

Supporting adoption of evidence into practice

Everyone with an interest in healthcare – health professionals, patients, managers and the wider public – expects to see the findings of important research incorporated into clinical practice without undue delay. When it comes to promoting evidence-based, clinically effective practice, ‘guaranteed’ implementation approaches are often proposed¹. However, these solutions usually reflect professional disciplines or areas of expertise or interest; they seldom agree, and are more likely to be based on beliefs than on evidence^{1,2}.

This MeReC bulletin highlights relevant evidence and ideas from educational theory, decision-making theory, information management and implementation science and brings them together in one place. Although based on several comprehensive literature reviews, it is not intended to be a systematic review of those disciplines. Rather, the intention is to provide insights from each of them together into a new synthesis, so as to provoke a debate and contribute to a review of current implementation strategies – perhaps bringing a fresh approach to difficult challenges. This MeReC bulletin builds on MeReC Bulletin 2011;22:1³, which discussed how people make decisions and how decision-making might be done better.

Summary

- The NHS is a ‘professional bureaucracy’ in which front-line clinical staff have a large measure of control and influence over day-to-day decision-making, which is greater than that of staff in formal positions of authority. As a result, directives issued ‘from above’ can have limited impact and may be resisted.
- Adoption of evidence into practice depends ultimately on decisions to change made by individual people. Personal mental models, relationships and interpersonal influences, as well as organisational matters, are therefore critical factors. All these factors interrelate and affect one another in complex and evolving ways which are not predictable and may be surprising.
- This complex context means that approaches to promoting change which are solely or largely mechanistic will usually be less successful than those which take complexity into account.
- Ideas about how people learn, how they make decisions and how they can better manage information can be helpful in developing strategies for introducing evidence and changing practice. They can also be helpful when reviewing why some strategies have been more or less successful than others. An approach which includes measures to support personal adoption of evidence into practice may be helpful.
- A strategic approach to introducing evidence and changing practice is recommended. This should be flexible and adaptable, and address the concerns of potential adopters.
- There are no fool-proof solutions or formulae which guarantee success but a wide range of interventions can be deployed. If done so sensitively and appropriately these can lead to important improvements in care.

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Why is there a need to look at this issue?

Failure to use evidence optimally leads to inefficiency and a reduction in both quality and quantity of life for patients⁴. In the NHS, evidence-based guidance may be under or over implemented, with considerable variations in uptake⁵. The current financial pressures on the NHS mean that it is more important than ever to address inappropriate variations in practice, including prescribing. The NPC's document 'Key therapeutic topics – Medicines management options for local implementation'⁶ highlights a number of prescribing topics where there is scope for improvement.

Introducing evidence-based change to a complex system

This bulletin is concerned with the introduction of health technologies, treatment pathways, ways of working or similar which are new or at least new to their potential users. It may be tempting to assume that implementing such changes in healthcare is purely a **complicated** problem. Although there may be complicated aspects to it, it is really a **complex** problem (see **Panel 1**), because healthcare is itself a complex system^{1,7}. Failing to recognise its complex nature helps explain why some implementation strategies chosen do not always work^{7,8}.

Approaches that are solely mechanistic are appropriate for purely complicated problems. However, healthcare does not and cannot operate 'like a well-oiled machine'. It is provided **for** individual people (and their carers) and **by** a number of teams of individual people. All these people have the freedom to act in different ways that are not totally predictable, and whose actions are interconnected and affect those of others⁷. In such a complex system, a decision to change is ultimately made by individuals, so personal mental models, relationships and interpersonal influences, as well as organisational matters, are critical factors in the adoption of evidence into practice^{7,8}.

Implementing evidence-based changes in healthcare is a complex problem, not just a complicated one

A continuum of approaches

Broadly speaking, there is a continuum of approaches to introducing new evidence into practice⁹. One approach is to '**let it happen**' (for example, by publishing research and seeing whether the findings are taken up widely). However, just sending out printed information has a limited effect at best¹⁰, and is certainly not enough to ensure evidence-informed decision-making⁴. At the other extreme one can try to '**make it happen**'. Mechanistic strategies which attempt to do this, such as using incentives (or sanctions), contracts and compulsion have been shown to be effective in some circumstances². However, the evidence indicates that such strategies should be used judiciously, because there is a risk that they can damage relationships and lead to a future pattern of behaviour that tends to resist change⁷. Between these two extremes, one can try to '**help it happen**' (for example, by supporting change through networking)⁹. There are no 'solutions' – approaches guaranteed to succeed – but a wide range of interventions can be deployed.

Levels of engagement – seeing the whole picture

Initiatives to support adoption of evidence into practice need to take into account the perspectives of individual practitioners and patients; the groups or teams affected; the organisation; and the wider environment and NHS policy¹. People are not passive recipients of changes to practice, they interact with them purposefully and creatively; often through dialogue with other users⁹. When planning for and implementing changes, it is essential that end-users are included to ensure that the change and its implementation are relevant to their needs⁴.

Organisational influences on adoption of evidence into practice

Influences within and between organisations (such as among different GP practices and between them and

Panel 1: Characteristics of complicated and complex systems (adapted from Plsek⁷)

A complicated problem – sending a rocket into space

- The overall problem can be broken down into discrete component parts.
- Separate expert teams can be assigned to each part.
- Processes are predictable and so proven methodologies can be used with reasonable expectation of success, including those developed in other locations or situations.
- Rare or unexpected events can be analysed and the learning can be incorporated into the methodological processes to make future success even more likely.

A complex problem – raising a child

- Although there are identifiably different parts to the task, boundaries are blurred and activity in one part affects other parts in ways which are not always predictable and which are sometimes surprising.
- Success in raising one child is no guarantee of success in raising another.
- Past experience and advice from experts can serve only as guides. Applying simple formulae that worked previously may not lead to success and may even lead to problems because of the child's resentment at being treated in that way.

local hospitals), and the political environment in which the NHS operates all interrelate and affect one another in complex and evolving ways⁹. Although structural characteristics such as the availability of resources are important, they account for only a small proportion of the differences in how well organisations are able to change and adopt new ways of working⁸. ‘Softer’ dimensions are more important, such as whether or not active efforts are made to obtain and share knowledge from outside the organisation⁸. A ‘risk-taking climate’ is particularly important: in other words, the feeling among staff that it is permissible to experiment with new ways of doing things (within clear ethical and governance arrangements). Some of these ideas will not succeed, and if staff are criticised for this they will soon learn to be less innovative⁸.

Learning between organisations (for example, between different GP practices in one locality) can be very effective in diffusing new ideas and ways of working⁸. ‘Boundary spanners’ (people who move in more than one organisation or social circle) can be particularly effective in supporting this⁸. However, formal networking initiatives such as quality improvement collaboratives or ‘beacon’ schemes are sometimes but not always effective⁹. Moreover, the context in each organisation is unique and so adaptation of the change and/or its implementation will usually be required⁷.

Individual factors

The NHS is a ‘professional bureaucracy’⁸. Unlike traditional bureaucracies, with their strong internal hierarchies, front-line clinical staff have a large measure of control and influence over day-to-day decision-making, which is greater than staff in formal positions of authority⁸. As a result, directives issued ‘from above’ can have limited impact, may be resisted and may make future changes attempted using this approach less successful^{7,11}. Factors relating to individuals and the teams in which they work can help to explain how some evidence-based changes are adopted readily whereas others are not; and how small-scale activities can sometimes have large effects but larger-scale activities can sometimes have little, a slow or no effect⁷. New evidence and practices are more likely to be assimilated if, among other things, they are seen as congruent with the team and organisation’s values, norms and ways of working; and if there is tension for change (i.e. staff feel dissatisfied with the current situation)⁹. Ideas about how people learn, how they make decisions and how they can better manage information can be helpful in developing strategies for implementing the adoption of evidence into practice, and reviewing why some strategies have been more or less successful than others.

How do people learn?

The traditional model of teaching and learning sees learners as empty vessels to be filled with knowledge, with the teacher deciding what the learner should

know and the learner learning it in the teacher-approved form¹². Moreover, it is assumed that people will automatically know what to do, and will do it, in response to the factual information they have been told. The limitations of this approach are readily apparent: it is common experience that good practice is rarely universally agreed upon or adopted quickly. In fact, an approach which (perhaps tacitly) implies ‘a doing unto, by someone who knows more, to someone else’ is actually likely to hamper change — especially if those at the receiving end perceive themselves as experienced, proficient practitioners¹¹.

A learner/adopter-centred approach

Two important developments have increased understanding of learning and teaching. The first is the influence of cognitive psychology: the science which describes how humans think. It is now generally recognised that humans do not passively accumulate knowledge but that learning involves creating a complex, personal, mental map^{13,14}. In contrast to the ‘push’ approach of the traditional model of teaching and learning, contemporary adult learning theory encourages more of a ‘pull’ approach, in which individual learners are more in control of the learning process. The teacher’s role is understood as being to help learners build new knowledge and understanding from and onto their prior knowledge^{13,14}. Some key principles have been paraphrased into everyday language by a GP¹⁵:

- ‘All our learning starts with a problem, so we only want solutions to problems we already have’
- ‘We learn by asking questions, so we want to participate actively in our learning’
- ‘We are busy people, so we do not want our time wasted’

Although ‘solutions’ (i.e. approaches that are guaranteed to succeed) are unlikely to be available, his first point underlines the need for learners to have a motivation, which they value, for learning; and the need for educators and implementers to address this need. It is also appropriate to note that different people find it easier to learn in different ways, thus a range of materials, activities and techniques suited to different learning styles is required¹⁶.

Learning as participation as well as acquisition of knowledge

The second development is a recognition that thinking about learning solely in terms of acquiring information and personally making sense of things is not enough¹⁷. Learning can alternatively be seen as participation: a process of becoming a member of and contributing to the development of a ‘community of practice’^{17,18}. Examples include a group of GPs or medicine management pharmacists, or a practice or ward

Front-line NHS staff have great control and influence over day-to-day decision-making. Directives issued ‘from above’ can have limited impact and may be resisted

People create knowledge and understanding as individuals and as members of communities of practice

team. This model of learning is implicit in some aspects of traditional apprenticeship models and in the development from novice to expert practitioner. However, it is not simply about learning how to work within established ways of doing things¹⁸. It also entails the creation of knowledge at the level both of individuals and also the system(s) in which they practice¹⁸. In this model of learning, the community of practice is seen as having ways of thinking, sets of values, and expectations of behaviours which are associated with its particular culture. People new to it start by hearing and using terms which express these concepts, but do not fully understand them in their deeper senses. As they develop their membership they are increasingly able to engage in and contribute to the communal development of these concepts and the community's 'sense-making' of new information or circumstances¹⁸. This takes place on individual and inter-individual levels¹⁸. Just as different organs combine to form a living body, so the individual members influence and are influenced by the whole community of practice¹⁷.

The idea of a group or community of practice collectively making sense of new information and developing and refining group characteristics can help explain apparently complex behaviours of its members and the importance of interpersonal influences within it⁷. These characteristics may not be explicit or even rational to others, but they cannot be wished away⁷.

How do people make decisions?

All decision-making in healthcare requires the recall, interpretation and application of large volumes of information. The evidence around individual decision-making is covered in more depth in MeReC Bulletin 2011;22:1³ and in part 4 of the NPC's DVD on 'Making Decisions Better'. The processes humans use to handle large volumes of complex information are the same, whatever the context or type of information¹⁹. There is a limit to the amount of information humans are able to use in decision-making: when faced with a large quantity of it, the portion actually used is usually truncated so as to make a 'good enough' decision, a phenomenon known as 'satisficing'¹⁹. Furthermore, humans tend to favour the intuitive, automatic way of processing this information known as System 1 thinking. This involves the construction and use of mental maps and patterns, shortcuts and rules of thumb (heuristics), and 'mindlines' (collectively reinforced, internalised tacit guidelines²⁰). These are usually based on undergraduate teaching, brief written summaries, personal experience, talking to colleagues (the community of practice) and seeing what they do^{20,21,22}. Mindlines are developed and reinforced through experience, repetition and interactions with others in the community of practice^{20,21,22}.

The alternative – System 2 thinking – involves a careful, rational analysis and evaluation of all the available information. Both approaches have advantages and disadvantages. Although System 2 processing is

intellectually attractive, it requires effort and is time consuming^{20,21}. System 1 processing is fast and it would be impossible to practice as a health professional (or indeed function as a human being) without it. However, in addition to the potential bias which is introduced because only a subset of the total evidence is known and used, there are many well-described cognitive biases that affect the heuristics and mindlines involved in this rapid decision-making³.

A major challenge for all practitioners is to pick out the information they need to inform their practice from the daily flood of information they receive. However, even if they succeed in this, the preference all humans have for System 1 processing makes it hard to modify practice in the light of new information which conflicts with one's previous (perhaps tacit) assumptions and knowledge¹⁹. It also makes it difficult to switch into System 2 processing when this is needed. Some clinical decision support systems (especially those which force a degree of System 2 thinking when appropriate) have been shown to improve clinical practice significantly²³, including increasing safer prescribing²⁴. All practitioners can try to ensure that, when they are appropriately using System 1 thinking, they take a moment to check that the decision they have come to is reasonable.

Decision-making by groups adds another level of complexity. This is outside the scope of this bulletin, but is discussed in part 5 of the NPC's DVD on 'Making Decisions Better'.

Shared decision-making, involving patients and professionals, is increasingly recognised as an essential part of modern healthcare²⁵. NICE recommends that all patients should have the opportunity to be involved in decisions about their medicines at the level they wish²⁶. One way in which this can be facilitated is by using patient decision aids (PDAs)²⁷. The NPC has produced PDAs intended for use by health professionals within the consultation ('shared decision aids') and more information is available on the NPC website.

Information management and Information Mastery

Practitioners are presented with a daily flood of newly published research, guidance, opinion, etc., but face a major challenge in identifying not only the important new information they need, but also that which is out of date among what they already know²⁸. To cope with large volumes of information, practitioners 'satisfice'¹⁹, but the strategies they adopt may carry risks. Many practitioners use expert opinion as a shortcut to information and its application to practice, but experts can be wrong. For example, in one study 53% of the answers given to Dutch occupational physicians by experts of their choice regarding typical questions in their practice were wrong, compared with the answer obtained from a full literature search²⁹.

To cope with large volumes of information, practitioners 'satisfice', but the strategies they adopt may carry risks

'Information Mastery' describes a system by which busy practitioners can keep up to date^{30,31}. There are three complementary components and practitioners need to employ all of them:

- **Foraging:** having a reliable system to alert one to new, important, relevant, valid information that requires one to change one's practice.
- **Hot synching:** purposefully checking and updating one's personal mental map of knowledge and skills once or twice a year for each of the 30 to 40 conditions one sees frequently.
- **Hunting:** having a reliable system to find the best possible answer to a specific question and recognise it as such, quickly and efficiently.

Practitioners need to employ all three components of Information Mastery

Effective 'hot synching' will ensure practitioners' mindlines are in keeping with the evidence base and will make their System 1 processing more likely to result in better decisions. An effective 'foraging' system will help alert practitioners to the new, important information which might require them to switch purposefully into System 2 processing, and perhaps 'hunt' for more information to answer the questions that arise. MeReC Briefing 2005;30 and its supplement, and part 3 of the NPC's DVD on 'Making Decisions Better' contain more information about Information Mastery.

An essential part of all three components is that health professionals should preferentially use trustworthy, pre-appraised summaries of information which set new evidence in the wider context, rather than reading and attempting to critically appraise primary research. NICE and the NPC produce a number of resources to help practitioners and medicines managers in the three components of Information Mastery. The NPC's Rapid Reviews and podcasts are useful foraging resources. The NPC's e-learning resources and MeReC Bulletins are tailored to support effective, efficient hot synching. NHS Evidence provides a powerful hunting resource.

What might a development programme look like?

There are no 'magic bullets' for ensuring adoption of evidence into practice^{1,2,32}, but many different approaches have been tried. NICE has produced a number of implementation tools to help people who are responsible for putting NICE guidance into practice. Cochrane systematic reviews are available relating to dissemination of printed materials and guidelines¹⁰, use of conferences, meetings and workshops³³, academic detailing/outreach visits³⁴, local opinion leaders³⁵, audit and feedback³⁶, and computerised reminders³⁷.

Used alone, interventions tend to have limited or at best moderate effects, but multi-faceted interventions which include several approaches can have cumulative and significant effects^{1,2,32}. However, rather than a 'scattergun' approach of employing multiple approaches in an unsystematic way, recent research

advocates a consideration of the full range of options and using a rational system for selecting from among them³⁸. The National Audit Office (NAO) published an extensive suggested communication plan for prescribing advisers in 2007³⁹. This recommends establishing clearly who within the prescribing team is responsible for dealing with which practices; targeting the team's efforts carefully; and dividing practices into groups based on different levels of potential impact and their ability and willingness to change. After this, an action plan for each group can be developed, which is both cost-effective and tailored to individual circumstances. Although the landscape of primary care has changed since 2007, the principles within the NAO report are still highly applicable, and indeed can also be applied to secondary care.

The NAO report suggests trying to move potential adopters through the AIDA adoption model: raising **awareness** of the issues, evidence and potential changes to practice, leading to **interest** in making some sort of change and engagement with the process; thence to making a **decision** to change followed by **action** to do so³⁹. Obstacles to change need to be identified and interventions matched to the problems: for example, reminders are likely to be effective only if not having the right information at the right time is an important barrier³². A Cochrane review found that tailoring interventions to identified barriers was more likely to improve practice than no intervention or dissemination of guidelines⁴⁰.

Careful planning is therefore essential when promoting the adoption of evidence into practice. It is important to set clear SMART (Specific, Measurable, Appropriate, Realistic and Time-bound) objectives and success criteria, so as to know if change has been made and has resulted in improvements. Piloting changes, perhaps using the Plan, Do, Study, Act (PDSA) approach should also be considered. Both aspects are discussed in NPC elearning materials. Nevertheless, it is imperative not to stray into a purely mechanistic approach. Plans must be flexible and respond to changing circumstances and the needs and challenges of potential adopters. As stated above, people are not passive recipients of changes to practice, they interact with them purposefully and creatively⁹. They experiment with them, evaluate them, seek meaning in them, develop feelings (positive or negative) about them, challenge them, gain experience with them, modify them and try to improve them; often through dialogue with other users⁹. It is therefore just as important to consider what needs to be done from a 'bottom up' perspective, to support individuals in adopting evidence and changing their behaviour, as from a 'top down' perspective of making system or organisational changes³⁸. Labelling people using value-laden terms such as 'innovators', 'early adopters', 'late adopters' or 'laggards' can lead to stereotyping, and has little theoretical or empirical evidence to support it^{8,9}. Alternative models have been suggested^{9,41} such as Hall

It is just as important to support individuals in adopting evidence and changing their behaviour, as to make system or organisational changes

Panel 2: Principles for more successful implementation of evidence into practice

These principles are drawn from and summarise the evidence and models discussed in this bulletin.

- **Aim for adoption of the change in practice, not its imposition.** Sustained change is most likely if those affected come to value the change and 'own it' for themselves. Raising awareness and stimulating interest (addressing the 'what's in it for me?' question) can lead to a decision to change and action to do so. Use a targeted, multifaceted approach to 'help it happen'.
- **Consider the concerns and questions of potential adopters.** Potential adopters are likely to question the rationale behind the change in practice, especially if it appears to conflict with their previous assumptions and knowledge. Instead of attempting just to transmit information, aim to help people build new knowledge and understanding from and onto their prior knowledge. Recognise and address the need people have for a motivation which they value to learn more about the evidence and the proposed change in practice, and stimulate tension for change.
- **Make it easier for people to do the right thing.** Potential adopters are also likely to have questions and concerns about how they can put the proposed change to work in their particular situation. They need help and support to do this. Changing ways of doing things which have become habits is hard, even when one is strongly motivated to do so. Prompts, reminders, feedback, etc. are likely to be helpful but must be tailored to the problems adopters face.
- **Support effective foraging, hunting and hot-synching.** Practitioners face a daily flood of information. Supporting effective Information Mastery will help them manage this, and can also help them put the information with which they are presented into context, especially if this appears to challenge or undermine the proposed change in practice.
- **Recognise and support the communities of practice in which potential adopters work.** People acquire and make sense of new information, and form the mindlines which drive their practice, largely by brief reading and talking to other people. Getting the support of the community(ies) of practice is crucial for extensive adoption of evidence into practice, and 'boundary spanners' are likely to be particularly important in encouraging its diffusion.
- **Allow potential adopters to experiment with and adapt the change in practice to their situation.** The context in each setting is unique and so local adaptation of the change in practice and/or its implementation will usually be required. Successful adoption is more likely if adopters have the opportunity and autonomy to adapt and tailor it to their particular needs and circumstances. This needs to occur within clear ethical and governance arrangements.
- **Plan carefully but be flexible and adaptable.** Planning is indispensable, but plans must respond to changing circumstances and the needs and challenges of potential adopters. Set SMART objectives, consider piloting changes, and include end-users in the planning to ensure that the change and its implementation are relevant to their needs.

and Hord's 'Concerns-Based Adoption Model'⁴². Such models consider individuals' perspectives and concerns, and seek to consider how these may be addressed to support change.

Pulling it all together

Introducing evidence and changing practice is not simple or easy, but when successful it can lead to important benefits for patients and be immensely rewarding for those involved in bringing it about. Several principles can be identified from the evidence and models highlighted above and these are summarised in **Panel 2**. Bearing these in mind will help people who wish to introduce an evidence-based change into practice to develop a plan. This does not

guarantee success, but makes it more likely and, at least as importantly, helps critical reflection on what has been successful or less successful and why, and how plans need to be modified.

These are exciting times for those involved with getting evidence into practice. There is now a large repository of high quality clinical evidence synthesised into authoritative guidelines. In many healthcare systems this is becoming linked into systems to support and encourage evidence-informed decision-making. Deploying the different but complementary approaches described in this bulletin would be expected to enhance further the adoption of evidence into practice, to the benefit of patients.

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The National Prescribing Centre (NPC) is responsible for helping the NHS to optimise its use of medicines. NPC is part of the National Institute for Health and Clinical Excellence (NICE), an independent organisation providing national guidance on promoting good health and preventing and treating ill health.