

Achieving health gain through clinical guidelines II: Ensuring guidelines change medical practice

Jeremy M Grimshaw, Ian T Russell

"Clinical guidelines are proliferating on both sides of the Atlantic."¹ Nevertheless there is considerable uncertainty whether this will improve clinical practice.² We therefore systematically reviewed published evaluations of clinical guidelines.³ We identified 59 rigorous evaluations covering a wide range of clinical activities, all but four of which detected statistically significant improvements in the process of medical care and all but two of the 11 that also measured the outcome of care reported statistically significant improvements in outcome. We concluded that guidelines improve clinical practice and achieve health gains when introduced in the context of rigorous evaluations.

Within the United Kingdom, clinical guidelines are likely to be incorporated into contracts between purchasers and providers.⁴ However, if these guidelines are to achieve the health gains reported in our review,³ two things are needed. Firstly, purchasers and providers should identify scientifically valid guidelines in the sense that, when followed, they lead to the health gains projected for them.⁵ To this end we have proposed a classification of factors influencing the validity of guidelines, designed to inform choice about which guidelines should be integrated into contracts. Greater validity is likely to follow from the use of systematic literature reviews, of independent guideline development groups including representatives of all key disciplines, and of explicit links between recommendations and scientific evidence.⁵ Secondly, purchasers and providers should ensure that these scientifically valid guidelines are successfully introduced, in the sense that medical practice is significantly changed in the direction proposed by the guidelines, thus leading to health gain. The successful introduction of guidelines is dependent on many factors, including the clinical context and the methods by which they are developed, disseminated, and implemented.⁶ Different methods are appropriate in different contexts. In this paper we tabulate the methods adopted by the studies identified by our review (tables 1-3)³ and propose a framework for successful introduction of guidelines, covering development, dissemination, and implementation strategies. We use the term "dissemination strategy" to describe educational interventions that aim at influencing targeted clinicians' attitudes to, and awareness, knowledge, and understanding of, a set of guidelines and we use "implementation strategy" to describe interventions that aim at improving targeted

clinicians' compliance with guideline recommendations (that is, to turn changes in attitudes and knowledge into changes in medical practice). Although this distinction is helpful in exploring the process of introduction of guidelines, we recognise that some interventions influence both dissemination and implementation.

Development strategies

In developing clinical guidelines the aim is to produce explicit recommendations that are both scientifically valid and helpful in clinical practice. We previously discussed factors that may influence the development of scientifically valid guidelines.⁵ We now consider factors associated with the successful introduction of guidelines, including who develops them, how they are developed, and how they are presented.

WHO SHOULD DEVELOP GUIDELINES?

Guidelines can be developed by internal groups (composed entirely of the clinicians who will use them), intermediate groups (including some of the clinicians who will use them), or external groups (none of whom will use them).⁵ Studies evaluating internal, intermediate, or external guidelines all observed significant changes in clinical behaviour. Three studies directly compared the success of internal guidelines and local external guidelines (table 1). Sommers *et al*, evaluating guidelines for managing unexplained anaemia in four community hospitals in the United States, observed that, though the introduction of internal guidelines had no effect on compliance, that of local external guidelines increased compliance.¹⁶ In contrast, Putnam and Curry reported a greater increase in compliance when Canadian family physicians developed their own guidelines for five common conditions than when they received guidelines developed by others.¹⁹ Similarly, in the North of England Study of Standards and Performance in General Practice, which compared the success of internal guidelines and local external guidelines for five common paediatric conditions, significant changes in process and in outcome were apparent only when general practitioners developed their own guidelines.²⁸

Although fewer resources are needed to disseminate and implement internal guidelines than intermediate or external guidelines,³ internal guidelines are less likely to be scientifically valid^{5 68} because local groups lack the clinical, managerial, and technical skills

**University of
Aberdeen,
Foresterhill, Aberdeen
AB9 2ZD**

Jeremy M Grimshaw,
senior lecturer,
department of general
practice
Ian T Russell, director,
health services research
unit

Correspondence to:
Dr J M Grimshaw,
Department of General
Practice, University of
Aberdeen, Foresterhill
Health Centre, Westburn
Road, Aberdeen AB9 2ZD

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Table 1 Development, dissemination, and implementation strategies adopted by rigorous evaluations of guidelines for clinical care⁵

Year	Authors	Subject	Type of guideline	Method of dissemination	Method of implementation	Effect on process	Effect on outcome
1976	McDonald ⁷	Diabetes and various medical conditions	External local	None reported	Computer generated reminder in notes	+++	-
1976	McDonald ⁸	Various medical conditions	External local	None reported	Computer generated reminder in notes	+++	-
1978	Barnett <i>et al</i> ⁹	Streptococcal sore throat	Intermediate	Guidelines "determined" by medical and nursing staff	Failure to comply caused computer generated reminder following consultation	++	-
1978	Sanazaro and Worth ¹⁰	Various medical, surgical, and paediatric conditions	External national	Guidelines approved by medical staff	Guidelines inserted in patients' notes	+	0
1980	Hopkins <i>et al</i> ¹¹	Hypotensive shock	External local	Residents instructed in use of guidelines for 30 minutes	Copy of guidelines carried by residents	++++	++
1980	Linn ¹²	Management of burns	External national	Seminar lasting 4 hours focusing on guidelines	Copy of guidelines kept in emergency department	+	++
1980	McDonald ¹³	Various medical conditions	External local	Supporting publications available on request	Computer generated reminder (+/- bibliographic citation) in notes	++	-
1983	Barnett <i>et al</i> ¹⁴	Hypertension	External local	None reported	Failure to comply caused computer generated reminder following consultation	++++	++
1983	Thomas <i>et al</i> ¹⁵	Diabetes	External local	None reported	Computer generated reminder in notes	++	0
1984	Sommers <i>et al</i> ¹⁶	Unexplained anaemia	Internal and external	Internal post	Phase 1 - feedback on baseline compliance Phase 2 - failure to comply caused computer generated reminder after consultation	++ ++++	-
1985	Norton and Dempsey ¹⁷	Cystitis and vaginitis	Internal	None reported	Feedback on baseline compliance	+++	-
1985	Palmer <i>et al</i> ¹⁸	Various medical and paediatric conditions	Intermediate	Guidelines discussed, assessed, and then posted	Feedback on baseline compliance discussed then posted	++	-
1985	Putnam and Curry ¹⁹	Various medical conditions	Two internal, three external	External guidelines posted	Interview with feedback on baseline compliance, subsequent personal educational package	++++	-
1986	Brownbridge <i>et al</i> ²⁰	Hypertension	Intermediate	Guidelines discussed with participants	Paper or computerised protocol as part of medical record	++	-
1986	McAlister <i>et al</i> ²¹	Hypertension	External provincial	Guidelines posted to all participants	Computer generated reminder in notes	0	++
1986	Wirtschafter <i>et al</i> ²²	Neonatal respiratory distress syndrome	External local	Lectures lasting 3 hours with/without training in protocol use	Protocol embedded within medical record	+	-
1987	Kosecoff <i>et al</i> ²³	Breast cancer, caesarean section, coronary artery bypass grafting	External national	Published in medical press posted to relevant professionals	None	0	-
1989	Lomas <i>et al</i> ²⁴	Caesarean section	External national	Published in medical press, posted to relevant professionals	None	+	-
1991	Lomas <i>et al</i> ²⁵	Caesarean section	External national	(A) Educational programme led by opinion leader (B) Local guideline adaptation	(A) None (B) Aggregated feedback and discussion of hospital compliance	++ 0	-
1992	Durand-Zaleski <i>et al</i> ²⁶	Hypovolaemia	External national	Internal post to all doctors, meetings for all prescribers	Monthly feedback on total albumin use and cost to all prescribers	++++	-
1992	Margolis <i>et al</i> ²⁷	Six paediatric conditions	External local	Clinicians adapted guidelines for local use	Protocol within computerised medical record	+++	-
1992	North of England Study of Standards and Performance in General Practice ²⁸	Five paediatric conditions	Internal and external	External guidelines posted	Feedback on baseline compliance	+	++++
1992	Sherman <i>et al</i> ²⁹	Localised prostatic carcinoma	External national	Published in medical press, posted to relevant professionals	None	0	-
1993	Emslie <i>et al</i> ³⁰	Infertility	Intermediate	Posted to relevant professionals	Protocol embedded within medical record	++++	-

- Outcome not measured.

0 No significant improvement.

+ Significant improvement <10% in absolute terms.

++ Significant improvement 10-19.9% in absolute terms.

+++ Significant improvement 20-29.9% in absolute terms.

++++ Significant improvement ≥30% in absolute terms.

needed to develop guidelines.^{69 70 72} Furthermore, greater resources in total are needed to develop internal guidelines.⁶⁸ In Scotland the Clinical Resource and Audit Group has recently proposed an attractive solution to the potentially conflicting demands of developing a guideline that is both scientifically valid and likely to change medical practice.^{5 73} It suggests that resources should be devoted to the development of national scientifically valid

guidelines which can be modified locally to reflect context and resources. Nevertheless, further research is required to identify the most effective forum for developing guidelines, whether national or local.

HOW SHOULD GUIDELINES BE DEVELOPED?

The methods used to develop guidelines include consensus conferences, peer groups, and the Delphi technique (in which consensus

Table 2 Development, dissemination, and implementation strategies adopted by rigorous evaluations of guidelines for preventive care⁵

Year	Authors	Subject	Type of guideline	Method of dissemination	Method of implementation	Effect on process	Effect on outcome
1978	Morgan <i>et al</i> ³¹	Antenatal care	External national	Guidelines discussed at departmental meetings	Failure to comply caused computer generated reminder after consultation	++	-
1982	Cohen <i>et al</i> ³²	Preventive care	External local	Five seminars on preventive medicine	Copy of guidelines attached to patients' notes	++++	-
1983	Rodney <i>et al</i> ³³	2 Adult immunisations	External local	Educational programme on preventive medicine	Medical record redesigned to highlight health maintenance (including tetanus and pneumococcal vaccinations)	++	-
1983	Thompson <i>et al</i> ³⁴	Investigations in "routine" physical examinations	Intermediate	Extensive educational programme over 2 years	2× aggregated feedback	+++	-
1984	McDonald <i>et al</i> ³⁵	9 Preventive tasks and six laboratory tests	External local	None reported	Computer generated reminder in notes	+++	*
1984	Winickoff <i>et al</i> ³⁶	Colorectal cancer screening	Internal	Regular meetings of Department of Internal Medicine	Feedback of group and individual compliance	++	-
1985	Cohen <i>et al</i> ³⁷	13 Preventive tasks	External local	Internal post	Credit at university bookshop after reading guidelines	†	-
1986	McDowell <i>et al</i> ³⁸	Influenza vaccination	External national	None reported	Computer generated reminder in notes	++	-
1986	Prislin <i>et al</i> ³⁹	2 Preventive tasks	External local	Conference on preventive care and use of flowsheet	Flowsheet in patients' notes	++++	-
1986	Tierney <i>et al</i> ⁴⁰	11 Preventive tasks	External local	Internal post	(A) Computer generated reminder in notes (B) Computer generated monthly feedback on patient specific non-compliance	++ +	-
1987	Cheney and Ramsdell ⁴¹	12 Preventive tasks	External national	None reported	Checklist placed in patients' notes	++	-
1987 } 1989 }	Cohen <i>et al</i> ⁴²⁻⁴³	Smoking cessation	External national	1 hour lecture and booklet on smoking cessation	Two types of reminders in patients' notes	++++	-
1988	Robie ⁴⁴	3 Preventive tasks	External national	Lecture on cancer screening	Reminder in notes	+++	-
1988	Schreiner <i>et al</i> ⁴⁵	4 Preventive tasks	External national	None reported	Reminder in notes	+	-
1988	Wilson <i>et al</i> ⁴⁶	Smoking cessation	External national	4 hour training in smoking cessation	Patients recruited by receptionist	++++	+
1989	Becker <i>et al</i> ⁴⁷	9 Preventive tasks	External national	None reported	Reminder in notes	+	-
1989	Chambers <i>et al</i> ⁴⁸	Mammography	External national	None reported	Computer generated reminder in notes	++	-
1989	Cummings <i>et al</i> ⁴⁹	Smoking cessation	National external	3 hour continuing medical educational programme	Reminder in notes	++	+
1989	McDowell <i>et al</i> ⁵⁰	Blood pressure screening	External national	None reported	Computer generated reminder in notes	++	-
1989	McDowell <i>et al</i> ⁵¹	Cervical screening	External national	None reported	Computer generated reminder in notes	0	-
1989	McPhee <i>et al</i> ⁵²	7 Preventive tasks	External national	None reported	(A) Computer generated reminder in notes (B) Aggregated feedback	+++ ++	-
1991	McPhee <i>et al</i> ⁵³	11 Preventive tasks	External national	None reported	Computer generated reminder in notes	++	-
1991	Rosser <i>et al</i> ⁵⁴	Smoking cessation	External national	None reported	Computer generated reminder in notes	+++	-
1992	Cowan <i>et al</i> ⁵⁵	7 Preventive tasks	External national	None	Guidelines placed in patients' notes	+	-
1992	Headrick <i>et al</i> ⁵⁶	Cholesterol	External national	Lecture	(A) Computer generated reminder in notes (B) Guidelines placed in patients' notes	++ +	-
1992	Lilford <i>et al</i> ⁵⁷	Antenatal care	Intermediate	None reported	New paper record or computerised questionnaire	+	-
1992	Rosser <i>et al</i> ⁵⁸	Tetanus vaccination	National external	None reported	Computer generated reminder in notes	++	-

- Outcome not measured.

0 No significant improvement.

+ Significant improvement <10% in absolute terms.

++ Significant improvement 10-19.9% in absolute terms.

+++ Significant improvement 20-29.9% in absolute terms.

++++ Significant improvement ≥30% in absolute terms.

*Authors report significantly fewer emergency room visits by patients treated in study group during influenza epidemic.

†Authors report "modest" increase in compliance.

is achieved by successive circulation of a postal questionnaire); we have described these methods in detail elsewhere.⁷¹ Although all evaluated methods were successful in at least two studies,³ it is difficult to draw conclusions about which method is best in given circumstances. In many studies the method of development was not explicitly stated, in others the potential of a method of development is difficult to judge in the face of unsatisfactory dissemination and implementation strategies. For example, three studies evaluating guidelines developed by consensus conference found little change in medical practice (table 1).^{23 24 29} However, the guide-

lines were disseminated with little effort and without any attempt at implementation. In contrast, Lomas *et al* identified substantial improvements in performance when such guidelines on caesarean section were disseminated by a local "opinion leader",²⁵ and Durand-Zaleski *et al* reported even greater improvements when guidelines on hypovolaemia were disseminated at local meetings and implemented through monthly feedback.²⁶ From these five studies we can conclude that the successful introduction of guidelines developed by consensus conference is very dependent on the choice of appropriate dissemination and implementation strategies.

Table 3 Development, dissemination, and implementation strategies adopted by rigorous evaluations of guidelines for prescribing and ancillary services⁵

Year	Authors	Subject	Type of guideline	Method of dissemination	Method of implementation	Effect on process
1976	Brook and Williams ³⁴	Prescribing of injectable antibiotic	Intermediate	Guidelines posted to all doctors and visits to doctors not complying with guidelines	Payment denied for Medicaid claims not complying with guidelines	++++
1980	Lohr and Brook ³⁵					
1984	Fowkes <i>et al.</i> ³¹	Skull x ray examinations for patients with head injuries	National external	Guidelines approved by senior staff, two seminars on guidelines	Structured head injury casualty card	++++
1986	Fowkes <i>et al.</i> ³²	Preoperative chest x ray examinations	National external	Guidelines approved by senior staff and sent to all consultants	(A) Utilisation review committee (B) Feedback on individual compliance (C) New chest x ray examination forms (D) Review of requests by radiographers	++ ++ + ++
1988	Landgren <i>et al.</i> ⁶⁵	Antibiotic prophylaxis in surgery	Intermediate	Educational marketing programme	Feedback on and discussion of baseline compliance	+++
1990	Bareford and Hayling ⁷¹	Haematological tests	External local	Postal distributing and introductory lecture to junior medical staff	Monthly comparative feedback and inappropriate expensive tests cancelled	+++
1990	Clarke and Adams ⁶³	Skull x ray examinations for patients with head injuries	Intermediate	Posters and lectures to new casualty doctors	Copy of guidelines distributed to casualty officers	+++
1990	De Vos Meiring and Wells ⁶⁶	9 Radiological investigations	External local	Guidelines approved by local medical committee and sent to all general practitioners	None	+++
1992	Gama <i>et al.</i> ⁶⁷	Cardiac enzyme tests	Intermediate	Presentation to department	None	++++

+ Significant improvement <10% in absolute terms.

++ Significant improvement 10–19.9% in absolute terms.

+++ Significant improvement 20–29.9% in absolute terms.

++++ Significant improvement ≥30% in absolute terms.

The studies also serve to illustrate why there is general uncertainty over whether clinical guidelines change medical practice.

HOW SHOULD GUIDELINES BE PRESENTED?

There is little published information on the effect of the style and format of guidelines on their adoption. In the North of England study, peer groups of general practitioners showed considerable diversity in the style of their internal standards,⁶⁹ but this did not prevent substantial improvements in process and outcome (table 1).²⁸ In contrast, the Harvard Community Health Plan has established a quality assurance programme based exclusively upon algorithms,⁷⁴ building on their successful use as a method of information transfer in educational settings.⁷⁵ However, doctors are often reluctant to use algorithms in everyday practice because of their apparent complexity and lack of flexibility.^{76–77} A recent guideline for urinary incontinence sponsored by the Agency for Health Care Policy and Research⁷⁸ has responded to these criticisms by adopting an annotated algorithmic format incorporating literature citations and patient counselling notes.

Kahan *et al.* analysed the content of 24 consensus statements by the National Institutes of Health (NIH) and suggested that variations in style may affect their acceptance by clinicians.⁷⁹ Subsequently, the national institutes encouraged consensus development conferences to produce guidelines which were concrete (making specific recommendations), didactic (offering practical advice to the clinician), and differentiating (dividing patients into specific subclasses). Whatever format is chosen, it is important that the guideline is both reader friendly and comprehensive.⁸⁰ To meet these potentially conflicting demands many institutions now

produce guidelines containing a short summary of the principal recommendations (which can be consulted in clinical practice), underpinned by detailed documentation about the process of guideline development and the scientific basis. Although more research is needed, it is reassuring to note that rigorously evaluated guidelines have achieved success with a wide range of styles and formats.³

Dissemination strategies

Dissemination strategies aim at influencing targeted clinicians' awareness, attitudes, knowledge, and understanding of a set of guidelines. These strategies include publication in professional journals, postal distribution to relevant groups, incorporation within continuing medical education, and educational initiatives that focus specifically on the guidelines. Unfortunately, in many of the studies we reviewed, the method of dissemination was not explicitly stated.

Of the six studies that reported on guidelines disseminated without concurrent implementation strategies, three were consensus conferences that generated little or no change in clinical practice (table 1).^{23 24 29} Yet, one reported moderate success in reaching the appropriate target audience,²³ and another found that 90% of doctors were "aware of the guidelines" and concluded that dissemination of "guidelines may predispose physicians to consider changing their behaviour but may not effect rapid change in the absence of other incentives."²⁴

Rodney *et al.* were able to observe the effect of an educational programme on adult immunisation before the institution of implementation strategies; they observed little improvement in compliance before implementation (redesigning the medical records to highlight health maintenance activities

including immunisation) but a significant improvement thereafter (table 2).³³ Only two studies observed significant changes in clinical practice after the dissemination of guidelines without an explicit implementation strategy (table 3).^{66 67}

In contrast, all the other successful studies we reviewed undertook implementation very soon after dissemination. Our review also suggests that the more overtly educational the dissemination strategy, the greater the likelihood that the guidelines will be adopted within clinical practice, provided that dissemination of guidelines is reinforced by an appropriate implementation strategy.

Implementation strategies

Implementation strategies are intended to encourage clinicians to change their own clinical practice in line with guidelines, and they may be divided into those that operate during or outside the doctor-patient consultation.

STRATEGIES OPERATING DURING CONSULTATION

Implementation strategies operating within the doctor-patient consultation include general reminders of the guidelines, feedback specific to the previous care of individual patients, changes in medical records, and patient specific reminders at the time of consultation.

The simplest strategy is to provide clinicians with easily accessible copies of the guidelines; successful studies have used posters (tables 1, 3)^{12 65} or guidelines packaged in a format that can be easily carried.^{11 63} Feedback specific to individual patients was successfully used in five studies (tables 1, 2).^{9 14 16 31 40} Successful changes to medical records have introduced computerised history taking^{20 27 57} or focused on a defined activity or condition (tables 1, 3).^{33 61 62}

Several different methods have been used to provide patient specific reminders at the time of consultation. The simplest strategy is to place a copy of the guidelines in the patient's notes (tables 1, 2).^{10 32 55 56} For example, Cowan *et al* who did this with preventive care guidelines (without any further attempt at dissemination) observed significant improvements in the provision of preventive care (table 2).⁵⁵ Other studies have placed a checklist, flowsheet, or reminder based on the guidelines in patient's notes.^{39 41-45 47 49} In some studies guidelines were embedded in a supplementary medical record or investigation request form. For example, Wirtschafter *et al* provided Canadian community hospitals with medical record cards containing embedded protocols for specific neonatal emergencies, and they reported significant improvements in managing neonatal respiratory distress syndrome (table 1).²² Emslie *et al* reported improvements in general practice management and referral of infertile couples when guidelines were embedded within an infertility management package.³⁰ Many studies have reminded doctors about previous non-

compliance with guidelines at the time of consultation: patients' notes are screened before the consultation, either by a trained health care professional or more often by a computer, and reminders are placed only in those notes not complying with the guidelines (tables 1, 2).^{7 8 11 13 15 21 35 38 40 48 50-54 56 58}

STRATEGIES OPERATING OUTSIDE CONSULTATION

Strategies operating outside the consultation that have been rigorously evaluated include aggregated feedback on compliance with guidelines, introducing financial incentives, explicit marketing, and peer review organisations. Feedback of aggregated data on performance is commonly used in medical audit but varies in its evaluated success.^{25 26 34 36 52 62 64} Reporting on a direct financial incentive, Brook *et al* observed a dramatic reduction in the prescription of injectable antibiotics when payment was denied for claims not complying with the guidelines (table 3).^{59 60}; reporting on an indirect financial incentive, Cohen *et al* observed that residents who were offered a credit at the university bookshop showed improved knowledge of the guidelines but only a "modest" increase in compliance (table 2).³⁷ Several studies have used advertising campaigns to implement guidelines: for example, Landgren *et al* mounted a successful "educational marketing campaign" to implement guidelines for prophylactic antibiotic use in 12 Australian hospitals (table 3).⁶³ Although the use of peer review organisations to stimulate change is mostly associated with the United States, the only two rigorous evaluations are British: Fowkes *et al* showed that a utilisation review committee successfully discouraged chest x ray examinations⁶² and Bareford and Hayling that professional monitoring reduced inappropriate laboratory testing.⁶⁴

RELATIVE EFFECTIVENESS OF IMPLEMENTATION STRATEGIES

Several studies have compared different implementation strategies. Fowkes *et al* compared four strategies to promote guidelines for routine preoperative chest x ray examinations – namely, utilisation review committee, feedback on individual compliance, introduction of a new x ray examination request form, and review of requests for x ray examinations by radiologists: all were moderately successful, none more so than the other three (table 3).⁶² In a sequential study Sommers *et al* compared the effect on managing unexplained low haemoglobin concentration of two different types of feedback – aggregated versus patient specific feedback: they found that both strategies improved compliance but patient specific feedback was better (table 1).¹⁶ Lomas *et al* compared the effects of the traditional audit cycle with continuing education led by a local "opinion leader": they observed significant improvements in compliance with guidelines for caesarean sections only for the opinion

leader.²⁵ McPhee *et al* compared computer generated reminders placed in patients' notes with aggregated feedback to promote cancer screening; both strategies were successful but reminders were better (table 2).³² Headrick *et al*, comparing two strategies to improve compliance with National Cholesterol Education Program guidelines – namely, copies of the guidelines and computer generated reminders, both placed in patients' notes – showed that both strategies improved compliance but that reminders were better.⁵⁰ Tierney *et al* compared the effects of two strategies on compliance with preventive care protocols – monthly patient specific feedback and patient specific reminders at the time of consultation – and they found that both strategies improved compliance but that reminders were better.⁴⁰

In summary, implementation strategies operating within the consultation that focus on the management of individual patients are more likely to lead to changes in medical practice. Although there is little evidence on the relative effectiveness of strategies operating outside the consultation, they seem to have contributed substantially to the success of guidelines when they have been used.

Discussion

Clinical guidelines can change medical practice and achieve health gains.⁵ However, if guidelines are to achieve health gain through the contracting process purchasers and providers need to identify successful strategies for introducing them into clinical practice. Although literature reviews have begun to identify effective techniques for introducing clinical guidelines and to propose an agenda for future research,⁸¹⁻⁸³ they have not attempted to quantify the relative effectiveness of different strategies.

In this paper we have shown that the introduction of clinical guidelines is a complex process with three crucial stages: creating a guideline (development), assimilation of the guideline by clinicians (dissemination), and ensuring clinicians act on the guideline (implementation). By examining the strategies adopted in rigorous evaluations of clinical guidelines we have previously identified those most likely to change medical practice.⁶ This review has reinforced our previous conclusions⁶ – namely, that if guidelines are developed internally by the clinicians who are to use them few resources are needed to disseminate or implement them whereas successful introduction of guidelines developed externally needs much more

emphasis on dissemination and implementation. Table 4 provides a basic framework for those using guidelines, but the evidence available on the relative effectiveness and efficiency of different strategies is still sparse.

Furthermore, only 10 of the studies reviewed were conducted in the United Kingdom; four of these were concerned with radiological investigations. It is therefore timely to explore this classification more thoroughly in the context of the restructured NHS. The challenge to those who evaluate guidelines in future is to provide rigorous evidence on the relative merits of different combinations of development, dissemination, and implementation strategies.

Despite this call for further research, three conclusions can be drawn. Firstly, clinical guidelines cannot achieve health gains unless they are scientifically valid (in the sense that they are rigorously developed and thus consistent with the available scientific evidence or, without such evidence, best clinical judgement.⁵ Secondly, clinical guidelines can achieve health gains if appropriate development, dissemination, and implementation strategies are adopted during their introduction. Thirdly, implementation strategies provide the key to the successful introduction of intermediate or external guidelines, which are potentially more valid³; in particular, implementation strategies that use information technology to focus on consultations with individual patients rather than general performance are very likely to change practice. This suggests that major advances will stem from the development of real time information systems in both hospital and general practice.

Finally, if guidelines are to achieve maximum benefit within the multidisciplinary NHS⁸¹ careful attention should be given in their introduction to the principles of change management⁸⁵; in particular, successful introduction needs leadership; energy; avoidance of unnecessary uncertainty; good communication; and, above all, time.⁷²

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Table 4 Factors influencing the successful introduction of guidelines⁶

Relative probability of being effective	Development strategy	Dissemination strategy	Implementation strategy
High	Internal	Specific educational intervention	Patient specific reminder at time of consultation
Above average	Intermediate	Continuing medical education	Patient specific feedback
Below average	External local	Posting targeted groups	General feedback
Low	External national	Publication in professional journal	General reminder of guidelines

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