline, (p=0.003).

The appointment-keeping rate was highest among those who were up-to-date at baseline, (p=0.004).

Vaccination coverage rates averaged 84.1% and did not differ significantly among control and reminder groups.

Children who kept appointments were 2.3 times more likely to be up-to-date than children who missed appointments were, (95% CI: 1.7 - 3.2).

The reminders were significantly more effective at increasing vaccination coverage for the subgroup of children who were not up-to-date at baseline, (p=0.011).

Coverage rose to 26.3% for the P group, (OR: 3.6; 95% CI: 1.3 - 10.1) and to 22.4% for the T group.

Children who received postcard and telephone reminders increased their vaccination coverage threefold compared with controls (OR: 2.9; 95% CI: 1.1 - 8.0)

Clinical conclusions
Appointment reminders, blinded to immunisation status, are a practical strategy for increasing kept-appointment rates for all children.

Measure of benefits used in the economic analysis
The measures of benefits were kept-appointment and vaccination coverage rates.

Direct costs
Direct costs were not discounted due to the short time horizon of the study (less than 1 year). Quantities and costs were reported separately. Direct costs related to the costs of the reminders and telephone calls. Revenue generated by kept-appointments was based on 5,000 visits per year. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on actual data. The price year was 1997.

Statistical analysis of costs
No statistical analysis was reported.

Indirect Costs
Indirect costs were not included.
Currency
US dollars ($).

Sensitivity analysis
No sensitivity analysis was reported.

Estimated benefits used in the economic analysis
See effectiveness results above.

Cost results
The cost of the reminders per patient ranged from $0.67 for a postcard to $1.58 for the postcard and telephone reminder. Net revenue generated by the additional kept-appointments would range from $500 to $57,500.

Synthesis of costs and benefits
Net revenue per dollar invested would range from $0.11 with the telephone reminder to $10 with the postcard reminder.

Authors' conclusions
Appointment reminders blinded to immunisation status are a practical and cost-effective strategy to increase kept-appointment rates for all children and, through this mechanism, to reach and vaccinate children who are not up-to-date.

CRD COMMENTARY - Selection of comparators
A justification was given for the comparator used namely no reminders. You, as a user of the database, should decide if these health technologies are relevant to your setting.

Validity of estimate of measure of benefit
The analysis was based on a cohort study, which was appropriate for the study question and the study sample was representative of the study population. Patient groups were shown to be comparable at analysis. The analysis of effectiveness was handled credibly. Appropriate statistical analyses were undertaken to take account of potential sampling biases. The authors did not derive a measure of health benefit and the analysis was therefore one of cost-consequences in design. The authors stated that the study did not measure the added health benefits associated with regular preventive visits and the possible benefit of improved patient satisfaction from being made to feel welcome by the practice. The vaccination coverage of children who did not keep appointments may have been underestimated if they went elsewhere for vaccinations.

Validity of estimate of costs
Good features of the cost analysis were that all relevant direct cost categories were included; the price year was reported, and quantities and costs were reported separately. However, no statistical analyses or sensitivity analyses were conducted on costs; and charges were used to proxy prices. The authors noted that the cost analysis did not consider additional savings accrued from improved patient flow and reduced costs associated with a lower outlay for patient recall.

Other issues
The authors did make appropriate comparisons of their findings with those from other studies and the issue of generalisability to other settings was addressed. The authors did not present their results selectively. The study examined children aged 4 to 18 months, scheduled sequentially for clinic appointments, and this was reflected in the authors'
conclusions. The study did not measure the potential impact of repeated reminders on the same child or family.

**Implications of the study**
The findings of the study suggest that providers to enhance vaccination coverage for children through improved clinic attendance should adopt appointment reminders.

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