An educational intervention to improve data recording in the management of ischaemic heart disease in primary care

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Abstract

Background Gaps in computerized medical records and a lack of a systematic approach to data recording make progress towards achieving quality standards in primary care difficult to demonstrate. The aim of this study was to examine the effect of an educational intervention on data quality in primary care.

Methods A before-and-after study of key data quality measures was carried out in 87 general practices in eight primary care organizations in England in phase 1 and 84 general practices in phase 2. The subjects were 19 470 patients with ischaemic heart disease in phase 1 and 19 784 patients in phase 2. The main outcome measures were improvement in the completeness and quality of the computerized medical record. Anonymized data were extracted from clinical information systems and processed to produce comparative information on each practice. Data quality workshops were arranged, in which reflection can take place, backed up by summary statistics. Practice visits provided training and personalized feedback of patients needing intervention.

Results In the patients with heart disease, nearly 16 000 new clinical entries were made in the key improvement areas. The percentage of patients advised to quit smoking increased by 49.3 per cent, from 23.6 per cent to 61.9 per cent. There were also significant improvements in many other aspects of management.

Conclusions Focused interventions that provide targeted and relevant clinical information can be implemented in primary care. Such interventions can lead to a rise in data quality in primary care, but their effectiveness needs to be further tested in more rigorous research settings such as randomized controlled trials.

Keywords: primary care, quality improvement, secondary prevention of coronary heart disease, computerized medical records

Introduction

Health care systems across the world are trying to improve the quality of care they provide. One area with considerable scope for improvement is the implementation of secondary prevention in patients with ischaemic heart disease. This paper describes the use of an audit-based data quality initiative to address this deficiency.

Much of the information required to audit the quality of care given will come from the computerized medical records held by general practitioners (GPs). At present, these records are often incomplete and inaccurate. There are a number of reasons for this, including a lack of training and support in using clinical information systems. However, there is relatively little published on initiatives to improve data quality in primary care.

In this paper, we describe the first results of a programme to improve the quality and completeness of information recorded on patients with ischaemic heart disease in eight primary care organizations. We chose to study ischaemic heart disease because it is a common condition, there is good evidence about the effectiveness of treatments for it, and primary care has an important role to play in its management. The objectives were to see if a structured data quality improvement programme could lead to improvements in data quality in primary care and to identify lessons that could be applied by other primary care organizations.

Methods

The Primary Care Data Quality (PCDQ) Programme is an educational intervention targeted at primary care professionals, which is designed to improve data recording on general practices' computer systems. The PCDQ Programme aims to build upon existing skills and knowledge for recording data within primary care and to maximize the use of technology to monitor and assess improvements in the quality of data. The package includes support for the installation of Morbidity, Information Query and Export Syntax (MIQUEST), a program that extracts data from computerized medical records in primary care.
Training in the use of Read codes\textsuperscript{5} is also provided to any clinician who needs or requests it.

The programme's only didactic session is a 1 hour introductory meeting. This is held with each primary care organization, with representatives from every practice; ideally, one or more GPs accompanied by their practice manager and nurse. Anonymized data are then collected from the participating practices using MIQUEST, and analysed and presented to primary healthcare professionals in a format that is easy for them to interpret.\textsuperscript{6} This is done at baseline, and at least 6-monthly thereafter in data quality workshops that last about 2–3 hours. The participants work in small groups to discuss the findings and how they can improve both the quality of care and data recording.

The MIQUEST software extracts data in the same formats from different practice computer systems. In addition, the PCDQ Programme produces written guidelines on how and why to code information customized for each of the major versions of general practice software. Although these guidelines include lists of suggested Read codes, the MIQUEST searches used are designed to trawl widely to maximize the identification of patients with ischaemic heart disease, even when 'ideal' Read codes have not been used.

The MIQUEST queries also identify (to that practice only) those patients who need intervention or changes in their treatment. Lists can be produced by practice of patients who need interventions such as cholesterol or blood pressure measurement, aspirin or lipid-lowering drugs, or smoking advice. The process is done with a minimum of effort from the participating clinicians – all the practitioners have to do is attend two meetings in the year and have an on-site Read code training session if they wish it. The small group work allows the clinicians to learn more about data quality, how much unmet need there is in their own practice and locality, and the extent of completeness of their computerized medical records.

The PCDQ Programme deals with a deliberately small dataset, the correct recording of the diagnosis of ischaemic heart disease and the recording of four key measures of management. These are blood pressure measurement,\textsuperscript{7,9} use of aspirin prophylaxis,\textsuperscript{10} cholesterol measurement and control,\textsuperscript{11,12} and recording of smoking status and advice to stop smoking.\textsuperscript{13}

An incremental approach is taken as our preliminary discussions revealed that many clinicians who do not already code data on their computer systems do not do so because they are either not in the habit of doing this or are uncomfortable about Read coding clinical information.\textsuperscript{14} Many clinicians stated that asking them to make a relatively small incremental step – such as coding the diagnosis of ischaemic heart disease and four key areas of management – would be more likely to achieve change than asking for 'everything' to be Read coded on their computer systems.

The participating clinicians know that at the next review meeting, their progress in achieving the preliminary coding targets will be reviewed. The PCDQ Programme will only move on to other areas (such as high-risk groups and co-morbidities, coding of information on anti-coagulation treatment in people with atrial fibrillation,\textsuperscript{15} beta-blockers in people with a history of myocardial infarction,\textsuperscript{16} angiotensin-converting-enzyme inhibitors in people with heart failure\textsuperscript{17}) once the collection basic information has reached a satisfactory standard.

An introductory meeting is held before the first data collection, so that professionals within the primary care organization can meet the PCDQ team members who will be working with them. This allows the participating clinicians to build a cooperative relationship with the PCDQ team members and realize that what is being asked of them has already been achieved by clinicians in other primary care organizations. One clinician and one data collector are assigned to each primary care organization the programme works with. To be successful in achieving change, the PCDQ Programme needs to engage almost every practice within the primary care organization. An enthusiastic local lead is a significant help because they can help encourage participation from other local clinicians.

The programme's key event is the 6-monthly data quality workshop, again ideally attended by a GP, nurse and manager from each practice. The participants at the meeting learn from presentation and then discussion of pooled, anonymized data. The workshop seeks to draw out the knowledge about what has been done to achieve better data quality from the participants. Where adjudged by the group to be relevant to their learning needs, the programme will build on skills in locating and appraising evidence. Questionnaires completed at each step of every workshop inform whether the presentation can be understood and if it has had the required impact. In addition, there is also input into individual practices.

Results
The first results of the PCDQ Programme are available from eight primary care organizations, located in three NHS Regions. These are based on a total practice population of 600 000, of whom about 20 000 have ischaemic heart disease. There were 87 practices in the first data collection and 84 in the second (the decline in the number of practices was due to some upgrading to computer systems that were not MIQUEST compatible). The second data collections were all carried out between August 2000 and October 2001, between 6 and 8 months after the first data collection.

The recorded prevalence of ischaemic heart disease increased by about 10 per cent, from 29 to 32 per 1000 patients. Many of the newly identified patients had very limited clinical information coded and in many practices this therefore resulted initially in a reduction in the proportion of patients with key data items coded. Despite this, among the patients with ischaemic heart disease, there has been a considerable overall increase in computerized recording of new clinical data. Nearly 10 000 (50 per cent) additional patients with ischaemic heart disease have been recorded as being given advice to stop smoking, a further 2000 (10 per cent) have had their smoking habit recorded and their
cholesterol measured, and nearly 1000 (5 per cent) have had their aspirin status recorded (Table).

**Discussion**

The PCDQ Programme has shown how a focused educational intervention can result in a modest but positive change in data recording within primary care. A key factor in the success of the programme appeared to be the leadership and involvement of local clinicians. A visiting team, which has the technical and educational expertise, proved to be a highly cost-effective investment. Involvement in the PCDQ Programme for 1 year cost the practice less than employing one full-time clerical member of staff; a strategy adopted by several of the participating primary care organizations before joining the PCDQ Programme. Its costs are between £10 000 and £15 000 per year depending on the size and geography of the locality.

The content of the data quality workshops focused on what practical steps could be taken to improve data recording. This included the training of clinicians by the programme’s data collectors when they visited the practices, the use of our Read code prompt cards, and whether the locality should employ more nurses in the areas that needed to see greater improvement. The last was sometimes contentious, with some practices believing that receiving extra resources was rewarding poorly performing practices. There was always debate over how to use nurse time effectively, and whether nurses should be employed by the primary care organization or by individual general practices.

The educational approach, focused on a narrow clinical area where there are interventions of known effectiveness that GPs can make, appears to change data recording. The intervention should also be generalizable, both within the United Kingdom and elsewhere. The programme has now been implemented in 23 primary care organizations with very different characteristics.

**Limitations of study**

One limitation of the PCDQ Programme is that the primary care organizations that participated were volunteers and were actively looking for tools to help them raise standards. Some had tried other means to collect the required data, but their previous approaches had either proved highly expensive or had failed. Not surprisingly, all but one of this group of primary care organizations had baseline levels of data recording higher than that in a previous study.18

Another limitation of the study design is that we used a ‘before-and-after’ approach to evaluate the effectiveness of the intervention. This means that there was no control group and hence we cannot be certain that there was a causal relationship between the PCDQ Programme and improvements in data recording and quality of care.

There were also technical problems with the MIQUEST interpreter software, especially in the lack of an effective interpreter for one of the major and several of the minor computer systems. A central system of producing queries had advantages in that it was possible to have staff constantly looking out for changes in the Read classification, and for problems with a particular computer system’s interpreter. Personal relationships have been established with the small number of programmers who create the MIQUEST interface for their clinical system. Data collected in a standard way by a query are also readily comparable. The downside is that this is potentially less flexible for the end user – although they still have the ordinary search tool built into their clinical system.

**Implications for policy and practice**

Our findings suggest that the approach to similar programmes should not be centred on technical issues such as adeptness at extracting, processing and presenting data, but on the creation of an environment in which what might work in a locality is discussed and then reflected upon. Much of that knowledge appeared to be tacit and only shared when the appropriate opportunity presented itself. Finally, ischaemic heart disease is a disease area where the Read coding systems offers appropriate terms. The evidence on management also lends itself to quantitative recording (e.g. blood pressure, cholesterol, number of

### Table Change in IHD data recording during phase 1 of the PCDQ Programme (numbers, with percentages given in parentheses)

<table>
<thead>
<tr>
<th></th>
<th>First data collection</th>
<th>Second data collection</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of practices</td>
<td>87</td>
<td>84</td>
<td>–3</td>
</tr>
<tr>
<td>Total combined list size</td>
<td>643 890</td>
<td>600 424</td>
<td>–43 466</td>
</tr>
<tr>
<td>IHD subset population</td>
<td>19 470 (2.9)</td>
<td>19 784 (3.2)</td>
<td>314 (0.3)</td>
</tr>
<tr>
<td>Patients with BP record</td>
<td>17 889 (91.9)</td>
<td>18 136 (91.7)</td>
<td>247 (–0.2)</td>
</tr>
<tr>
<td>IHD patients taking aspirin</td>
<td>14 422 (74.1)</td>
<td>15 355 (77.6)</td>
<td>933 (3.5)</td>
</tr>
<tr>
<td>IHD patients with cholesterol reading</td>
<td>8871 (45.8)</td>
<td>10 885 (55.0)</td>
<td>2014 (9.5)</td>
</tr>
<tr>
<td>IHD with raised (&gt;5 mmol) cholesterol</td>
<td>4394 (22.6)</td>
<td>5075 (25.7)</td>
<td>681 (3.1)</td>
</tr>
<tr>
<td>NOT taking a lipid-lowering drug</td>
<td>2110 (48.1)</td>
<td>2309 (45.5)</td>
<td>199 (–2.6)</td>
</tr>
<tr>
<td>IHD patients with smoking habit record</td>
<td>14 370 (73.8)</td>
<td>16 580 (83.8)</td>
<td>2210 (10.0)</td>
</tr>
<tr>
<td>IHD patients advised to quit smoking</td>
<td>2469 (12.7)</td>
<td>12 248 (61.9)</td>
<td>9779 (49.2)</td>
</tr>
</tbody>
</table>

BP, blood pressure; IHD, ischaemic heart disease.
cigarettes smoked) and there are interventions – such as aspirin, lipid-lowering drugs and anti-hypertensives – that primary care clinicians can implement.\(^{19}\) These evidence-based decisions have been demonstrated to have a far higher influence on outcome than treatments in many other areas of primary care.\(^{20}\)

**Conclusions**

The PCDQ Programme appears to be a successful educational intervention. The programme was acceptable to GPs and participation resulted in primary care professionals improving clinical care as well as learning how to share their knowledge and expertise. It has resulted in a modest but clinically significant increase in the identification of cases of ischaemic heart disease and in data recording on these patients in primary care. Further evaluation of the PCDQ Programme using more rigorous research designs such as randomized controlled trials will help determine if second and subsequent cycles lead to additional improvements in data recording in primary care.

**Acknowledgements**

The South Thames MIQUEST Project was funded by South Thames NH IM+T. MSD has funded the core team of PCDQ for 2 years through an unconditional educational grant. The primary care organizations in the programme co-fund their participation in the localities in which it is operating. A.M. holds a National Primary Care Scientist Award, funded by the NHS Research & Development Directorate.

**References**


Accepted on 16 September 2003