

ARTICLE

Lost in translation: transferring knowledge from research to clinical practice[†]

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[†]For an innovative example of knowledge transfer see the clinical librarian project described by Steele *et al.*, pp. 259–267, this issue. Ed.

SUMMARY

Using a new treatment is not an instantaneous act. There is a gap between research and practice and carefully evaluated evidence often fails to achieve widespread use. Various factors intercede along the pathway from knowledge generation to knowledge utilisation. These can hinder, or indeed facilitate, the use of research evidence in psychiatry. Knowledge translation is a discipline that attempts to identify and understand these barriers and facilitators to knowledge transfer. In this article, the terminology and key concepts of knowledge translation will be outlined, the evidence transfer pipeline described and obstacles and facilitators to uptake of evidence explored. The article also identifies sources of information on knowledge transfer. Innovative approaches designed to enhance the uptake of evidence from research, such as summaries, systematic reviews and targeted messaging, are also described.

DECLARATION OF INTEREST

None.

an instantaneous act; it is a process that occurs over time (Dobbins 2001). Knowledge translation is an increasingly important topic and describes efforts to facilitate the transfer of high-quality evidence from research into clinical practice throughout the careers of medical doctors. It represents a process whereby research information is not only received but also acted on. Transforming research evidence into practice is a demanding task requiring creativity and endurance.

Several factors have increased the need for better knowledge dissemination in medicine and psychiatry. The growth of science and technology, increased media attention on scientific discoveries and the demand for political accountability have all intensified the demand for better dissemination and utilisation of research evidence in healthcare settings (Dobbins 2001). In mental healthcare, a major challenge is to translate scientific advances rapidly into clinical practice, with a route from evidence to action that is efficient and explicit (Geddes 1998).

The importance of research evidence in clinical decision-making is accepted on an intellectual level and is largely unquestioned. It is assumed that by funding research an eventual improvement in healthcare will occur. In practice, however, behaviour often diverges from evidence-based recommendations (Oxman 1995) and good clinical evidence is not necessarily used. It can sometimes take 17 years to translate findings into clinical practice (Balas 2000). Antipsychotic medications may be prescribed outside the evidence-informed effective range and evidence-based psychosocial interventions such as family therapy may be available only to the few (Drake 2001). Research evidence is frequently not reflected in guidelines, expert advice and clinical practice, thereby robbing the patient of the benefits of advances in medical research. Failure to translate successful research into practice is a major cost to the public.

Adoption of an innovation, such as a newer medication or a novel psychological therapy, is not

The knowledge explosion

Knowledge translation is a relatively new concept that has come into prominence in many healthcare disciplines. The term has gained visibility and represents a shift in priorities. Plenty of money is spent on research without making sure that findings are implemented by clinicians. There is a fracture between knowledge and utilisation and also a realisation that strategies accelerating the use of research should run alongside knowledge creation (Lang 2007).

The quality chasm

Doctors are faced with the challenge of improving the quality of care and decreasing the risk of adverse events. Evidence-based medicine aims to provide clinicians and patients with choices about the most effective care based on the best available evidence. To patients, this is a reasonable expectation, but to busy clinicians it poses a challenge (Glasziou 2005). There is a gap between research-based

clinical practice and what doctors do. The lack of translation means that patients are prevented from benefiting from advances in biomedical sciences. Perhaps up to 45% of patients are not receiving recommended care (Lang 2007) and there is a quality chasm between medical advances and medical practice. The advice of guidelines such as The Maudsley Prescribing Guidelines (Taylor 2012), despite widespread availability, may not necessarily be used (Cabana 1999). This failure to optimally apply results from quality research can lead to inefficiencies and reduced quality and duration of life (Straus 2009).

It is not surprising that the uptake of research findings appears to be slow and haphazard. The variation in the use of electroconvulsive therapy, continuation antipsychotics and treatments for depression noted over 15 years ago (Geddes 1997) remains. Important variations also exist in the use of stimulants in attention-deficit hyperactivity disorder. The gap between evidence and practice is also present for clinical psychologists and nurses, but doctors act as if peer-reviewed journals will eliminate practice variation and knowledge gaps (Grimshaw 2002).

Selecting treatments: getting the balance right

Psychiatrists, however, do not have the time to read, or the skill to appraise, all primary research of variable quality. There are three main types of quality problems: misuse, underuse and overuse of research evidence. Often, attention is focused on misuse or error. However, there is often underuse of proven therapies and overuse of inappropriate treatments, with a large proportion of the preventable burden likely to be the evidence–practice gaps of underuse and overuse. For example, in general medicine there is suboptimal management of acute otitis media and significant underuse of established therapies such as aspirin in acute coronary syndromes (Lang 2007). Some authors argue that evidence-based psychotherapies, such as cognitive–behavioural therapy (CBT), have been underused as treatments of depression (Markowitz 2008).

The science and practice of knowledge translation aims to address these challenges. Providing evidence from clinical research is necessary but alone is insufficient for delivering optimal clinical care. Knowledge translation is about the methods used for closing knowledge-to-action gaps (Straus 2009).

Terminology

Knowledge translation is topical in healthcare, but the concepts behind the term are not new.

Knowledge translation encompasses notions such as enhanced evidence uptake and the movement of research quickly into clinical practice. Whereas the terminology may be unfamiliar, the gap between current best evidence and clinical practice is a concern to which most psychiatrists can relate. Knowledge translation is about the exchange, synthesis and application of knowledge to capture the benefits of research for patients.

Many terms describe the process of moving evidence to practice. ‘Implementation science’ and ‘research utilisation’ are often used in Europe, whereas ‘knowledge transfer’, ‘research diffusion’ and ‘knowledge uptake’ are typical in the USA. Common to the different terms is an emphasis on the practical use of evidence: a realisation that knowledge creation, dissemination and distillation individually are not enough.

Knowledge translation has its own terminology (Box 1). Diffusion refers to the clinician’s natural, unaided adoption of practices and policy. Dissemination refers to the communication of information to clinicians to improve their knowledge and skills. It is more active than diffusion. Implementation is more active still. It involves effective communication strategies that identify and overcome the barriers to change, using effective techniques in the clinical setting. Adoption refers to psychiatrists’ intellectual commitment to change their practices. It can also refer to the actual alterations in practice.

Implementation science is the study of practical methods to promote the uptake of research findings into routine practice. Academic detailing is an intervention that involves the education of an individual physician by a healthcare professional, usually in the clinician’s office (Davis 1997). All these related terms imply that it is necessary to move beyond the simple publication or dissemination of evidence to the routine practical use of knowledge by psychiatrists.

BOX 1 The terminology of knowledge translation

Diffusion

Natural, unaided adoption of research evidence

Dissemination

Active and targets a specific audience

Implementation

Overcomes barriers in the clinical setting

Adoption

Commitment to change practice

The evidence pipeline

The uptake of evidence can have a number of phases. Pathman *et al* (1996) described four stages of the evidence-to-action process: first, the clinician needs to be aware of evidence, then agree with it, then adopt it and then adhere to it in practice. However, there is often a steady decline or loss of information at each stage of the process (Mickan 2011). So, even with high rates of transfer of evidence in the early stages, there may be little impact on eventual patient outcomes.

In a schema adopted from Glasziou & Haynes (2005), the evidence pipeline represents the trajectory that research evidence, represented as water, must take to be incorporated into clinical practice, having been generated by a 'cloud' of researchers. The water flow reflects the effectiveness with which clinical research influences patient care and affects clinical outcomes (Fig. 1). The research evidence leaks gradually from the evidence pipeline where a number of factors, or barriers, contribute to its evaporation and dissipation. These factors can include beliefs, values, education, social status and networks (Dobbins 2001). Knowledge translation interventions can be viewed as attempts to address these barriers and reduce the evaporation and dissipation of research evidence as knowledge moves towards the patient from its source.

From science to bedside

It is therefore important to look at the initial problem of getting the relevant evidence into the clinical pipeline and how the process can be

improved, and then develop methods for reducing blockages and leakages at each stage. Given the information glut, it is not surprising that individual psychiatrists find it difficult to be aware of all the relevant, valid evidence. Awareness is problematic for many important innovations, such as low-cost pharmaceuticals or psychological treatments lacking a major marketing campaign. To carry out an intervention, clinicians need not just access to the innovation but also knowledge of how to implement the change. For medication, this is challenging enough. For more complex interventions such as problem-solving for depression, additional strategies may be required to enhance uptake of knowledge about the treatment.

Interventions designed to change practice should be based on an accurate assessment of the factors that support or impede targeted healthcare outcomes (Cochrane 2007). The accuracy of the assessment is directly related to the future impact of the intervention (Bloom 2005). If we accept this finding, then it is vital to identify barriers and facilitators to evidence uptake first, before implementing the strategy to improve knowledge uptake.

Barriers and facilitators to evidence uptake

The clinical use of research evidence in the real world is inconsistent. The mere publication of a study is insufficient to result in widespread usage of a diagnostic method or treatment. Obstacles or barriers to the application of best evidence and the development of innovative approaches to overcoming these obstacles fall squarely within knowledge translation.

Barriers

In general, little is known about the process and factors responsible for how clinicians change their practice when they become aware of evidence (Greenhalgh 2004). Researchers have attempted to examine the barriers to change with the long-term aim of understanding how the gaps can be narrowed and closed (Cochrane 2007). By identifying the barriers, it may be possible to target an intervention to the specific obstacle identified.

Barriers can operate at different levels, such as the individual, the team or the organisation. Much of the work has been focused on barriers to uptake of evidence from clinical practice guidelines. The most comprehensive scheme for considering the barriers to evidence uptake was devised by Cabana and colleagues (Cabana 1999). They classified barriers to utilisation of clinical practice guidelines into the three domains of

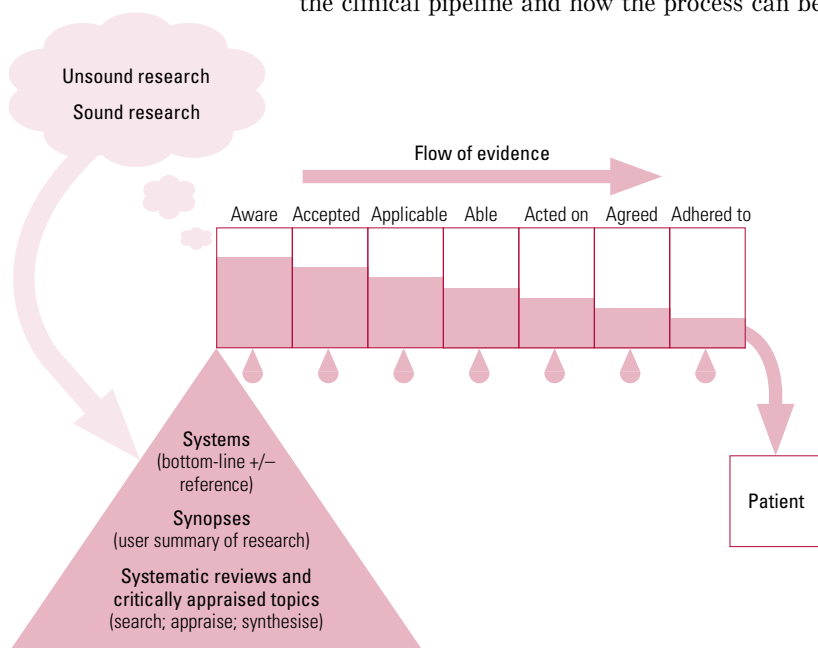


FIG 1 The 'leaky evidence pipeline' (adapted from Glasziou 2005, with permission).

knowledge, attitudes and behaviour. The barriers to guideline adherence that they identified were lack of awareness and familiarity, lack of belief in a good outcome following adoption of the guideline and the inertia of previous practice. Cabana also identified external barriers to following guideline recommendations based on the characteristics of the guideline, the patient or the organisation. There may be practical difficulties in using the guideline, patient opposition to it and organisational or resource impediments.

The conclusions from their study are transferable to many situations where convincing evidence is inconsistently applied or ignored in everyday clinical practice. In psychiatry, cited barriers include a lack of time, difficulties specific to psychiatric research, lack of resources, ingrained habit, insufficient research evidence and difficulties in disseminating research findings (Lawrie 2000).

Facilitators

Some factors, of course, enhance rather than impede evidence uptake, although research in this area is underdeveloped. However, identified facilitators can include training in database-searching and critical appraisal, peer support and greater control over the amount of detail available in a specific research report (Dobbins 2009). Decision makers place a high value on choice and autonomy in relation to mode of delivery, format and presentation of evidence (Dobbins 2009). Ways to increase evidence-based psychiatric practice include more relevant, good-quality research, more sources of information and more education (Lawrie 2000).

Knowledge translation strategies

Translating research into practice is a demanding task. It requires intellectual rigour, discipline, creativity, clinical judgement, skill and endurance (Straus 2009). It is important to facilitate access to evidence but there is little consensus in the published literature as to the most effective ways to improve research uptake.

Different factors may predispose to, enable and reinforce the uptake of evidence (Green 2005). Factors such as didactic lectures, mailed guidelines, conferences and rounds may predispose to change in knowledge uptake. Patient-education materials and other tools may enable the change, while reinforcing strategies including reminders, audit or feedback can solidify the change already made.

If practitioners are aware of a new finding but do not agree with it, increased interactivity in the conference setting exposes the learner to peer

influence. For adoption, online learning and in-depth workshops may facilitate a change.

Synopses and systematic reviews

Knowledge translation aims at a seamless link between research and routine clinical implementation (Glasziou 2005), but making the best of the available evidence in a clinical setting is a significant challenge (Geddes 2001). More effective knowledge and exchange strategies are required but investigation of dissemination and utilisation of research has not progressed much since it a review almost 15 years ago found it to be in its infancy (Ciliska 1999). An aspect of knowledge translation that is largely understated relates to the impact of evidence summaries and knowledge synthesis on patient care (Lang 2007).

The communication of clinically important research findings is hampered by the volume and geometric growth of the medical literature. With hundreds of randomised controlled trials being published each week, it is impossible to stay abreast of all important developments in mental health research, which is a broad specialty that might be appropriately influenced by developments in disciplines such as psychology, sociology and pharmacology. It is often difficult to determine which studies are relevant.

Synopses

Evidence-based synopses are specifically designed for bedside use. They overcome the barriers of limited time, resources, searching and critical appraisal skills (Oermann 2007). The major objective of synopses is to provide clinicians with a bottom-line evidence summary in a format that is accessible and can easily be incorporated into decision-making. Synopses are contained in journals such as *Evidence-Based Medicine* and *Evidence-Based Mental Health*, which scan many journals to identify new evidence that is both valid and important. Summaries are more useful if they are published in different formats for specific audiences, such as the public, patients, physicians, nurses and policy staff (McKibbin 2009).

Systematic reviews

A systematic review is a review of a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant research and to collect and analyse data from studies that are included in the review (Sackett 1996). These reviews set the results of an individual study systematically in the context of other, similar studies. Therefore, a key step in assimilating the evidence would

ideally involve using a systematic review. These pre-appraised, integrative reviews are capable of providing high-quality evidence for action. The successful uptake of knowledge from systematic reviews should improve quality of care by decreasing inappropriate variation in clinical practice and expediting the application of effective therapeutic advances to everyday practice.

Good-quality systematic reviews should be available for widely used psychological and pharmacological interventions. In psychiatry, systematic reviews allow researchers to identify important residual clinical uncertainties on which primary research can then focus (Geddes 2001). The contribution of systematic reviews is captured by a number of online databases such as the Cochrane Library (Geddes 1997).

Cochrane Library

Instead of searching for individual studies, practitioners can use systematic reviews in which evidence has already been critiqued and summarised. The Cochrane Collaboration is recognised for its well-established record in systematic review methodology. Their database contains published systematic reviews covering a range of healthcare interventions. Encouraging from a mental health perspective is the work of the Cochrane Collaboration Depression, Anxiety and Neurosis Review Group (CCDAN) within the Cochrane Library. This will encourage the development of systematic reviews of particular relevance to the specialty.

As Cochrane reviews are increasingly utilised, they may help to bridge the gap between best evidence and optimal healthcare. However, questions persist as to how best to acquaint psychiatrists with the best high-quality systematic reviews. There is a scarcity of literature evaluating the effectiveness of online resources in achieving evidence-based decision-making (Dobbins 2009).

Clinicians may have heard of the benefit of a new intervention or the harms of an old one, but they may not be persuaded to change management based on the evidence. Even when we know and accept what to do, we often forget or neglect to do it. Habits do not change easily but a simple reminder is often sufficient for simple omissions. Scanning and alert services have also been developed to help psychiatrists become aware of important developments.

Interventions

Knowledge translation is about improving clinical practice. Ways of doing this have been subject to much research, the essence of which is the

measurement of behaviour change in the direction of greater use of evidence-based interventions or treatments applied to the care of patients (Lang 2007). After practice change, patient benefit is a key element of knowledge translation research.

Continuing medical education

The healthcare system relies on continuing medical education to improve the clinical practice of psychiatrists. A systematic review of lectures, workshops and courses and their impact on practice and patient outcomes revealed that didactic presentations have limited effect (Grol 2003). Programmes that have an interactive approach such as audit with feedback, academic detailing and outreach, together with reminders, seem more effective at changing both physician care and patient outcomes (Lang 2007).

Targeted, tailored messaging

Other strategies used to improve knowledge uptake include targeted, tailored messaging that connects relevant research evidence to specific decision makers (Dobbins 2009). Tailored and targeted messages have gained visibility as a popular knowledge translation strategy. 'Tailored' means that the message is focused on the position and level of training of the intended user; 'targeted' indicates that the content of the message is relevant and directly applicable to the decision currently faced by the clinician.

Tailored, targeted messaging has been used successfully with public health decision makers in a sample of 108 Canadian health departments (Dobbins 2009). In this study, participants were sent a series of emails containing links to seven systematic reviews on promoting healthy body weight in children. A short summary and the full-text version of the review were offered, with a hyperlink contained in the body of the email. Over 7 successive weeks at the same time of the day, an email was sent telling participants of a relevant systematic review and providing a hyperlink to it. A significant effect for the intervention was observed and this strategy was successfully implemented so as to incorporate research evidence into public health policy and programmes to promote healthy body weight in children (Dobbins 2009).

These targeted electronic messages are aimed at groups with common interests. Email has advantages: it can reach a large number of individuals and needs limited resources. In a recent study, individuals with subthreshold depression have been targeted, twice weekly over 6 weeks, with automated, email-based, tailored advice about self-help strategies (Morgan 2012).

These emails afford a low-cost, highly automated approach to depression prevention. The ‘mood memos’ sent to individuals with subthreshold depression included messages such as ‘Set yourself a small goal and reward yourself for it’ and ‘Learn relaxation techniques’. The aim is to encourage and persuade. There was a small but significant difference in depression symptoms at post-intervention – an indication that online delivery of tailored messages focusing on self-help may ease the burden of depression and provide a useful adjunct to clinical management.

Knowledge brokers

An alternative strategy is to employ a knowledge broker, who acts as a catalyst for change. They work in a one-to-one relationship with clinicians to facilitate evidence-informed decision-making. Brokers establish and nurture connections between researchers and physicians to promote a culture that values evidence.

Other interventions

Freely accessible web-based resources such as e-registries were also widely used to promote evidence-informed decision-making (Dobbins 2009). Other strategies to facilitate evidence uptake include educational visits (Wyatt 1998), which involve a knowledgeable person visiting a clinician to explore and discuss problems, offer solutions and provide useful support literature. Short summaries of systematic reviews that do not require a background in research and statistics have also been used to promote research evidence (Oermann 2007). Further approaches investigated in an attempt to improve knowledge uptake include structured e-learning programmes, computer (CD-ROM)-based learning and interactive workshops (Gülmezoglu 2007).

Challenges

Evidence-based medicine is an easy concept to embrace, but implementing it poses great challenges. Multifaceted approaches that use more than one method to remind physicians about following the evidence may be more effective than single approaches but are also more expensive. Some believe that where interventions in evidence transfer include a prospective identification of barriers to change, the proportion of effective strategies is significantly higher than for standardised interventions (Chaillet 2006).

A list of knowledge translation interventions aimed at improving evidence uptake is given in Box 2. Searching for material related to these

BOX 2 Knowledge translation interventions

- Educational visits
- Conferences
- Outreach visits
- Tailored, targeted messaging
- Summaries of evidence
- Local opinion leaders
- Patient-mediated interventions
- Audit and feedback
- Reminders
- Marketing
- Multifaceted interventions
- Local consensus processes
- E-learning
- Online registries of summaries
- Academic detailing

interventions and knowledge translation theory is difficult. The specialty crosses several disciplines that have an evolving and varied vocabulary. Box 3 outlines some useful knowledge translation databases.

Patient decision aids

Eventually, it is over to the patient. If resources to inform psychiatrists about best practice are

BOX 3 Useful knowledge translation databases

- CINAHL (www.ebscohost.com/biomedical-libraries/the-cinahl-database)
- Atlantic Health Promotion Research Centre Knowledge Translation Library, Dalhousie University (www.ahprc.dal.ca/kt/default.asp)
- Canadian Health Services Research Foundation (<http://www.cfhi-fcass.ca/WhatWeDo/AppliedResearchandPolicyAnalysis.aspx>)
- Cochrane Effective Practice and Organisation of Care Group, University of Ottawa (www.epoc.cochrane.org/en/index.html)
- KT+, McMaster University (<http://plus.mcmaster.ca/kt/Default.aspx>)
- Keenan Research Centre – Research Programs Joint Program in Knowledge Translation (www.stmichaelshospital.com/research/kclearinghouse.php)
- New York Academy of Medicine (www.nyam.org/library/pages/grey_literature_report)

(McKibbin 2009)

inadequate then they are more so for patients. Improving adherence to short courses of treatment is relatively easy, but enhancing adherence to long-term regimens, as occurs with schizophrenia and chronic depression, is more difficult. Patients must be aware of their options and agree to accept an intervention that is compatible with their values and preferences. Decision aids have been developed to reduce patients' conflict about their choices. Giving information in the form of patient summaries, before the consultation, may prove helpful (Harris 2006). Using reminders and enlisting social support are also potential options (Straus 2009).

Knowledge translation research

The barriers to evidence uptake have been the subject of extensive research and scholarly work. Quantitative survey-type assessments continue to dominate barrier research. However, an increasing number of qualitative and mixed-method study designs have emerged. Investigations attempting to identify barriers to, and facilitators of, evidence uptake are usually surveys, focus groups and semi-structured interviews. Surveys tend to examine a limited number of barriers and the questions asked are usually closed. As a consequence, results can be biased by the researchers' pre-selection of identified barriers (Cochrane 2007). Survey research tends to confirm selected barriers rather than identify new ones.

Traditional approaches to improve uptake of research findings have focused on better availability and presentation, which is enough for simple changes (Grol 2003). However, further efforts are required to have a significant impact, not just on awareness and familiarity, but on clinical behaviour and healthcare outcomes.

There are many design issues in knowledge translation research. Strategies for knowledge implementation vary according to the audience (e.g. researchers, clinicians or policy makers) and the type of knowledge being translated. Similar to the standard that is held for therapeutic interventions in patient care, randomised controlled trials are the criterion standard for studying the efficacy of interventions designed to increase evidence uptake (Lang 2007). To reduce contamination between intervention and control groups, cluster randomised designs are prominent in translation research.

Future directions

Major difficulties arise in introducing innovations into routine daily practice. A consistent finding is the gap between evidence and practice: some 40%

of patients do not receive care that is in accordance with current scientific evidence (Grol 2001). Even when most clinicians are aware of evidence, there may be little impact on quality of care without further attention to other aspects of evidence uptake.

Psychiatrists see many hurdles to evidence-based approach to psychiatric practice (Lawrie 2000). They want more clinically relevant, practically oriented research and also easier access to it. There is no shortage of clinical questions regarding treatment of core conditions that psychiatrists would like to see answered (Lawrie 2000). However, answering clinical questions in mental health is time-consuming and routinely requires critical appraisal skills. It is understandable that psychiatrists want summaries of the current literature and of effective treatments in specific clinical situations.

Integrating research and clinical practice in mental health is vital (Geddes 2010). The link between evidence and practice should be efficient and explicit. Psychiatrists deal with complex and disabling disorders, and optimal treatment is likely to use all modalities, including medication and psychological therapies (Geddes 2010). Psychiatry needs to define the greatest evidence-to-practice gaps in the specialty. A compilation of these deficiencies would constitute a research agenda in knowledge translation in psychiatry.

Conclusions

Evidence-based decision-making is not about clinical decision-making being determined solely by research evidence, but rather ensuring that research evidence is considered within the context of resources, patient expectations and professional expertise. There should be concern within evidence-based psychiatry not just about clinical content but also about knowledge translation and implementation of change. Simply hearing about a study is not enough to convince someone to change their practice. The profession needs to tap into, and build on, the process of local 'consensus building' to promote incorporation of evidence from clinical trials into everyday practice (Fairhurst 1998).

To implement evidence, it is best to prepare well. To move knowledge from research to practice, a specific clinical problem must be identified. The knowledge needed to solve the problem is then selected and adapted to local conditions before the knowledge-use determinants, such as obstacles and facilitators, are identified. Then the intervention to enhance evidence uptake is selected and tailored to build on the facilitators and overcome the identified barriers. Finally,

the intervention is implemented and strategies put in place to ensure sustained knowledge use. Importantly, it is essential to take account of the users of the evidence – clinicians, patients or policy makers – because one size rarely fits all. The overall aim is to make patient care more effective, efficient, safe and friendly.

Knowledge translation is best thought of as a bridge (Lang 2007). It brings together continuing medical education, continuing professional development and quality improvement in the hope of closing the research-to-practice gap. Integrating research and clinical practice in psychiatry must be a priority. Collaboration between clinicians, researchers, policy makers and those involved with information technology is required to optimise the contribution of research evidence (Geddes 2001). Interventions making patient care more efficacious are of benefit only if they are implemented in practice. Evidence generation and evidence implementation should go hand in hand.

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MCQ answers

1 e 2 e 3 a 4 a 5 e

MCQs

Select the single best option for each question stem

1 Regarding knowledge translation terms:

- a diffusion is a commitment to change practice
- b dissemination overcomes barriers in the clinical setting
- c implementation is passive and targets a specific audience
- d adoption is the natural, unaided adoption of research evidence
- e knowledge translation is about improving clinical practice.

2 Knowledge translation interventions do not encompass:

- a educational visits
- b tailored, targeted messaging
- c audit and feedback

d e-learning

e osmosis.

3 A systematic review:

- a uses systematic, explicit methods to identify, select and critically appraise research
- b avoids setting the results of an individual study in the context of other studies
- c is of little use in assimilating evidence
- d avoids appraising evidence for action
- e should improve quality of care by increasing inappropriate clinical variation.

4 Barriers to uptake of evidence from guidelines:

- a can operate at different levels, such as the individual, the team and the organisation
- b never involve a lack of awareness or familiarity

c include a belief in a good outcome following adoption of the guideline

d have never been investigated

e rarely include the characteristics of the guideline.

5 Facilitators of evidence uptake include:

- a a lack of awareness and familiarity
- b inertia
- c practical difficulties in using the evidence
- d patient opposition
- e organisational and peer support.