Improving health outcomes – a review of case studies from English health authorities

Alastair McColl, John Gabbay and Paul Roderick

Summary

We review a series of case studies from English health authorities that have tackled the assessment and improvement of health outcomes. We reflect their concerns and difficulties and the lessons they learnt. We identified case studies from a telephone survey of 91 representatives of the 100 English health authorities (61 were directors of public health). We edited 26 structured case studies which described how they had used population health outcome assessments or indicators. The health outcome assessments included service reviews, needs assessment projects, case-control studies, small area variations analyses, action research, and the use of focus groups. Many case studies highlighted inequalities in health service delivery. Health authorities chose some topics because they were outliers on national indicators, others had found unacceptable inequalities within their district, and others had been concerned that clinicians were not using the most effective interventions. Public health departments played a major role in these population-based health outcome assessments. The case studies highlighted the strengths and weaknesses of national population-based health outcome indicators, the difficulties of using information on effectiveness, the role of evidence-based process proxies for outcome, the need to extend information sources, the involvement of patients and carers, and the difficulty of changing clinical behaviour. We make recommendations as to how the Department of Health and NHS Executive could help health authorities improve the health outcomes of the populations they serve.

Keywords: health outcome indicators, health outcome assessment, health authorities – case studies

Background

If health authorities are to improve health they need to be able to undertake population-based assessment of health outcomes. Comparative population-based health outcome indicators such as the UK Health of the nation targets can prompt health authorities to undertake local assessments and help them to determine priorities in their work. Population health outcome indicators for the NHS was another set of such indicators for English health authorities, published in 1993. These indicators built on the avoidable mortality indicators first developed as quality of care indicators by Rutstein et al. in the United States and then by Charlton et al. in the United Kingdom. They are now in the public health common data set, a set of regional and district indicators published annually. In 1993 the Scottish Clinical Outcomes Working Group also presented population and provider-based outcome indicators for a limited number of conditions highlighting variations between health boards. The clinical performance indicators for England will be population based and presented by health authority as well as by hospital. Previous National Health Service (NHS) Executive and Department of Health reports have suggested that measures of health outcome are central to assessing the performance of health authorities and NHS Trusts. ‘Health outcomes’ are now explicitly part of the portfolio of the new UK Minister of State for Public Health. The proposed national framework for assessing performance contains health outcomes of NHS care.

Despite such a plethora of initiatives, there is still a dearth of knowledge as to how such indicators can be, or are, used in planning and delivering health care. There are a few published examples of how health authorities have undertaken confidential inquiries, audits, or needs assessments, but little has been published on how health authorities have tackled the assessment and improvement of health outcomes including the problems faced, results achieved and lessons learnt. This paper reviews a Department of Health commissioned series of exemplary case studies recently published and available on the world wide web (http://www.soton.ac.uk/~wi/). The objectives of these studies were to:

(1) provide health authorities with practical examples of successful approaches to the assessment of health outcome within a district;
(2) provide a pragmatic account of why health authorities investigated a problem, how they undertook the work, what happened and the lessons they learnt;
(3) feed back to the Department of Health and NHS Executive the concerns, difficulties, and constraints expressed by health authorities when attempting to improve the health outcome of their population.

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Methods

In October 1996 we reported how health authorities used population health outcome assessments and indicators in the whole range of their work. These included health advocacy and alliance work as well as purchasing and performance management. We defined health outcome as 'the attributable effect of an intervention on a previous health status'. The Central Health Outcome Unit at the Department of Health had commissioned the report as a baseline against future monitoring of the use of population health outcome assessments. Our report was based on a telephone survey undertaken between October and December 1995. We interviewed 91 representatives of the 100 English health authorities; 61 were directors of public health and 25 were consultants in public health. We obtained details on 147 topics in over 30 clinical areas in which population health outcome assessments had been of value.

We subsequently invited 20 of the 91 health authorities to write case studies explicitly linked with use of population health outcome assessments or indicators. We broadly subdivided these studies into those stimulated by national indicators, those focusing on subdistrict variations, and those using effectiveness information. The criteria we used for including case studies were as follows:

1. an attempt had been made to improve health outcome at a population level;
2. the work had been stimulated by the use of national comparative indicators, variations in health outcome within their district, or by attempts to implement effective interventions;
3. the work focused on a major health problem;
4. something had been achieved as a result of the work undertaken;
5. the study included examples of lessons learnt, both positive and negative, including critical organizational success factors.

We then used discretion in selecting case studies that fulfilled these criteria to give a variety of studies across a range of disease areas. These included some with a primary care focus, some where districts had developed their own indicators, and some which discussed problems such as data validity, attribution and changing clinical behaviour. Seventeen health authorities agreed to produce a case study. We also invited a case study on the East Anglian hip fracture project, a regional audit, because some of the local districts had referred to it. Their case study was relevant at a district level and fulfilled our criteria.

We encouraged authors to use the following structure for their case studies: abstract; why this clinical area was chosen; further information that was required; data validity studies; changes which were made; how changes were monitored; resource implications; practical lessons learnt; conclusions. We also requested a final section on the health authority organizational context. We edited 26 case studies, and encouraged authors to bring out their story and to acknowledge the constraints of their approaches. We were primarily interested in the processes, results and lessons learnt for a range of different situations, however pragmatic the districts' approaches.

Results

We selected health outcome assessments which used a wide variety of methods, including service reviews (case studies 4, 16, 17, 18), needs assessment projects (case studies 6, 8), a case–control study (case study 13), small area variations analyses (case studies 1, 14, 15, 22), action research (case study 6), an appropriateness study (case study 16), an epidemiological review (case study 2), audit projects (case studies 1, 27–31), workshops for users and carers (case study 9), and the development of general practitioner (GP) based indicators (case studies 17, 18). The tables present the authors, title and summaries of how all the case studies were linked to improving health outcome. Table 1 summarizes the case studies which focused on the use of national indicators, Table 2 describes those focusing on subdistrict variations, and Table 3 those using effectiveness information. This classification is somewhat arbitrary as several studies have elements of all three categories.

National population-based health outcome indicators

National comparative indicators prompted several districts to undertake population health outcome assessments and helped them to set priorities (case studies 1–9). Most of them used a range of routine and ad hoc local and national data as a focus for discussions among health care professionals, to inform the auditing of current practice, to attempt to decide why a district may have an outlying value, to suggest changes, or to evaluate change. In one study high rates were due to an increased incidence (case study 1), and in another were possibly due to an increased case fatality rate at a local provider (case study 2). Others interpreted high rates as being partly due to an under-use of effective interventions (case studies 3, 4, 6–9).

Population-based health outcome indicators have advantages over provider-based indicators especially if comparisons are made between districts with similar socio-economic compositions. The East Anglian hip fracture audit highlighted the importance of taking case mix and other confounding factors into account when comparing providers (case study 20).

However, there are constraints in the use of population-based health outcome indicators. There was inconsistency in the use of terms such as 'indicators', 'measures', 'process proxies' and 'intermediate outcomes'. Many studies highlighted difficulties in the interpretation of indicators and the complexity of health outcome assessments. For example, the local media interpreted high mortality rates for breast cancer as...
evidence of inadequate services (case study 1); small numbers heavily influenced peptic ulcer mortality rates (case study 5); the validity of indicators for diabetes was found wanting (case study 8); and indicators by themselves were insufficient to identify the nature of individual need or to generate specific proposals for change (case study 6). Care was needed in the interpretation of such indicators, and they were misleading if unwisely used. Although the timeliness and quality of data are improving they still limited the usefulness of indicators, as highlighted in the Barking and Havering study (case study 8).

Another weakness was the lack of evidence of the attributability of population health outcome indicators to health care. Coventry had a high mortality rate from peptic ulcer but a confidential audit concluded that these deaths were not attributable to the quality of local health care (case study 5).

Health care had little influence on mental health admissions in Avon (case study 14). Differences in admission rates were almost entirely a function of the socio-economic status of the different localities.

Subdistrict variations in health outcome

The case studies highlighted the importance of examining variations in population-based health outcomes within a district, as health authorities with an average value for a national comparative indicator could have considerable variations within the district. Examples of variations in health service delivery included the utilization of cardiology services in Sheffield (case study 11), variations in appropriate coronary heart disease admissions in Barking and Havering (case study 16), variations in the use of mental health services in Avon (case study 14), and family planning services in West Hertfordshire (case study 15) and in Southampton and South West Hampshire (case study 18). As a result of these health outcome assessments, the health authorities intervened by reallocating health resources on care to meet unmet health needs and redressing inequalities.

Using information on effectiveness

Effective clinical interventions can improve health outcome, but some authors found untangling the use of evidence to be unexpectedly complex. The North Cumbria study highlighted how there is often insufficient time to assess all the relevant evidence (case study 25). The Oxford case study commented that conclusions about the effectiveness of health care were rarely black and white but usually came in shades of grey (case study 19). The study illustrated that even for relatively well-researched areas of medicine such as the use of steroids in preterm labour, the literature rarely provided specific or precise answers to the particular question clinicians may have had about the care of individual patients. Service developments were not always evidence based. In Barking and Havering there was a question over the effectiveness of a proposed diabetic day centre (case study 8). Despite there being no clear evidence, most clinicians and patients regarded diabetic day centres as an essential part of a service. In the East Anglian hip fracture audit there were differences between hospitals in their use of thrombo-prophylaxis (case study 20). Some surgeons resisted the idea of routinely using pharmaceutical thrombo-prophylaxis in the face of evidence of its efficacy.

The role of evidence-based process proxies for outcome

Some of the case studies illustrated how process measures could be helpful alongside outcome measures when there was good evidence linking processes to the desired outcome. Examples included measures used to monitor the management of hip fracture (case studies 2, 20), breast cancer screening (case study 1), diabetes services (case studies 22, 26), and asthma medication (case studies 17, 18).

Extension of information sources

National routine data sources were not usually amenable to use for developing population-based health outcome indicators as they were mostly limited to mortality and hospitalization rates. Some centres extended their information sources, and included information from audit, prescribing cost data, disease registers and special data collection. Lambeth, Southwark and Lewisham (case study 17) and Southampton and South West Hampshire (case study 18) used Prescribing Analysis Cost (PACT) data to construct some of the indicators. Examples of special data collection included the case studies on: the prevalence of angina symptoms in Sheffield through the use of a postal questionnaire to over 16,000 people (case study 11); the use of the SF36 as an outcome measure for renal replacement therapy in Sheffield (case study 12); the use of corticosteroid in preterm delivery in Oxford (case study 19); the measurement of physical and social function, quality of life and carer outcome in the East Anglian hip fracture audit (case study 20); the quality of mental health services and the extent to which the population’s health needs were being met in South Cheshire (case study 21); and the collection of quality of life measures before and after varicose vein surgery in North Cumbria (case study 24). Some described the difficulty in obtaining data. For example, in Southampton and South West Hampshire it was hard to obtain audit data from providers because contract managers neither saw audit as a priority nor considered collecting information to be worth while in the context of contract negotiation (case study 18).

The standards used in audit usually focused on process measures or intermediate outcomes. The case studies defined the numerators and denominators differently for their standards in primary and secondary care audit. Such data were rarely comparable between districts.

Involvement of patients and carers

Some case studies described the involvement of patients and carers in formulating strategy, service reviews and service developments, together with the difficulties that arose. In
### Table 1 Summaries of the case studies focusing on the use of national indicators

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<tr>
<th>Authors</th>
<th>Title</th>
<th>Summary of how the case study is linked to improving health outcome</th>
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<tr>
<td>Kishor Padki, Steve Kisely and Steven Kissely</td>
<td>Breast cancer in South Lancashire</td>
<td>Nationally based health outcome indicators suggested a high mortality rate from breast cancer and marked variation between two halves of the district. Further investigation revealed a high incidence rate for which no single cause was identified. To achieve the desired improvement in outcome they focused on providing accessible and effective screening services, increasing breast awareness, and high-quality treatment services.</td>
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<tr>
<td>Steve Kisely and Shelagh Garnett</td>
<td>Hip fracture in South Lancashire</td>
<td>Deaths occurring after hip fracture contributed to the high district accident mortality rates in people over 65 years old. The high mortality rate was not explained by a higher incidence of hip fracture. Small numbers and possible case mix variations prevented conclusions on the case fatality rates at individual provider units. However, routine HES data suggested that one-third of patients were being operated on more than two days after admission. They developed guidelines for the treatment of hip fractures and introduced them into clinical audit in local trusts, as well as into the monitoring of contracts.</td>
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<tr>
<td>Sharon Abdul and Diana Forrest</td>
<td>Aspirin project in Liverpool</td>
<td>Liverpool has one of the worst mortality rates in the country for coronary heart disease and has marked ward level mortality variations. The project aimed to increase the use of aspirin in people at high risk of coronary heart disease and stroke. They employed a facilitator to work with primary care teams and ran a media campaign. They used many of the lessons learnt from a Sheffield aspirin project in the use of this evidence-based highly cost effective treatment.</td>
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<tr>
<td>Kishor Padki, Keith Williams and Peter Barker</td>
<td>Commissioning organized stroke care in Coventry</td>
<td>National indicators highlighted increased standardized mortality rates for stroke in Coventry when compared with other districts in the West Midlands and other similar districts. Further information showed variation in stroke mortality within the district. Population based health outcome indicators helped to prioritize a review of the management of stroke and a subsequent increase in funding. They set up targeted interventions aimed at the primary and secondary prevention of stroke. A review of stroke services and an examination of effectiveness evidence led to a strategy focusing on a comprehensive, co-ordinated hospital and community rehabilitation service with clear guidelines for management.</td>
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<tr>
<td>Kishor Padki, Keith Williams and Peter Barker</td>
<td>Peptic ulcer deaths in Coventry</td>
<td>Coventry has a high standardized mortality rate from peptic ulceration. Using their own mortality database they were able to identify eight deaths in 1995. They conducted a case note audit to determine whether there were avoidable factors associated with these deaths. They did not identify any factors although four of those who died were taking non-steroidal anti-inflammatory drugs.</td>
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<tr>
<td>Hilary Stirland</td>
<td>Stroke in Wandsworth</td>
<td>Population-based outcome indicators drew attention to stroke as a disease of major public health importance in Wandsworth. Comparative service utilization data were helpful in determining the extent and pattern of resource use and demonstrating the complexity of service requirements for stroke patients. The indicators alone were insufficient to identify the nature of individual need or to generate specific proposals for change. They undertook an action research project to investigate the concerns of patients and their carers and to track their experience through the course of the illness and its treatment. The project demonstrated inequity of access to diagnosis and care in the acute stage of stroke, variation in rehabilitation, scope for improvement in continuity of care between hospital and community services, and lack of continuing review and replanning of treatment. It also highlighted the need for much better education of carers and patients about stroke and its care and prevention. They produced a framework for future stroke services and made changes.</td>
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<tr>
<td>Bernard Crump</td>
<td>The use of population-based health outcome measures in South Birmingham</td>
<td>Comparative population health outcome data, including the indicators in Population health outcome indicators for the NHS, taken alongside other local information, helped them choose relevant topics. Proxy outcome measures, or impact measures, were introduced into contract monitoring, to focus the attention of providers on factors likely to be associated with a good outcome for the patient and within their sphere of influence. These measures helped to begin a dialogue about the quality of clinical care relevant to outcome. The study described the development of these proxy measures of outcome, focusing particularly on the measures for fractured neck of femur, and on the steps taken to introduce them into contracts.</td>
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<tr>
<td>Parameswaran Kishore</td>
<td>Diabetes in Barking and Havering</td>
<td>Nationally produced population health outcome indicators for diabetes together with concerns from local clinicians stimulated a strategic review. The study summarized the reasons why they undertook the review, further information that they required, and critically appraised national outcome indicators for diabetes.</td>
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Wandsworth the input of stroke patients and carers highlighted the practical problems they faced (case study 6). They wanted to be better informed and to be able to participate effectively in care. In West Pennine users, carers and residents in high-risk localities had a considerable input into the development of a strategy to reduce morbidity and mortality from circulatory diseases (case study 9). The Stroke Association was involved in one case study (case study 4) and in another the local branch of the British Diabetic Association identified operational issues such as the conflicting advice given to patients by different hospital clinicians, communication problems between the hospital and GPs, and the lack of good quality advice (case study 8). But there were sometimes difficulties in involving the public. South Cheshire found it problematic to obtain a wide consumer view of schizophrenia services (case study 21). Some authors felt that there were not enough patient-centred outcome measures (case study 17). Although patient-centred health status measures are essential for research, there were few examples in the studies or in our survey\(^\text{18}\) of their application to evaluating routine services.

### Changing clinical behaviour

Despite many examples of difficulties in changing clinical behaviour, some successfully made changes. On occasions, clinicians were reluctant to provide information on their activity because of worries about how the health authority would use it. For instance, in Liverpool GPs were concerned that the health authority could use a diabetes register to assess their performance (case study 26). McCarthy suggested that it was easier for clinicians to say information was not available than to provide it to someone who could use it in an unexpected way (case study 10). Information available to national databases such as that on renal replacement therapy and coronary artery bypass grafting was not available to the local health authorities.

The Oxford study explored the role of clinical uncertainty and operational inefficiency (case study 19). There can be uncertainty because the information does not exist or because particular clinicians are unaware of it. The authors suggested that where there was a gap between intended practice and the care actually delivered, operational inefficiency should be examined by looking not just at the individual clinicians but at the structure and systems in which care is delivered.

Clinical behaviour did change in some of the case studies, especially those from Sheffield (case study 11), South Lancashire (case study 2) and Oxford (case study 19), through collaboration and co-operation. In many studies clinicians played a key role; in others it was more the work of key people such as diabetes nurse advisors in East Kent (case study 22) or stroke care co-ordinators in Wandsworth (case study 6). In one study there was conflict over the very different clinical management offered by two consultants (case study 8). The only practical approach was for the health authority to produce a detailed service specification and insist that two clinicians provide a service consistent with the specification. This study recommended that professional organizations such as the Royal College of Physicians should set up an independent advisory service which health authorities or trusts could consult.

There were a few examples within the case studies of how

### Table 1 (Continued)

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<th>Authors</th>
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<th>Summary of how the case study is linked to improving health outcome</th>
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<tr>
<td>Kate Wooff</td>
<td>Stroke in West Pennine</td>
<td>They developed a strategy to reduce morbidity and mortality from circulatory diseases because of high mortality rates and wide variations at a subdistrict level. Their focus on circulatory diseases as a whole, and the involvement of users, carers and residents in high-risk localities in the design of health authority strategies widened the traditional medical model emphasis on prevention. Primary preventive programmes for stroke aimed to increase the supply of healthy food choices, non-smoking environments and opportunities for exercise. Dedicated workers focused on high-risk localities and attempted to implement changes driven by local residents' views on the determinants of their health status. To improve rehabilitation they set up a specialist stroke team with therapists who worked both on wards and in the community. The study highlighted the value of partnerships, the interdependence of medical and social models of care, the need to include data handling skills within clinical teams, and the importance of continuing to review health outcomes.</td>
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<tr>
<td>Mark McCarthy</td>
<td>Renal replacement therapy, coronary artery surgery and HIV-AIDS in Camden and Islington</td>
<td>The study highlighted the difficulty of obtaining local population-based health outcomes. In many cases such information did exist but clinicians were reluctant to provide this to health authorities. Although outcome data were provided to national databases such as the European Dialysis and Transplant Association database and the UK Cardiac Surgery register there were few incentives for these provider-led organizations to disseminate the information to health authorities. Postcode and district of residence were often not collected. HIV-AIDS information could be made available by district of residence in addition to provider-based information. McCarthy argued that the NHS Executive and DoH have a role to play in making this information available locally.</td>
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### Table 2 Summaries of the case studies focusing on subdistrict variation in health outcome

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<tr>
<td>Nick Payne and Carol Saul</td>
<td>Variations in the utilization of cardiology services in Sheffield</td>
<td>A population-based assessment of health outcomes highlighted marked variations in coronary heart disease mortality within Sheffield. They sent a postal questionnaire to over 16,000 people to determine the prevalence of angina symptoms. Further investigation showed that utilization of coronary artery revascularization services did not correspond to need and seemed to exhibit the inverse care law. These findings prompted the need for further work to ensure that access to health care was directed to where it would have the greatest effect.</td>
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<tr>
<td>Jeremy Wight</td>
<td>The use of the SF36 as an outcome measure for RRT in Sheffield</td>
<td>There were problems in obtaining information about the outcomes of different modalities of renal replacement therapy (RRT). Together with other local purchasers, they felt that it was important to have an assessment of the quality of life (QoL) being enjoyed by patients on different modalities, which have varying costs, to inform the debate about choice of modality, and numbers to be taken onto the end stage renal failure programme. They wanted to assess the potential for using a QoL outcome measure as a quality measure in contracting for RRT and whether routinely collected data could be used as a proxy measure for QoL.</td>
</tr>
<tr>
<td>Max Kammerling</td>
<td>Suicides in Avon</td>
<td>There were substantial small area variations in suicides in Bristol. A literature review suggested the following for local implementation: ensuring an audit of suicides recently in contact with psychiatric services; identifying and improving safety measures at the Clifton Suspension Bridge; and reinforcement of media guidelines on the reporting of suicides. They used a local database as the source of information for the audit of suicides and also for a case-control study which provided evidence that the Bridge contributed significantly to the local pattern of suicides. This helped to set up a national competition seeking ways of making the Bridge safer. By focusing on a population health outcome and working in cooperation with local clinicians and academics, they were able to bring about changes in the quality of audit of suicides and in the provision of safety measures at a local suicide hotspot.</td>
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<tr>
<td>Keran Morgan and Max Kammerling</td>
<td>Locality profiling in Avon</td>
<td>Locality profiling techniques focused attention on different communities within their health authority of one million people. Population-based outcome measures in particular — SMRs and Census-derived morbidity indicators — provided compelling evidence on which to base the case for change. They defined 13 localities according to a set of key criteria. The information in their locality profiles included local perceptions of health and health care needs as well as information on the use of health services. They presented conclusions from one deprived locality in South Bristol together with the action taken. They explored reasons for wide variation in admission rates for psychiatry between localities as an example of the effect of locality profiling on local mental health services. Unemployment alone explained nearly 95% of the variation. They funded a number of developments to improve services available in the inner city and other deprived areas. They concluded that population outcome measures were essential tools in the task of distributing resources on a locality base within health authorities and also served to downplay vested interests.</td>
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<tr>
<td>Alison Frater</td>
<td>Linking data for locality analysis in West Hertfordshire</td>
<td>Programme budgeting – allocating expenditure by diseases across health care settings with information on health in localities – provided a means for assessing whether current patterns of expenditure were in line with the understanding of the pattern of diseases by the then Hertfordshire Health Agency. This approach linked information on the mortality and morbidity of the population with health service utilization through localities. They were able to devise referral rates by defined localities and relate these to demographic characteristics and to local health trends. Analysis of patterns of expenditure by disease then offered clearer insights into how well resources were allocated to meet current health needs. The study explored the implications for family planning services as a result of their approach. Their approach informed discussion on the appropriate deployment of health care services, highlighted anomalies in the distribution of resources which merited further investigation in relation to improving geographical equity and raised questions for work on clinical effectiveness.</td>
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<tr>
<td>Chris Watts and Sarah Meredith</td>
<td>Coronary heart disease in Barking and Havering</td>
<td>There were considerable variations in coronary heart disease mortality within their localities. They investigated a rise in hospital emergency admissions and found an increase in the number of episodes associated with coronary heart disease. They set up a study to investigate the management of patients with suspected acute manifestations of coronary heart disease presenting to hospital and whether there were clinically appropriate alternatives to admission. They will examine public perceptions of general practice to help them understand why there is apparent under-use of GP services. Their study also described their overall use of national population-based health outcome indicators within their health authority and localities. The indicators had in some circumstances stimulated detailed strategic reviews, and led to the setting up of multidisciplinary focus groups.</td>
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contracting increased the focus of clinical care on health outcome (case study 7). Centrally driven policies such as the priority on efficiency gains and waiting lists were generally thought to be a hindrance.

**Discussion**

The case studies highlighted some of the potential strengths, weakness and complexities of population-based health outcome indicators. The effect of indicators on clinical and managerial behaviour needs further research.\(^{20}\) Training is required to interpret the increasing use of these indicators and how to undertake relevant health outcome assessments. The proposed national framework for assessing performance will encourage comparisons in population-based health outcomes between health authorities but not within districts.\(^{13}\) These case studies suggested that health authorities with average values for a national comparative indicator could have considerable variations within their districts and that it was important to assess the reasons for these variations.

Training is also required to use information on effectiveness and to understand the complexity of implementing effective care in the face of clinical uncertainty and operational inefficiency. There are many different approaches to changing clinical practice.\(^ {21,22} \) Grol proposed that after identifying obstacles, change can result from educational, epidemiological and marketing approaches, which focused on internal processes, and behavioural, social interaction, organizational and coercive approaches, which focused on external influences.\(^ {22}\)

The case studies illustrated the role of evidence-based process proxies for outcome. Such indicators can have many advantages over outcome indicators such as mortality.\(^ {23}\) The case studies on hip and breast cancer highlighted the value of developing both process and outcome indicators. They stressed the importance of extending information sources, but highlighted the importance of assessing the cost effectiveness of such work, e.g. in setting up local registers to help monitor the management of various diseases. Routinely collected data in national and regional databases are an under-used resource;\(^ {24}\) national databases were not always available to health authorities. Audit data were rarely comparable between districts.

In summary, the DoH and NHS Executive should: (1) persuade health authorities to examine indicator variations within their district as well as between health authorities; (2) increase the monitoring of clinical care for diseases, such as hip fracture and breast cancer, at a district level based on comparative process and outcome indicators; (3) extend information sources to include information from audit, registers, prescribing cost data and special data collection; (4) develop process measures to be used alongside outcome measures when there is good evidence of the clinical effectiveness of the process leading to the desired outcome; (5) make information which clinicians already send to national databases available to local health authorities; (6) encourage standardization of the definitions used in audit standards which would be comparable between districts; (7) encourage the further training of health professionals as discussed above; (8) commission further research into the use and impact of indicators.

**Conclusions**

The case studies highlight what really happened when health authorities undertook a wide range of projects to investigate and
Table 3 Summaries of the case studies focusing on effectiveness

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<th>Authors</th>
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<th>Summary of how the case study is linked to improving health outcome</th>
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<tr>
<td>Nicholas Hicks, Jonathan Mant, and Sue Dopson</td>
<td>Corticosteroids in preterm delivery in Oxford</td>
<td>This study suggested that population-based outcome indicators and outcome measures were not necessarily a guide to the potential for improving the quality of health services. The perinatal mortality rate for Oxfordshire was below the national average but they found that not all women delivering at gestations less than 34 weeks were receiving antenatal corticosteroids. They suggested that for known effective interventions it was more appropriate to monitor and improve the quality of health services by monitoring and improving the relevant process measures. By the end of their project the proportion of women receiving corticosteroids had increased. They concluded that the main determinant of individual clinical decisions was clinicians' beliefs about what is best for their individual patients. They classified the causes of the gap between research and practice into one of two categories: (1) clinical uncertainty and (2) operational inefficiency. All their qualitative evidence pointed to the building of collaborative relationships between purchasers and providers based on trust and mutual respect as the most productive way of changing clinical practice.</td>
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<tr>
<td>Chris Todd and Carol Freeman</td>
<td>East Anglia audit of hip fracture</td>
<td>A regional group audited the management of hip fracture in East Anglia against recommendations from the Royal College of Physicians and a local consensus conference. They used a wide range of outcome indicators. There was diversity in clinical management and health outcomes at a provider level. There were significant differences between hospitals in mortality and development of pressure sores and in indicators of good practice such as prophylaxis against deep vein thrombosis, antibiotic prophylaxis, delays to surgery and early mobilization. They concluded that lower mortality appeared to be associated with the cumulative effects of a number of aspects of the organization of treatment and the management of hip fracture, including specialist team management, thromboembolic pharmaceutical prophylaxis, antibiotic prophylaxis and early mobilization. They did not examine variations in health outcome at a district level. They emphasized how examination of differences in health outcome (including case fatality) between provider units must take into account case mix and other potential confounders.</td>
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<tr>
<td>Leslie Klein, Susan Ellerby and Roger Simpson</td>
<td>Mental health and cardiac health in South Cheshire</td>
<td>The schizophrenia study focused on components in a proposed service specification that were known to be associated with improved outcome. These included strengthened community mental health nursing, specified liaison with hospital services, and specialized residential units for longer-term rehabilitation or placement for highly vulnerable people. In the cardiac study the focus was on changing diagnostic services and behaviour, which would lead to more appropriate and effective treatment and so improvements in personal and population health outcomes. Both these clinical areas were the subjects of an increasing volume and quality of evidence at a time when variations in access and outcome were becoming clearer.</td>
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<tr>
<td>Hiten Dodhia, Sandro Limentani, Jonathan Sexton, Julian Barlow</td>
<td>Diabetes in East Kent</td>
<td>The study described how a strategic review for diabetes identified models of service provision and desired health outcomes for use as measures of progress towards agreed targets for health gain. They developed eight key service target areas which were linked to improved health outcome and for which process measures could be developed and monitored.</td>
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<td>Matibalsingham Chandrakumar</td>
<td>Carotid stenosis in East Kent</td>
<td>They undertook a service review to examine the local provision for the management of carotid stenosis. Effectiveness evidence was used to determine for which patients it was appropriate to perform endarterectomy and which high-risk patients should be considered for screening. The author noted that from a population perspective endarterectomy would only reduce the total incidence of stroke by 1%. However, from an individual perspective the procedure can substantially improve health outcome in high-risk patients.</td>
</tr>
<tr>
<td>Peter Tiplady</td>
<td>Varicose veins in North Cumbria</td>
<td>The objectives of this study were to demonstrate the practicalities of developing health outcomes jointly with clinicians. They wanted to improve health outcome by more appropriate selection of patients for varicose vein surgery. They found the literature on the effectiveness of treatments for varicose veins unclear but will use their own study and local consensus to identify factors associated with improved outcome. The preliminary examination of results suggested a poor correlation between the outcome of varicose vein surgery as assessed by surgeons and that as assessed by patients using the EuroQol quality of life measures. In most cases the treatment of varicose veins was associated with improvement in important symptoms. They hoped to use the lessons from this study to develop health outcomes as a contract currency by specifying them in contracts as well as volume of activity.</td>
</tr>
</tbody>
</table>
Table 3 (Continued)

<table>
<thead>
<tr>
<th>Authors</th>
<th>Title</th>
<th>Summary of how the case study is linked to improving health outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peter Tiplady</td>
<td>Back pain in North Cumbria</td>
<td>The health authority set up a clinical group to produce and implement evidence-based guidelines. They chose back pain as their first topic because the use of such guidelines would lead to a cost-effective improvement in processes and outcomes in this common condition. The use of the guidelines highlighted major service deficiencies, revealed considerable unmet need and led to a considerable increase in the funding of physiotherapy services.</td>
</tr>
<tr>
<td>Case study 25</td>
<td></td>
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<tr>
<td>Sharon Abdul and Diana Forrest</td>
<td>Diabetes register in Liverpool</td>
<td>A primary care based diabetes register was set up to improve the effective management of diabetes and thereby to reduce morbidity and mortality. A register was necessary to monitor the use of shared care guidelines, and to obtain local process and outcome measures which were not available from routine data. Secondary coding of diabetes on routine HES data was poor.</td>
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<tr>
<td>Case study 26</td>
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</tbody>
</table>

We have summarized and documented here some of the successes, difficulties, and concerns which have been published more fully elsewhere. Public health departments played a major role in these population-based health outcome assessments. They should be encouraged to share their work more often. Not only can they benefit from each other’s experience, but collation of that experience could lead to further recommendations to enable the Department of Health to do more to help health authorities in their attempts to improve the health outcome of the populations they serve.

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**References**


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