

PLEASANT: Preventing and Lessening Exacerbations of Asthma in School-age children Associated with a New Term – a cluster randomised controlled trial and economic evaluation

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Scientific summary

The PLEASANT RCT

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Scientific summary

Background

Asthma episodes and deaths are known to be seasonal. A number of reports have shown peaks in asthma episodes in school-aged children associated with the return to school following the summer vacation.

Children returning to school are exposed to a variety of novel respiratory insults, including allergens and viruses, at a time of changing climactic conditions. It has previously been shown that viral infection and allergen exposure in allergen-sensitised asthmatics are associated with increased hospital admissions for acute asthma.

In previous research by members of our team, a random sample of approximately 75,000 school-aged (5–16 years) children from England, Wales and Scotland, with a medical diagnosis of asthma, were obtained from general practices within the General Practice Research Database [now the Clinical Practice Research Datalink (CPRD)] to investigate the seasonal effect of asthma in a primary care setting. Age- (within 2 years) and sex-matched controls (i.e. no asthma diagnosis) from the same practices were also taken for comparisons.

This investigation confirmed the increase in unscheduled medical contacts in children with asthma throughout the year, and a regression analysis showed that children with asthma were approximately twice as likely as control children to have an unscheduled medical contact with their doctor around the time of the return to school.

In the same study it was found that in August, immediately preceding the return to school, there were 25% fewer prescriptions for inhaled corticosteroids than in July and September. Furthermore, patients who received a prescription for inhaled corticosteroids were less likely to have an unscheduled medical contact after the return to school.

Objectives

The aim of the study was to assess if a NHS-delivered public health intervention [a letter sent from the general practitioner (GP) to parents/carers of school-aged children with asthma] can reduce the number of unscheduled medical contacts after the school return.

The primary objective of the study was to assess whether or not the intervention reduces the September peak in unscheduled medical contacts.

Methods

The study was a cluster randomised trial to assess if a letter sent by a GP to the parents/carers of school-aged children with asthma, reminding them to take their medication, reduces the number of unscheduled medical contacts after return to school in September following the summer holiday. The unit of cluster was general practices. Site recruitment commenced in January 2013, with the intervention being delivered during the week commencing 29 July 2013. Data for the trial were collected via the CPRD.

The effectiveness of the intervention was assessed on the basis of prescription uptake prior to the school term and medical contacts thereafter. Analyses of medical contacts were defined in four overlapping time intervals:

1. September 2013 (the primary study period)
2. September–December 2013 (the extended study period)
3. September 2013–August 2014 (the 12-month study period)
4. September 2014 (the echo substudy).

The primary study period was 1–30 September 2013, as this was the period when the intervention was felt to be most likely be able to demonstrate an impact. The extended study period was 1 September–31 December 2013, as asthma-related appointments are more frequent in these months. The full follow-up period was 12 calendar months from 1 September 2013 to 31 August 2014. There is also an echo (or follow-on) substudy period in September 2014 to see if the effect from September 2013 was maintained when there was no actual study intervention.

Prescription uptake and scheduled medical contacts such as asthma reviews were evaluated during three periods:

1. August 2013
2. August 2013–July 2014
3. August 2014 (the echo substudy).

The health economic analyses were based on a 12-month period from 1 August 2013 to 31 July 2014. The period starts 1 month earlier than the evaluation of medical contacts in order to incorporate the cost associated with delivering the intervention, including any increase in prescriptions or medical contacts in response to the intervention that occurred during August 2013.

The primary outcome was the proportion of patients who had an unscheduled medical contact in September 2013. The primary analysis population was the intention-to-treat (ITT) population among children aged between 5 and 16 years.

The secondary outcomes evaluated included the number of unscheduled medical contacts in September 2013, and the number and proportion of any medical contacts (scheduled and unscheduled) in the same time interval. The analyses of the same outcomes were repeated for the other time intervals.

The study was designed to detect a difference of 5% (30% vs. 25%) with 90% power and a two-sided significance level of 5%, with an intraclass correlation of 0.03 to account for clustering. Based on this, we estimated that we required 70 practices per arm. It was expected that the sample size of 140 practices would equate to approximately 14,000 school-aged children with asthma.

The proportion of children having a medical contact was analysed separately for each time period using logistic regression, in which the covariates were the individual's age, sex, number of contacts the previous September and the trial arm (intervention or control) as fixed effects, and the design/cluster effect of general practice as a random effect. The proportion of children having a prescription within each time period was analysed in the same manner.

The number of contacts, and the number of prescriptions, that each child had in each period were both analysed using a random-effects negative binomial model, in which the same covariates as above were included.

An economic evaluation was undertaken to estimate the cost-effectiveness of the intervention from an NHS and personal social services perspective. The population for the economic evaluation was defined as

school-aged children with asthma who are registered with a GP in England or Wales and, therefore, the analysis was based on the Preventing and Lessening Exacerbations of Asthma in School-age children Associated with a New Term (PLEASANT) study population. As the primary outcome for the PLEASANT study was restricted to those children aged 5–16 years, this age subgroup was used for the base-case cost-effectiveness analysis, with a subgroup analysis looking at children aged 4 years.

Setting

The setting was primary care, with the unit of cluster being general practices. Site eligibility required practices to be using the Vision IT software [INPS (In Practice Systems), London, UK] and to be part of CPRD. Site recruitment was conducted by CPRD and the National Institute for Health Research Primary Care Research Network.

Participants

Participants were school-aged children with asthma, aged between 4 and 16 years, who were registered with a GP.

Interventions

Sites were randomly allocated to either:

1. intervention group: sending out the letter
2. control group: standard care (no letter).

The intervention was a letter sent from a GP to the parents/carers of children with asthma, reminding them to maintain their children's medication, and to collect a prescription if they were running low. It also advised that, should their child have stopped their medication, it should be resumed as soon as possible.

The letter template was developed based on standard letters already used in general practice. The wording of the letter had input from the study team, which includes a GP, a health psychologist and a consultant respiratory paediatrician, and was also discussed in detail at two patient and public events that included school-aged children with asthma and their parents.

The intervention letters were sent out the week commencing 29 July 2013 to obviate the distraction of planning for family holidays, and yet left enough time for parents and children to renew prescriptions and gain benefit from the medication. The timing of the letter was decided following discussion with the patient and public involvement group.

Results

In the primary analysis, the proportion of individuals who had at least one unscheduled medical contact was 45.2% in the intervention arm, compared with 43.7% in the control arm [adjusted odds ratio (OR) 1.09, 95% confidence interval (CI) 0.96 to 1.25]. Similar results were observed across other subgroups, but with wider CIs in the under-fives subgroups, reflecting the smaller number of children. The difference was marginally greater for per-protocol than ITT analyses, and was marginally greater for children under 5 years old compared with those aged 5–16 years (ITT population). However, no statistically significant difference was seen in any of the ITT comparisons.

An objective with the PLEASANT study was that the intervention would increase the proportion of children who had a prescription in August 2013, as it was shown in the earlier research that not collecting a prescription was associated with unscheduled contacts in September. The intervention (letter) was associated with an increased uptake of prescriptions in the month of August 2013. Among children aged 5–16 years, 876 (16.5%) had at least one prescription, compared with 703 (12.6%) in the control group (adjusted OR 1.43, 95% CI 1.24 to 1.64); the total number of prescriptions was also higher (adjusted incidence rate ratio 1.31, 95% CI 1.17 to 1.48). Scheduled contacts made in August 2013 also increased (adjusted OR 1.13, 95% CI 0.84 to 1.52).

The increase in medical contacts in September may have been caused by GPs needing to see certain patients before giving a new prescription. Evidence to support this is the observation that for children who had collected a prescription within the last 3 months prior to the start of the study, there was no evidence of an increase in unscheduled contacts in September; 56.4% in the intervention arm compared with 56.8% in the control arm. For patients whose last prescription was 3–6 months prior to the start of the study, the excess was greater: 48.0% in the intervention arm against 42.9% in the control arm.

After September, there was evidence of a reduction in the mean number of unscheduled medical contacts. The difference was small and not statistically significant.

The reduction in the medical contacts was reflected in the economic analysis (which used data over a 12-month period from August 2013 to July 2014), which estimated that the intervention had a 96.3% probability of being cost-saving, with a mean cost saving of £36.07 per child in the base-case analysis for 5- to 16-year-olds when adjusting for baseline differences in costs between trial arms. There was no associated increase in quality-adjusted life-years (QALYs).

Conclusions

The intervention did not reduce unscheduled care in September, which was the primary end point. However, the intervention succeeded in increasing the proportion of children collecting a prescription in August, along with the proportion of children who had scheduled contacts in the same month.

Over a wider time interval, there is weak evidence that the intervention reduced unscheduled medical contacts. This is reflected in the health economic evaluation, which estimated a high probability that the intervention was cost-saving. There was no increase in QALYs associated with this cost reduction.

Trial registration

This trial is registered as ISRCTN03000938.

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