Priority setting in public health and health services research

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Abstract

Models for strategic priority setting in public health and health services research typically lack coherence or omit key considerations. We propose a new model, the Seven 'I's, with seven components: innovation, identification, inequalities, incorporation, importance, influences, and interventions. It tests the 'relevance' of research, while 'excellence' will be evaluated using existing criteria for peer review. It should be used to set research priorities primarily on the basis of expected health benefits, with adjustments for other non-health benefits as necessary.

We discuss each component and compare our approach to other models. We argue that our model helps ensure resource allocation is transparent and accountable, and encourages the link to population health gains. It is flexible, and is applicable to both commissioned and investigator-driven research. It may be applied to assess existing proposals, or to generate research ideas.

Introduction

We propose a decision support aid for setting priorities for topics in public health and health services research. Our model highlights key perspectives revealed by seven 'I' words - *innovation, identification, inequalities, incorporation, importance, influences,* and *interventions.*

We intend that the Seven 'I's model should complement current work on priority setting protocols being developed by the Strategic Research Development Committee of the National Health and Medical Research Council (NHMRC) and others. We critically examine each component of our model and discuss the strengths and limitations of our approach compared to a number of other public health and health services research priority-setting models.

Two assumptions underpin our priority setting model. Firstly, we are in agreement with Sainsbury and Ward that the primary goal of public health and health services research should be the improved health of the population (Sainsbury & Ward 1999). Nevertheless, the concept of payback for research may encompass broader issues than health benefits alone, such as benefits to future research and purely economic benefits (Buxton & Hanney 1996).

Our second assumption is that public health and health services research is mostly strategic. Its purpose is to target gaps in knowledge needed for the development of health policy or practice.

We see two main reasons for developing priority setting for public health and health services research, one relating to process and the other to outcomes.

Firstly, the process of allocating funds across research areas needs to be transparent and accountable, in order to counter perceptions of reviewer bias and cronyism. Secondly, research outcomes need to be linked as effectively and efficiently as possible to the goal of delivering population health gains, in order to deliver the best possible value for money. Our proposed model addresses these twin goals.

We have progressed beyond simply compiling lists of priorities. We are proposing a methodology for priority setting that is flexible enough to adapt and remain relevant in a public health and health services environment which is undergoing rapid change.

The Seven 'I's model addresses the question of priorities in research topics ('relevance') and not the merits of specific research project proposals ('excellence') (Frenk 1992). We wish to determine the research topics to be funded rather than assess research methodology. Evaluation of methodology (qualitative or quantitative) is beyond the intended scope of our model.

The Seven 'I's model is applicable to commissioned research as well as investigator-driven research. The model may be used to assess existing proposals for research into public health or health service issues, or alternatively, the model may be used to generate suggestions for priority areas in future research.

Current policy context

The future of public health research and health services research is a hot topic. At a national level, some of the foundation for the current debate was laid in 'Research for a Healthy Society' (Prime Minister's Science and Engineering Council 1994). This paper provided advice and recommendations on how to optimise the balance between different types of research, including public health and health services research.

The Health and Medical Research Strategic Review Committee, chaired by Mr Peter Wills, has released its final report (Commonwealth of Australia 1999). A key recommendation of the Review was that Australia needs a well managed, priority-driven program of strategic, development and evaluation research with explicit funding, national coordination, and a rigorous priority setting process.

Meanwhile, the National Health and Medical Research Council (particularly through the work of the Strategic Research Development Committee) has had the development of a comprehensive priority setting methodology under active consideration (NHMRC 1999). The National Public Health Partnership is also taking a keen interest in this topic (NPHP 1998).

The Seven 'I's model

The Seven 'I's model brings together the key elements of strategic health research into a logical priority setting framework (Fig. 1). There are seven key factors incorporated in the model each belonging to one of three clusters - global, technical and practical.

The 'global' cluster consists of the single factor *innovation*, which occupies a unique place in the model and exerts a dominant influence over the other six factors.

The 'technical' cluster comprises the factors *importance, influences* and *interventions*. These three factors are commonly considered to be on the 'hard science' side of evidence-based health care methods. The primary interest of this cluster is 'technical' (related to prediction and control) and its orientation is towards 'knowledge'. The 'technical' factor is associated most strongly with the disciplines of epidemiology and health economics. Alternative terms for these three factors are in common use: *importance* is also referred to as the 'size of burden' of disease or injury in the public health literature, *influences* refers to the 'cause of burden' or 'risk factor' and *interventions* encompass a range of activities, from diagnostic screening, medical and surgical treatment and health promotion to health services organisation and legislative approaches.

The 'practical' cluster comprises the factors *identification, inequalities* and *incorporation*. These factors have been associated with the 'softer' disciplines (without any pejorative connotation) such as education and training, marketing, politics, psychology and social science. The primary interest of these areas is 'practical' and relates to the issue of communication while their orientation is towards 'action'.

Seven I s Research Priority Setting Model

Global

Innovation

Identification
↓
Inequalities
↓
Incorporation

Importance
↓
Influences
↓
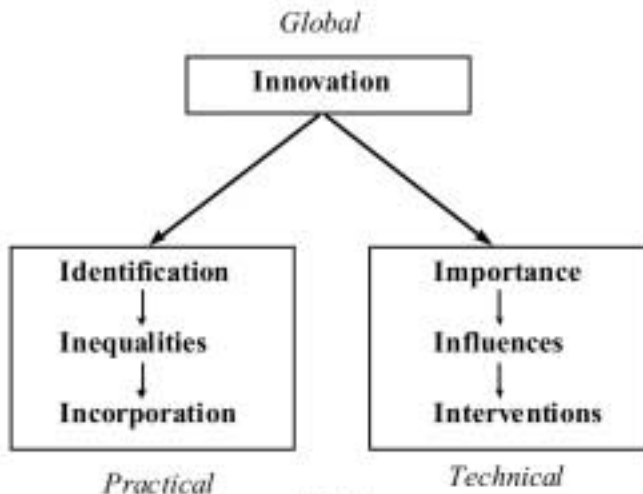**Interventions**

Practical   *Technical*

Fig. 1

Identification refers to the process of conceptualisation, clarification, definition and refinement needed to frame an issue, pinpoint information needs, and identify specific questions that are researchable.

Inequalities refers to

*   the goal of ensuring equity in the spread of health gain benefits across all sections of the community especially with respect to those currently underserved or in special need and

*   the development and delivery of interventions that are designed to meet the requirements of specific population groups, settings and contexts.

Incorporation refers to the process of transferring the results of research into policy and practice in a way that is widespread and sustainable.

Innovation

Key Question: *Does the research address a new (under-researched) topic or tackle an established topic in a new way?*

Key Words/Phrases: *knowledge gaps; new evidence; cutting edge; scientific advancement; expanding the frontiers; breaking new ground; innovative; original; creative; novel; breakthrough*

By innovation in public health and health services research we refer to the quest for new knowledge, new methods or new ways of thinking about health problems. In other words, innovative research may address new (poorly researched or newly emerging) problems, tackle old problems in new ways or synthesise current knowledge.

Innovation is widely recognised as a key factor for priority setting in public health research. The NIH *'adopted procedures and programs for ensuring innovative research, and ... innovation has been explicitly added to the list of peer-review criteria'* (Committee on the NIH Research Priority-Setting Process 1998).

No matter how important the topic of a research project, nor how well the research is carried out, if nothing new is added to knowledge, the research will not be considered to have a high priority.

An important precondition for innovation is a keen awareness on the part of the researchers of the 'state of the art' of current knowledge and where the knowledge gaps are. Researchers undertake a thorough assessment of the knowledge base in order to design projects that are more likely to be innovative, enhance the evidence base and fill a real information need. This approach follows the 'market-pull' model of innovation (Smith 1987).

We believe that systematic reviews of research-derived knowledge may be as useful and important as original research. Systematic reviews contribute to the creation of new knowledge through the innovative synthesis and presentation of the findings of original research.

The priority setting model encourages innovative research by rewarding activities and processes that are demonstrably associated with increased levels of innovation. For example, the utility of public health and health services research is enhanced by a multidisciplinary approach. An analysis of project proposals in one innovative area of research and development (the interface between primary and secondary care) showed that multidisciplinary applications are more likely to be funded (Wisely & Haines 1995).

It is very difficult to predict in what area the next significant breakthrough will occur, so it is wise to 'hedge our bets' by spreading research efforts across a range of target areas. A key message is that *the diversity of knowledge, and therefore of research required to achieve innovation ... is an important factor'* (Wisely & Haines 1995). The US National Institutes of Health concur with this view. 'Portfolio diversification' is one of the key criteria designated by the US National Institutes of Health in their research priority setting process (Table 3).

Flexibility in the priority setting model should be retained to allow for a proportion of curiosity-driven and simply 'interesting' research to be funded in spite of a low probability of immediate practical applications. It is naïve to believe that assessment of innovation can be entirely routinised. While we are generally supportive of the 'market-pull' model of innovation in public health and health services research, there may be occasions when the 'science-push' model of innovation, based on investigator-driven research proposals, is more appropriate (Smith 1987).

A significant element of judgment is involved in assessing the likelihood that research in one area may yield enough significant additional knowledge to justify the opportunity cost of diverting resources from research in other areas. This judgment function is likely to remain more 'art' than 'science'. We agree with the view that *'the path of innovation is always thorny ... there are no short cuts to success, no infallible formulae'* (Jewkes, Sawers & Stillerman 1995).

Identification

Key Question: *Does the research incorporate a process for defining and conceptualising the problem within an appropriate context?*

Key words and phrases: *problem definition; issue framing; specification; stakeholders; communication; utilisation-focus; multiple perspectives; information need; research needs assessment*

The identification of the research question is the key first step in a strategic research project. The process of identification will usually begin with the initial selection of an issue or problem area and then proceed to a more specific definition of the research question. An advance in thinking about how to frame a researchable question may be more important than the answer to an ill-defined or wrongly specified health issue (Dawson 1995).

The process of research question definition is most effective when there is *'... an extended, three-way process of communication linking researchers, decision-makers and those most affected by whatever issues are under consideration'* (Porter & Prysor-Jones 1997).

The best way to ensure that the results of research will be used by decision makers and managers is for information needs to be acknowledged and built in as an integral part of the research. In practice, a sufficient level of communication between researchers and the potential users of research still occurs all too rarely.

Table 1: The Seven 'I's Model

'I' Factor	Scope	Research Focus	Key Questions
Innovation	Global	covering gaps in knowledge	Does the research address a new (under-researched) topic or tackle an old topic in a new way?
Identification	Practical	problem definition	Does the research incorporate a process for defining and conceptualising the problem
Inequalities	Practical	equity; under-served populations; life-stages; settings/contexts	Does the research focus on the issue of inequalities, health outcome differentials between population groups, life-stages, settings or contexts?
Incorporation	Practical	implementation; transfer; research to practice	Does the research address the question of dissemination and implementation of research-based knowledge
Importance	Technical	illness burden (size, severity, community concern)	Does the research aim to increase knowledge about the 'importance' or burden of the problem Is the problem regarded as a 'high importance' public health or health services issue?
Influences	Technical	causality; determinants	Does the research examine the causes of a health problem?
Interventions	Technical	interventions; solutions; change	Does the research study solutions to the problem?

An important aspect of the identification of a researchable health issue concerns the role of the community. Researchers should recognise community perceptions about health issues to be a valid and important part of the process of problem identification. Issues of demonstrated community concern should be taken seriously and given weight as priority topics for research, independently of the views of outside 'experts'. The existence of such issues is likely to indicate a readiness to mobilise for community action.

The following questions may assist research identification:

- Are high quality reviews of published and unpublished literature on the issue part of the research strategy?

- Are the views and perspectives of stakeholders and potential users of the research (such as program managers, policy makers and community representatives) about how to define the issue included in the research strategy?

Inequalities

Key Question: *Does the research have a focus on the issue of inequalities, or equity, in terms of health outcome differentials between different population groups, life-course stages, settings and contexts?*

Key Words/Phrases: *inequalities; equity; social justice; fairness; underserved; target groups; disadvantaged; special needs; vulnerable; high risk; socioeconomic status; poverty; indigenous, aboriginal; rural; settings; contexts*

The reduction of inequalities and promotion of greater equity in health outcomes is an important component of the aim of public health and health services research. The World Health Organization (WHO) identifies the goal of reducing inequalities in health as being an integral part of public health practice. It says that '... public health is the art of applying science in the context of politics so as to reduce inequalities in health while ensuring the best health for the greatest number' (World Health Organization 1998).

The existence of large health inequalities in Australia has been well-documented (National Health Strategy 1992, Australian Institute of Health and Welfare 1994). The causal pathways producing these health outcomes have been much less explored and this area deserves a high priority in future research.

The inclusion of specific population groups and settings of special interest as part of the research is likely to add richness, meaning and practical relevance to the results obtained. Settings are the social structures that provide channels for implementing interventions (such as health promotion programs) and through which diffusion of knowledge and change is facilitated. There are significant gaps in knowledge and opportunities for research into the influence of settings on health education and promotion programs and policy (Mullen et al 1995).

Contrasts between processes and outcomes in different groups and settings may serve to illuminate the determinants of ill health and provide information for policy and program planning. Table 2 provides some examples of population groups, life-stages, settings and contexts relevant to the inequalities factor. An important priority for research on inequalities in health relates to socioeconomic status (SES) and the *'social gradient'. Mathers and Douglas (1998) have observed that '… there are overwhelming inequalities in the health of Australians by all measures of socioeconomic status (as measured by education level, occupation, occupational prestige, equivalent family income and areas of socioeconomic disadvantage).'*

Table 2: Classification of the 'practical' factors (interventions, influences and inequalities)

Interventions	Primary prevention	Secondary prevention	Tertiary prevention
	Interventions which occur before the diagnosis of an event is made.	Interventions which aim at early detection and elimination of health problems	Interventions which involve treatment, management, support and after-care services, including rehabilitation.
	Individual level	Community level	Society-policy level
	Individual lifestyle factors are embedded in:	Social and community networks, living and working conditions, which in turn are related to:	The wider cultural and socioeconomic environment
Influences	Upstream factors	Midstream factors	Downstream factors
	Global forces Government policies e.g. economic, welfare, health, housing, transport, taxation

Social/physical/economic/environmental factors e.g. education, employment, occupation, income, housing and area of residence

Culture e.g. political climate | Psychosocial factors e.g. control, stress, self esteem, isolation

Behavioural factors e.g. diet/nutrition, smoking, alcohol, physical activity, preventative health care use

Health care system factors e.g. access, availability, affordability, utilisation

Culture e.g. social capital | Physiological systems e.g. endocrine, immune

Health outcomes e.g. mortality, morbidity, life expectancy

Biological reactions e.g hypertension, suppressed immune function, blood lipids, glucose intolerance |
| **Inequalities** | Population Groups | Life-stages | Settings and contexts |
| | People with multiple and complex needs Socioeconomically disadvantaged Indigenous population Rural residents | Infants Children Adolescents Working-Aged Adults Retired/elderly | Home Work/Employment Education (school, vocational, tertiary) Community settings |

Information is needed to determine how socioeconomic status 'gets into the body' to cause disease and disability. Recent work by Michael Marmot and Leonard Syme suggests a causal pathway involving socioeconomic status and pychosocial factors such as job control (Marmot et al 1997, Syme & Balfour 1997). This line of inquiry looks promising but there is a need for research to confirm and extend these findings.

Incorporation

Key Question: *Does the research address the question of dissemination and implementation of research findings into policy and practice?*

Key Words/Phrases: *implementation; dissemination; research transfer; application; utilisation; diffusion of innovation; payback; translational research; research marketing*

Research findings must be promulgated to affect policy and practice. There is a growing awareness of and dissatisfaction with the gap between the efficacy of interventions in studies and their effectiveness in practice, between the passive dissemination of information and evidence of actual changes in behaviour. We need as a matter of urgency to find ways to address this shortcoming. Research on incorporation of research findings is needed

- to identify, apply and evaluate methods of transferring research-based knowledge into practice, management and policy;
- to determine the most effective methods of disseminating programs which have been shown to be effective; and
- to discover how to maintain and sustain the adoption of such programs over time.

It has been pointed out that the benefits from health services research will only occur if the primary outputs of research are incorporated into policy and practice (Buxton & Hanney 1996). This transfer is more likely when the primary research findings meet the needs of decision makers, clinicians, investors and patients (the identification and importance factors), as a result of a good project specification and selection, based on research needs assessment. However, effective dissemination of research findings to end-users is also necessary. The overall process of research needs assessment, prioritisation and dissemination might be thought of as 'research marketing'.

There are three necessary ingredients that make for incorporation of research into policy and practice: knowledge base, political will and social strategy. The knowledge base is defined as 'the scientific and administrative data base upon which to make decisions', political will is 'society's desire and commitment to fund new programs or to support or modify existing programs and a social strategy to accomplish change' and social strategy is 'the plan by which we apply our knowledge base and political will to improve or initiate programs' (Richmond & Kotelchuck 1991).

According to this model, all three components must be present in some degree for preventive action to succeed. More research into the 'political will' and 'social strategy' components of health policy development (not just the 'knowledge base' component) will be required for a balanced strategic research program which emphasises 'incorporation' of research findings as a goal.

Importance

Key Questions: *Does the research aim to increase knowledge about the 'importance' or burden of the problem? Is the problem acknowledged as an important public health or health services issue?*

Key Words/Phrases: *size; burden; mortality; morbidity; disability; Global Burden of Disease (GBD); DALY; QALY; urgency; severity; economic loss; public health need; descriptive epidemiology; incidence; prevalence*

We define 'importance' as the level of public health 'need' for an organised response to a perceived health status or health system problem. A widely used taxonomy of need refers to four types of need (Bradshaw 1972, Royse & Drude 1982, Batterham 1997) which may all be valid, but need to be clearly distinguished:

- *Normative* needs are benchmarks described by experts, task forces, etc.

- *Expressed* needs are 'wants put into action' and are directly expressed by those in need or inferred from behaviours.

- *Comparative* needs result from gaps in health and its determinants between populations.

- *Felt* needs are attitudes to health that are not expressed unless elicited.

The 'importance' dimension of a health problem or issue may be influenced by whether a top-down (expert opinion, data driven) or a bottom-up (community perception, local issue) approach is taken. Normative and comparative needs may be thought of as needs with a top-down flavour, while expressed and felt needs come from a bottom-up perspective.

In a 'top-down' approach, factors taken into account include:

- *size* of the problem (incidence and prevalence information indicated by how many people are affected, number of deaths, number of admissions to hospital etc); and

- *seriousness* of the problem (indicated by an assessment of the duration and amount of distress and disability and the overall impact on an individual and society).

An example of the 'top-down' approach to the importance factor is the World Bank's Burden of Disease Project methodology which is being used in Australia by the Australian Institute of Health and Welfare and the Victorian Department of Human Services (Murray & Lopez 1997; Andrews, Mathers & Sanderson 1998; Department of Human Services 1999a,b).

This work uses a metric known as the Disability Adjusted Life Year (DALY) to compare the importance of ill health across the whole spectrum of diseases and injuries. These findings are then projected into the future for planning purposes. Another example of a 'top-down' approach to the importance factor is the National Health Priority Areas process developed for the Australian Health Ministers Advisory Council (Australian Institute of Health and Welfare 1996).

The 'bottom-up' approach to the importance criterion may include information about community concerns derived from surveys, interviews, focus groups and analyses of media coverage of issues. Community health needs assessment approaches usually include data derived from both top-down and bottom-up perspectives (Batterham 1997). Grass-roots feedback is desirable in order to reduce the chance of ignoring important issues that are not covered by currently available routine data sources and to enhance political will and local capacity for action.

Influences

Key Question: *Does the research study the causes of a health problem?*

Key Words/Phrases: causes; *causal pathway; determinants; risk factor; protective factor; behaviour; causative agent; upstream; midstream; downstream; aetiology; analytical epidemiology*

We use the term 'influences' to refer to the risk factors, protective factors or determinants underlying ill health. The basis of the scientific approach to public health is that all problems have causes and that these causes can be identified through careful study. However, the immediate causes of ill health may themselves turn out to be the outcome of other causes or risk factors in a chain of events referred to as the 'outcomes hierarchy'.

The 'outcomes hierarchy' concept refers to the causal pathway (or multiple pathways) leading from factors influencing health at a macro (society) level descending through a sequence of levels to the ultimate biological and molecular processes taking place within individual human physiological systems (being the proximate causes of disease and disability).

The chain of factors comprising the 'outcomes hierarchy' may be divided into three broad groups: upstream (macro) factors, midstream (intermediate factors) and downstream (micro) factors (Table 2). We have based this causal factor classification on a model provided by the Centre for Public Health Research, Queensland University of Technology (Turrel, Oldenburg, McGuffog & Dent 1999).

An effective program of targeted research needs to gives coverage to the full range of causal factors (from upstream to downstream). Nevertheless, there is now a growing conviction within the public health field that the balance of research needs to be shifted towards a greater emphasis on research into upstream factors. It is generally more efficient to make a change at the upstream level, the effects of which cascade down to each individual, rather than start at the level of each single individual.

Interventions

Key Question: *Does the research examine solutions to the problem?*

Key Words/Phrases: *intervention; solution; strategy; efficacy; effectiveness; cost-benefit; cost-effectiveness; cost-utility; prevention; disease management; treatment; therapy; maintenance; screening; health promotion; health education; clinical epidemiology; quality of care; capacity building*

Intervention activities may be classified according to timing of the intervention or according to system level (Table 2). Research is needed into each of these intervention categories and how they interact with each other.

Most morbidity and mortality today has multiple causes. Heart disease for example is influenced by factors at all system levels (individual, community and policy). In order to develop effective interventions, research is needed to determine how multiple causal factors interact, and how interventions can address these interactions (Freudenberg et al 1995).

Efficacy and effectiveness are important but quite distinct aspects of public health intervention activity where high quality research is badly needed. *'The efficacy of an intervention is its impact in the best possible circumstances, whereas effectiveness is used to describe the impact of an intervention in everyday practice.'* (Muir Gray 1997).

Research to determine the efficacy of an intervention often uses a carefully managed clinical trial protocol with narrowly defined patient groups. In contrast, research into effectiveness of interventions involves settings and client groups defined broadly so as to more realistically reflect circumstances in the real world outside the laboratory. While both aspects of intervention are important, the balance of research in public health and health services needs to move away from the study of efficacy towards the study of effectiveness.

Discussion

We believe that the major strength of our proposed Seven 'I's model, and its superiority over previous efforts in this area, derives from the balance the model accords between technical knowledge and practical action factors. The inclusion of the 'technical' factors in the Seven 'I's model is in step with most previous work on priority setting in public health and health services research. Almost all epidemiological and health economics research is focused on questions of *importance* (size of the problem), *influences* (causes of the problem) or *interventions* (proposed solutions to the problem).

On the other hand, 'practical' factors still seem to be ignored or given far less prominence than they deserve in published guidelines for priority setting in public health and health services research. Of what use is an intervention that is available and cost-effective if this information is not disseminated and makes no difference to policy or practice? This is the relevance of the *incorporation* factor in the Seven 'I's model. How can we expect to get the right answers if we do not ask the right questions? This is the meaning of *identification*. How can research help to spread the benefits of health improvements equitably in society? The *inequalities* factor provides a key perspective.

A summary of the criteria used in some other national and international work on priority setting for public health and health services research is presented in Table 3. Many of these models have identified factors with similarities to those included in our Seven 'I's model, particularly in the 'technical' or knowledge oriented area.

For example, all of the approaches have a factor corresponding to *importance* (referred to variously as 'size', 'burden', 'public health need', 'significance' or 'incidence/prevalence') and some of the models have factors corresponding to our *influences* and *interventions*. However, none of the other models refer explicitly to the important set of practical action oriented factors we have called *identification, inequalities* and *incorporation*.

Table 3: Criteria used in other priority setting models for strategic health research

Health and Medical Research Strategic Review	(Australia)	size of burden of disease or health problem
		cause of burden of disease or health problem
		interventions of known cost-effectiveness
		application in practice (including efficiency and equity) of
		cost-effective interventions
		technical efficiency of health services
National Public Health Partnership	(Australia)	the size of the problem
		its policy relevance
		the potential availability of research methods for investigating
		the likely cost of the research
		the feasibility and acceptability of the research process; and
		the potential impact of the findings
National Institutes of Health (1998)	(USA)	public health needs
		scientific quality of the research
		potential for scientific progress
		portfolio diversification along the broad and expanding frontiers
		of scientific knowledge
		adequate support of infrastructure (people, equipment, instrumentation
		and facilities needed for research)
National Institutes of Health (revised)	(USA)	significance
		(addresses an important problem)
		approach
		(conceptual framework, design, methods and analyses adequately developed)
		innovation
		(novel concepts, approaches, method)
		investigator
		(appropriately trained, well suited)
		environment
		(scientific environment contributes to probability of success)
American Heart Association	(USA)	incidence and prevalence
		social and economic costs
		promising research opportunities
		application of research findings to improve health
National Health Service	(UK)	burden
		policy
		relevance
		timeliness
		likely benefits

The Seven 'I's model does not explicitly encompass a specific disease or injury component as a criterion for priority setting. To do so would focus attention at the wrong end of the health outcomes and risk factor spectrum, since most of the acknowledged risk factors for ill health affect a number of different diseases (and injuries).

The Seven 'I's model may be used in several ways. It may be used to sort and classify the topic and style of research proposals. It can form the basis for the development of a priority rating system. It may be used as a common language to support the process of dialogue, planning and learning for researchers, funding organisations and communities. Finally, it is relevant to the generation of ideas for future research priorities.

Disclaimer

The views expressed in this paper are those of the authors and do not necessarily represent those of their employer.

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