Abstract

Background The aims of this study were to develop ischaemic heart disease (IHD) registers in three primary care groups (PCGs) in SW London; to determine what proportion of patients with IHD were already identified; and to estimate the workload in producing an IHD disease register.

Methods A population-based cross-sectional study was carried out in 46 out of 49 general practices in three PCGs in SW London, using computerized and paper medical records. Outcome measures were proportion of patients with IHD on existing disease registers, and workload and cost of producing complete registers.

Results Of 3803 patients with a pre-existing IHD Read code, 570 (15 per cent) were found to have no evidence of IHD, leaving 3233 patients with confirmed or probable IHD. A search of 7726 patients prescribed one of five cardiovascular drugs but not already coded as having IHD identified a further 1447 confirmed or probable cases. On average, coders spent 4.9 hours per 1000 list size verifying IHD cases or finding uncoded cases. Each additional IHD case required about 0.68 hours (41 minutes) of coder’s time to identify and one case of IHD was identified or confirmed for about every five sets of notes examined. The cost of each additional case identified was about £10.20. At practice level, there was a wide variation in the proportion of IHD patients already on the register or wrongly coded as having IHD.

Conclusions A centralized search programme can identify patients with IHD efficiently and at relatively low cost. As the identification of cases is an essential first step in implementing effective secondary prevention, other primary care trusts may also find this method useful in improving the management of patients with IHD.

Keywords: Workload, primary care, ischaemic heart disease, Population Register

Introduction

Ischaemic heart disease (IHD) is among the commonest causes of death in the United Kingdom. Because patients with pre-existing IHD are at high risk of death and further acute cardiac events (such as myocardial infarction), they are an important group to target for secondary prevention. Ideally, this group of patients should be included in primary care based disease registers and this is one of the key recommendations of the National Service Framework for Coronary Heart Disease. However, previous studies have shown that the care of this group of patients remains sub-optimal in both primary and secondary care.

The identification of patients with IHD is a key first step in setting up disease registers in primary care. However, previous studies have shown that many patients with IHD in primary care are not included on disease registers. In a previous paper, we described a method for identifying patients with IHD using a computer search routine in 11 general practices, based on prescribing of five drugs used to treat cardiovascular disorders. The paper and computerized medical records of these patients were then examined manually to determine if they had evidence of IHD. The rationale for this approach is that general practices vary widely in the completeness and accuracy of their coding of diagnostic data on their clinical computer systems. Hence, a search based just on a Read code of IHD or a related diagnosis may miss many patients with the disorder. By contrast, almost all general practices now use their computers for repeat prescribing. Hence, a computer search based on the prescription of drugs used to treat cardiovascular drugs should identify a subset of patients whose notes can then be examined manually to determine if they have coronary heart disease.

We have now tested this method in an additional 46 practices in three primary care groups (PCGs) in SW London. We are able to report on the work required to identify IHD patients, the yield of the search method, and the accuracy of the existing IHD registers in these practices. The project is part of the CONDUIT (Cutting Out Needless Deaths Using Information Technology) programme, which has the objectives of setting up registers of

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IHD patients and improving their management in four PCGs in SW London. The findings should be of general interest to primary care trusts and general practices, as they all need to set up accurate primary care based disease registers for patients with IHD.

**Methods**

Our previous work showed that patients aged 45 or over and on one of five cardiovascular drugs (atenolol, aspirin, digoxin, nitrates or statins) were found to have an increased probability of having IHD. We found that if all the patients on these drugs without a prior diagnosis of IHD had their notes reviewed, 96 per cent of IHD cases would be detected and that for each case detected, about six sets of medical records would need to be searched (an estimated detection rate of 17 per cent). We repeated this search strategy in the current study. In addition, we searched the notes of any patient already coded as having IHD to confirm the diagnosis. Patients under 45 years of age were excluded from the search because IHD is rare in this group.

A team of six coders, all with a nursing or medical background, was trained to look for evidence of IHD in primary care based notes. Cases were defined as ‘definite’ if the records confirmed the diagnosis with the report of a diagnostic electro-cardiogram, raised cardiac enzyme activity confirming myocardial infarction, or positive results on a coronary angiogram, exercise test or thallium scan. Cases were defined as ‘probable’ if the written record strongly suggested IHD and the patient was receiving drugs that could be used to treat angina.

Practices were visited by our coding manager, who ran the five-drug search and printed the names of patients onto spreadsheets. These patients’ notes were drawn from the practice racks by the practice receptionists and searched by the coder, who recorded on the spreadsheet and the practice computer whether or not the patient had IHD. Because coders were paid for each set of notes they examined and also recorded their hours of work, we were able to assess the workload and costs of producing disease registers in this group of practices. The coding manager checked a random sample of each coder’s work for its accuracy.

Most of the 49 general practices in the three PCGs were using the EMIS computer system (34/49), with the remainder using Torex (5/49), Vamp Vision (3/49), Vamp (2/49), Vamp Medical (1/49), Aramis (1/49), ECL (1/49), Medidesk (1/49) and Meditel (1/49). One practice refused to take part and two practices were excluded because of errors in their data, leaving data from 46 practices for analysis. An overview of the plan for this study is given in Figure 1.

**Results**

In total, 11,429 people aged over 44 years either had a prior diagnosis of IHD or had been prescribed one of the five cardiovascular drugs (Table 1). We identified 3803 patients aged over 44 years with a pre-existing IHD Read code. Of these patients, 570 (15 per
cent) were found to have no evidence of IHD in their medical records, leaving 3233 patients with definite IHD. The search of 7726 patients prescribed one of the five cardiovascular drugs listed in the methods, but who were not already coded as having IHD, identified a further 1447 cases of IHD, giving a total of 4680 cases in the three PCGs. Hence, of the 4680 cases of IHD, 69 per cent were already Read coded; the remainder were identified through a drug-based search strategy. The overall prevalence of IHD in those aged over 44 years was 7.1 per cent, consistent with the results of other studies.7

On average, coders spent about 11.3 hours extracting data from 100 sets of patient records. This equated to 4.9 hours per 1000 total list size (Table 2). Hence, it would take about 9.8 hours to search the notes of a general practitioner with a typical list size of about 2000 patients. Each additional case of IHD required about 0.68 hours (41 minutes) of coder’s time to identify, and one case of IHD was identified or confirmed for about every five sets of notes examined. Coders were paid about £15 per hour; hence, the cost of each case identified was about £10.20.

At practice level, there was a wide variation in the proportion of IHD patients already on the register or wrongly coded as having IHD. The percentage of Read-coded cases in the 46 practices that had a correct diagnosis of IHD varied from 30 per cent to 100 per cent. Of all patients with IHD identified by the search, 69 per cent (range 0 per cent to 97 per cent) were on the practices’ pre-existing registers (Figure 2). Hence, some practices had almost complete registers in place whereas other practices had almost no cases correctly coded before the CONDUIT programme began.
Discussion

Our study showed that a team of trained clinical coders can set up an accurate IHD disease register quickly and at relatively low cost, even in an inner-city area with diverse socio-economic, ethnic and practice characteristics. A similar model could be used in other parts of the country and may be more efficient than asking each practice to produce its own disease register. Now that it is increasingly common for primary care organizations to employ support staff for practices, such as disease facilitators, the method we have described could form part of their job description and be seen as feasible to carry out. The method also ensures that standardized criteria are used for defining cases of IHD, which makes comparisons of the quality of care across practices more valid. We found that about 15 per cent of cases of IHD on practices’ pre-existing registers were wrongly coded as cases. In addition, a significant number of cases with IHD were not on current registers. The cost of identifying the additional 1447 cases was about £10.20 per case, which is low in relation to the potential benefits of secondary prevention in this group.

Once accurate disease registers have been established, practices will need to ensure that they remain accurate. For example, they will need to take into account patients joining and leaving the practice, new cases of IHD, and deaths in pre-existing patients. Although we have shown how feasible it is to set up disease registers using a centralized approach, it is important that practices maintain a sense of ownership over their own registers and have systems in place to update them regularly.

Strengths and limitations

This was a population-based study, covering all but three of the 49 general practices in three PCGs. Unlike some previous studies, it was not confined to practices that volunteered to take part in a trial. The three PCGs also cover a diverse population, with high levels of socio-economic deprivation and a high proportion of patients from ethnic minority groups. Hence, the findings are likely to be representative of general practice in other inner-city areas. The clinical coders had all received standardized training and used pre-agreed diagnostic criteria to confirm the accuracy of diagnosis of IHD.

One limitation of the study is that some patients with IHD may have been missed by the search strategy we used. However, our previous work suggests that this proportion will be small (less than 5 per cent of total cases of IHD). A second limitation is that the estimates of the costs of the project depend on the number of notes that need to be examined, which in turn depends on the accuracy of existing disease registers. Hence, the costs of similar projects in other PCGs may be more or less than the estimates reported here.

The wider applicability of the method described here also depends on the views of practices and PCTs about providing a central service for constructing disease registers compared with the alternative of giving practices greater control of their own registers. PCTs would also need to consider how they maintained the accuracy of disease registers in the longer term, and whether they used a centralized or decentralized approach.
Comparison with previous studies
The 69 per cent of cases of IHD on current registers compares with 43 per cent of patients with myocardial infarction in an earlier study in Oxford and 60 per cent of patients with angina in a study in Scotland.9,10 This suggests that the background level of coding of IHD in general practice has improved in recent years. However, these studies did not estimate the costs or workload of producing more accurate IHD registers.

Implications for practice
Identifying patients with IHD correctly is essential if the standards for secondary prevention in the National Service Framework for Coronary Heart Disease are to be met. Other studies have looked at the workload generated by secondary prevention and suggested that considerable additional data recording needs to be carried out. For example, Hippisley-Cox and Pringle found that even in patients already coded as having IHD, many of the key clinical data required for secondary prevention were missing.11 Our own study suggests that even this may be an underestimate of the probable workload, because many patients with IHD in primary care cannot be identified without hand searching medical records. Hence, there is likely to be a pool of patients not currently on IHD registers who need to be identified and targeted for secondary prevention.

Another key finding was that 15 per cent (570) of the patients with a pre-existing Read code of IHD were found to have no evidence of IHD on further examination of their notes. The annual current cost of statin treatment in (for example, 20 mg of simvastatin daily) is about £360 just for the drug costs alone, with some other associated costs for monitoring cholesterol levels and liver function. Treatment with statins also has some side-effects, for example, myositis or hepatitis. Excluding patients with an incorrect diagnosis from the disease register therefore ensures that patients are not prescribed unnecessary treatments and that NHS resources are used effectively. It also helps to ensure that NHS performance statistics (such as the proportion of patients with IHD prescribed statins) are based on accurate data.

Conclusions
Our study has shown that it is possible to build accurate and complete disease registers efficiently and relatively cheaply using a central team of clinical coders. This may be a more efficient solution than asking practices to set up their own registers, particularly for practices that are not well computerized or that currently have poor quality registers. However, practices without a system in place to identify new IHD cases will find their registers become increasingly incomplete with time. In a future study, we will look at the turnover of patients on disease registers and estimate the work required to keep registers up to date.

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