Academic detailing has no effect on prescribing of asthma medication in Danish general practice: a 3-year randomized controlled trial with 12-monthly follow-ups

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\textbf{Background.} Educational outreach visits, particularly when combined with social marketing, appear to be a promising approach to modifying health professional behaviour, especially prescribing. Results from previous studies have shown a varying effect.

\textbf{Objective.} The purpose of the study is to examine the effect of academic detailing as a method of implementing a clinical guideline in general practice.

\textbf{Methods.} A cluster randomized, controlled, blinded study was carried out of the effect of an academic detail visit compared with postal distribution of a guideline for prescribing asthma medication. Half the practices in a Danish county with 100 practices were visited once. The outcome measure was routinely collected data from all Danish pharmacies on the sales of asthma medication. Data were collected monthly for 2 years before to 1 year after the intervention.

\textbf{Results.} There was no effect on the pattern of prescription of asthma medicines following the visit, neither immediately nor long term.

\textbf{Conclusion.} We found no effect of academic detailing as a single intervention.

\textbf{Keywords.} Asthma, continuing medical education, family practice, practice guidelines, randomized controlled trial.

\section*{Introduction}

Different methods have been used to make clinicians change their practice.\textsuperscript{1,2} One method is academic detailing, which is the visiting of practitioners by colleagues or specially trained staff to present and discuss guidelines. This is also known as outreach visits.

Inspired by the apparent success of an academic detailing programme in Copenhagen, Denmark,\textsuperscript{3} we decided to try this way of providing feedback to GPs on prescribing patterns and presenting information about a guideline. As the effect of the Copenhagen programme was not tested in a scientific study, we decided to do this. Our decision was supported by the fact that the pharmaceutical industry spends a large part of their marketing resources on drug representatives (drug reps, detail men).

Danish health care offers unique opportunities for long-term, prospective studies of drug prescribing because of a combination of the list system in primary care and a national database of the sale of all prescription drugs.

At the start of our project, we searched the Cochrane database and MEDLINE for reviews of methods of implementation. In the Cochrane review,\textsuperscript{4} the reviewers’ conclusions were: educational outreach visits, particularly when combined with social marketing, appear to be a promising approach to modifying health professional behaviour, especially prescribing. Further research is needed to assess the effects of outreach visits for other aspects of practice and to identify key characteristics of outreach visits that are important to its success.
The purpose of our study is to examine the effect of academic detailing as a method of implementing a clinical guideline in general practice.

Methods

Setting
Two of the authors (KW and EK) have worked in the county of Vestsjælland in a quality development (QD) programme that was begun in 1993 by the county Health Service. The purpose of the programme is to improve the GPs’ prescribing in accordance with the current best medical evidence and to ensure efficient use of health care resources. Danish counties pay approximately half the cost of all prescription drugs, and as >85% of these are prescribed by the GPs, the GPs in the county are the targets of the programme.

The programme uses prescription data that the pharmacies routinely collect for billing and reimbursement purposes. The prescription database is maintained by the Health Service. The Health Service makes the data available to the quality development programme.

The data are used to give feedback by post or in discussions at local meetings with small groups of doctors. These groups form the basis of continuing medical education (CME) in primary care in Denmark.

After the discussion at a CME group meeting, data from the pharmacies are monitored in the following months through the prescription database, and the results are mailed to the practices.

The practices
All GPs in the county of Vestsjælland were included in the project. From the county Health Service (SygeSikringen), we had up-to-date information on all the practices (number, sex).

Randomization and blinding
The practices were randomized into an academic detailing group (intervention) and a postal group (control). Randomization was done in clusters at the level of the CME groups in order to avoid a carry-over effect from the practices that had been visited by the other doctors in the CME group.

The names of the CME groups were each placed in an envelope. The envelopes containing the names of the two largest groups were marked ‘1’, those with the two second largest were marked ‘2’, etc. The envelopes were then sealed and mailed to the county office where a secretary marked one of the ‘1’ envelopes with an ‘A’ and the other with a ‘B’, and so on. Before mailing the envelopes and without the knowledge of the secretary, it had been decided that B would indicate the intervention group.

The visit was introduced as a part of the regular QD project. Nobody outside the planning group knew about the research project or that only one half of the practices in the county would be visited. The pharmacies were not informed of the project.

Prescription data
The data are generated whenever a patient buys a registered drug from a pharmacy anywhere in Denmark. Included is the date of sale, a code for the pharmacy, a code for the drug package [which indicates the drug, the quantity in daily defined doses (DDD), the price, etc.], a code for the patient’s sex and date of birth (the coding of patient data prevents identification of individual patients), a code for the prescribing practice and a code for the practice that has the patient on its list.

All asthma medications are included in the Health Service database.

The intervention
The authors developed an asthma guideline in cooperation with the specialists at the county department of respiratory medicine. The main purpose of the guideline was to change medication in children to more inhaled steroids and less β2-agonists, and to increase the GPs’ use of peak-flow meters and spirometry.

Each practice in the intervention group was visited by one of the authors during a 2 month period from late January to late March in 1997.

The guideline was given to the doctor at the visit, and the prescription profile of the GP’s practice was discussed and compared with the asthma guideline. The doctors were invited to comment on the quality and relevance of the guideline and their attitude to changing habits according to it. The visit was planned to last 15–20 min, but many visits lasted 30 min and a few even longer because of the GPs’ involvement in the discussion.

The practices in the control group received the guideline by post together with data on their prescriptions of asthma medication.

Outcome measures
We used DDD of steroids and β2-agonists as a measure of the amount bought. From the practice list, we calculated the DDD per child in the practice.

We used monthly data from the period beginning 24 months before the intervention and ending 12 months after. That enabled us to adjust for seasonal changes and general trends. The data were downloaded from the Health Service database at the end of the study.

Patient population
All patients listed with the practices were included. A small proportion (~2%) of the population choose to have a special insurance instead of the standard national coverage. These patients are not associated with any one practice, so their prescriptions are excluded from the study population.
For this report, we have only included children, i.e. patients below 16 years of age.

**Statistical methods**

To analyse the effect of academic detailing on practitioner’s prescription of asthma medication to patients under 16 years of age, a mixed-model was used. Two levels of asthma inhaling medication were analysed: the daily doses of steroid and β2-agonists, respectively.

Data were transformed, such that the square root of the levels of daily doses were used as responses, as this yielded the residuals approximately normally distributed. The model adjusts for seasonal variation and general trends, where both a linear term and a square root term of time are included to account for the transformation of data. The effect of the intervention is modelled by three different contributions to the level of daily doses in the first 3 months after the intervention. Moreover, a long-term effect is included in the model as a general change in the level after the intervention. All intervention effects are allowed to be different in the postal group and in the intervention group. Each practice has an individual level, modelled as a random effect. All other effects are modelled as fixed effects.

Practices show important differences in the variation of prescription levels from month to month. Typically, small practices with few registered children will have a large variance, as the level in a particular month depends heavily on a few patients’ buying habits. In contrast, practices with many registered children will have a more constant level, hence a lower variance. Therefore, the model allows the variance to be different for different practices.

The analyses were conducted using the procedure PROC MIXED in SAS version 6.12.

**Results**

**Participation**

All practices in the intervention group agreed to the visit. During the intervention period but after the visit, one single-handed GP stopped practising and was excluded. During the follow-up period, two practices were sold in the intervention group and one in the control group; they were excluded. Figure 1 shows the flow of GPs through the trial.

![Flowchart of participation, randomization and drop-outs](https://academic.oup.com/fampra/article-abstract/21/3/248/601379)
The daily doses are computed as number of DDD sold divided by number of children registered in a practice, but the actual number of children with asthma is unknown. Therefore, it is difficult to interpret data from small practices, which in most months have no registration of asthma medication at all. Thus data from 12 practices with <200 registered children were excluded from the analysis, leaving 84 practices; 48 in the control group and 36 in the intervention group.

Outcome
The effects for steroids and β2-agonists were analysed separately (the β2-agonist figures are given below in parentheses).

No significant difference in the short-term effect was detected \([P = 0.90 (0.63)]\), and the model was simplified, not allowing for differences between groups in the short-term effects. We still did not detect any significant short-term effects regardless of group \([P = 0.10 (0.075)]\). In Figures 2 and 3, the model without any short-term effects is drawn. Simplifying the model to only consider a long-term effect, no significant difference between groups was detected \([P = 0.12 (0.11)]\) in the long-term effect, nor any long-term effect regardless of groups after simplifying \([P = 0.72 (0.28)]\). Thus, the simplified model does not include any intervention effect at all. In this simple model, the linear term on the general time trend was insignificant \([P = 0.93 (0.27)]\). The final model includes dependence on month \([P = 0.001 (0.0001)]\) and the square root of time \([P = 0.0001 (0.001)]\). Consequently, the untransformed data show a linear positive trend. The levels of prescription in the months July, August and September (February, March, July, August and September) are significantly smaller than the December level.

The intervention showed no effect, either short term or long term. No difference between visiting the practices or mailing the material was detected.

Discussion

The GP population
Randomizing at the CME group level was done to minimize the influence of any effect of our visit to one practice on a neighbouring practice in the control group. It was confirmed during the visits in the intervention group that this precaution was necessary.

There were no drop-outs from the intervention group until after the visit. The project lasted >3 years, and within this period there were only minor changes of practice (Fig. 1). The effects of changes within a group practice are difficult to judge, but generally the partners in a practice share views of treatment principles.

Patient population
The patient population is well defined and has been stable during the project. There are small changes as patients change their GP when they move house. This may affect asthma prevalence in the small practices. Therefore, 12 small practices have been excluded from the analyses. If the routine data had allowed us to trace individual patients, we might have been able to adjust for the changes.

![Figure 2](https://academic.oup.com/fampra/article-abstract/21/3/248/601379)
Registration of prescription data

All sales were registered at the pharmacies by electronic cash registers at the time of sale. This means that the database of prescriptions at the pharmacies is complete. At the time of the study, the practice code was entered manually, making mistakes possible (a prescription being assigned a wrong practice code). In an unpublished study of pharmacies in the neighbouring county of Roskilde (K Schäfer, personal communication), it has been shown that the rate of errors in the practice code varies from pharmacy to pharmacy, but is at the level of 3%. As the pharmacies were unaware of our study, systematic error is unlikely.

Blinding

Neither doctors nor pharmacies were aware of the project, and blinding was maintained throughout the entire study period.

Intervention

We have not overlooked the fact that the lack of effect of the intervention may be due to some deficiency in the process at the visit. The careful planning described makes us believe that this is not the case. Each practice was visited by one author, EK or KW, and there was no difference in the outcomes in the groups visited by one or the other.

Furthermore, the detailers had the advantage of being GPs themselves. They had worked with all the doctors before as part of the ongoing QD project. They had been giving feedback at earlier meetings in all the CME groups and discussed the doctors’ opinion on other topics.

The guideline was made in co-operation with local specialists and tailored to general practice in the county.

As the intervention took place as a meeting between colleagues, we believe that a similar result may be expected in primary care elsewhere, even where primary care is organized differently from that in Denmark.

The visit was not followed by any other intervention, so there was nothing to remind the doctors of the visit. In several other studies, the doctors were aware of a project, e.g. because special forms were used for data collection.

Most studies have used different interventions simultaneously. The literature is not conclusive and we think that there is reason to suspect publication bias, in this case by negative results not being reported.

May et al. showed an effect of a multiple intervention CME programme over a 5 year period. In the first year, the intervention practices received two visits 6–8 weeks apart to inform about the use of non-steroidal anti-inflammatory drugs (NSAIDs). At the following visits, other subjects were discussed, but the detailers also talked about NSAIDs. This programme is different from the other studies in the literature because of the sustained intervention.

The results

The intervention had neither short- nor long-term effects. The lack of effect does not appear to be due to bias. All GPs participated, the randomization was concealed, and the GPs, the pharmacies and the Health Service were unaware of a study taking place.

Any effect of a visit is not registered until a patient uses the new prescription. Other patients continue to

![Figure 3](https://academic.oup.com/fampra/article-abstract/21/3/248/601379)
use prescriptions issued at consultations prior to the intervention, so the long follow-up period is necessary. We were able to analyse the data for both a short- and long-term effect because baseline data are included monthly from 2 years before the start of intervention, and monthly follow-up data are included until 1 year after intervention. Further, we have controlled for seasonal variation.

International research shows results varying from no effect to a clearly significant effect, but the number of well conducted controlled, randomized trials is small.4

Newton-Syms et al.8 concluded that their intervention was effective, resulting in increased use of ibuprofen. The effect was small. The intervention materials were designed by a marketing consultant and also included a poster for the patients in the waiting room. The period of registration was 5 months before and 5 months after the intervention. Of the 150 assigned to the intervention group, 101 participated. Data from the control group were available for 217 out of 223 doctors. The groups differed in their pre-intervention prescribing pattern. The end point was not number of DDD or prescriptions but costs in pounds sterling, making the results difficult to interpret.

Berings et al.9 aimed at reducing the prescription of benzodiazepines. They report 24% fewer packages of benzodiazepine prescribed in the intervention group (one visit plus educational material) compared with the control group that received only educational material. The study has several weaknesses. The concealment of the randomization is not clear and the level of significance not reported. Of the 450 doctors approached by the researchers, 143 (32%) agreed to participate and 128 (28%) actually entered the study. The doctors were a highly selected group, having agreed to record additional information on special prescription forms during the 12 week study period.

The method of academic detailing could easily be dismissed if it was not for the fact that the medical industry spends vast amounts on marketing efforts that include detailing. In the USA, it has been estimated that the >30 000 sales representatives make >75 million outreach visits per year.10

The literature also indicates that detailing should not be isolated events, but carefully scheduled and repeated in combination with other interventions, e.g. feedback about prescribing patterns, invitations to lectures and courses, and reminders and advertising in the way used by the pharmaceutical industry. We consider it likely that the goal of better prescribing may be achieved most effectively if we stop thinking in terms of CME and instead adopt the industry’s strategy of integrated marketing.

Conclusion
In our study, we found no effect of academic detailing as a single intervention.

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