

**IMPROVING RESEARCH DISSEMINATION AND
UPTAKE IN THE HEALTH SECTOR:
BEYOND THE SOUND OF ONE HAND CLAPPING**

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POLICY PRECIS

Many Working Papers and Policy Commentaries have both academic and policy relevance. Therefore, in addition to the author(s) abstract (typically intended for an academic audience), this paper has been summarized with input from a professional journalist to enhance its accessibility and readability. This summary is referred to as a Policy Precise.

**Improving Research Dissemination and Uptake in the Health Sector:
Beyond the Sound of One Hand Clapping**

Health policy researchers and policy-makers have to take a totally different view of how research into health concerns is conducted and how those results are translated into practice if research is to play a meaningful role in changing the Canadian healthcare system. Most importantly, all those involved in doing the research and applying the findings have to view research dissemination and uptake as a communication process between two sides.

These points emerge from a review of the current status of health research and the lack of progress in disseminating research results and changing practitioner behaviour. Much of this failure to apply research more effectively is attributable to a lack of communication between researchers and policy makers and a poor understanding on the one hand, of the environment in which research is generated, and on the other, of the realities facing policy-makers trying to interpret and implement research findings. In addition, there is an undue emphasis on trying to change the behaviour of clinical practitioners in health care to the exclusion of other potential audiences for research such as legislative, administrative and industry decision-makers.

Part of the cultural change required to make research dissemination more effective is already occurring in Canada with the funding of applied research centres both inside and outside the university setting and the widespread interest in evidence-based decision-making. These new bodies promote the needed multi-disciplinary approach to health research and provide opportunities for the two sides to gain a better understanding of each other's work. The most effective instances of health research being translated into practice occur when decision-makers are involved in the study process from the very beginning.

To speed the process of research dissemination and uptake, we need new structures to improve the opportunities for ongoing communication between researchers and policy-makers, new activities and processes to promote more effective research and dissemination of findings, and even the creation of new human resource positions which would bridge the research and decision-making communities.

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SUMMARY¹

Decision-makers in the British merchant navy took 263 years to introduce citrus juice as a routine preventive for scurvy following Lancaster's first demonstration of its value in 1601. The dissemination and uptake of research is not a new problem. The preoccupation with evidence-based medicine and evidence-based decision-making is, however, a phenomenon of the 1990s. Encouraged by researchers and a general culture of accountability, explicit consideration of formal "research evidence" is now expected by many in the decision-making of politicians, bureaucrats, clinicians, and industry.

Initial efforts tend to have focussed on assembling and disseminating the evidence on clinical practice. The Cochrane Collaboration compiles health care effectiveness studies and is but one example of the emerging dedication to synthesising and disseminating health research for clinicians. Refining meta-analysis, clinical guidelines, information technology and other summarisation techniques are growth areas for research, as is the study of effective approaches to changing practitioner behaviour through dissemination of these summaries.

To date the yield from these efforts is more sound and fury than substance. The sizes of the Cochrane and other databases expand, but we have little idea of either whether or how decision-makers are using them. A few promising dissemination techniques such as audit and feedback, opinion leaders, or academic detailing seem to work sometimes but not always. Information provision, whether by hard-copy or electronically, may predispose toward changed approaches but is rarely enough on its own to enable changed behaviour by clinicians, administrators or legislators. We are far from knowing what works in what setting for what kind of decision-making.

There are a number of reasons for this spluttering progress. One is that efforts by researchers and by decision-makers seem to proceed largely independently. Each have their own (often misplaced) ideas about the other's environment. Opportunities for ongoing exchange and communication are few. Because evaluation of research dissemination and uptake tends to be by researchers not decision-makers, the focus has been more on understanding the assembly and dissemination than on the uptake of research evidence. Decision-makers' focus, however, is on the applicability, usefulness, and context dependency of research findings. It is like two people trying to assemble a jigsaw puzzle, each with half the pieces but each working in a separate room.

¹ Portions of this summary appeared as an editorial in the August 1997 issue of the Australia and New Zealand Journal of Public Health.

More significant progress may come from a better understanding on each side of the constraints and possibilities of research and decision-making. For instance, with increased exposure to decision-making, researchers may come to understand that it is not an event, occurring at a specified time in a specified place, but is, rather, a diffuse process with difficult-to-identify participants and locations, and a good sousing of values, preferences and biases to spice the evidence. On the other side, decision-maker exposure to research may lead to an understanding that it is not a product to be purchased from the local research supermarket, but is also a process, wherein methodologies and subjects of study make take years to refine and complete.

With more opportunities for researchers and decision-makers to engage in ongoing exchange throughout their two processes might come more realistic expectations of each other's environments. This may make it less likely that researchers and decision-makers treat each other like customer and store owner in contact only for the time it takes to exchange money for a product. It has been said that the two things one should never watch being made are sausages and public policy; one might add research evidence to this list of taboos. Nevertheless, the less squeamish among the applied research community and decision-makers could profit much from closer scrutiny of each others' respective sausage-making machines.

Advantages can accrue when applied researchers congregate around issues not disciplines and coalesce, either inside or outside universities, as organised multi-disciplinary units. These units can absorb across many researchers the fixed costs of research transfer programs, and offer a coherent target with which decision-makers can communicate. When decision-makers recognise the uptake of research as a separate function from its dissemination, they are more likely to establish research "receptor units" dedicated to such uptake inside their organisations. These units can not only acquire and insert summarised research findings into decision-making, but also offer an identifiable target with which interested applied researchers can communicate.

A second reason for the spluttering progress is the emphasis on clinical decision-makers. Although clinicians are obviously central to health services, pre-occupation with practitioner behaviour change has tended to obscure the relevance of other potential audiences for health research. Separating potential users of health research into legislative, administrative, clinical, and industrial audiences highlights that each wishes to extract different things from research and each have different preferences for the format of dissemination.

Legislative decision-makers are often non-experts in health care and tend to be interested in ideas, defensible policy assumptions to define a problem, or in justifications for or impacts of actions already taken. This is what some have called the “enlightenment” use of research in policy. These decision-makers seem to prefer short memos or face-to-face meetings to acquire such research rather than lengthy articles laden with jargon.

Administrative decision-makers, however, are more likely to have specialist knowledge of health care, often seeking research to assist with difficult resource allocations or to diagnose planning problems. Theirs is a more instrumental use of research. Administrators are probably better able to digest longer (but still summarised) versions of research evidence, they may use personal contacts in the research community and they are likely to attend conferences and workshops.

Industry decision-makers are oriented toward marketable products and are the most likely of any audience to be aggressively trying to “pull” findings from the researchers. Formats are less important than the potential profitability of a particular piece of research evidence.

Current processes tend not to recognise these distinctions across audiences. Researchers get caught in a “one-size-fits-all” process of dissemination, failing to tailor the content, timing, setting and format of dissemination to the audience. Research funders communicate a single set of research priorities, failing to recognise that each audience may have separate priorities. Better differentiation of the potential markets for health research would profit funders, producers and potential users.

Making progress in the relevance and applicability of research, as well as in the processes for acquiring and using it in decision-making, needs a cultural change by both researchers and decision-makers. Much of this cultural change is already well underway in Canada. For instance, in the last few years many provinces have funded one or more applied research centres with the mandate to produce health services research for decision-making -- some inside universities and others as stand-alone units. Some provinces are using their research funding programs to increase the emphasis on dissemination of findings and even developing a separate emphasis on uptake of evidence. Partly in response to the interest and partly due to funding restraints, universities are exploring more market-oriented approaches to education and research.

At the federal level research funders such as the National Health Research and Development Program or the Medical Research Council are increasing either the emphasis on targeted research priorities, and/or the dissemination of useful health research, and the synthesis of findings for decision-makers. Significant new funds are flowing for a Canadian Health Services Research

Foundation, for a Canada Foundation for Innovation, for a Canadian Health Information System and for a Health Transition Fund. The recent Prime Minister's National Forum on Health also highlighted evidence-based decision-making as a priority area.

The emerging cultural change from these initiatives can be built upon and expanded with new organisational structures, new activities and processes, and new human resources to facilitate more ongoing communication. The paper includes suggestions for action in each of these areas.

I. INTRODUCTION

“Science is both a collection of ideological beliefs and an agency for liberation, it substitutes democracy for political and religious authority. Demanding evidence for statements of fact and providing criteria to test the evidence, it gives us a way to distinguish between what is true and what powerful people might wish to convince us is true.”

S.N. Tesh, “Hidden Arguments: Political Ideology and Disease Prevention Policy”.
London: Rutgers University Press, 1989, p. 167.

The above quote provides a justification for concern about improving the link between research and decision-making - good information is a tool in the maintenance of democracy and a bulwark against domination of the diffuse broad interests of the many by the concentrated narrow interests of the powerful few.

The popularity of “outcomes-based management”, “evidence-based medicine”, and other manifestations of the recent enchantment with rationality in decision-making attests to the attraction of basing decisions more on research and less on assertion. Like all new “movements”, claims for its potential probably far exceed its reality (Klein, 1996; Lomas and Lavis, 1996; Maynard, 1997). Nevertheless, whatever potential there is in greater use of evidence in decision-making, it cannot be realised until significant improvements are achieved in the linkages between current or future research and decisions on pressing or emerging issues. This report assumes the existence of cadres of both applied researchers and decision-makers genuinely committed to better serving each others’ needs. What they lack, however, are the structures, processes and people able to facilitate improvement and build on past successes.

Unfortunately, debates about linking social and health research to decision-making tend to involve a lot of finger-pointing. Decision-makers accuse health researchers of:

- * lack of responsiveness to priorities,
- * measuring timelines in years instead of weeks,
- * favouring jargon to transparent communication,
- * preferring equivocation to conviction when faced with real decisions, and
- * over-reliance on written tomes instead of succinct person-to-person debate.

The researchers accuse decision-makers of:

- * imposing unrealistic timelines,
- * being unaware of what is a researchable question,
- * being unable to distinguish good from bad research,
- * expecting instrumental aid from enlightenment research,

- * ignoring research findings because of “political considerations”, and
- * being generally unprepared to adopt the fixed costs of monitoring, influencing, and incorporating research for decision-making.

Thus are born animosities, further barriers to interaction, and the vicious cycle of misunderstanding continues.

At the root of this appear to be at least four misunderstandings:

1. Researchers and policymakers think of each others’ activity as generating *products* instead of as engaging in *processes*.
2. Researchers fail to make the decision-makers’ distinction between a *rational* decision (research-driven and largely context free) and a *sensible* decision (pragmatically-driven and dependent on institutional and political context).
3. Decision-makers are largely ignorant of (or refuse to accept) the incentives, rewards and organisation of the university researcher’s environment; more specifically, they struggle with the researchers’ distinctions between *biomedical* and *social* scientists, or between *discovery* and *application* oriented research.
4. Researchers rarely discriminate between, and address uniquely, the different needs of the potential non-academic audiences for their research (legislative, administrative, clinical, industrial).

I start by exploring these four misunderstandings before reviewing some possible mechanisms to overcome the implied shortcomings of the current link between research and the various decision-making audiences in the health sector.

II. IS THIS THE SOUND OF ONE HAND CLAPPING? THE CURRENT STATE OF RESEARCH DISSEMINATION AND UPTAKE

RESEARCH AND POLICY AS PROCESSES NOT PRODUCTS

There is an oft-quoted line that the two things you should never watch being made are sausages and public policy. To this duo might be added research. And, indeed, other than a handful of specialists paid to do it, few people actually observe either the policy process or the research process. However, this does not mean that there are no processes to arrive at the “products”.

Decision-making is not an event

Researchers and decision-makers tend only to connect, if they connect at all, around the products of their processes. Just at the point of decision, after the issue has bubbled up onto the policy agenda, after it has been framed within a particular context, after the various claimants for a voice have been adjudicated, the procedures for negotiation and exchange agreed upon, and often after the limits have been set around feasible options, the researcher arrives brandishing his or her study. This is a less than opportune time to insert research into this now complex stew. This approach emanates from the “decision-making as an event” view -- as if policy were made by a defined small group of actors clustered in a room at a specified time, perhaps until a puff of white smoke is emitted (Weiss, 1982; Rist, 1994). This view fails to do justice to the ethereal nature of that diffuse, haphazard, and somewhat volatile process called decision-making.

Research is not a retail store

Equivalently, products from and not processes within the research community are what concern decision-makers. They arrive at the research community’s doorstep with complex questions and urgent deadlines. After the months and sometimes years of deciding study priorities, establishing a conceptual framework, choosing a methodology and endpoints, acquiring the research grant and obligations, and collecting and analysing data, the researcher is faced with a decision-maker who wants help with an emerging problem upon which decisions are being made **now**. It is unlikely that, in the absence of earlier communication of priorities and politically feasible options, any specifically relevant research products will be available to such a decision-maker. This emanates from the “research as a retail store” view -- as if researchers are busy filling shelves of a shopfront with a comprehensive set of all possibly relevant studies that a decision-maker might someday drop by to purchase. This view recognises neither the breadth of possible studies that could be done, nor the numerous stages involved in choosing which of those studies to do and how to do them.

Implications of research and policy as processes

The clearest message from evaluations of successful research utilization is that early and ongoing involvement of relevant decision-makers in the conceptualisation and conduct of a study is the best predictor of its utilization (Beyer and Trice, 1982; Weiss, 1982). Similarly, research centres with ongoing linkages to and an accepted role in a specific jurisdiction’s or organisation’s decision-making, have greater influence than those without such links (Frenk, 1992; Huberman, 1994; Fooks et al., 1997). Apparently familiarity breeds pertinence not contempt. This is a large part of the explanation of the burgeoning number of dedicated centres and institutes funded by and linked to decision-making organisations such as ministries of health, regional health authorities, hospital consortia, or practitioner associations.

By treating policy as a discrete product rather than an extended process, researchers miss the opportunity to influence how issues are framed or even whether they make it on to the policy agenda. As Rist (1994) has said “So long as researchers presume that research findings must be bought to bear upon a single event, a discrete act of decision making, they will be

missing those circumstances and processes where, in fact, research can be useful” (p.546). By treating research as a product instead of a process, decision-makers miss the opportunity to influence both the topics under investigation and the approaches adopted. As Huberman (1994) observes: “If it takes a research team two years to get hold of its study, conceptually speaking, why should we assume that the reading of a single research report in a few days ... will bring enlightenment [for the decision maker]” (p.22).

Table 2
Stages in the decision-making process

Environment scanning
Agenda-setting and priorities
Problem identification
Causal model evaluation
Assemble feasible options
Develop consultation methods
Assess public/stakeholder reaction
Choose and apply decision
Justify decision
Evaluate impact of decision

Table 1
Stages in policy oriented research process

Hypothesis generation
Methods development
Develop causal model (theory)
Study-specific evaluation (efficacy)
Knowledge summary/synthesis
Results communication
Application <i>to</i> policy world (effectiveness)
Application <i>in</i> policy world (applicability)
Ongoing monitoring/evaluation

Tables 1 and 2 present one view of the various stages in the policy and research processes. For the purposes of presentation both processes are listed as if they move sequentially from one logical stage to the next. As numerous analysts and observers have noted, this

is rarely the case. However, the apparent illogicality of policy-making to the researcher and research to the decision-maker, does not mean that work on any or all of the stages does not proceed, it just rarely proceeds in the kind of logical sequence represented by the tables.

Table 3
Stages of the research process -
an illustration using shared patient decision-making

This multi-stage process characteristic of research has a further implication. The stages of the research process are not necessarily intra-project stages i.e. a single research project will rarely contain all stages within it (see Table 3). A single project may do no more than develop an idea, validate a methodology, assess efficacy or evaluate applicability. Indeed, the “abuse” of research findings is often because a single study within one stage of the process (often an efficacy study showing that something works under “ideal” conditions) is taken as the product of the entire process and used as if it was a synthesis of all stages and applicable in far more complex “real world” conditions (Haynes, 1990). The unit of research transfer should rarely be the single study but

<p>Hypothesis Generation shared patient decision-making is a good idea (i.e. it is valued)</p>
<p>Methods Development how to elicit and/or aggregate patient values and preferences or how to present risk-benefit trade-off information</p>
<p>Causal Model or “Theory” lack of patient involvement leads to “unwanted interventions”</p>
<p>Study-specific Evaluation (Efficacy) RCT of interactive video-discs under ideal controlled conditions or RCT of living wills’ impact on health care use at the end of life</p>
<p>Knowledge Summary and Synthesis meta-analysis of study-specific work; social science overview/s</p>
<p>Results Communication dissemination to providers/patients in study, media, journals, etc</p>
<p>Application to Policy World (Effectiveness) what are the barriers to using video-discs (living wills, etc) under different health care funding and organisational arrangements?</p>
<p>Application in Policy World (Applicability) details of implementing shared patient-decision-making for specific jurisdiction, institution, or even practitioner</p>

should, rather, be the summary and synthesis of knowledge across the entire spectrum of stages in the process. Just as decision-makers in the legislative and administrative levels decry premature adoption by clinicians of innovations based on single or limited studies, so too should all decision-makers be sceptical of responding to the findings of a single study emanating from only one of multiple stages in the research process.

Grant funding agencies, particularly traditional biomedical and clinical ones, have inadvertently perpetuated the inappropriate idea that single studies are worthy units of transfer and dissemination. This is because of their major focus on funding project-based assessments rather than issue-based programs of research and/or relevant summaries and syntheses. The approach has reinforced the idea that advances in knowledge come only from project-based assessments and has downplayed (and often left unfunded) other important contributions from methods development, descriptions of alternative causal models, or case studies of failed attempts to apply an apparently efficacious approach in particular settings.

Better links between research and decision-making depend, therefore, on the two communities finding points of exchange at more than the “product” stages of each of their processes and, furthermore, on a redefinition of the research product as a synthesis of a broad spectrum of knowledge rather than an individual study’s findings. More attention is required on both sides to the task of establishing and maintaining **ongoing** links and more comprehensive communication.

THE IMPORTANCE OF INSTITUTIONAL AND POLITICAL CONTEXT FOR DECISION-MAKING

When context makes a difference

It took 263 years after Lancaster demonstrated the preventive value of citrus juice against scurvy before the British merchant navy finally introduced citrus at the end of the 19th century as a routine supplement to its sailors’ shipboard diet (Mosteller, 1981). The seeds of “evidence-based medicine” were sown in 1916 when the Flexner Report transformed medical training from quackery to science, but it has taken until now to see this incorporated into the assumptions of decision-making for health care systems. Sir Richard Doll’s most important findings linking smoking to lung cancer were completed in 1950 but it was not until 1957 that any legislative action was initiated (Walt, 1994). The initial studies demonstrating surgical rate variations were done in the 1950s, but significant policy concerns at legislative, administrative or clinical levels were not manifest until the early 1990s.

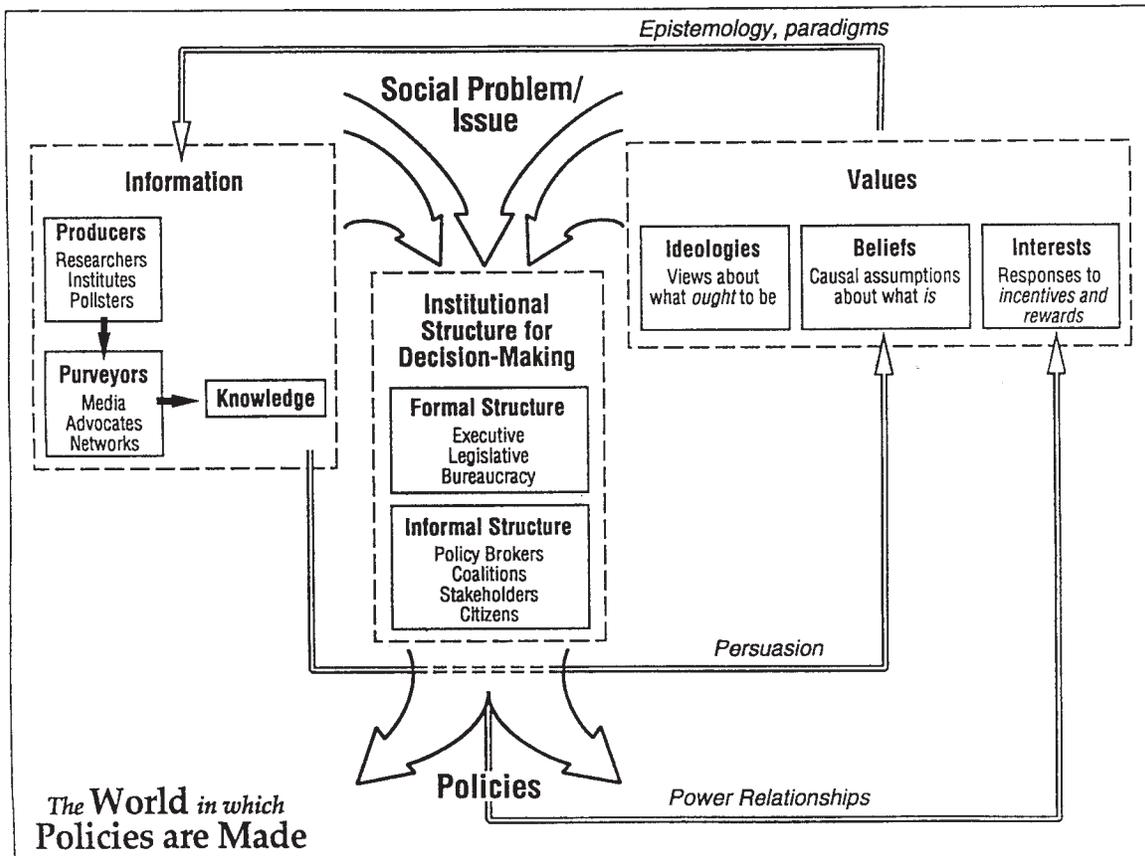
In each of these cases, it can be argued, the political and institutional context was initially misaligned with the findings. Decisions based on these insights did not flow into “useable knowledge” (Lindblom and Cohen, 1979) until the research resonated with other contextual factors, providing a justification for its use or corroborating its value. It is these “other factors” that researchers trained in the rationality and logic of science find so hard to understand and/or give credence to.

A framework for understanding the context of decision-making

In order to understand these factors, and how research relates to them, it is useful to divide the decision-making world into three interrelating domains (see Figure 1). First, is the *institutional structure for decision-making* -- its design, those who officially and unofficially have a voice, the history and nature of the interest groupings, the distribution of responsibility and accountability, the implicit and explicit rules of conduct. This is the “sausage-machine” out of which emerge the products “policy”, often redefining new power relationships and changing stakeholder interests. Into this structure go the outputs from two other domains -- the values in which decisions are immersed and the information upon which a decision is based and justified.

Figure 1

A schematic of the contextual influences on the decision-making process



Values influencing a decision emerge from a complex interaction of interests with beliefs and ideologies, and are expressed through individuals and organisations (Sabatier, 1987; Lomas, 1990). Interests are how one would **like** the world to work e.g. “as an executive in a for-profit health care company I support the expansion of private hospitals”. Interests change readily with context and are altered with each new policy decision. Ideologies declare a person’s or an organisation’s view of how the world **ought** to work e.g. “there ought to be a greater role for the private sector and the market than for government in health care (education, job creation, etc)”. They are hard if not impossible to change. Beliefs are sandwiched between interests and ideology. They are our knowledge of how we think the world actually **does** work, arrived at on the basis of whatever has persuaded us from the bombardment of information we receive e.g. “for-profit private hospitals are more efficient than public hospitals”. Beliefs, therefore, are the main target of research findings. Nevertheless, these findings must compete with other sources of persuasion, as well as with the pressure for rejection because of their incompatibility with interests or ideology (see Box 1). Beliefs, therefore, are likely to change only over years, if not decades - burning bush experiences are the exception not the rule.

Box One
HOW IDEOLOGY BIASES
RECEPTIVITY TO RESEARCH

Psychologists have elegantly demonstrated how our ideologies bias our reaction to research findings. Lord et al gave a class of undergraduates a survey to evaluate the strength of their opposition to or support for capital punishment. They took two groups from this sample -- those with the strongest views at either end of the spectrum. To half of each group they presented research studies showing a deterrence effect of capital punishment, and to the other half of each group studies showing no deterrence effect. In other words, half of each group saw research supporting their pre-conceived ideology and half saw research contradicting their pre-conceived ideology.

The experimenters first showed the students the studies' results, then assessed any impact of them on their attitudes to capital punishment, then they showed the methods used to arrive at the results in each study before again assessing the students' strength of support for or opposition to capital punishment.

*Perhaps predictably, when confronted with results in support of their initial ideology the students embraced them and the research was used to strengthen their pre-conceived views. Subsequent presentation of each study's methods had little or no additional impact. In contrast, students presented with results contrary to their ideology, moved their views only minimally or not at all in the direction of the findings. On presentation of the studies' methods, these students immediately reverted to their pre-conceived views, even **increasing** the strength with which they held them! Criticism of the methods was used as the "excuse" to reject research contrary to their initial ideology.*

In a delightful twist of study design the experimenters had, in fact, controlled for the quality of each study. They had re-constructed each research report so that half the time it had the original methods, but half the time methods used in an opposing study were inserted. Students were indiscriminate in their use of methods to reject "uncomfortable" research findings. Methods used in studies recently embraced for their confirmatory value, were now used to reject contrary findings!

These undergraduates are the future decision-makers and scientists. As Marmot (1986) has pointed out: "When facts collide with theories, scientists [and, one might add, decision-makers] are far more likely to discard or explain away the facts than the theory".

*Lord et al. Journal of Personality and Social Psychology
1979; Vol 37:2098-2109.*

The values for a decision, especially in public policy, emerge from a process of cognitive dissonance reduction (Plous, 1993). Individuals, organisations and policy sub-systems try to bring into congruence often competing messages from their interests, ideologies and beliefs. Only one of these - beliefs - are really amenable to change based on research, and even then this influence is usually over prolonged periods of repeated exposure in the context of competing sources of information. Furthermore, and especially at the legislative policy level, the window of opportunity to make major change, however compelling the research, opens only rarely and briefly when the constellation of values may happen to coincide with the research's implications.

Information also comprises more than research. Not only are there other sources for the "evidence" used for decisions - anecdote, experience and even propaganda - but also there are many purveyors of the research and other information, from think-tanks and interest groups through to the media (Stone, 1996; Day, 1997). It is these purveyors who turn information into "common knowledge". It is this common knowledge, only partly representing health researchers' labours, that serves as both the input to the institutional structure for decision-making and as a persuasive force acting on the beliefs embedded in values.

The distinction between rational and sensible decisions

The impact of, for instance, researchers demonstrating that for-profit private hospitals are less efficient than public hospitals is not straightforward. The ideologically committed private sector proponent with interests determined by his or her for-profit health care company is more likely to question the study methods than to accept the researcher's verdict and change beliefs. Furthermore, in their translation of this research into common knowledge the purveyors of information are as influenced by the values as they are by the evidence. What to the researcher appears an irrational response - ignore the findings that favour not-for-profit performance - is from the perspective of a sensible decision-maker trying to minimise conflict and perhaps embedded in a pro-business organisation or government.

Researchers who ignore the distinction between rational and sensible decisions i.e. fail to acknowledge the influence of these political and institutional factors, are restricting themselves to a very limited niche in the decision-making world. A better understanding by researchers of the competing sources of information, the likely manner in which their findings will be purveyed into common knowledge, the nature of the decision-making structure/s, and the prevalent values will help them to know not only whether, but also how and when their findings might be useful (Weiss, 1983).

PROBLEMS IN DECISION-MAKERS' VIEWS OF THE RESEARCH COMMUNITY

Distinguishing between disciplines

Decision-makers tend to treat the research community as homogeneous. In practice, health researchers comprise at least two quite distinct communities - biomedical/clinical scientists and social scientists. Decision-makers wishing to receive advice from researchers on (say) the overall advisability of extending coverage to a new vaccine, require not only details of the composition, toxicity, effectiveness and other biomedical questions, but also information on costs, acceptability, appropriate delivery personnel, administration of the immunisation program, and other social science questions. As Frenk (1992) has stated "in order to fully understand and act upon a health problem it may be necessary to integrate information on the subindividual level (through biomedical research), the individual level (through clinical research), the population level (through epidemiologic research) and the societal level (through health systems research)" (p.1401).

The presumption that one can obtain this relevant research from a "one-stop-shopping" site would be false. Rarely does a synthesis of the biomedical and social science research exist. Infrequently do biomedical and social scientists work together in an "issue-driven" research team. Researchers organise around disciplines rather than issues. They cluster around quite specialised bodies of knowledge and preferred methodologies (qualitative techniques, randomised controlled trials, surveys, cost-effectiveness analysis, and so on) each with a disciplinary label. At the crudest level, these divide into the clinical/biomedical and the social sciences. The lack of coordination between these approaches is not only a consequence of how academe is organised. It also has ideological roots. Behind the disciplinary labels lurk epistemological battles about what approaches lead to "truth", what is "scientifically valid", and what should be inside and outside the boundaries of "evidence-based knowledge".

Faced with the task of extracting a harmonious chorus from this cacophony of competing voices, the decision-maker cannot be blamed for either granting hegemony to one discipline or ignoring the lot of them! The emergence of "evidence-based decision-making" has increased the intensity of the battle, but has not yet solved the problem of synthesising the methodological apples and oranges. Funding "institutes" and "centres" provides an incentive for housing multiple disciplines under one roof, but not necessarily for inter-disciplinary collaboration and the synthesis of "one-voice".

Distinguishing discovery from applied research

Within each discipline a particular researcher or research organisation may have more or less of a predilection to engage in applied research - designed to contribute directly and instrumentally to defining, describing or solving society's current social problems - versus discovery research - designed to explore new techniques, approaches or knowledge independent of society's *current* perceived needs. Part of today's debate about the role of the university in society is centred on the relative worth ascribed to each of these approaches in academe - less tolerance of the discovery approach and higher expectations for the applied approach. Increasingly governments, employers and social groups in the health sector are demanding more obvious linkages between the output of university teaching and research and the problems confronting society.

Unfortunately, this debate tends to over-simplify the issue as an "either-or" choice rather than as a question of balance (Swales, 1997). The university environment, where most health research is performed, is one with multiple objectives, only some of which relate to addressing the immediate concerns and pressing problems of health care decision-makers. Hence, when decision-makers turn to the university health researcher for applied research help they represent but one of numerous demands on that researcher's time. They are competing with the priorities of students to teach, discovery research to do, academic articles to publish, administrative responsibilities to discharge, specialist conferences to attend, and so on. Within the university there are implicit and explicit priorities to which the academic health researcher will respond and, although these are changing, they are still dominated by the traditional "publish or perish" axiom. The relatively circumscribed and "local" problems upon which the decision-maker seeks assistance have little appeal for the academic searching for answers to specialised questions that transcend the borders of a particular geographic location, i.e. the characteristics of the archetypal peer-reviewed journal article. Neither the direct incentives of the university nor the professional norms and ethics of academe tend to reward or value work on tractable problems of immediate concern to local decision-makers i.e. applied research. The peer-review process for both the acquisition of grants and the publication of papers tends to perpetuate an insularity among researchers where the measurable is often able to drive out the relevant, or the ideological to oust the pragmatic.

Decision-makers' scepticism about research

The above description of the state of academe might explain why decision-makers are generally sceptical about the potential role of university research in decision-making. For instance, in one of the few direct studies of the origin of policy research advice for government decision-makers, Lester (1993) found that U.S. state policy officials rated universities last (of 15) as a source for useable policy research advice - other state agencies, newspapers, federal agencies, the governor's

office, and Foundations or think tanks were all rated more highly. In a study of US State Medicaid drug programs Soumerai et al (1997) found that 14 out of 18 administrators reported that no academic researcher input was sought to inform significant co-payment or prescription cap changes to programs, despite the fact that relevant research had been published. Similarly, Gwatkin (1996), summarising the findings from case studies of policy research use by Ministries of Health in four developing countries, observed that in none of the cases had universities been instrumental in providing the policy research: "If one wants research of the sort that [decision-makers] find relevant for their problems, independent or ministry-affiliated research institutes and consulting firms appear much more promising places to look than universities" (p. 5).

Part of this scepticism may, however, be rooted in decision-makers' limited view of the university researcher and lack of appreciation for less instrumental forms of input. Many of the "ministry affiliated research institutes and consulting firms" referred to by Gwatkin exploit the tools and approaches developed in universities, are peopled with professionals trained in the universities, and very often contract with university researchers to undertake parts of the applied research. In other words, the process of discovery research undertaken in the university may, given the correct structures and incentives, yield an applied research harvest both inside and outside academe. The biomedical bench scientist may wear her academic discovery hat on most days, but on others she (or the organisation in which she works) might be working with a pharmaceutical firm to develop commercial applications of the "discovery research". The abstract concept developed by a university social scientist of shared patient decision-making may find its way into a national cancer strategy or a local cancer clinic with practitioners offering specific risk and benefit trade-off information to help patients to decide therapy.

The point is that if all the university effort were turned over to applied research, then the feedstock from which applications are drawn - discovery research - would soon dry up. Improving the linkages between health research and decision-making is more about re-balancing the university environment to provide incentives for and structures that facilitate some applied research output, than it is about turning all university researchers into applied consultants (Frenk, 1992). Decision-makers who understand and appreciate the current incentives and priorities faced by academics will be in the best position to offer competing incentives and structures that re-orient at least a portion of a researcher's or a research organisation's time to applied health research. A simple example is the willingness of decision-makers to design a policy research request so that it has some generalisable (and therefore publication) value and then to avoid the usual government contractual restriction on the right of the contracting academic to publish results.

PROBLEMS IN RESEARCHERS' VIEWS OF THE DECISION-MAKING COMMUNITY

Researchers tend to feel about decision-makers the way decision-makers feel about researchers -- they treat them as homogeneous. Decision-makers, however, exist at a number of levels in the health care system, consisting of different types of individuals with differing needs for the content and format of health research. Numerous typologies are possible, but the one used below highlights the four main audiences with whom health researchers might profitably interact. The failure of researchers to distinguish between these audiences leads them to an inappropriate "one-size-fits-all" approach to dissemination of findings.

Legislative decision-makers

Legislative decision-makers consist of politicians, bureaucrats and various interest groups engaged in the highly visible process of public policy. It is this visible government decision-making process where attention is focused most when discussing the use of health policy research. Decisions such as whether to offer public or private health insurance and what to mandate as coverage, what forms and amounts of payment to make to practitioners and institutions, the nature of governance and regulatory oversight provisions, and which processes to use for such decision-making are the remit of this level of policy.

The needs of this audience are mostly related to problem identification, policy ideas, the validity of previous or potential policy assumptions, explication of causal models, and broad syntheses rather than specific studies - what might be termed health policy analysis. They are more likely to use research and analysis to form policy agendas (eg. should health consequences be an integral part of debates on unemployment?) or to justify already-chosen courses of action (e.g. how many deaths per year can we claim to have averted with gun controls?), than they are to engage in open-ended searches for the most scientifically valid solution to a problem. Decision-making at this level is more about defining manageable problems than it is about selecting solutions (Wildavsky, 1987). Uncertainty - ever-present for all decision-makers - is an accepted part of their environment and is as likely to be viewed positively as it is negatively, for it allows room to accommodate the disparate and sometimes competing interests and values surrounding a policy decision.

Decision-makers in this audience are usually part of large and demanding organisations and may often have no prior specialist knowledge in the health area. The routine flow through the in-tray of the average legislative decision-maker means that the conscientious individual would, in order to keep up, have to read the equivalent of a sizeable book each and every working day! Research information communicated via dense and jargon-laden publications is therefore far less appropriate for this audience than are person-to-person or brief memo formats.

Administrative decision-makers

Administrative decision-makers consist of program managers, regional administrators, executives and board members of institutions, and other more locality-based decision-makers. For this audience the more applied health services research and sometimes clinical research is of use to make their less publicly scrutinised allocational and organisational decisions. To some extent this audience can be viewed as implementing the specifics of the broader public policy decisions made at the legislative level. Decisions such as facility location, program design, human resource mix, budget allocations, and quality improvement strategies are taken by this audience.

The needs of these decision-makers are generally more specific than for those at the legislative level, and they are likely to be specialists of some kind in the health care sector. Cost-effectiveness studies, program evaluations, need assessments, and data on clinical practice variations help them to make or justify budgetary reallocations, program redesigns, changed staffing levels, and so on. As managers of a particular domain in the health care sector, they may have the stamina and perhaps the ability to read research in its original form, but still face the reality of tight timelines and ongoing uncertainty for most of their decisions. Synthesised knowledge around a concrete issue, provided within the time-frame of the decision-process, is of most use to them. It is not uncommon for an administrative decision-maker to establish a number of trusted contacts upon whom he or she can rely as a source of research information when it is needed. This reduces their search time and assures reliability for the source. They are less tolerant of uncertainty than legislative decision-makers, but still resigned to its inevitability.

Clinical decision-makers

Clinical decision-makers consist only partly of the individual practitioners caring for patients. Of equal or greater importance in recent years are all the officials and panel members of specialty societies, third party insurers, and other groups developing clinical guidelines and other “directives” that have become the fledgling legislative framework for clinical practice. The needs of this audience are more specific still than administrative decision-makers, involving questions about appropriate patient selection criteria, schedules for preventive regimens, safely delegable acts, ethical tenets under end-of-life and other circumstances, effective monitoring and disciplinary procedures, and so on.

They have, perhaps, the most circumscribed needs of the three audiences described so far -- data on safety, clinical effectiveness, cost-effectiveness, and patient acceptance are of greatest concern to them. That their research needs are more easily identifiable and circumscribed than those of the other two audiences may help to explain why there has been more recent attention to organising the research production and dissemination process to suit their needs. The emergence of

the Cochrane Collaboration which synthesises research by clinical area, journals that precis clinically relevant studies, clinical guidelines, and “how to” series on evidence-based medicine represent efforts to better serve the research needs of clinical decision-makers.

Nevertheless this audience still suffers from similar time constraints as administrative and legislative decision-makers and, despite hopes to the contrary, rarely seek out the research and act upon it on a routine basis. Most practitioners are not information-seeking probabilistic decision-makers, even though proponents of evidence-based medicine tend to assume that they are. Coordinated implementation of research into clinical policy requires attention to the myriad of influences and formats that the busy practitioner faces each day (Lomas, 1993).

Industrial decision-makers

Industrial decision-makers constitute the final audience. These consist of the marketing, technical, and research and development department employees of private corporations. Not only pharmaceutical and device manufacturers, but increasingly the computer hardware and software industries are prime audiences for some of the products of health research, especially biomedical and clinical research. In addition, venture capital companies become part of this audience insofar as such capital is needed to develop products from the “bench to the bedside”. Their decisions are obviously commercial ones related to the likely saleability, profitability and export potential of items developed by health researchers.

A major characteristic distinguishing this from the other three audiences is their inherent motivation. They are more likely to be trying to “pull” relevant findings out of the research community, especially the biomedical research community, therefore necessitating less effort on the part of researchers to “push” their findings out to the audience. Black and May (1996) make this point when they highlight two quite different meanings of the “D” in Health Research and Development programs. For administrative and clinical audiences it refers to the implementation of centrally evaluated and now “ready-for-market” findings in local settings; for industrial audiences it means taking basic scientific advances and seeking practical applications for the marketplace. The research needs of the industrial audience are, therefore, driven largely by what can be marketed. The higher level of motivation of this audience means that the formats in which these possibilities can be disseminated is less important than the findings themselves. It also means that issues of proprietary research, diversion of public into private priorities for research, and challenges to “academic freedom” are inevitably raised by their role in health research.

Table 4

A summary of audience types, their research needs and preferred information formats

AUDIENCE	TYPE OF DECISION-MAKER	RESEARCH NEEDS	PREFERRED FORMATS
LEGISLATIVE	politician bureaucrat interest group	* problem definition * affirmation of assumed causes * policy “ideas” (health policy analysis)	* person-to-person * overview in brief memo * media
ADMINISTRATIVE	program manager regional administrator hospital executive	* program evaluation * practice variation * cost-effectiveness (health service research)	* ‘special’ contacts * summary report * dedicated seminar
CLINICAL	practitioner professional society expert panel member	* effectiveness * ethics * patient preference (clinical research)	* colleagues * action-oriented synthesis
INDUSTRIAL	company scientist corporate executive venture capitalist	* marketable product (biomedical, information technology research)	depends on scientist vs non-scientist

Beyond “one-size-fits-all”

When asked about the principal audience for their work most health researchers include their academic colleagues at the top of the list followed, perhaps, by some vague reference to “society” or “decision-makers”. A necessary (although not likely a sufficient) condition for improving the linkage between health research and decision-making is for researchers to better discriminate between the four potential audiences for their findings and to understand their varying needs. Different solutions will likely exist for each audience to improve the links between them and research. Table 4 summarises the characteristics and needs of these four audiences.

One cannot leave a discussion about audiences for health research without noting the potential for a powerful new audience to emerge - the public. New information technologies such as the internet, combined with increasing scepticism about expert professional opinion and an awakened ethic of “consumer choice”, mean that the public in its various roles will demand greater access to research. The burgeoning “shared patient decision-making” movement, especially in areas such as cancer and reproductive care (Charles et al, 1997; Coulter, 1997), and the increased reliance in all

decision-making on citizens as governors or in advisory roles, will likely require greater attention to their needs, either as a subset of the legislative, administrative or clinical audiences, or as an audience in their own right

Despite what many researchers think, their role in decision-making does not have to be reserved for the few occasions in their career when they have a specific solution to a delineated problem. Indeed, at the legislative level one of the principal needs of these decision-makers is assistance in clearly delineating problems or giving weight to one model of problem causation over another (Reich, 1988; Stone, 1989), e.g. are rising health care expenditures caused by lack of patient co-payments or the increasing number of doctors? More cynically, at the level of the industrial decision-maker a problem can sometimes be created to match an attractive and marketable solution - prostate specific antigen testing to detect latent cancers in middle-aged men being a recent example. The point more generally is that different audiences see different uses for research (see Box 2). Gaining a better understanding of the interaction between audience-type and research needs is an important building block for researchers seeking to improve their relations with and usefulness to decision-makers.

Box Two
DIFFERENT STROKES FOR DIFFERENT FOLKS

The District Health Council (DHC) in the city of Windsor, Ontario negotiated an agreement with the provincial Minister of Health to retain all the savings resulting from closure of hospitals in the community. In October 1995, after the hospital mergers and closures were completed, a panel of the various decision-makers and interests were invited to a conference to reflect on the role that research played in the exercise. The use that each saw for research varied substantially depending upon which level of decision-making they occupied during the process of rationalisation.

THE MINISTER OF HEALTH:

"To point in the appropriate policy direction"

"To legitimise the political decision"

THE CHAIR OF THE DHC:

"To inform and galvanize the public"

"To compare Windsor to other places"

THE HOSPITAL CEO:

"To give advice on governance and management structure"

"To provide evidence on the effectiveness of regionalisation"

THE MANAGEMENT CONSULTANT:

"To answer specific instrumental questions"

e.g. "what minimum number of patients makes a viable service"

THE CLINICIAN (a nurse):

"To show clinical (ie bedside) effects of changes"

"To prioritise via cost-effective services"

As one participant concluded "Where you stand depends upon where you sit"!

Ontario Health Care Evaluation Network Annual Conference, October 1995

III. BEYOND THE SOUND OF ONE HAND CLAPPING. APPROACHES FOR IMPROVING RESEARCH DISSEMINATION AND UPTAKE

Hence, research use in decision-making is not usefully viewed as a one-way street in which research, when available, supplants decision-making. Neither should it be seen as a technical exercise in which research is carefully slotted into a specified place in decision-making. Rather, research dissemination and uptake is more usefully viewed as a communication process between relevant researchers and decision-makers. The current failings of dissemination and uptake are more to do with miscommunication -- inappropriate dissemination, limited commitment to uptake, lack of understanding and unrealistic expectations of each others' environments -- than they are to do with unavailability of research or an absent need for it in decision-making.

THE PREDISPOSING CULTURAL SHIFT FOR RESEARCH USE

“On the ground” improvement in the relationship between the communities therefore needs a move from ad hoc and occasional contact to organised and ongoing communication. But this is a cultural shift and cannot be brought about overnight. On their own, reorganisation and fiscal sticks and carrots are not enough to open new lines of communication and increase the understanding of and mutual respect for each others' environments and tasks. These may well enable the change, but they will fall on stoney ground if there is not a commensurate change in expectations -- that decision-makers will seek out and use research in their work, and that researchers see part of their role to be to meet these expectations.

This cultural shift is, in fact, occurring. Despite its hugely inflated ambitions and somewhat misguided approach, the partnership of the early 1990s between the U.S. Congress and the Agency for Health Care Policy and Research around outcomes research and medical practice guidelines has changed many U.S. decision-makers' and researchers' ways of thinking (Warren and Mosteller, 1993). Although the budget of the program has now been cut below \$100 million per year, the almost \$1 billion that has been expended since the start of the decade has been an investment in bringing about increased expectations for evidence-based decision-making.

It is in the U.K. that the cultural shift is perhaps most advanced. The now international Cochrane Collaboration, summarising and making available in a database clinical research by area of medical specialty, started there (Chalmers, 1992) and has been built upon with the funding of a Centre for Evidence-based Medicine. More significantly, the entire health care sector was put on notice of

a changed approach when the National Health Service (NHS) implemented its new R&D strategy in 1990. The genesis of this strategy was in a House of Lords Select Committee on Science and Technology that concluded that “no research system can function efficiently when the principal customer for research (the NHS) has so small a direct input into the initiation of research programmes ... there is no lack of push from medical researchers; what is missing is enough pull from the NHS” (as quoted in Black, 1997). With an objective to “ensure that the content and delivery of care in the NHS is based on high quality research relevant to improving the health of the nation” (U.K. Department of Health, 1991) they set a target of 1.5% of the NHS budget for R&D by 1996; appointed Directors of R&D in every Region and nationally; designed priority-setting and tendering processes; funded dedicated centres for primary care, and for dissemination and reviews; and moved the focus of much research to problem-oriented inter-disciplinary investigation (Black, 1997).

Although it is still too early to comment on the success or failure of the UK’s strategy, Black does state in his recent review of the initial experience that it has:

“started to redress the balance between basic, clinical, and health services research in terms of funding; raised awareness of and concern for the outcome of health care among clinicians and managers; ...[and] raised the profile and respectability of dissemination and implementation of scientific evidence” (Black, 1997, p. 503).

In other words, it has gone a long way to bringing about the overall cultural shift that may facilitate “on the ground” improvement in ongoing communication between researchers and decision-makers.

Canada, too, is on the way to the same cultural shift. In addition to the academic base that has long pushed the development of evidence-based medicine (Evidence-based Medicine Working Group, 1993), there has been a recent federal endowment of a Health Services Research Foundation and related health research and innovation entities. Similar initiatives in some of the provinces in both dissemination and uptake of research are capitalising on their existing funding of applied research centres, although smaller provinces, particularly those in the Atlantic region, have been slower to establish this kind of infrastructure. The Prime Minister’s National Forum on Health highlighted many of the issues in its recent report and chose “Evidence-based Decision-making” as one of its four areas of work. The fact that the Deputy Ministers of Health, too, are jointly grappling with the issue of how to set research priorities and how to improve the links between research and decision-making indicates the extent of recognition within the health care system of the need for improved dissemination and uptake of research.

Within this context of predisposing elements bringing about a cultural shift, the chances for success are improved for accompanying changes in three enabling areas -- new organisational models, new processes and activities, and new human resource skills. However, before moving to a discussion of changes in these three areas, two issues need reiterating.

First, the purpose of reorganisation is not to substitute applied research for all discovery research in universities or other knowledge-producing organisations. As pointed out earlier, the latter is the feedstock for the former and its obliteration would soon bring about starvation for applied research with the content of the supply lines drying up. The aim is to re-balance the relative efforts in the applied and discovery domains and to make more effective the communication and uptake of applied research. Second, reorganisation is not designed to colonise the decision-making domain for research. Such “academic imperialism” would deny the right and proper role of value disagreements and interpretations inherent to the uncertainty of most decision-making. Although better access to research may justifiably marginalise the more outrageous claims of some interest groups, the core of decision-making will remain the contestability of ideas, problem definitions, and solutions, and the processes needed to resolve the inevitable conflict. If strategies to improve the dissemination and uptake of research in the health sector have the consequence of marginalising discovery research and provide the excuse to avoid the tough decisions in the absence of evidence, then they will have failed.

NEW ORGANISATIONAL MODELS

The purpose of new organisational models for researchers is to:

- a. facilitate the fixed costs of priority-setting, synthesis, dissemination, data warehousing, and so on by grouping a critical mass of varied skills within one organisation
- b. organise around issues more than disciplines
- c. provide a coherent target with which decision-makers can communicate in an ongoing relationship.

The structures that can achieve these objectives will vary depending upon such factors as the current political and economic context of the researchers and the decision-makers, the principal audience for the research, the skill levels of available researchers and decision-makers, the usual timelines for decisions, the resources available for sustaining the organisations, and so on. Hence, the issues and options are described below without necessarily prescribing a particular resolution.

Organisational models for researchers

Aggregating researchers into single organisational structures or networks raises questions of their location, governance, funding, and disciplinary mix (see Table 5).

Location

Researchers can be located inside the university or outside, and if outside they can be stand-alone or inside a decision-making organisation. Frenk (1992) refers to the latter as *academic subordination* -- researchers are located within, or under the direct control of, the decision-maker organisation. This has the obvious advantages of ensuring responsiveness and essentially combining both the research production and the decision-maker receptor functions. This model therefore minimises the barriers to communication. Unfortunately it also has significant disadvantages. It usually captures the entire research capacity for applied work, leaving little or no time for discovery research. Given the existence of a “market” for researcher employment, it tends to garner only the lesser qualified and less skilled researchers, others preferring to locate in venues where they have more freedom and autonomy (and access to equivalently unfettered colleagues). Experience with this model tends to confirm the suspicion that its efforts easily become concentrated on the immediate problems while medium- to long-term issues are neglected. Finally, there is a significant risk in this model that “research may serve merely to legitimize decisions which have already been made” (Demeny, 1988), a consequence of the obvious difficulty of maintaining intellectual integrity and independence in such a model.

Nevertheless, there may be (indeed there already is) a role for this “industrial R & D” approach for the biomedical and clinical researchers whose main audience is industrial decision-makers. In addition there are health services researchers generating information for the day-to-day management of an organisation such as a regional health authority or a professional association, such as the newly developed research unit of the Canadian Medical Association or the long-established research capacities of some of the public sector trade unions. However, finding “pure” examples of these academic subordination models is difficult because most will at least form linkages with universities or other sites with greater agenda-setting autonomy to obtain their feedstock of discovery research, new techniques and so on.

Locating researchers in stand-alone organisations independent of both the university and decision-maker environments is a second alternative. This *quarantine model* has the advantage of freeing the researchers from the competing priorities of teaching, journal publication and other “distracting” elements of the university. It also assures a degree of independence from (and therefore broader credibility outside) the decision-maker environment. This independence and not-for-profit

status is what distinguishes this model from the management consulting firm. The obvious disadvantage is the potential for independence from either environment to translate into irrelevance to or neglect of those environments -- research does not “connect” with the decision-makers and/or is not informed by academic developments. Governance and funding mechanisms have the potential to overcome at least some of this potential isolation. Like the academic subordination model, however, there may be difficulty in attracting researchers to this environment in the face of apparently more autonomous employment opportunities in university academic departments. This model may serve well in environments where such alternative employment opportunities for the researcher with an applied predilection are absent or limited, and where a funding agent, such as a government in a small jurisdiction, wishes to maximise its use of resources by establishing a single entity for all potential audiences. Again, finding “pure” examples of the model is not easy given the likelihood that researchers will develop at least some academic linkages, as has happened with some of Canada’s most prominent quarantine models -- Quebec’s SECOR, Ontario’s Institute for Clinical Evaluative Sciences or Institute for Work & Health, and Saskatchewan’s Health Services Utilisation Research Commission.

Locating researchers inside academe as a dedicated structure might be termed the *academic freedom* model. The advantage of this approach is the wealth of researcher resources potentially available to the organisation -- not only are there the skills of the direct members of the organisation but also there is access to other skills from around a university. In addition, funding of such an organisation can often be at the margin with core academic budgets absorbing many of the fixed costs such as office space, library facilities, data storage, computer analysis capability and so on. In this model the organisation has the capacity to operate across the full spectrum of the research process - developing new methods, for instance, as well as applying the methods - and to research both longer-term issues as well as currently pressing problems. A major disadvantage is the likely distraction of the researchers into the competing priorities of the academic environment outlined earlier, especially the temptation to allow discovery research to overwhelm applied research. Again, governance and funding mechanisms may ameliorate some of these difficulties, as seems to be the case for academic freedom models in Canada such as the University of British Columbia’s Centre for Health Services and Policy Research or the GRIS at the Universite de Montreal. All too often, however, the career structure of the university, and most universities’ unwillingness to accommodate and adapt promotion and tenure criteria, tends to lead to domination by academic incentives.

A solution to this dilemma, implemented in a number of Centres such as the U.K.'s Centre for Health Economics at York University, is to segregate within the organisation the investigator-initiated research (undertaken with traditional research grants under traditional disciplinary labels) from client-based research (undertaken on contractual and similar bases and organised around issues and/or specified deliverables). The Manitoba Centre for Health Policy and Evaluation most closely approximates this hybrid model in Canada. It has the advantage of making the full spectrum of researcher skills and predilections available both to each domain internally and to those outside. Assuming that the client-based relationships affect activity, then they provide both a motivation for and a reinforcement of

communication with decision-makers. This may "spill over" in its influence to researchers in the investigator-initiated domain. Such an organisation has the capacity to retain the strength of disciplinary approaches but also has the flexibility to organise around issues when necessary. The main disadvantage is that it tends to create two classes of citizen inside the organisation, with the "client-driven" employees inevitably being regarded as inferior by their "purist" academically

Table 5
Issues summary for potential new organisational models for researchers

<p>LOCATION:</p> <p>Academic Subordination Model</p> <ul style="list-style-type: none"> - inside decision-maker organisation - responsive to immediate needs - potentially neglectful of longer-term needs <p>Quarantine Model</p> <ul style="list-style-type: none"> - stand-alone - broad credibility, avoids perverse academic incentives - potential drift from responsiveness and disconnection from academic feedstock <p>Academic Freedom Model</p> <ul style="list-style-type: none"> - inside academic institution - lower fixed costs, accessibility to wealth of skills - potential drift from responsiveness, some competition with academic objectives <p>(Hybrid Segregation Model places responsive client-driven alongside investigator-driven research in academic setting)</p> <p>GOVERNANCE:</p> <ul style="list-style-type: none"> Internal Management Board of Directors Advisory Council <p>FUNDING:</p> <ul style="list-style-type: none"> Infrastructure Support Project-specific Support Support for Specified Deliverables Mixed Support <p>DISCIPLINARY AND SKILL MIX:</p> <ul style="list-style-type: none"> Multi-disciplinary (within manageable boundaries) Combine Biomedical/clinical and Social Sciences "Story-telling" Skills
--

driven colleagues. Nevertheless, in environments where university employment opportunities dominate the researcher marketplace, this hybrid of the academic freedom model may offer the most cost-effective approach to re-orienting some of those university-based resources toward more applied work.

Governance

The main choices are between internal management without governance, a Board of Directors, or an Advisory Council (or equivalent entities), and the mix of membership if the choice is either of these latter two bodies. These choices interact with decisions on the location and the funding of the organisation. Relying entirely on internal management with no external governance is unlikely to be feasible if the organisation is largely supported by external funds -- the source of funds may justifiably desire some influence over ongoing activity. Also, if the organisation is located within academe it is very difficult to resolve the potentially contradictory expectations of the academy on the one hand and of a Board of Directors on the other; an Advisory Council is to be preferred.

The key to deciding on membership is a recognition that the governance mechanism is, usually, also an element in the dissemination and uptake of an organisation's work. Generating "ownership" in the work of the organisation by those likely to find it of most use is one of the most effective ways of ensuring uptake (Huberman, 1994). Membership should therefore aim to strike a balance between those whose main role is to give input to the management and workplan of the organisation, and those whose main role is to broadcast and amplify the work of the organisation. These abilities can, of course, coincide in the same individual.

Funding

Funding of an organisation is another effective way to generate ownership in its output. It is therefore advisable that where possible at least a portion of the funding for an organisation be obtained from the audiences most likely to benefit from its output. There is, however, a trade-off to be kept in mind when thinking of how many sources of funding an applied research organisation should rely upon. A single source of (large) funding may emulate some of the disadvantages of the academic subordination model via fiscal dependency. In contrast, multiple sources of (small) funding may either facilitate no commitments to the audiences' needs and/or ownership by them of the organisation's outputs, or impose multiple unmanageable and often competing expectations on the organisation. Somewhere between these lies each organisation's optimal number and mix of "sponsors".

There are at least three forms of financial support -- infrastructure funding, project-specific funding, or funding for specified deliverables such as routine reports or analyses. Infrastructure funding may be best to achieve the objectives of encouraging synthesis of project results across the spectrum of the research process, “need assessments” of the researchers’ relevant audiences, targeted dissemination (even person-to-person exchanges with decision-makers), and ongoing communication. These activities are the ones not generally rewarded or funded in the academic environment and, for the most part, not considered within the remit of the peer-review funding process. Project-specific funding and funding for deliverables may also be added to this core infrastructure support, but is less crucial given the alternative sources such as granting bodies and/or direct contracts. Indeed, without infrastructure funding, the ability of applied research centres to respond to such project-specific activities is compromised.

Assembling skilled and specialised research teams is a particularly onerous task, and this should be kept in mind when establishing funding periods. Stability of infrastructure support over at least 3-5 year timelines circumvents the time-consuming chore of constantly dismantling and reconstituting such teams.

Disciplinary and Skill Mix

Given that few disciplines are able to span the entire breadth of the research process as outlined in Tables 1 and 3, it is likely that most applied research organisations will avoid being uni-disciplinary. Uni-disciplinarity should particularly be avoided in the academic setting. Here it will tend to reinforce the existing departmental boundaries and the natural inclination of academics to band together around disciplinary rather than issue-driven research agendas. The capacity of an applied research organisation to absorb multiple disciplines should not, however, be overestimated. As discussed earlier, behind the disciplinary labels lurk ideological differences that can impede rather than facilitate the synthesis of usable new knowledge.

To date there has been a tendency for clinical and/or biomedical disciplines to congregate separately from the social science disciplines. Some of this reflects the very different foci of the former on the sub-individual or individual as the unit of analysis and the latter on the population or society as the unit of analysis. An appropriate challenge in the future is how to blend these approaches within one organisation to better serve the emerging health sector issues that, given the new reality of clearly fixed budgets, are more and more concerned with trade-offs and conflict between these individual and societal/population perspectives.

The above disciplinary considerations largely have their impact on the relevance of the research undertaken in an organisation. A separate, but obviously equally important, issue is the skill mix needed to improve the dissemination and uptake of whatever research is conducted. Here the skills of communication specialists such as creative writers, marketing personnel, and innovative educators are central to the mandate of applied research organisations. Neil Postman, the communications theorist, has written eloquently of social science as being no more than the telling of compelling stories. Talking of social scientists he says: “One becomes fastidious about method only when one has no story to tell. The best people in our field have, with few exceptions, been almost indifferent to the question of method. ... They used whatever social or historical theories and facts as seemed relevant; they put forward their arguments by using the instruments of reason, logic, intuition, conjecture, metaphors, images and ideas” (Postman, 1988, p. 17). Whether these specialists work with the researchers to improve each one’s story-telling ability, or whether they substitute for the researchers’ generally constrained efforts and take on the responsibility themselves, is a strategic decision to be taken by each organisation.

A compelling idea, often encountered in the literature on research utilisation is that of a knowledge “broker” with an assigned job description to bridge the gap between decision-makers and researchers. This is discussed in more detail in the section below on new human resources.

Whatever the organisational model or models chosen for applied research, there remains the issue of how to capitalise on the work of all researchers regardless of whether they are part of a critical mass or not. Some researchers are either unable or unwilling to be incorporated into an organised unit such as that outlined here. This does not mean that their research is irrelevant to the needs of decision-makers. It does mean that those organised research units that do exist need to make networking possibilities available to tie such individuals in to the dissemination capacity they have and, more generally, to see their task not as disseminating just “**our**” research, but rather assembling and disseminating **all relevant** research.

Organisational models for decision-makers

The purpose of new organisational models for decision-makers is to:

- a. define an accountable research receptor function able to assess research and establish ongoing relationships with relevant researchers
- b. facilitate the communication of priority research needs and decision-making constraints for current and future issues
- c. provide a coherent target with which researchers can communicate and to which internal decision-makers can turn for advice.

The organisational arrangements to achieve these objectives are unlikely to be the same for each of the four potential audiences of legislative, administrative, clinical and industrial decision-makers. All, however, will have to address the three main issues of where to locate their receptor capacity, what types of skills to have within that capacity, and what mechanisms to use to capture and communicate priorities and constraints.

Location

Those decision-maker organisations adopting the academic subordination “industrial R&D” model for the research process have, obviously, predetermined the co-location of both research production and receptor functions. Their main issue will be to ensure that the designated unit commits time, skills and resources to the “push” of relevant findings to match a strong “pull” from their internal audience i.e. that their research function is balanced with a receptor role for all relevant research (not just their own) on behalf of the organisation. This combination of research production and receptor capacity is most likely among organisations with relatively narrow and clearly defined research needs, such as industrial manufacturers and some administrative groups. Indeed, the fixed costs can be shared by manufacturers or administrative groups banding together to form R&D consortia, as has been done for some industries (PRECARN, 1990) and by some health care organisations such as the District Authorities under the UK’s system of Regional Health Authorities (Black, 1997).

This industrial research and development approach, however, is unlikely to be viable for legislative decision-making bodies or most administrative and clinical groups -- their research needs are too broad and diffuse. For them the decision is whether to “contract” for the function outside their organisation or to develop it “in-house”. If the decision is the latter, a further decision is whether to diffuse the capacity throughout the organisation or identify it as a critical mass on its own.

The main advantage of locating the receptor capacity outside the organisation is the potential to share its costs with others in some form of consortia. This may enable smaller organisations to have access to a much larger set of skills and capacities than would otherwise be the case. The disadvantages are the decreased sense of ownership on both sides, the difficulties of levelling accountability compared to internal location, the decreased capacity for the receptor personnel to apply pressure for the use of research by decision-makers, and the likely diluted representation and communication of a particular organisation’s priorities and constraints. On balance, the importance of having a clear target for the researcher and good connections to relevant decision-makers argues for most ministries of health to have their research receptor units inside the organisation.

In locating the receptor capacity inside the organisation the issue of concentrated mass versus diffused capability arises. Some management philosophies of evidence-based decision-making reject the idea of identifying a location or unit within the organisation where research is received and assimilated. They argue that all managers should have this ability and should incorporate it on a routine basis in day-to-day decision-making. This argument confuses the ability to use research with the ability to find, appraise, and assimilate research. It also underestimates the size of the task (and over-estimates the time available to the manager) given the burgeoning literatures across the health sector. Finally, a diffused research reception capacity makes the task of the researcher wishing to communicate findings that much harder -- identifying the relevant decision-maker for his or her findings inside a complex organisation is a job better left to a knowledgeable and skilled insider than displaced to a naive outside researcher. This issue may have resonance for those in legislative environments who have participated in the periodic and recurring debates about centralising or diffusing policy development capacity in the organisation.

The choice, therefore, is really a false one. Once a decision is made to locate the capacity inside the organisation, both an identifiable receptor unit is needed **and** attention needs to be given to developing decision-makers' abilities (and supervisors expectations) to use its output. Hence the need for some of the predisposing initiatives outlined at the start of this section.

Skill mix, priority setting and communication

For those organisations with peer-review and/or contract-based research funding programs, co-location of the receptor function with this group has obvious synergies for the skills needed. However, the two are related but separable activities, with similar but not coincidental skill requirements.

Most grant and contract funding programs require at least broad outlines of priorities to guide their research investments. The way these priorities are currently determined and then communicated may not, however, meet the broader needs of a new organisational entity dedicated to better communication between the decision-makers and the researchers. For instance, many such granting programs establish these priorities based more on consultation with the research community than with their own decision-makers. Hence the preponderance of disease-based or discipline-based terms for the expression of priorities rather than problem- or issue-based descriptions.

The average decision-maker is not, however, well skilled in describing their research needs in terms familiar to the researcher. They see issues through managers', politicians' or clinicians' eyes and are unlikely to express their priorities in the form of "researchable questions". Those working in a new receptor and linkage unit inside the organisation must, therefore, have the remit to extract priorities from decision-makers and the skill to translate them into terms understandable to the research community.

Regarding the need to not only fund but also reap the harvest from research, current programs are often staffed with administrators rather than those with the skills to seek out and appraise research on broad fronts. Few in-house granting programs actively link relevant decision-makers with specific researchers throughout the process of conducting the research (although the National Health Research and Development Program has a history of taking this approach, with mixed results) . Rather, the best that usually can be expected is that a lengthy and largely "academic" final report is passed off to potentially interested decision-makers some time after the research is complete and the researchers have moved on to another area. The skills needed in a receptor unit to overcome this are not, however, necessarily those of the research "doer". Research "user" skills, coupled with the ability to translate complex findings into understandable communications, are far more appropriate.

Finally, developing decision-making processes with an explicit requirement for consideration of relevant research evidence, as has become the case for much clinical policy development by practitioner groups, can do much to enhance the role and functioning of these receptor and linkage units.

NEW ACTIVITIES AND PROCESSES

The purpose of new activities and processes is to:

- a. increase researchers' and decision-makers' mutual respect and their understanding of each others' environments
- b. increase the relevance to decision-makers of what is researched and, even more, what is transferred to them (i.e. improve the "push" from researchers)
- c. increase decision-makers' communication of research needs and their motivation to use research to inform their decisions (i.e. improve the "pull" from decision-makers).

The need for a cultural shift in universities and research sponsors

Achieving these objectives will have to involve more than the researchers and the decision-makers. Both the larger institutions in which researchers reside (usually academic settings) and the numerous governmental and non-governmental sponsors of research will need to be involved. For the foreseeable future academic institutions will continue to be the primary setting for health research and the numerous Foundations, Research Councils, and private sector funders will continue to dominate the sponsorship of research. Although governments may continue to be the major provider of funds to them, it will be the approaches, incentives, norms and values of these institutions that will heavily influence what is researched and how much effort is put into its dissemination and uptake. Just as a predisposing cultural shift among decision-maker organisations is needed to improve the pull for research, so too is a cultural shift among research institutions and sponsors needed to improve the push from research.

The incentives of the promotional and status criteria in universities are a central barrier to much of the move to applied research. Incentives are often upside-down for the applied-oriented researcher -- from the high value placed on academic publication versus the low value for timely influence on a policy decision, through the recognition of student education in a classroom but lack of recognition for decision-maker education in a workshop, and the contrast between accolades for membership on an international journal's editorial board but indifference to a seat on a national policy advisory committee. Indeed, the kinds of incentives generated by these criteria are even reinforced by the way governments fund universities. For instance, differential allocation of funds across universities is often determined by factors such as the number of students taught (with no commensurate factor for the frequency of contact with non-student decision-makers), or the number (and "Journal Impact Factor") of peer-reviewed scientific articles published (with no commensurate factor for applied research reports or policy memos to decision-makers, whatever their demonstrable impact). Greater flexibility in the application of university promotion and tenure criteria is an urgent need if applied research is to flourish inside the university.

This cultural shift may be encouraged by gradual and inexorable changes in the institutions that surround universities. The distribution of relevant roles and funding will vary with each jurisdiction, but the processes that need to be addressed are unlikely to vary. These include: coherent communication of priorities, the ways in which research is funded, the "unit of transfer" and formats of dissemination, and the modes of uptake.

Coherent communication of priorities

Consensus on priorities is unlikely if attempts are made to establish them across either too broad a spectrum of decision-making audiences or across too many separate jurisdictions. Given the quite different research needs of legislators, administrators, clinicians and industry described earlier, it would be surprising if a coherent set of priorities could be extracted from such a heterogeneous mix of potential research users. If national priorities are attempted across regions of a country that differ significantly in health care system structure, values, culture, and so on, either failure or broad and highly permissive motherhood priorities are likely -- another exercise in “heart disease”, “cancer”, “innovative and cost-effective delivery arrangements”, and “the impact of aging and technology”. This would be unfortunate. In the absence of clearly delineated directive priorities, researchers cannot be blamed for setting their own agendas.

The first issue, therefore, is to ensure that a consensus on priorities is organised separately around the research needs of each kind of audience (i.e. policy analysis, health services research, clinical and biomedical research) and at a jurisdictional level with significant shared characteristics and aspirations.

Even if coherent priorities across audiences and jurisdictions can be established, there is still the question of how to ensure that they are reflected in the actual organisation and funding of research. The NHS R&D strategy in the UK quickly discovered that “achieving the aim of a coordinated national R&D strategy depends on maintaining considerable control over the research agenda. This is threatened by the desire for independence of other funding bodies” (Black, 1997, p. 500). This independence makes system-wide ownership of priority listings difficult in the face of a multiplicity of potential research sponsors. Two strategies, which are not mutually exclusive, are available. One is to build an effective coalition of research sponsors - most common in northern European countries. The other is for government to take over the task of implementing priorities by gathering greater control over its currently diffuse and indirect expenditures on research. It might then be possible to leverage the remaining sponsors in a unified direction - this is the philosophy behind the UK's R&D strategy.

Finally, there is the challenge of what currency to use to express the priorities. Should priorities be captured using **diseases** and health burden labels -- heart disease, disability, suicide, and so on? Or should one use the **causes** of ill-health, either biological -- genetics, infection, atherosclerosis; or social -- motor vehicle behaviour, stress, social isolation, poverty? Alternatively should **problems** be the mode of expression -- cost-containment, technology explosion, the aging population; or should the focus be the **disciplinary approaches** to those problems -- cost-

effectiveness studies, controlled trials, epidemiologic or health systems research, meta-analysis? Other currencies are obviously possible.

The fact that different decision-makers (and researchers) will likely choose different currencies of expression is a further reason to separate out priorities by audience. However, the implications of choosing one currency over another are not insignificant. For instance, a decision to express priorities in terms of social causes instead of disease burden would, if aggressively implemented, necessitate wholesale reorganisation of the research community. Therefore it is advisable for any priority setting exercise to make explicit the choice of currency and to debate it extensively as an early if not initial order of business.

Research funding

Whatever priorities emerge for research investment, their implementation will require changes in the approaches of research sponsors. At the moment health services research is primarily funded through project-based investigator-initiated grants. This has the advantage of presenting a manageable unit for appraisal - the single study - but places in the hands of researchers, through peer-review, the judgements of relevance and quality. As discussed earlier, it also tends to inappropriately reinforce the use of the single research study as the unit of research dissemination.

Current arrangements also do little to encourage investigations across the full spectrum of the research process as schematised in Tables 1 and 3. Project-based funding tends to focus, although not exclusively, on efficacy and sometimes effectiveness assessments. It is far less accommodating to the development of methods and causal models, it is unsympathetic to knowledge summary and synthesis, and tends to pay only lip-service to results communication. Few research sponsors spend time asking, for any particular priority topic, what kinds of investigation are most needed to “fill the gaps” -- will balance across the spectrum be improved with a knowledge summary, more methods development, some case studies of applicability, or something else?

Hence, for the support of applied research, sponsors need to consider ways to implement activity on declared priorities, broaden the spectrum of what is considered fundable research, inject greater consideration of relevance into appraisal of funding applications, and move away from exclusive reliance on project-specific funding and toward dedicating at least a portion of their support to thematic programs of research in areas of priority.

Assuming that the kind of infrastructure support for applied research organisations outlined in the previous section is in place, support for the actual conduct of research becomes the major

concern of the granting agencies, foundations and government programs. Their implementation of priorities can either be through the expression of broad bands of priority, leaving specific proposal details in the hands of investigators, or through more directive “requests for proposal” (RFPs) with competitive tendering. Some sponsors may choose to use both options depending on the content and purpose.

The advantage of RFPs is the opportunity to clearly specify the expected outcome; the disadvantage, overcome by leaving investigators to respond to broad-band declarations of priority, is the significant censoring of researchers’ potential creativity in responding to the research challenges. Developing such funding initiatives around thematic programs of research rather than specific projects may encourage greater attention to the full spectrum of the research process. It may also encourage (indeed, could require) inter-disciplinary investigation.

Beyond improving the relevance of applications, sponsors also need to think of enhancing the peer review processes’ consideration of relevance and of accommodating all processes to some of applied research’s strictures. One approach might be to include research-wise decision-makers on the traditionally researcher-only peer-review committees. Unfortunately the entire peer-review process is still geared to a world in no hurry, with discovery research assumed to be its principal focus. The proposal submission, review, response (and often re-submission) cycle can, and often does, take more than a year. This kind of timeline, merely to secure the funding to do the research, is obviously not compatible with the sort of short-term responsiveness that often characterises the decision-maker world. Sponsors may need to consider some fast-tracking options for appraisal of time-sensitive applied research, such as evaluations of new policy initiatives, where baseline measures are often needed now rather than later.

Dissemination and the unit of research transfer

Beyond accommodations and reform to improve the relevance of the research, sponsors may need to incorporate new activities into their operation to assist in dissemination and uptake. Funding of syntheses and summaries of research has not historically been within the remit of most sponsors. With the advent of formalised meta-analysis and structured overviews this is starting to change. However, encouragement is also needed for overviews from the decision-makers’ perspective. For these, social science considerations such as assumptions about problem causation, values inherent in proposed solutions, cultural acceptability of proposals, and applicability of initiatives to particular jurisdictions, carry as much or more weight than the clinical sciences’ important but relatively narrow perspective of “effect size”. Without these initiatives it will be difficult to move beyond the conception of the single research study as the unit of transfer. These considerations are particularly

important for the legislative audience where “ideas” more than “results” are the currency of debate.

Sponsors may have a role in enhancing dissemination of such summaries. A marginal change for them would be to require more than “journal publication” as the acceptable form of dissemination. Additional expectations of grantees could include: specification of the target audience for the research; required periodic contact, or even incorporation into a steering committee, for representatives of the audience; assessment of the audience’s preferred formats for dissemination; and implementation of those preferred formats for the final dissemination exercise.

More generally, sponsors can themselves convene groups of relevant decision-makers and researchers for exchanges around bodies of developing or developed knowledge within their sponsorship domain. The objectives of these can vary between better informing the upcoming research efforts of a group, to better equipping decision-makers who must confront an oncoming issue. This strategy has been used to good effect by organisations such the King’s Fund in the U.K and the Milbank Foundation in the U.S. (Fox, 1996). Indeed, consideration might be given by a consortia of sponsors and governments in a jurisdiction to establish a stand-alone organisation charged specifically with this kind of responsibility.

The applied research organisations discussed in the previous section are also central to this dissemination effort. Beyond the less formal dissemination in which they will presumably engage as a consequence of being linked closely to particular decision-maker audiences, their infrastructure funding can be used for routine conferences, workshops, newsletters, and other more innovative programs of dissemination including creative use of the media (Fooks et al., 1997).

The uptake of research

Much of the above relates to increasing the “push” of findings from research. Complementary activities are needed to increase the “pull” for research from decision-makers. Historically, dissemination and uptake have tended to be thought of as synonymous by both researchers and decision-makers -- improvement and expansion of dissemination by researchers and their organisations would naturally increase uptake by decision-makers. The last decade of study of dissemination and behaviour change (especially within the clinical audience) has convincingly demonstrated the fallacy of this assumption. Uptake is a complement to dissemination and as much effort needs to be placed on this activity as has been focussed more recently on dissemination.

The mere task of setting satisfactory priorities, if conducted and done across a broad base of the concerned legislative, administrative, clinical, or industrial audiences, should go some way toward increasing “ownership” in the activities of the research community. Furthermore, if research receptor units are set up, their existence assures that at least some portion of the decision-making community will be dedicated to extracting useable knowledge from research findings.

The task of these units can, however, go beyond harvesting from and communicating with the research community, and then servicing the research needs of decision-makers. They can also assist decision-makers to see where research may ease or make more effective their work. For instance, training workshops on research literacy, case-studies of effective use of research resources, or hand-holding the decision-maker during involvement with a relevant research program could all become routine parts of the curriculum of a research receptor unit. Building in evaluative components to the introduction of new policies, and explicitly linking policy development to policy evaluation by combining researchers and decision-makers in a single evaluation team is an innovation worth exploring. This approach is currently being tried, for instance, in Prince Edward Island to evaluate its system reforms implemented in the early 1990s. A research literate bureaucracy is at least better equipped, and maybe better motivated, to “pull” findings, ideas, and directions from the research community.

Such “deluxe” receptor units are, however, probably only possible in large organisations such as government Ministries of Health, major regional health authorities, and some industries. Units serving decision-makers in smaller administrative or clinical organisations may have to resign themselves to absorbing the lion’s share of the organisations’ efforts to communicate with the research community.

The biggest enemy of research uptake by decision-makers is time. Both the time constraint of a deadline that is rarely feasible for a thoughtful compilation of relevant research findings, and the time constraint of a job description that has no built in allowance for the not inconsiderable task of acquiring, appraising, and applying research for decision-making. Some improvement in this overwhelming constraint might emerge from the insertion of an explicit stage for the consideration of relevant evidence in any formal decision-making processes of an organisation. Although this does not, in truth, fairly represent the way in which the two **processes**, research and decision-making, are best interlaced, it would highlight the often unreasonableness of the deadline and the hypocrisy of the job description. Eventually improved accommodation might ensue.

NEW HUMAN RESOURCE APPROACHES

The purpose of new human resource approaches is to:

- a. improve training for the conduct, dissemination and uptake of applied research
- b. increase the opportunities for applied researchers and decision-makers to experience each others' environments
- c. develop a new category of human resource dedicated to bridging the research and decision-making communities.

Re-orienting training

In addition to the kind of in-house curriculum activities offered by a receptor unit in a decision-maker's environment, the original training of such managers and administrators could encompass a broader education on research literacy. This could include orientation to forms of evidence, how to find and assimilate relevant research, the structure and processes of research, critical appraisal of research, and so on. Similarly, researcher training, especially training of researchers destined for applied settings and roles, could expose scientists to the structure and context in which decision-makers work. This could include the separation of decision-makers into definable audiences (and consideration of their separate needs), rudimentary organisational theory, the contextual influences on decisions, and so on.

The type of researchers that are trained may also need re-visiting. In jurisdictions with a long history of dedication to discovery research, and only fledgling applied research capacity, training programs may wish to expand overall training resources or shift some from basic and/or clinical sciences training to health services researcher and social scientist training. This is another component of balancing the relative efforts on applied and discovery research. Training of these kinds of researchers might include mandatory placement periods inside decision-making environments.

The need for exchanges

Placing researchers inside the decision-making environment for time-limited exposure does not have to be restricted to their training periods. With the presumed advent of stronger ongoing linkages through the new organisational models of both researchers and decision-makers, exchange programs may be a natural extension of the improved communication. Hence, not only researchers but also decision-makers can gain a few weeks or months exposure to the environment on the other side of the "fence". Where timelines will permit, a researcher might profitably be assigned to a policy development, administrative reorganisation, clinical guideline development, or new product-marketing process in his or her area of expertise. Early in the planning phases of major research projects, a decision-maker knowledgeable about the "real world issues" in the area under investigation might

profitably contribute design improvements, and potentially learn more about the current state of research knowledge in his or her area/s of responsibility. Although each exchange may be largely organised around achieving a specific and instrumental goal, the cumulative impact of such exchanges may well be to improve overall levels of understanding between the two communities

Knowledge brokers

The concept of a new type of health sector human resource dedicated to improving dissemination and uptake of research is certainly not new. It has been suggested over many years with titles such as Policy Entrepreneur (Weiss, 1977), Research Liaison Officer (Crosswaite and Curtice, 1994), translator (May, 1975), geographic scholar (Lomas, 1993), intermediary (King et al, 1996), research synthesiser (Gunter and Brady, 1984), and so on (Seidel, 1985; Orlandi, 1987; Huberman, 1990; Frenk, 1992).

Crosswaite and Curtice describe the justification for and job description of such a knowledge broker: “The very real problem of resourcing and planning effective dissemination might, in part, be addressed by a specialist individual whose remit is to liaise between researchers, managers, and other user groups in order to implement a dissemination strategy ... The tasks ... may be defined as ... to establish and maintain links between researchers and their audience, via the appropriate translation of research findings. This is achieved through effective communication skills (including the ability to educate and report) and a familiarity with the differing approaches and methodologies characteristic of research” (1994, p. 293).

Most jurisdictions contain such individuals who have emerged on a largely ad hoc basis and are not officially designated as the go-between for the communities. One possibility is not only to formalise these kinds of roles but, further, to design a training program that would produce them as a matter of course. Applied research units located in universities offer a natural venue for such training.

Whether, after training, to locate them in the research community, the decision-maker community, somewhere in between, or even with a research sponsor organisation, is not clear. If such programs can be initiated, it would be worthwhile evaluating the relative advantages and disadvantages of their various possible locations.

CONCLUSION

Achieving improved dissemination and uptake of health research will depend upon interested applied researchers, committed decision-makers, and both research sponsors and universities willing to consider new ways of doing business. This discussion document identifies four elements in a campaign to achieve this improvement:

- * an umbrella message from a national level that communicates a cultural change toward more conduct of relevant, good quality research and greater attention to the application of findings from such research in decision-making.
- * new structures to improve the opportunities for ongoing fruitful communication between researchers and decision-makers, and to concentrate both applied research production and research receptor skills as a critical mass in universities and decision-making organisations respectively.
- * new activities and processes:
 - i. by researchers to synthesise and disseminate their work in a way that is more sensitive to the needs of their target audiences,
 - ii. by decision-makers to both receive and apply research findings as well as to communicate audience-specific priorities,
 - iii. by universities to reward instead of penalise their employees interested in applied research, and
 - iv. by research sponsors to both encourage greater relevance in funded research and to recognise issue-specific bodies of knowledge as an important unit of research production and transfer.
- * new human resource approaches to give both decision-makers and researchers a better understanding of each others' environments and to produce new categories of personnel skilled in bridging the not insignificant cultural gap between the two communities.

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