

# No Magic Targets! Changing Clinical Practice To Become More Evidence Based

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*This article focuses on the diffusion and adoption of innovations in clinical practice. The authors are specifically interested in underresearched questions concerning the latter stages of the creation, diffusion, and adoption of new knowledge, namely: What makes this information credible and therefore utilized? Why do actors decide to use new knowledge? And what is the significance of the social context of which actors are a part?*

**This article focuses on the diffusion** and adoption of innovations within the context of clinical practice. We are specifically interested in what we regard to be underresearched questions concerning the latter stages of the creation, diffusion, and adoption of new knowledge, namely: What makes this information credible and therefore utilized? Why do actors decide to use new knowledge? And what is the significance of the social context of which actors are a part? The article also attempts to address these questions in a novel way in that it arises from regular meetings of two groups of researchers working within the rapidly developing field of health services organizational research in the U.K, who have over the last 2 years sought to reflect on their research activity in relation to these questions. In particular, we have considered whether it would be additive to “scale up” or aggregate analyses by taking an overview across a suite of seven related and recently completed studies that consider the diffusion of innovation. We were interested in exploring, first, if pooling results across this family of related studies would produce more generalizable findings. And second, if so, what are the rules of method to be adopted and do they differ from those apparent within the conventional systematic review paradigm? Here we concentrate on the first aspect of our work together. (The work on rules of method is discussed in Ferlie et al.<sup>1</sup>)

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The article is organized as four sections. First we give a very brief discussion of the general themes within the relevant literature on innovation, diffusion, and knowledge utilization. (This literature is reviewed in depth in Chambers' dissertation.<sup>2</sup>) It is this body of academic work that has shaped our various research projects and to which we seek to contribute. The second section documents the research design and databases on which the third section—the presentation of generalizable findings—derives. Finally we reflect on the managerial and policy implications flowing from the work.

### INNOVATION, DIFFUSION AND KNOWLEDGE

The diffusion of innovations has become a burgeoning area of research in health care settings and is an important topic within the U.K. health care policy context. This prominence is directly related to the push to apply the principles of evidence-based medicine (EBM) within clinical practice. The EBM movement centers on the results of a great deal of research that suggest a significant gap between what research is available and what is done in clinical practice. It advocates ensuring that clinical practice is continually informed by the results of robust research. For the past several years, EBM has been viewed by many policy makers, managers and clinicians as an important lever to ensure clinical practice is more effective and represents value for money.

The majority of statements from policy makers and in policy documents on EBM implementation draw on classic diffusion of innovation models, the most influential of which remains Rogers.<sup>3</sup> Rogers argues that the adoption of new ideas, practices, and artefacts is influenced by the interaction among the innovation, the adopter, and the environment. In his view there are five characteristics that influence the success rate of adoption: the perception of the relative advantage of innovation; the compatibility with existing structures; the degree of difficulty involved in making the change; the extent to which the innovation can be tested by potential adopters without significant resource expenditure, and the visibility of the outcomes. Rogers' early work has been criticized for adopting a rational view of how change is achieved and for its simplicity in relation to the complexity of the change process.<sup>4</sup> Furthermore, while his later work (from 1995) explicitly considers the nature of the adoption process within large organizations rather than by individuals, a unitary perspective is still evident, for

example according to Rogers later stages in the innovation process cannot be undertaken until earlier stages have been settled, either explicitly or implicitly.<sup>3</sup>

Rational models of the innovation process have been challenged within the general literature on innovation. A selection of this work is given below to illustrate the emerging themes. Williams and Gibson<sup>5</sup> suggest a sequence of four models of diffusion: the *appropriability model* (science push); *dissemination model* (good science; plus strong networks, communications; boundary spanners); *knowledge utilization* (incorporating demand pull; problem-solving needs among the users), and finally the *communication and feedback model*. These authors describe the innovation process as being dependent on communication between stakeholders, where researchers, developers, and users may have differing perspectives about the innovation, which must be accommodated for diffusion to occur. In short, they see the dissemination process as far more chaotic than the S curve used in Rogers's work suggests. While their model acknowledges the importance of feedback loops, it does not however provide an analysis of the complex social context that is often referred to in the literature as the "receiving system."

Kimberly<sup>6</sup> argues that the existing literature concentrates on the adoption behavior of individuals and neglects the fact that the career of managerial innovations is shaped in particular by the internal change capacity of the receiving organization and the context in which it is situated. He points out that while environmental constraints are often acknowledged conceptually they have rarely been examined empirically. The relationship between organizational attributes and innovation has been explored by Damanpour who provides a list of independent organizational variables and their expected relationship to innovation.<sup>7</sup>

Argyris and Schon have argued that the diffusion process is frequently decentralized and iterative in nature and that a key aspect of the diffusion of innovation is the capacity of the organization to learn about the context of their learning.<sup>8</sup> Actor network theory and the emerging literature on the importance of communities of practice<sup>9,10</sup> point to the importance of social networks and communities of knowledge as critical to gaining scientific acceptance for ideas and knowledge and are discussed as important features of the innovation process that need to receive much more careful attention from researchers. Jelinek and Schoonhoven's<sup>11</sup> work on innovation in high technology firms also suggests the value of paying more

careful attention to interconnections, multiple teams, multiple relationships, and interactions. Finally we have ourselves stressed the importance of local actors—and of the interactions between these actors—as a major source of the messy and unpredictable nature of the innovation process empirically apparent within health care.<sup>12</sup> Emergent change was found to be far more evident than planned change, and innovations have to be enacted within local clinical groups who are well able to resist change initiatives.

This developing literature challenges the sequential view of the innovation journey and stresses the messy, dynamic, and fluid nature of the innovation journey.<sup>13</sup> Such literature has informed the EBM implementation literature and within that literature, the need for more complex models to explain such a complex social processes has been acknowledged.<sup>14</sup> Yet despite such developments, a great deal of the texts aimed at assisting those charged with achieving evidence-based change locally fall back on more linear models, where knowledge and implementation are viewed as relatively unproblematic.<sup>15,16</sup> Unfortunately in the U.K. it is often such texts that are seized upon by policy makers in their policy deliberations in this area. (This reflects Rich's insight that many decision makers are reluctant to collect or contract for information outside of that supplied by particular agencies.<sup>17,18</sup>) Our research, the detailed design of which is discussed below, challenges such inputs via extensive empirical work in this area and suggests the need for policy makers to consider alternative ways of analyzing and seeking to achieve change.

## RESEARCH DESIGN AND METHODOLOGY

One frequent criticism hurled at qualitative researchers seeking to contribute in this field is that the research base is too limited to provide rigorous insights that meet the methodological tests of reliability and validity. Both teams involved in this article are keen to pursue work that is relevant and will influence policy. (The studies were recently completed by two groups of Organisation Behaviour researchers [one based at Templeton College, Oxford University and at Southampton University, and the other originally based at the Centre for Corporate Strategy and Change, Warwick Business School). The researchers were active in the same health care system, the NHS, at the same period, the mid-1990s, and were operating from similar theoretical bases. Both groups used similar—though not identical—case-study-based

methods and looked at similar questions. See Table 1 for an overview of research design and methods. The studies include work in primary and secondary health care settings and also a comparison of cases where changes in the organization were thought to be strongly evidence-based, with others where the clinical research evidence was apparently weaker. We therefore took the view that it may be worth the attempt to upscale and pursue a strategy to conduct an overview of a family of related studies where we are sure—unlike in a systematic literature review—that we really are comparing like with like. We believe that we can offer such an overview within our studies, which can be pooled to enlarge scale.

As Langley<sup>19</sup> states, process data pose many challenges. They are: data composed of events; data that involve multiple units and levels of analysis; data of variable temporal embeddedness, and data that are eclectic. For all of these reasons, developing theory from process data is a complex task. Our intention in working together was to debate the means for exploring patterns and synthesizing, using a larger number of cases. We agree with Van de Ven<sup>20</sup> that process theorizing needs to go beyond surface description to penetrate the logic behind observed temporal progressions—whether simple or complex.

There are of course a number of methodological problems in comparing the case studies. Some examples: The material required for qualitative case studies is itself loose and difficult to define. At an interstudy level, there is the question of how far we mean the same thing when we use the same terms in our analyses. This means that even if the methods used in different studies are similar, that is, a comparative case study method, the study focus will affect the events to which researchers pay most attention. Within any case study site, data will be collected from a number of units and a range of stakeholders. In considering comparison, we must be aware of the factors including simple financial and practical expediency, which might limit or impinge on the choices made by researchers. Finally, a number of questions emerge about the chronology. Were the studies synchronous? Were they prospective or retrospective? Were they longitudinal or cross-sectional? How variable were the political and organizational contexts?

We debated such concerns at length prior to interrogating the empirical data contained within the final reports from our combined research efforts. There is not the space here to provide an account of the methods used in the seven individual studies; these are

TABLE 1

## INTERVIEW DATA

	Design	No. Of Case Studies	Face-To-Face Interviews*	Telephone Interviews*	Written Questionnaires	Document Analysis	Dates
Dopson and Gabbay <sup>22</sup>	Single stage case studies on four clinical topics	4	58 (RHA and purchasing managers, clinicians and public health)			✓	2 years, 1993-94
Wood et al. <sup>29</sup>	Two stages: 1. Overview survey across whole region 2. Case studies, one per clinical topic, selected on evidence of clinical change elicited from first stage	4	71 (mainly front-line clinicians) 48 (mainly clinicians and clinical managers)			✓	2 years, 1995-97
Dawson et al. <sup>12</sup>	Embedded case studies, 2 clinical topics in each of four hospitals	8	256 (clinical staff of various professions and grades) plus 20 informal interviews with trust and HA managers	256 (same group as interviews)		✓	2 years, 1995-97
CSAG (Gabbay et al.) <sup>21</sup>	Single stage case study design, full in 7 sites, telephone and questionnaire only in 6	13 (7 + 6)	250 (front-line clinicians and managers)	321	1317 GPs 256 hospital clinicians	✓	6 months 1996-97

Fitzgerald et al. <sup>26,27</sup>	<p>Three stages:</p> <ol style="list-style-type: none"> <li>1. Overview across four health authorities on diffusion of innovation</li> <li>2. Overview with same group, concentrated on particular innovations</li> <li>3. Case studies on four innovations in primary care</li> </ol>	<p>38 (senior HA managers and GPs)</p> <p>35</p> <p>40 (GPs and other primary care and physiotherapy staff)</p>	<p>✓</p> <p>✓</p> <p>✓</p>	<p>2 years, 1997–99</p> <p>"</p> <p>2 years, 1997–98</p>
Dopson et al. <sup>23</sup>	<p>Two stages:</p> <ol style="list-style-type: none"> <li>1. Initial round of interviews half-way through project</li> <li>2. Second round at end of project, using themes elicited during first stage</li> </ol>	<p>7 (staff from King's Fund and DoH)</p> <p>51 (project team members, managers and clinicians)</p> <p>122 (project team members, other senior managers and clinicians)</p> <p>150 (front-line clinicians)</p>	<p>✓</p> <p>✓</p> <p>✓</p>	<p>6 months, 1998–99</p>
Locock et al. <sup>28</sup>	<p>Single stage case studies, after project completion</p>	<p>18 (front-line clinicians)</p> <p>65 (project team members, other senior managers and clinicians, Welsh office reps)</p> <p>238 (front-line clinicians)</p>	<p>✓</p>	<p>6 months, 1998–99</p>

Note: All interviews were in-depth and semi-structured.

provided in the separate reports, most of which have been published in peer-reviewed journals and met their standards for the rigor of the qualitative methodology used.<sup>12,21-30</sup> Our purpose here is to report our methodology for comparing and synthesizing our findings. The process went through several stages; at each stage the team has met, debated the output of that stage, and reflected critically on the methodology for the next stage. At the first stage, the authors of this article re-read all the full project reports. Additionally each team produced a summary of what they felt were the key points arising from their own studies. (The team refers to the two teams represented by the authors. The other members of the original research team that produced the seven studies did not take part in this analysis.) To some extent these were already cumulative or comparative, given that each team was building on its past research and that both teams were already in communication with each other and citing each other's findings.

From this stage we developed an initial overview of the findings, identifying common themes emerging from each team's separate key points. As a pilot, one researcher undertook a more in-depth analysis of one theme (opinion leaders), using both key points and full texts of final reports, which was then commented on by other researchers. We assessed the feasibility of pursuing this method for other themes, and decided that each researcher should undertake his or her own analysis of each theme to avoid reliance on one researcher's perceptions. To support this systematically, we prepared a draft coding structure of themes and subheadings, which each team member then applied to the theme of evidence, working individually. This was followed by a collective discussion and simultaneous analysis, using one report as an illustration. At this point, the draft coding categories were debated among all team members, to check for perceived accuracy and completeness, and then redrafted.

At the next stage, each researcher individually applied the whole coding structure to all the themes and all the reports, looking for points of difference as well as convergence, and reflecting on (a) use of different terms to define similar areas and (b) use of similar terms but meaning different things. For example, we found uncertainties about definitions of product champions versus opinion leaders between teams, and differing layers of understanding of what we meant by context. Again, the outputs generated by all five researchers were debated collectively and aggregated.

Even though the overview of our findings presented below is not a systematic review, still less a meta analysis, it goes beyond the usual limited focus on one project. It attempts to create a more comprehensive and nonlocal body of knowledge, which covers 7 studies and 49 cases (involving 1,400 interviews) in health care organizations.

### THE DIFFUSION OF INNOVATIONS IN U.K. HEALTH CARE: COMMON CORE THEMES

It is especially noticeable that despite the differences of design and execution, a number of common core themes emerge across the studies. These are discussed below. The strength of these themes in relation to the individual studies is presented as Table 2.

#### **Robust Evidence Is Not Sufficient To Facilitate Diffusion**

Despite growing acceptance of the principle of evidence-based practice amongst clinicians, there is still a weak relationship between the strength of the evidence base and clinical behavior change. Although change is more likely where the evidence is seen as strong, it is not in itself sufficient. There are a number of other contributing factors, which will be weighed alongside the evidence. As a result, across our cases, there was no discernible pattern that innovations, supported by stronger evidence were diffusing faster. Instead, the pattern was variable and dependent on a range of factors.

#### **The Interpretation of Evidence Is Socially Constructed**

It is apparent across the cases that the production of evidence is a social as well as a scientific process. Our research data suggest that there is no such thing as

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**TABLE 2**

RESEARCH THEMES							
Theme	Dopson & Gabbay <sup>22</sup>	Wood et al. <sup>29</sup>	Dawson et al. <sup>12</sup>	CSAG (Gabbay et al.) <sup>21</sup>	Fitzgerald et al. <sup>26,27</sup>	Dopson et al. <sup>23</sup>	Locock et al. <sup>28</sup>
1. EVIDENCE IS NOT SUFFICIENT	3	2	3	3	3	3	3
2. EVIDENCE IS SOCIALLY CONSTRUCTED	2	3	3	2	3	3	3
3. EVIDENCE IS DIFFERENTIALLY AVAILABLE	2	3	2	3	3	1	2
4. HIERARCHIES OF EVIDENCE EXIST	3	3	3	3	2	3	3
5. OTHER SOURCES OF EVIDENCE	2	2	3	3	3	2	3
6. THE IMPORTANCE OF PROFESSIONAL NETWORKS	2	3	3	3	3	3	3
7. THE ROLE OF PROFESSIONAL BOUNDARIES	2	3	3	3	3	2	2
8. CONTEXT AS AN INFLUENCE	3	2	3	3	3	3	3
9. THE ROLE OF OPINION LEADERS	2	2	3	3	3	3	3
10. THE ENACTMENT OF EVIDENCE	3	3	3	3	3	3	3

**Key:**

- 1 = Theme is present
- 2 = Strong evidence of theme
- 3 = Very strong evidence of presence

“the evidence,” even within precise clinical topics, supposedly capable of scientific testing and proof. There are in reality bodies of evidence, often competing bodies of evidence, which are capable of differing interpretations. Moreover, there are multiple interpretations by different stakeholders, varying by individuals within one group, by group, and by profession. Evidence therefore has to be conceived of as malleable and eclectic. Many of the reports highlight the degree of controversy surrounding the particular innovation under study. In the majority of cases, this controversy existed; was widespread, and persisted over time. Another aspect of the malleability of evidence relates to changes over time. The priority given to the available evidence and therefore its use may alter, if either health policy alters or the pattern of patient demand alters.

### **Evidence Is Differentially Available For Different Professions**

Additionally, there was certainly almost as much attention given by respondents to the lack of evidence as to its adoption and use. Evidence is relatively more scarce for the practices of nurses and the professions allied to medicine (e.g., physiotherapists; speech therapists) and this has important implications both for the evidence base of a large proportion of clinical work, and for the perception of EBM by the majority of health care professionals.

### **Hierarchies of Evidence Exist**

One overarching theme from the studies was the emergence of hierarchies of evidence; some forms of evidence were considered by clinicians to have greater validity and therefore higher credibility than others. However alongside this finding, there emerged the equally important theme that different professions had different hierarchies of the forms of evidence. These variations, while nonuniform, occurred across sectors and across professions. Professions took different views about what constituted credible evidence. Within the perceived hierarchy of knowledge, the relative positions relate to the credibility of the source as well as the hardness of the data.

In considering the ordering of the hierarchy, randomized controlled trials (RCTs) were most frequently quoted by clinicians as the “gold standard” and the pinnacle of scientific evidence. It is noteworthy that this stresses scientific evidence over other forms. RCTs

were described as “the only form of evidence that might persuade doctors to change.”<sup>28 (p.16)</sup> The credibility of the RCT might be further enhanced if it was written up and published in a reputable journal.

### **Other Sources of Evidence (e.g., Tacit; Experiential)**

In the majority of studies respondents also spoke extensively of other forms of evidence. Two of the alternative forms of knowledge were tacit/experiential knowledge and craft skills.

Tacit/experiential knowledge was perceived to be a persuasive form of knowledge, which existed in a reciprocal relationship with scientific evidence—they reinforce each other and become woven together.

Evidence is more powerful when it chimes with experiential knowledge.<sup>23 (p.31)</sup>

Acknowledging experience involves acknowledging the experiences of colleagues and the importance of professional networks.

A number of medical specialties, namely surgery and obstetrics and other professions such as physiotherapy stressed the critical importance of craft skills. These skills are individual and difficult to codify or transfer, but many clinicians claim they are essential to producing a positive outcome for the patient.

### **Professional Networks Shape Behaviour**

In practice, medical behavior is shaped as much by experience and peer comparison as by scientific evidence from RCTs or other high-quality studies. At the local level, medical professionals sought advice and support from colleagues for their practice and for changes in their practice. Since for many clinical professionals there remain vast grey areas of practice where there limited current evidence is available, professionals rely on trusted colleagues for advice. Professionals could describe how they selected mentors and advisors and the manner in which trust was built. In primary care, it was particularly apparent that much of the evidence produced at the national level required substantial adoption before it could be used at a local level with different populations of patients. While there were a number of important forums for local exchange of knowledge, the one most frequently mentioned was the Continuing Professional Development training schemes.

The data also demonstrate that physicians still retain a high degree of professional autonomy and



authority over work practices. This means that the medical opinion on a topic is most likely to be accepted unchallenged by other professionals and to translate into organizational clinical policy.

### **Professional Boundaries Inhibit Knowledge Diffusion**

Professional boundaries frequently inhibit the movement of knowledge and the data suggest that knowledge is viscous and does not readily flow across professional boundaries. Historically, professions have grown up in varied ways and over different time frames. The educational experience of each profession, which forms the basis of their professional socialization, is radically different for each profession. As a result, currently, members of different professions hold differing views about what makes evidence credible. Different professions seek knowledge from different published sources, most of which are not shared. Formal learning normally occurs in uniprofessional groups.

Perhaps most surprisingly of all, the data illustrate that even after qualification and in practice there are very few formal, regular forums in which multiprofessional groups meet to debate up-to-date evidence. The data also suggest that such forums as do exist may not actually operate as forums for sharing, but as medically led forums.

### **Context as An Influence On Diffusion**

Context is displayed as an important (and poorly understood) mediator of the diffusion of innovations. The data illustrate that there are many context-specific variants of the diffusion process, even within one health care sector in one country. There is little to support the existence of generalized, uniform patterns of diffusion.

The influence of context can be conceptualized as a layered set of influences, which commence at the outer layer with influences from government health policy and move inward to regional/local influences, and finally to influences that are specific to a single organization and individual practitioner. Clearly, if one examines activities from the core, from inside the organization, these influences can be seen in a variety of combinations.

To understand the influence of context and its variability, one needs to examine key influences at each layer. Government policy influences innovation diffusion and knowledge utilization by focusing attention,

at any one time, on particular priorities. The high priorities are more likely to be granted financial and human resources. Clinical professionals are aware of this, as well as responding to government-set targets. So innovations that need resources to support change may be facilitated or inhibited by government policies.

Local influences are most frequently demonstrated through the strength or weakness of the local financial position. It should not be assumed that financial crisis or restraint always inhibits innovation diffusion, because on occasion, it may be the lever for change and/or may motivate clinical professionals to seek change. A second local influence can be seen in many of our cases and this is the history of local interorganizational (and intraorganizational) relationships. These may prove crucial in assisting or inhibiting the diffusion of an innovation. At worst, a history of poor relationships among local units may mean that there is no dialogue at all.

One might anticipate that one major local influence on innovation would derive from the assessed needs of the local population. Unfortunately, we found only very limited evidence of this in our case studies. The data suggest that patient needs may be a significant influence on knowledge utilization when the pressure of patient numbers or severity is creating a crisis in service delivery. In these circumstances, clinical staff may be driven to seek out innovations to assist them in resolving problems.

Finally, it is apparent that one critical influence at the local level and within organizations is the presence of local opinion leaders. This topic is discussed as the next theme.

### **OPINION LEADERS AS CHANGE FACILITATORS AND INHIBITORS**

The role of clinical opinion leaders is complex. The evidence from our studies tends to suggest that there is an effect, but that it is part of a wider process and cannot be seen in isolation from other contextual variables, with which it may interact. It should also be noted that the effect is not always positive, in the sense of supporting the desired change—the influence of hostile or ambivalent opinion leaders is an important and neglected area. We have therefore adopted the use of the term *opinion leader* as opposed to the narrower term *change champion*.

Whatever the exact mechanism by which opinion leaders exert influence, their active support for and involvement in a particular initiative is a powerful

factor. Our studies suggest that the case for change was enhanced by the presence of clinical product champions. Such advocates bring credibility and establish leadership within their own professional groupings.

The research teams found a spread of very different types and categories of opinion leaders: some who were experts and some who were peers; some who were hostile, some who were very positive, and some whose enthusiasm occasionally went too far; some with an ambivalent or hidden agenda; and some who were cynical about what they were doing but did it successfully nonetheless.

Our analysis points to the fact that there are at least two different types of positive opinion leader. The expert opinion leader is seen as the higher authority, able to explain the evidence and respond to academic debate. They may be important in the early stages of negotiating the evidence. The position of the expert in the social and organizational hierarchy could also be an important factor. Peer opinion leaders, on the other hand, are individuals who have applied the innovation in their own practice and can give colleagues confidence and support. They may be more influential during the later phases of implementation. A crucial factor is the presence of hostile opinion leaders who may undermine the views of the positive change champions, or may dilute the influence through internecine tensions.

#### **THE PERCEIVED STRENGTH OR WEAKNESS OF THE EVIDENCE; THE ENACTMENT OF EVIDENCE**

Building cumulatively on what has been said so far, it is apparent that there is no final agreed version of what constitutes strong evidence. In this section, we shall broaden the discussion to debate the contribution that the utilization of evidence may be dependent on other factors and not purely on the nature of the evidence itself.

We start by underlining that across all our studies, the existence of evidence, which was defined as strong evidence, did not cause the innovation to diffuse faster. Good quality evidence could be seen as a useful but not sufficient condition for diffusion.

Rock solid evidence improves the chances of dissemination and uptake.<sup>23 (p. 27)</sup>

If evidence is contestable, then it creates the necessity for forums of debate and negotiation. All of the

studies displayed data on these interactive processes, which shaped behavior, usually of a group within a setting. However, interaction is not solely a question of stakeholders debating the quality, validity, and relevance of evidence. One must also recognize that contextual factors can have an influence on behavior and cause stakeholders to seek evidence. So, for example, patient need or short-term organizational pressure may cause clinicians to seek out and grab at and use mediocre evidence. Thus interaction and knowledge utilization can be instigated by demand. From our data, we would suggest that these interactive processes, instigated by the push factors of the creation of knowledge and the pull factors of patient need or policy priority, are a key stage in utilization that we describe as the enactment of knowledge.

Within these processes of debate and negotiation, decisions about innovation adoption and knowledge utilization are influenced by a range of factors. Even strong evidence may still need support from other factors. Examining across the array of studies enables the identification of some of these additional key factors. These would include: whether the condition was life threatening or not; whether the knowledge/innovation can be applied to a large patient population; whether additional costs are involved or the change would be cost neutral; whether the change includes the shift of work across professional boundaries or not; patient compliance; and whether it accords with the practitioners' experiential knowledge. The probability of the evidence being used and diffused across groups of practitioners increases as the number of positive factors increases. However, it is rare for all factors to be positive.

The process of reviewing our studies has produced the conclusion that there is strong evidence of common findings. For example it is evident that the context in which the change is attempted is significant and that there are trends in the pattern of differences between the acute sector hospitals and the primary care sector. The data also illustrate that robust science is not sufficient to ensure the diffusion of new knowledge. The strength of the evidence is interpreted by actors and then weighed alongside other factors, most notably experience. Credible evidence can be delineated from the data and comparatively, the differences of interpretation, by profession can be described. A further important aspect of context emerges around the role of professional networks. Besides the quality of the scientific knowledge, it is evident that professional networks play a major role in the sources of data being

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## POLICY AND MANAGERIAL IMPLICATIONS

In this concluding section we speculate on the possible policy and managerial implications suggested by our findings. In the U.K., the EBM movement is supported policy-driven changes,<sup>32</sup> which can be characterized as a top-down approach. Our data suggest that to achieve these policy aims individual professionals and local groups will need to be fully engaged. Careful thought needs to be given as to how to engage such groups given that it has been shown that evidence in itself is not sufficient. Subtler strategies will be needed to convince clinicians to change their practice, especially in light of the remarkably resilient nature of professional influence and practice and the interaction between evidence and experience. This raises the question, what will help?

Our research data offer a challenge to the various systematic reviews of RCTs and other intervention studies that have been carried out, encouraged by the formation of the Cochrane Effective Practice and Organisation of Care (EPOC) group.<sup>33–36</sup> Despite their value, the results of these overviews are partial and inconclusive in shedding light on what facilitates the diffusion of innovation. They suggest that people should use a range of methods (no “magic bullets”) and that the results of specific interventions vary according to context. The NHS Centre for Reviews and Dissemination (NHS CRD)<sup>36</sup> has recently argued that there are some change strategies: educational outreach (but in the context of prescribing behavior in North American settings) and reminder systems tools for clinical management that are successful and are supported empirically by systematic review. The discussion of findings in the previous section of this arti-

cle suggests that a different approach may be needed to one that attempts to isolate specific interventions and their effects. This would involve policy makers, managers, and clinicians in examining and synthesising the interactions of interventions and their permutations in varied contexts and would require careful analysis of why and how they vary. In particular, careful consideration would need to be given to the influence of the context in which the change is to take place. In the NHS, local contexts are likely to consist of asymmetrical interdependency networks as witnessed in structural and professional hierarchies and permeated by fierce contests for scarce resources.

Policy makers and managers must be prepared for the fact that professional groups are well able to resist change<sup>37</sup> and that sites with a more receptive context for change, that is, where a number of helpful factors come together, will probably make swifter progress than sites that do not enjoy such favorable circumstances. It is therefore unrealistic to expect uniform levels of progress and failures will happen. Building and sustaining a receptive context for change are extremely complex and dynamic processes. Our work suggests a number of characteristics of a receptive context that include:

- *A favorable history of relationships between professions and managerial groups and between professional groups.* Organizational context and current clinical practice are influenced by history, that is to say people work within an inherited set of organization and policy arrangements that set an important part of the context for treatment. Clinicians rarely acknowledge that the organization and management of services are important influences on clinical practice yet time and again they appear as important if unacknowledged influences.<sup>31</sup>
- *Sustained political and managerial support and pressure for clearly defined change at a local level.*
- *The creation of a supportive local organizational culture, clear goals for change, appropriate infrastructure and resources are critical.*
- *Effective and good quality relationships within and among local groups.* Power struggles, demarcation disputes between, for example, teams and specialities adversely affect the capacity of groups to reflect, learn, and achieve change.
- *Access to opportunities to share information and ideas within the local context.* A key mediating factor in securing changes in clinical practice is the extent to which clinicians have access to groups.

Groups are important arenas for sharing experience and facilitating learning. They are also an important means through which formal communication from literature, guidelines, and educational initiatives is filtered. Poor definitions of roles and responsibilities as well as organizational and political barriers inhibit the formation of effective groups. Such processes could be facilitated and enhanced if they were provided through local systems of continuing professional development and were required for all and where staff can both feel safe to voice their concerns openly and see the direct relevance for their own work more clearly.

- *The introduction of organizational innovations to foster improved and effective interchanges among groups.* Such organizational innovation needs to be diffused across professional boundaries. Because of history, this may require expert facilitation and bridging roles in the medium term, for example, the employment of a research midwife and audit coordinator.

To conclude, the more general lesson of our work is the importance of realizing that individuals and groups involved in setting clinical policy are part of highly complex networks of social relationships that affect their practice. It is hardly surprising therefore that there have been no magic bullets for introducing evidence-based improvements in care—the complexity and variability of local contexts ensure that there are no magic targets!

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