Why general practitioners and consultants change their clinical practice: a critical incident study

Lynne A Allery, Penny A Owen, Michael R Robling

School of Postgraduate Medical and Dental Education, University of Wales College of Medicine, Cardiff CF4 4XN

Lynne A Allery, senior lecturer in medical education
Michael R Robling, research fellow

Llanedeyrn Health Centre, Cardiff CF3 7PN

Penny A Owen, general practitioner

Correspondence to: Ms Allery.

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Abstract

Objective: To describe the complete range of factors which doctors recognise as changing their clinical practice and provide a measure of how often education is involved in change.

Design: Interviews using the critical incident technique.

Setting: Primary and secondary care.

Subjects: Random sample of 50 general practitioners and 50 consultants.

Main outcome measures: Categories of reasons for change in clinical practice.

Results: Doctors described 361 changes in clinical practice, with an average of 3.0 reasons per change. The three most frequently mentioned reasons were organisational factors, education, and contact with professionals, together accounting for 47.9% of the total number of reasons for change. Education accounted for one sixth (16.9%) of the reasons for change and was involved in one third (37.1%) of the changes. Education was seldom mentioned as a reason for change in referral practice but was more often mentioned in management and prescribing changes. Consultants were influenced by medical journals and scientific conferences, while general practitioners were more influenced by medical newspapers and postgraduate meetings.

Conclusions: Education is involved in about a third of changes in clinical practice. The wide range of other factors affecting changes in practice need to be taken into account in providing and evaluating education. The role of education in the numerous changes in clinical practice that currently have no educational component should also be considered.

Introduction

An important objective of continuing medical education is to change doctors' behaviour. However, traditional quantitative studies investigating the relation between education and changes in clinical practice have several limitations. Firstly, only a few quantitative studies provide objective evidence of the effectiveness of continuing medical education programmes in changing physician performance or health care.¹⁻⁴ Secondly, many such studies do not address scientific criteria for the evaluation of educational events such as the use of control groups, methods of randomisation,

adequate statistical analysis of results, and internal and external validity.^{5,6}

The importance of gaining a wider understanding of the relation between education and change has recently been recognised. In addition to the quantitative, correlational approach other research methods are needed for exploring complex phenomena.^{4,7-10} Wergin *et al* recommended a shift away from trying to document whether an isolated education event changes physicians' behaviour, believing that the impact of continuing education can be understood only within the context of other important intervening variables.¹¹ Graham has emphasised the importance of researching the beliefs of clinicians if strategies to influence doctors behaviour are to succeed.¹²

We undertook a study to identify and categorise the complete range of factors that doctors recognise as changing their clinical practice and to describe the place of continuing education within this context. Instead of investigating whether an education event led to change we looked back to identify those factors which had initiated the change.

Subjects and methods

We interviewed 50 general practitioners and 50 consultants. The doctors were asked to describe a change they had made in four key areas of their clinical practice: management of a common clinical condition, prescribing, use of investigations, and referrals. Pilot interviews indicated that doctors were more likely to recall changes when asked about specific areas of clinical practice rather than general change in any part of their work. The four clinical areas were chosen on the basis of healthcare studies in the United States,³ and we added referral practice because of its importance in the United Kingdom.

We used the critical incident technique for this study.¹³ This method uses factual accounts of actual events in which the purpose and consequence of the behaviour are clear, focusing on the specific reasons for actions and behaviours. Incidents are categorised using inductive judgments rather than pre-existing theoretical models. The technique is recognised as a useful method where the subject matter is complex and when investigators want to understand the reasons for certain behaviour.¹⁴ It has been widely used in health services research.¹⁵⁻¹⁹

We used previous critical incident studies in health services research to estimate the number of changes that would provide sufficient data to construct a comprehensive classification framework.^{17 18}

Sample selection

General practitioners were randomly selected from the South Glamorgan Family Health Service Authority list of principals. Consultants working in South or Mid Glamorgan, representing teaching and non-teaching hospitals respectively, within general medicine, general surgery, or related specialties were also randomly chosen from lists provided by the employing authorities. We used a random sampling technique to ensure a representative sample of doctors.¹³

We contacted the doctors by telephone and explained the project. If the doctor wished to take part we sent a letter providing further details about the project and asking the doctor to think about examples of changes in their clinical practice before the interview.

The interviews

The interview schedule was developed during a pilot stage, which also enabled training of the single interviewer (MR). The schedule asked the doctors to describe a change they had made in their clinical practice in the preceding year. The interpretation of what constituted a change was determined by the individual doctors, although they were encouraged to consider situations where they were doing something different from what they had been doing a year ago.

The interview was semistructured to allow the interviewer to explore all the reasons the doctor may have had for making the change. Each doctor was asked if the interview could be tape recorded. Ten of the 100 interviews were not recorded, and notes taken during these interviews were used in the analysis. The interviews were conducted from October 1993 to November 1994.

Constructing the classification framework

The interview tapes were reviewed independently by each of us and by an independent advisory panel of three doctors. We met regularly over eight months to examine and discuss the reasons for change extracted from the interviews and to construct categories under which similar reasons for change could be grouped. The classification framework was extended and modified as further interviews were reviewed and new reasons for change extracted. We reached the stage at which no further changes in categories were required before all the interviews were analysed.

The reasons for change within most categories were grouped into subcategories. We produced definitions for each category and subcategory to ensure all were mutually exclusive. Full details of the classification framework are available from the authors.

Once the final classification framework had been constructed one of us (MR) coded all the reasons for change in clinical practice. Ten interviews with general practitioners and ten with consultants were independently coded by the two other authors to test for inter-rater reliability. Based on guidelines from Altman on the interpretation of κ values,²⁰ two of the study κ values (0.91 and 0.84) showed very good agreement and two (0.80 and 0.74) demonstrated good agree-

ment. Our study κ values are similar to values from other critical incident studies.^{16 21 22}

The presentation of the results in both a qualitative format (category definition statements) and a quantitative format (distribution of reasons for change) follows a trend towards accepting the appropriateness of study designs where data are analysed in both ways.²³⁻²⁶

Results

We contacted 130 doctors to obtain 100 interviews, giving a response rate of 77%. Consultants were slightly more likely to agree to be interviewed (50/61, 82%) than general practitioners (50/69, 72.5%).

All of the consultants interviewed were men, and the average number of years as a consultant was 12 (range 1-29 years). Of the 11 non-responders three were women, nine worked in South Glamorgan, and seven were physicians.

Among the general practitioners interviewed 33 (66%) were men, 14 (28%) worked in a training practice, and 20 (40%) were members of the Royal College of General Practitioners. The figures for non-responders were 15 (79%), six (32%), and eight (42%) respectively.

The physicians worked in general medicine (18), care of elderly people (five), cardiology (four), and thoracic medicine, neurology, and rheumatology (one each). Of the surgeons, 11 worked in general surgery, four in orthopaedics, three in ophthalmic surgery, and two in otolaryngology. Nearly all of the consultants (46) said they had some responsibility for undergraduate teaching.

Seven of the general practitioners were trainers, and 28 were undergraduate tutors. Seventeen general practitioners were either fundholding or preparing for fundholding. The average length of time as a principal was just under 11 years. The average number of partners was four; five doctors were singlehanded, and the largest practice had eight partners.

Number and types of changes described by the doctors

The 100 doctors provided 361 examples of change in clinical practice, with general practitioners describing 183 changes and consultants 178. Changes described varied from substantial organisational change—for

Table 1 Classification framework of doctors' reasons for changing clinical practice

Category	No of times given by		
	General practitioners	Consultants	All doctors (%)
Clinical experience	53	32	85 (7.9)
Contact with professionals	80	61	141 (13.1)
Economic	64	29	93 (8.6)
Education	80	102	182 (16.9)
Medicolegal	9	8	17 (1.6)
Organisation	109	84	193 (17.9)
Patient centred	63	41	104 (9.6)
Personal	23	16	39 (3.6)
Pharmaceutical companies	18	18	36 (3.3)
Pharmacology	31	25	56 (5.2)
Technology/tests	35	67	102 (9.4)
Waiting lists	21	11	32 (3.0)
Total	586	494	1080 (100)

example, setting up an asthma clinic—to specific changes in a single aspect of clinical practice—for example, change from cefotaxime to cefuroxime in the treatment of chest infections. General practitioners commonly described a change in asthma management (15) and increases in generic prescribing (20), referrals (14), and use of an investigation (20). Consultants commonly

described starting to use a drug (17) and increases in referrals (14) and use of an investigation (26).

The doctors gave 1080 reasons for the 361 changes in clinical practice, an average of three reasons per change. General practitioners described an average of 3.2 reasons per change, and consultants 2.8 reasons per change. The number of reasons per change ranged from one to 10. In 47 (13%) of the changes a single reason was described.

Analysis of the reasons for change resulted in a classification framework consisting of 12 categories and 50 subcategories. The appendix gives a brief summary of the definition statements for each category together with an example of a reason for change coded into each category.

Table 1 shows the distribution of the reasons for change in the 12 categories. The three categories containing the greatest numbers of reasons for change—organisation, education, and contact with professionals—accounted for nearly half (47.9%) of all reasons mentioned. Analysis of the results by change showed that organisational factors were involved in 147 of the 361 (40.7%) changes in clinical practice, education in 134 (37.1%), and contact with professionals in 118 (32.7%).

Table 2 gives a more detailed analysis of the reasons for change in the six most frequently mentioned categories. The most frequently mentioned subcategories of reasons for change were literature, which accounted for nearly a tenth of reasons for change; organisational factors originating at the hospital level (for example, hospital management, staffing, problems with or improvements in services or facilities in the hospital); and contact with consultants (for example, by letter or telephone, reading discharge letters).

We found differences in the distribution of reasons for change between the four clinical areas (table 3). Education was seldom mentioned as a reason for change in referral practice, but was more often mentioned in management and prescribing.

Table 4¹ gives the differences and similarities in the distribution of reasons for change of general practitioners and consultants in the education category. Consultants were influenced by medical journals and scientific conferences, while general practitioners were more influenced by medical newspapers and postgraduate meetings.

Discussion

We found that nearly all changes in doctors' clinical behaviour are due to a combination of factors. The reasons for change were numerous and wide ranging, and this finding is supported by other studies.^{7 11 27} Armstrong *et al* described how multiple factors are involved in general practitioners decisions to change their prescribing habits.²⁸ Education was involved in about a third of the doctors' changes in clinical practice in our study. Kerr *et al* found that for consultants the two most frequently mentioned educational reasons for change were reading medical journals and attending scientific meetings and correspondence,²⁹ which again agrees with our results. Organisational factors and contact with other health care professionals, together with education, accounted for nearly half of all reasons for change.

Table 2 Breakdown of reasons for change into subcategories for six most frequently mentioned categories

Category	No of times given by		
	General practitioners	Consultants	All doctors (%)
Organisation:			
Government	23	10	33 (3.1)
Health authority	10	0	10 (0.9)
Hospital	17	62	79 (7.3)
General practice	43	1	44 (4.1)
Workload	9	9	18 (1.7)
Uptake of new post	7	2	9 (0.8)
Education:			
Literature	39	60	99 (9.2)
Meetings	27	28	55 (5.1)
Research	4	6	10 (0.9)
Audit	4	6	10 (0.9)
Guidelines	6	2	8 (0.7)
Contact with professionals:			
Consultant	35	44	79 (7.3)
Training grade hospital staff	1	2	3 (0.3)
General practitioner	34	5	39 (3.6)
Non-medical	10	10	20 (1.9)
Patient centred:			
Patient led	35	10	45 (4.2)
Patient need	20	29	49 (4.5)
Doctor-patient interaction	8	2	10 (0.9)
Technology/tests:			
Improvement	11	34	45 (4.2)
Access	24	31	55 (5.1)
Use	0	2	2 (0.2)
Economic:			
Wish to save money	23	16	39 (3.6)
Pressure to save money	10	10	20 (1.9)
To obtain equipment	0	1	1 (0.1)
Lack of funding	0	2	2 (0.2)
Prescription charges	2	0	2 (0.2)
PACT data	15	0	15 (1.4)
Indicative drug budget	5	0	5 (0.5)
Income generation	9	0	9 (0.8)
All other categories	155	110	265 (24.5)
Total	586	494	1080 (100)

Table 3 Distribution of reasons for change in four clinical areas

Reason	Clinical area				Total
	Management	Prescribing	Referral	Investigation	
Clinical experience	19	14	27	25	85
Contact with professionals	27	38	31	45	141
Economic	18	63	4	8	93
Education	67	58	12	45	182
Medicolegal	5	0	5	7	17
Organisation	52	36	69	36	193
Patient centred	35	20	27	22	104
Personal	6	4	18	11	39
Pharmaceutical companies	16	18	2	0	36
Pharmacology	20	34	2	0	56
Technology/tests	12	1	9	80	101
Waiting lists	8	0	15	9	32
Total	285	286	221	288	1080

Table 4 Reasons for change given by general practitioners and consultants in education category

	General practitioners	Consultants
Literature:		
Scientific or medical journals	13	36
Medical newspapers	17	0
General press	5	3
Other	1	7
Unspecified	3	14
Organised education:		
Attendance at scientific meetings/ conferences	1	20
Postgraduate or clinical meetings/ general practice refresher courses	25	8
Supervision of trainees	1	0
Research	4	6
Audit	4	6
Disease management protocols or guidelines	6	2
Total	80	102

These findings have implications for both the provision and the evaluation of continuing medical education. We suggest that education providers should develop more multifaceted strategies, integrating their activities with the broad range of other factors which affect changes in clinical practice. Education should not be viewed as a stand alone activity. For the same reasons we suggest that when evaluating an educational event organisers should investigate whether the intervention had been one of a number of factors which led to change, not whether the event on its own led to a change. This approach is essential if the effectiveness of continuing medical education is to be established.

In our study nearly two thirds of the changes in clinical practice had no educational reason. Given the current emphasis on evidence based medicine, the question should be raised whether more changes in clinical practice should be supported by an educational component to ensure that they are both appropriate and maintained.

We found that audit and guidelines were infrequently mentioned as a reason for change. Similarly, Davis *et al* found that audit was one of the less effective change strategies in continuing medical education.⁴

Also of interest is that while general practitioners reported being influenced by both consultants and hospital organisation, consultants were rarely influenced by general practitioners or practice organisation. A future role for education could therefore be to aid two way learning between consultants and general practitioners.

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Appendix

Definitions and examples of the 12 main categories in the classification framework

1. Clinical experience

The doctor describes his or her everyday experiences in clinical practice as a reason for change.

"The life expectancy of this group [cystic fibrosis] has gone up ... so we are suddenly seeing an increasing number of them

Key messages

- Limited information is available from quantitative studies to understand the relation between education and change in clinical practice
- Doctors recognise organisational factors, education, and contact with professionals as influential in changing their clinical practice
- In this study education provided one sixth of the reasons for change, and was involved in one third of the changes
- The average number of reasons per change was three
- The wide range of factors involved in changing practice need to be considered in the provision and evaluation of education as does the role of education in the majority of changes in clinical practice which currently have no educational component

with liver problems. We are referring them earlier because we have a bit more experience with them, and we've learned that you can't delay."

2. Contact with professionals

Change has occurred due to contact with a hospital consultant (for example, by discussion, observation of their practice, discharge letters), training grade hospital staff, a general practitioner (for example, discussion with a partner, observation of their practice, practice meetings), and non-medical professionals (for example, pharmacist, nurse).

"There is no doubt that the face to face meeting has encouraged us to use a service that otherwise we might have felt diffident about ... seeing the man, listening to him talk, having the chance to question him ... encouraged us to change our practice."

3. Economic

The doctor has described economic consideration as a reason for change.

"I am looking to prescribe more generically [There are] several reasons for that, probably the most important is our prescribing costs and the fact that we are very high."

4. Education

Change has occurred due to an educational activity—for example, reading medical journals, attending an organised educational event, participation in research and audit, and the provision of clinical guidelines.

"Since I went to a ... postgraduate meeting of education about asthma ... by someone who had been on the committee producing the BTS guidelines."

5. Medicolegal

Complaints or medicolegal matters.

"Authorities ... appear in the popular press saying that it is negligent not to anticoagulate."

6. Organisation

Change has occurred due to organisational factors originating at a national level (for example, the

patient's charter), via a health authority, within a hospital (for example, an alteration in a clinic provided by the hospital) or a general practice (for example, a problem with a service provided in the service), workload factors, and the taking up of a new post.

"It was particularly prompted by the fact that we have a reduction in the number of our junior doctors now."

7. Patient centred

The doctor has described either the actions of the patient or a specific consideration of the patient as a reason for change.

"An exercise test performed at the same visit ... more convenient for the patient."

8. Personal

The doctor has described his or her own interests, beliefs, or attitudes as a reason for change.

"I was not happy, didn't enjoy doing [back/spinal surgery], and I didn't feel I was doing it often enough."

9. Pharmaceutical companies

The activities of a pharmaceutical company.

"The drug representative ... explained everything and I took her word and I found she was perfectly right."

10. Pharmacology

Pharmacological developments.

"A slight change in the pharmacology which means that there is a slightly better tolerated drug on the market."

11. Technology/tests

Technological developments.

"It's less hit and miss [magnetic resonance imaging]—it's successful every time, whereas there is a failure rate with myelography."

12. Waiting lists

Waiting list times.

"Because of the dreadful wait, I mean 18 months getting on to 2 years."

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Deep truth

My friend, Steven Shapin, moved to the University of California in San Diego a few years ago. But we keep in touch by email. He's a historian of science and his recent work has been about the scientific revolution of the 17th century. After Newton and Galileo he must find modern scientists of his acquaintance a bit of a disappointment. One of the things that he has been interested in is how scientific truth came to be accorded its special status; how even people who know little or nothing about science think of it as being in a different category from, say, economics or politics. And he argues that to understand how this distinction came to be made we need to look back to the practices of 17th century experimental and observational natural philosophers. He probably thinks that I've been slow to grasp the point because he sent me this story the other day.

"Niels Bohr," he wrote, "liked to illustrate the subtle nature of truth with an anecdote about his great-grandfather, the teacher Peter Georg Bohr, who once explained to his class the text: Man having put his hand to the plough, and looking back is fit for the kingdom of

God (St Luke ix, 62). 'That means,' he said, 'that you must be guided by ancient wisdom.' A student raised his hand. 'But the text actually reads: No man, having put his hand to the plough, and looking back is fit for the kingdom of God. 'Of course,' replied Peter Bohr, 'and it means that you must be ready to move on without being constrained by the past.' To which Niels used to add that this was an example of deep truth, a statement just as true as its opposite, in contradistinction to a triviality, the opposite of which is false; and that it was the task of science to reduce deep truths to trivialities."

Christopher Martyn is a clinical scientist at the Medical Research Council Environmental Epidemiology Unit in Southampton

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