EVIDENCE-BASED POLICY

The Role of Academic-Government Partnership

"Deepening partnerships between local schools of public health with policymakers and practitioners can potentially enhance the benefit of research to the policy process."

NUS National University of Singapore | Saw Swee Hock School of Public Health

A GLOBAL HEALTH WHITE PAPER SERIES

Leadership Institute for Global Health Transformation

This global health white paper is produced by the Leadership Institute for Global Health Transformation at the Saw Swee Hock School of Public Health, National University of Singapore.

CONTENTS

EXECUTIVE SUMMARY

Public health challenges are increasingly complex, multifaceted, unpredictable and diverse. The information and viewpoints that weigh-in on policy considerations are myriad. This paper discusses how active academic-government collaborations can contribute to the relevant use of evidence for prudent public health policy development. We first introduce the role that research can play in policymaking. We then list some ways that are being used to apply research in policy. Next, we highlight how academia can enhance the benefit of research to policymaking. Finally, we discuss some facilitators of academic-government partnerships.

Public health policies are "decisions, plans, and actions that are undertaken to achieve specific health goals within a (population). An explicit health policy can achieve several things: it defines a vision for the future which in turn helps to establish targets and points of reference for the short and medium term. It outlines priorities and the expected roles of different groups; and builds consensus and informs people". [1]

The different forms of information that can constitute evidence relevant to public health policymaking include but are not limited to the following: [2]

- Scientific literature in systematic reviews
- Scientific literature in one or more journal articles
- Public health surveillance data
- Programme evaluations
- Qualitative data from community members, other stakeholders and lobbyists
- Analyses of media/marketing data
- Word of mouth
- Personal experiences

Many models exist for understanding the general policy process. Some of them are described in the following table. The areas where research evidence can influence policy in each model are also highlighted.

[1] World Health Organization. Health policy. http://www.who.int/topics/health_policy/en/. Accessed 31 January 2017.

[2] Brownson R, Fielding J, Maylahn C. Evidence-based public health: a fundamental concept for public health practice. *Annual Review Public Health*. 2009;30:175-201.

MODEL	*WHERE RESEARCH CAN INFLUENCE POLICY*
Stages Model This model divides the policy process into different stages — agenda setting, policy formulation, implementation and evaluation. It serves as a heuristic to understand the complex policy process. The stages do not necessarily occur in a linear fashion; stages can occur simultaneously, in varying orders, with varying amounts of time spent on each, and the stages can be out of sequence or loop backwards.	**Agenda setting:** Framing and prioritising the problem. **Policy formulation:** Identifying solutions and comparing options. **Implementation:** Identifying and comparing ways to translate the policy to practice. **Evaluation:** Monitoring and evaluating the outcomes of interventions, re-designing them where necessary.
Multiple Streams Framework The framework posits that for an issue to be put on the policy agenda there must be a 'window of opportunity'. These windows of opportunity open when three independent streams coincide: the problem (a problem is perceived), policy (feasible solutions to the problem exists) and politics (there is political impetus to solve the problem) streams.	**Problem stream:** Surface novel problems or shed new light on known problems, such that it reframes the problem or gives it greater impetus. **Solution stream:** Develop viable solutions to important problems or make discoveries that turn previously unfeasible solutions into feasible ones. **Political stream:** Demonstrate to political office holders, through data analytics for instance, that an issue is gaining importance among their constituents and may warrant policy action.

Punctuated Equilibrium Theory The political process is characterised by long periods of stability, issues are defined or redefined in public discourse, and change generally occurs in an incremental fashion. However, 'lurches' in the political process can happen when events, such as crises or new discoveries, prompt policymakers to reconsider established viewpoints and ways of doing things.	Evidence from research can play a role in numerous ways. Here are some examples: Evidence is used to garner public pressure over an issue so that the issue gets prioritised by the government. During a novel crisis, evidence from previous similar events are used as reference to inform the current course of action. Scientific discovery leads to the development of a feasible solution to a longstanding problem.
Advocacy Coalition Framework Multiple actors who share similar beliefs and want to turn their beliefs into policy, group together and coordinate efforts to influence the policy process.	Research evidence serves as one of the means for advocacy coalitions to establish support for their objectives. One example is the coordinated efforts by academics and various anti-smoking advocacy groups to successfully persuade the US government to raise cigarette excise tax in the late 1980s. [3]

A variety of ways are being used to facilitate the utilisation of research to support policy deliberations, development and decisions at various levels, including for public health. Some of them are:

- Chief Scientific Advisers in government health departments. The United Kingdom and New Zealand have Chief Scientific Advisers (CSA) who fill such a role and advise their governments on scientific matters.
- Government engaging scientists as consultants participating in policymaking. For example, the UK's Department of Health formed the Policy Innovation Research Unit to bring in expertise from leading research institutions to work with officials from the early stages of policy development in health and social care.
- Independent or public institutions formed to provide government with evidence to inform policymaking, and to promote the application of scientific research in policy. Some examples are Netherland's ZonMw (The Netherlands Organisation for Health Research and Development), Thailand's HITAP (Health Intervention and Technology Assessment Program) and the National Academy of Medicine in the USA.
- Coalitions formed to advance the use of evidence to solve real-world problems by bringing together key stakeholders such as government, academia, practitioners,

[3] Scott E, Dickert J. *From research to policy: the cigarette excise tax*. John F Kennedy School of Government;1993.

businesses and charities. For example, Nesta and the Alliance for Useful Evidence.

- Think Tanks that aim to impact policy development through research, analyses, policy recommendation and thought leadership. For example, Chatham House and the European Observatory on Health Systems.
- Centres set up by academic institutions with the aim of applying their existing expertise to support policymaking. For example, the Health Promotion and Policy Research Unit at New Zealand's University of Otago and the Division of Policy Translation and Leadership Development in Harvard TH Chan School of Public Health.
- Collaborations are formed for government to tap on the expertise within academic institutions to guide decisions for a defined policy issue, for mid- and long- term, or for urgent issues. An example is the Saw Swee Hock School of Public Health's (SSHSPH) Public Health Translation Team, a platform for the School to work with the Ministry of Health to understand policy issues, share research findings and jointly design research studies to inform public health policies. Another example is the discovery by a team at the University of Hong Kong of the novel coronavirus that was causing the 2003 SARS outbreak. It provided government authorities with the evidence base for diagnosis and interventions.

Deepening partnerships between local schools of public health with government and practitioners can potentially enhance the benefit of research to the policy process.

- **Policymaking is supported by evidence that is current**

  As part of their work as educators and as scientists, academics stay current in their knowledge of the developments and innovations in their fields of interest. This is useful for the policy process when it comes to being informed of 'what is out there' or 'what is already being tried by others'. It is also a valuable source of input for horizon-scanning.

- **Credibility**

  The career success of academics rests, in part, on their work being recognised and deemed credible by their peers. This requires that academics' research to support policy development stands up under the scrutiny of fellow scientists around the world. Recognition of the credibility of the scientific support for a policy is especially crucial when it comes to policies that can potentially spark controversy or encounter resistance.

- **Deep and wide expertise, as well as the ability to integrate across different fields to solve public health problems**

  Schools of public health are ready hubs for scientists from various public health disciplines to work together and cross-pollinate. Being part of a larger academic institution also means that schools of public health are readily connected to other academic disciplines. This is an advantage as public health issues are often complex, multi-causal, and go beyond traditional healthcare to social, economic and behavioural considerations.

- **Independent evaluation of policies**

  Academia can serve as an independent evaluator of the evidence that is presented. This is particularly useful in places with more public-private partnerships. Private firms may approach public agencies to collaborate on initiatives and offer research evidence in support of the effectiveness of the proposed project. Such evidence must be evaluated and academia can be of service.

- **Application of evidence to the local context**

  With their understanding of the national and local context, schools of public health can

work with their governments to evaluate the relevance of international research findings or generate local evidence when needed. For example, SSHSPH assists Singapore's Ministry of Health to study the research evidence behind Australia's standardised packaging tobacco control measures to determine if Singapore should adopt similar policies. Local schools of public health can also give valuable support when international guidelines must take into consideration factors like variations across biological make-up (e.g., BMI cut-offs for obesity in Asians versus Caucasians), practices (e.g., applying dietary guidance to Asian dishes where the food groups are not always easily distinguishable) and culture (e.g., improving child nutrition by educating and enabling the person in the household who decides on meal allocation; in Tamil Nadu, it is the mother, in Bangladesh it is the grandmother). [4]

- **New paradigms and perspectives**

  Scientific inquiry and discovery are endeavours that build on existing knowledge while looking beyond the status quo. Academics are required to make a habit of independent and critical thinking. Academia can enrich policymaking by asking new questions, suggesting novel ways of framing issues, challenging established viewpoints and expanding the range of options. A classic example is tobacco control: smoking, once viewed as a cultural norm, is now widely seen in western developed nations as a harmful, toxic and anti-social behaviour. In the 1930s–40s, doctors and scientists began noticing that lung cancer incidence rose in parallel with cigarette consumption and started investigating a possible link. Scholars produced evidence from population studies, animal experiments, cellular pathology and studying the chemical components of cigarettes. The body of evidence grew and the reports by The Royal College of Physicians in 1962 and the US Surgeon General in 1964 heralded the beginning of the anti-tobacco movement. Research can cumulatively change ways of thinking among policymakers and the public. Public health research findings are inherently translational and academics in the field can go a step further by synthesising findings and 're-packaging' them to make their relevance to policy more apparent.

Academics and policymakers operate in different environments — cadence of workflow, the priority of research, stakeholders, bases for professional success, degree of specialisation, organisational constraints and the relevance of contextual factors to their output. Intentionally addressing the following elements can not only mitigate the effects of those differences on academic-government collaborations, it can potentially create an environment where such collaborations flourish.

- **Collaborative mindset**

  As experts who are immersed in their fields, academics are positioned to analyse the technicalities of proposed policy interventions, and highlight existing/potential problems. While such input is valuable, it must also be accompanied by a willingness to contribute to the development of the solutions. This establishes academia as a partner, rather than an 'armchair critic', and a voice worth paying heed to. Policymakers' willingness to include academic participation in policy and decision-making forums is also needed. By participating in such forums, academics are

[4] Cartwright N, Hardie J. Causal roles. *Evidence-based policy: A practical guide to doing it better*: Oxford Scholarship Online; 2015. Pg 7-9.

better placed to provide relevant and timely advice. Good evidence-based policies stand on sound evidence complemented by clear, judicious judgement based on ground experience.

- **Trust**

  Policymakers must be able to trust the academic community to exercise intellectual integrity in their research and advice. While public health academics may have their own agendas (e.g., persuade the government to prioritise an issue), they must proffer advice that is based on balanced and fair analyses, and refrain from an 'activist' approach where evidence is used selectively to support pre-determined conclusions. Researchers participating in policymaking must also ensure that their claims of the expected benefits of their work are realistic. Making these claims transparent to the public opens them to the scrutiny of the rest of the scientific community, as well as government and other institutions, and strengthens accountability.

- **Timescales**

  The issues that require policymakers to act can be sudden and urgent, or foreseen and long-term. Besides the nature of the issue, operational considerations also impact the timeframe in which policymakers must act. Academia, on the other hand, operates in a timescale that is more long-term, focusing on training and education, as well as taking the amount of time that is necessary for research projects to reach valid conclusions. This difference in timescales can be managed through openly communicating context and constraints, as well as through horizon-scanning to predict research needs for future policy issues. Where policy must be implemented even though there is little evidence (e.g., 'black swan' events), general experience and evidence from similar past events can be relied upon while the relevant evidence is being gathered.

- **Uncertainty**

  There is an inevitable uncertainty surrounding the actual impact of a policy or intervention. It is difficult to determine the independent impact of a policy intended to address long-standing, complex, multi-causal public health problems. Acknowledging that uncertainty is inevitable creates the expectation for the policy process to involve repeated rounds of evaluation and refinement as more evidence emerge. Setting the right expectations minimises undue frustration to implementers and the public. Academia can play a key role in educating the public on the benefits of policies which are evidence-based, evaluated and continually refined, and help distinguish adjustments that are 'part of the process' from those that are not.

- **Willingness to act on what the evidence shows**

  If evaluation shows that the policy does not work, there must be a willingness to correct or terminate it. Repeatedly failing to do so can perpetuate a sense of futility within academia and the practitioner/managerial communities about the use of research evidence in policymaking.

- **Transparency**

  The evidence that is used to support a policy and the decision-making process should be open to scrutiny and feedback. It holds policymakers and their scientific advisers accountable to each other, the wider political and scientific community, and to the public. Indeed, the UK government's guidelines to policymakers on the use of scientific evidence suggest that, "In public presentations, departments should wherever possible consider giving experts (internal or external) a leading role in explaining their advice on a particular issue. Independent scientific advisory bodies should have the ability to

communicate relevant advice freely, subject to normal confidentiality restrictions, including when it has not been accepted. Scientific advisers should make clear in what capacity they are communicating, for example as Committee Chair or in an academic capacity." [5]

❖ **Make policy-relevant research rewarding for academics**

The type of research needed for creating and collating evidence that are immediately relevant to the policy process may not be the type of research that builds academic careers (i.e., work that is deemed scientifically groundbreaking). Career academics may not be willing or able to spend substantial time working in the evidence-based policy (EBP) process. This can be addressed by aligning the career interests of academics with the public good of contributing to population health.

❖ **Training**

Government officials can be equipped with the competencies for evaluating evidence for policymaking. A possible platform is through courses that train existing and would-be senior regulators, in formal education and professional training. This is an area where academia can contribute significantly through curriculum development and offering courses for policymakers. Public health academics should also be trained in basic know-how for engaging in the policymaking process, as well as gain understanding of the players, processes and power dynamics in policymaking. There should also be content to help academics understand the factors that policymakers consider, as well as educate academics on effective ways to communicate their ideas to policymakers.

❖ **Having policy dialogues**

The key features of policy dialogues embody elements that facilitate the effective engagement needed in fruitful academic-government collaboration. Policy dialogues are usually accompanied by a policy brief of the evidence relevant to the issue under deliberation. The key features of a policy dialogue are: [6]

- It enables interactions between stake-holders (e.g., researchers, policymakers, civil society health professionals, industry and the media);
- It integrates explicit knowledge with tacit knowledge to guide policy development;
- It is characterised by participatory and consultative processes; having clear objectives, being inclusive and transparent, providing an opportunity to reflect on the applicability of scientific evidence in different contexts, challenging science, promoting dialogue among different types of stakeholders and directly impacting on the decision itself.

[5] Government Office for Science. The Government Chief Scientific Adviser's Guidelines on the Use of Scientific and Engineering Advice in Policy Making. United Kingdom2010.

[6] EVIPNet Europe. Policy dialogue preparation and facilitation checklist. 2016:2. http://www.euro.who.int/__data/assets/pdf_file/0017/323153/EVIPNET-PD-preparation-facilitation-checklist.pdf. Accessed 18 May 2017. Pg 2.

Academic-government partnerships in the policy process can contribute much to the success of public health policies. We have attempted to suggest some factors for fostering an environment that is conducive to fruitful partnerships. Given that the political and leadership models, as well as academic environments, vary among countries, the establishment of such partnerships is an evolving process and no two journeys are identical. As such, the journey will always be along an unchartered course and may even involve some setbacks. Nevertheless, the important thing is to not give up and keep moving forward.

INTRODUCTION

Public health challenges are increasingly complex, multifaceted, unpredictable and diverse. The information and viewpoints that weigh-in on policy considerations are myriad. This paper discusses how active academic-government collaborations can contribute to the relevant use of evidence for prudent public health policy development. We first introduce the role that research can play in policymaking. We then list some ways that are being used to bring research into the policymaking process. Next, we highlight the value that academia can bring to evidence-based policymaking. Finally, we discuss some facilitators of academic-government partnerships.

This paper focuses on evidence-based policymaking in public health, where public health policies are "decisions, plans, and actions that are undertaken to achieve specific health goals within a (population). An explicit health policy can achieve several things: it defines a vision for the future which in turn helps to establish targets and points of reference for the short and medium term. It outlines priorities and the expected roles of different groups; and builds consensus and informs people". [1]

In this paper, 'policymakers' are those directly employed in the machinery of policy development, decision and implementation, including elected officials and civil servants.

Policymaking is influenced by many factors (Box 1), with a variety of actors seeking to shape policy decisions, for example, advocacy groups, patients, pundits, industry, academia and the media. Researchers apply theories and methods from the natural and social sciences, as well as the humanities, to study the relevant factors and produce evidence to inform policymaking.

Different forms of information can constitute evidence that is relevant to public health policymaking. These include but are not limited to the following: [3]

- Scientific literature in systematic reviews
- Scientific literature in one or more journal articles
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- Programme evaluations
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- Word of mouth
- Personal experiences

Research has a role to play in every part of the policy process. Evidence is needed to support the identification and prioritisation of problems, weigh options, guide decisions and evaluate outcomes.

BOX 1: FACTORS THAT INFLUENCE POLICYMAKING

Source: Extracted from Davies, 2002. [2]
(Author additions are italicised).

EXPERIENCE, EXPERTISE AND JUDGEMENT OF DECISION MAKERS

- Often constitute human intellectual capital and tacit knowledge.
- May not be informed by sound evidence.
- The less evidence or time there is for decisions, the more decision makers will rely on this.

VALUES

- Values, ideology and political beliefs, which can sometimes be in tension with the empirical evidence.
- Evidence-based policy can itself be seen as a political ideology.

LOBBYISTS, PRESSURE GROUPS, CONSULTANTS, OPINION LEADERS AND MEDIA

- These are groups seeking to influence policy decisions in particular directions.
- Their use of evidence may be less systematic and more selective.

PRAGMATICS AND CONTINGENCIES

- The practical realities of political life (e.g., parliamentary terms and timetables, procedures of policy making process and capacities of institutions).
- Unanticipated events such as outbreaks, natural disasters and crises.

CONSTITUENTS

- *The interests, preferences, and values of the constituents who influence the political interest of decision makers.*

RESOURCES

- Finite and sometimes declining, making cost-effectiveness, cost-benefit and cost-utility important considerations.

HABIT AND TRADITION WITHIN POLICYMAKING INSTITUTIONS (E.G., PARLIAMENT, CIVIL SERVICE AND JUDICIARY)

- Habitual ways of doing things, and the rituals and procedures that reinforce them.
- Established ways of thinking.
- *Entrenched relationship dynamics.*
- *Habits and traditions can serve to advance or obstruct the development of a policy.*
- Changing habits and tradition "to accommodate the forces of rationality and modernity presents a major challenge for evidence-based policy and practice".

SCIENTIFIC EVIDENCE

THE INFLUENCE OF RESEARCH ON POLICY

Many models exist for understanding the policy process, some of them are briefly described in Table 1. The areas where research evidence can influence policy in each model are also highlighted in the table. Generally, the models seek to describe the relationships between five key elements that influence policy — the actors (individuals or collectives), institutions (the rules and norms that influence the behaviour of actors), policy networks (relationships between policy decision makers and 'pressure participants'), ideas (ways of thinking, ideology, beliefs, knowledge, world views) and context (the environment and events around the policymaker). [4, p29-30]

Table 1: Models of the policy process and where research can influence policy

Model	*Where research can influence policy*
Stages Model This model divides the policy process into different stages — agenda setting, policy formulation, implementation and evaluation. It serves as a heuristic to understand the complex policy process. The stages do not necessarily occur in a linear fashion; stages can occur simultaneously, in varying orders, with varying amounts of time spent on each, and the stages can be out of sequence or loop backwards.	**Agenda setting:** Framing and prioritising the problem. **Policy formulation:** Identifying solutions and comparing options. **Implementation:** Identifying and comparing ways to translate the policy to practice. **Evaluation:** Monitoring and evaluating the outcomes of interventions, re-designing them where necessary.
Multiple Streams Framework The framework posits that for an issue to be put on the policy agenda there must be a 'window of opportunity'. These windows of opportunity open when three independent streams coincide: the problem (a problem is perceived), policy (feasible solutions to the problem exists) and politics (there is political impetus to solve the problem) streams.	**Problem stream:** Surface novel problems or shed new light on known problems, such that it reframes the problem or gives it greater impetus. **Solution stream:** Develop viable solutions to important problems or make discoveries that turn previously unfeasible solutions into feasible ones. **Political stream:** Demonstrate to political office holders, through data analytics for instance, that an issue is gaining importance among their constituents and may warrant policy action.

Punctuated Equilibrium Theory The political process is characterised by long periods of stability, issues are defined or redefined in public discourse, and change generally occurs in an incremental fashion. However, 'lurches' in the political process can happen when events, such as crises or new discoveries, prompt policymakers to reconsider established viewpoints and ways of doing things.	Evidence from research can play a role in numerous ways. Here are some examples: Evidence is used to garner public pressure over an issue so that the issue gets prioritised by the government. During a novel crisis, evidence from previous similar events are used as reference to inform the current course of action. Scientific discovery leads to the development of a feasible solution to a longstanding problem.
Advocacy Coalition Framework Multiple actors who share similar beliefs and want to turn their beliefs into policy, group together and coordinate efforts to influence the policy process.	Research evidence serves as one of the means for advocacy coalitions to establish support for their objectives. One example is the coordinated efforts by academics and various anti-smoking advocacy groups to successfully persuade the US government to raise cigarette excise tax in the late 1980s. [5]

Buse et al. (2005) describes two models for understanding how research influences policy. [6, p161] The 'engineering model' describes a linear and direct relationship between research findings and policy decisions. It assumes that problems are identified by research and solved by evidence provided by researchers through policy change.

The 'enlightenment model' postulates that research findings "percolate through the political environment like water falling on limestone: the water is absorbed, disappears into multiple channels and then **e**merges unexpectedly some time later elsewhere". [6, p160] Research findings are used in a variety of ways by policymakers. Research influences policy decisions cumulatively by changing the way of thinking rather than providing solutions.

These two models represent two theoretical extremes of how research influences policy (Table 2). Depending on the context, relational dynamics among stakeholders, as well as the political culture, what happens in reality can fall anywhere in between the two extremes.

Table 2: Differences between 'engineering' and 'enlightenment' models
Source: Buse et al. (2005).

Engineering or problem-solving model	*Enlightenment model*
Sees relationship between research and policy as rational and sequential.	Sees relationship as indirect and not necessarily logical or neat.
Research identifies a problem.	Problems are not always recognised, or at least not immediately.
Applied research is undertaken to help solve the problem.	There may be a considerable period between research and its impact on policy. Much research develops new ways of thinking rather than solutions to specific problems.
Research is then applied to helping solve the policy problem. Research produces a preferred policy solution.	The way in which research influences policy is complex and hidden. Policymakers may not want to act on results.
Rarely or never describes how the relationship between research and policy works in practice.	How research influences policy is indirectly via a 'black box', the functioning of which is hidden rather than explained.

EXAMPLES OF PLATFORMS FOR RESEARCH WORK TO SUPPORT POLICYMAKING

There exists a variety of ways for facilitating the use of research findings to support policy deliberations, development and decisions at various levels. The following are some examples.

CHIEF SCIENTIFIC ADVISERS

The UK and New Zealand have Chief Scientific Advisers (CSA) who fill such a role and advise their governments on the use of scientific evidence to inform policies. The UK also has CSAs for most government departments (i.e., government ministries). [7]

SCIENTISTS AS CONSULTANTS

Each administration of the US government appoints a group of the country's leading scientists and engineers to the President's Council of Advisors on Science and Technology (PCAST). [8]

The European Commission's (EC) Scientific Advice Mechanism is a model that enables the EC to draw on the scientific experience and expertise of all member nations to garner independent advice on policy issues in a timely and coordinated manner. [9] The Mechanism works with scientific bodies of member states (e.g., learned societies, wider scientific community) and is overseen by a High-Level Group comprising leading scientists.

UK's Department of Health formed the Policy Innovation Research Unit to bring in expertise from leading research institutions to work with officials from the early stages of policy development in health and social care. [10]

Individual scientists may also be appointed on an ad hoc basis to act as consultants to the government on specific issues or projects. They usually do so as members of the relevant advisory boards or taskforce.

ORGANISATIONS THAT PROVIDE EVIDENCE-BASED GUIDANCE FOR POLICYMAKING

France's National Institute of Health and Medical Research is a public research body that provides scientific expert advice to French policymakers in public health. [11]

Germany's Association of the Scientific Medical Societies (AWMF) is the umbrella organisation for the country's medical scientific professional associations. AWMF coordinates among its members to advise the government on topics of scientific medicine, and medical research and classification. It also produces clinical practice guidelines for the prevention and treatment of a range of chronic diseases. [12]

Netherland's ZonMw (The Netherlands Organisation for Health Research and Development) is an independent self-governing organisation that administers funding for research, programme development and implementation in healthcare. [13] All its activities are undergirded by an approach that weaves together research, practice, policy, education and training. It conducts projects for local health authorities, health funds, insurers, private companies and professional associations, though the government is its main commissioner (through the Dutch Ministry of

Public Health, Welfare and Sports, and the Netherlands Organisation for Scientific Research). [14]

The Health Intervention and Technology Assessment Program (HITAP) is a semi-autonomous research unit under Thailand's Ministry of Public Health. It evaluates health technologies, programmes for health promotion and disease prevention, as well as social health policies, to inform policy decisions. [15]

The National Institute for Health and Care Excellence (NICE) provides evidence-based guidance, advice and information in the areas of clinical practice, health technology, public health and social care in England. It is accountable to the Department of Health but is operationally independent of the government. [16]

The National Academy of Sciences in the US is a non-profit institution where scientists who are recognised for their achievements are elected as members. The Academy, and its offshoots, the National Academy of Engineering and the National Academy of Medicine, support policy work through providing advice and conducting research commissioned by the government and others, and work to advance the development of sciences in the country. [17]

The Cochrane Collaboration (informs the practice of medicine), [18] Campbell Collaboration (informs social and economic policies) [19] and the International Drug Policy Consortium (informs and evaluates drug policies) [20] are some other examples.

COALITIONS FORMED TO ENGAGE GOVERNMENT

EBM+ (EBM-plus) is a group of academics participating in a three-year project funded by the UK government, to study and enhance the ways evidence-based medicine handles causal and correlational evidence. [21] Their members include leading academics in social science, medicine, as well as senior public health practitioners.

Organisations such as Nesta [22] and the Alliance for Useful Evidence [23] advance the use of evidence to solve real-world problems by creating collaborations among governments, academia, practitioners, businesses and charities. The Evidence-based Policy Collaborative, funded by a private foundation, works with various research institutions to further EBP practice through articulating the principles of EBP, creating an EBP policymaking toolkit and developing policy briefs. They disseminate these to policymakers through roundtables and briefings. [24]

THINK TANKS

The European Observatory on Health Systems and Policies [25], Chatham House [26], The Brookings Institution [27] and the American Enterprise Institute [28] are some of the notable think tanks in public health. These organisations aim to impact policy development through their research, analyses, policy recommendations and thought leadership. They engage stakeholders such as government officials, practitioners and civil society. They also facilitate the debate and discussion of policy issues among researchers and stakeholders.

CENTRES THAT ARE SET UP WITHIN ACADEMIC INSTITUTIONS

With the ready expertise residing within their walls, academic institutions have created centres dedicated to advancing EBP to translate knowledge into real-world impact.

The Health Promotion and Policy Research Unit at New Zealand's University of Otago works with local officials to establish solid evidence base for public health and health promotion policies. [29]

Oregon Health and Science University's Center for Evidence-based Policy provides analysis, consultation, stakeholder engagement and policy development services to policymakers from the various state departments of health. [30]

The Division of Policy Translation and Leadership Development within Harvard's T.H. Chan School of Public Health hosts a regular forum ('The Forum') to discuss pertinent policy problems and scientific controversies. The Forum invites key policymakers and experts to engage on topics that are at the confluence of policy and science. By making the sessions publicly available on the Internet, the perspectives and knowledge that are shared get disseminated to a wider audience, thereby enhancing their impact and influence. The Division also equips and engages policy influencers through the Harvard Ministerial Leadership Program. High-level leaders in public health, government, non-profit organisations and journalism are also invited to spend a semester in the school as part of their Senior Leadership Fellows programme. [31]

The Department of Nutrition within the T.H. Chan School of Public Health played a key role in advocating the push for soda tax to reduce sugar consumption in the US. [32-34] The School's research identified sugar-sweetened beverages as an important contributor to the epidemic rise in obesity and diabetes in the US and brought the issue to attention. [35] It also worked with several cities in the US to provide evidence on health impact and cost-effectiveness for policy decision. [36]

COLLABORATIONS BETWEEN GOVERNMENT AND ACADEMIC INSTITUTIONS

The expertise within academic institutions may be tapped on to guide decisions for a defined issue for mid- or long- term policy interventions, or for urgent policy interventions.

During the 2003 SARS outbreak in Hong Kong, Prof Joseph Malik Peiris and his team at the University of Hong Kong discovered the novel coronavirus that caused the disease and provided government authorities with the evidence base for diagnosis and interventions. [37]

In 2016's Zika outbreak in Singapore, the Saw Swee Hock School of Public Health (SSHSPH) also collaborated with the Ministry of Health to target interventions by modelling and predicting the way the disease would spread in the country. The School's faculty members were already familiar with Ministry officials through regular working-level interactions. This facilitated the speed with which the School and Ministry could come together and meet the urgent need during the outbreak.

The projection by SSHSPH on Singapore's type 2 diabetes prevalence in 2050 was significantly higher than the official estimate. This was then flagged to the government who

launched the nation's 'War on Diabetes' (WoD) in response to the new evidence. The School continues to work with the Ministry of Health on the WoD in the areas of evidence gathering and analyses, and makes recommendations on policies and outcome measures. By appointing the School's dean to the WoD Taskforce and having its faculty members on the various workgroups, the School has been able to contribute at various levels in a timely manner.

SSHSPH's Public Health Translation Team serves as a platform for the School to work with the Ministry of Health to understand policy issues, share research findings and jointly design research studies to inform public health policies. It identifies where and how policy needs can be met by the academic resources available, coordinates internally with researchers, and supports them in creating/collating and presenting the evidence to the ministry. Through regular working group meetings focused on specific domains, and senior management-level symposia, the School and the Ministry can share research findings, pertinent policy issues and jointly design research studies.

THE VALUE OF ACADEMIC PARTICIPATION TO EVIDENCE-BASED POLICYMAKING

Deepening partnerships between local schools of public health with policymakers and practitioners can potentially enhance the benefit of research to the policy process. The value that public health academia can bring is discussed below.

CURRENCY IN RESEARCH AND KNOWLEDGE

As part of their work as educators and as scientists, academics stay current in their knowledge of the developments and innovations in their fields of interest. This is useful for the policy process when it comes to being informed of 'what is out there' or 'what is already being tried by others'. It can also be a valuable source of input for horizon-scanning.

NATIONAL AND INTERNATIONAL CREDIBILITY

The career success of academics rests, in part, on their work being recognised and deemed credible by their peers. This requires that academics' research to support policy development stands up under the scrutiny of fellow scientists around the world. Recognition of the credibility of the scientific support for a policy is especially crucial when it comes to policies that can potentially spark controversy or encounter resistance.

DEEP AND WIDE EXPERTISE, AS WELL AS THE ABILITY TO INTEGRATE ACROSS DIFFERENT FIELDS TO SOLVE PUBLIC HEALTH PROBLEMS

Both depth and range of public health expertise can be found in schools of public health. Depth of expertise is found in individual faculty members/scientists, and scope of expertise is found among faculty/scientists. Schools of public health are ready hubs for scientists from various public health disciplines to work together and cross-pollinate. As part of larger academic institutions, schools of public health are also readily connected to other academic disciplines. This is an advantage as public health issues are often complex, multi-causal and go beyond traditional healthcare to social, economic and behavioural considerations.

Public health problems call for a transdisciplinary perspective. Schools of public health are well-positioned to integrate knowledge and research, across the public health domain and across academic disciplines, to apply them to solve real-world problems. An example is the development of a tele-rehabilitation system in Singapore, an alternative to home- and centre-based rehabilitation. The system was funded by a grant from the Integrated Health Information System (IHiS; the body overseeing the nation's IT in healthcare), and co-developed by the National University of Singapore's SSHSPH and School of Engineering through the THOR (Tele-Health Innovation Research) Research Programme. The system aims to be an

effective alternative that increases uptake of rehabilitation by patients (more convenient), efficiency (for therapists) while making rehabilitation more cost-effective.

INDEPENDENT EVALUATOR

Academia can serve as an independent evaluator of the evidence that is presented. This is particularly useful in places with more public-private partnerships. Private firms may approach public agencies to collaborate on initiatives and offer research evidence in support of the effectiveness of the proposed project. Such evidence must be evaluated and academia can be of service.

APPLICATION OF EVIDENCE TO THE LOCAL CONTEXT

With their understanding of the national and local context, schools of public health can work with their governments to evaluate the relevance of international research findings or generate local evidence when needed. For example, SSHSPH assists Singapore's Ministry of Health to study the research evidence behind Australia's standardised packaging tobacco control measures to determine if Singapore should adopt similar policies.

Academia can also help to tailor guidelines from international organisations (e.g., WHO, UN) for local implementation and communication, while ensuring that the intervention stays true to its intended purpose. This is valuable when guidelines must take into consideration factors like variations across biological make-up (e.g., BMI cut-offs for obesity in Asians versus Caucasians), practices (e.g., communicating dietary guidance for applicability to Asian dishes where the food groups are not always easily distinguishable) and culture (e.g., improving child nutrition by educating and enabling the person in the household who decides on meal allocation; in Tamil Nadu, it is the mother, in Bangladesh it is the grandmother [38, p7-9]).

NEW WAYS OF THINKING

Scientific inquiry and discovery are endeavours that build upon existing knowledge while looking beyond the status quo. Academics are required to make a habit of independent and critical thinking.

Academia can enrich policymaking by asking new questions, suggesting novel ways of framing issues, challenging established viewpoints and expanding the range of options. A classic example is tobacco control: smoking, once viewed as a cultural norm, is now widely seen in western developed nations as a harmful, toxic and anti-social behaviour. In the 1930s-40s, doctors and scientists began noticing that lung cancer incidence rose in parallel with cigarette consumption and started inquiring about a possible link. Scholars produced evidence from population studies, animal experiments, cellular pathology and studying the chemical components of cigarettes. [39] The body of evidence grew and the reports by The Royal College of Physicians in 1962 and the US Surgeon General in 1964 heralded the beginning of the anti-tobacco movement.

Research can cumulatively change ways of thinking among policymakers and the public. Public health is inherently translational and academics in the field can go a step further by synthesising findings and 're-packaging' them to make their relevance to policy more apparent.

FACILITATING ACADEMIC-GOVERNMENT COLLABORATION

Academics and policymakers operate in different environments as described in Table 3. In this section, we discuss the factors that we consider key to facilitating academic-government collaborations.

COLLABORATIVE MINDSET

As experts who are immersed in their fields, academics are positioned to analyse the technicalities of proposed policy interventions, and highlight existing/potential problems. While such input is valuable, it must also be accompanied by a willingness to contribute to the development of the solutions. This establishes academia as a partner, rather than an 'armchair critic', and a voice worth paying heed to.

Policymakers' willingness to include academia in policy and decision-making forums is also needed. By participating in such forums, academics are better placed to provide relevant and timely advice. The involvement and input of academia early in the policy process can minimise the risk of the policy being overturned by challenges to the soundness of its evidence base. Early involvement of academia can also ensure that research studies meant to inform policy decisions are robust, reliable and valid.

Good evidence-based policies stand on sound evidence complemented by clear, judicious judgement based on ground experience. The application of evidence to real-world problems is not formulaic or one-size-fits-all.

UK's Department of Health put up £47.5m to fund health protection research in universities. To ensure collaboration between academia and policymakers, the Department requires each research unit it funds to work in partnership with Public Health England. [40]

TRUST

Policymakers must be able to trust the academic community to exercise intellectual integrity in their research and advice. While public health academics may have their own agendas (e.g., persuade the government to prioritise an issue), they must proffer advice that is based on balanced and fair analyses, and refrain from an 'activist' approach where evidence is used selectively to support pre-determined conclusions.

The Human Genome Project had been much criticised for overpromising on the usefulness of its discoveries to cure diseases, and its low return on investment relative to the billions of dollars that have been invested to date, funds that could otherwise have gone into research that directly addressed specific healthcare problems. By nature, researchers in academia delve deeply into a narrow area of a discipline. There is therefore the danger of having an exaggerated view of the importance of their work relative to other policy issues, or the potential usefulness of their work to policymaking. Bearing in mind the danger of such a tendency, researchers participating in policymaking must ensure that their claims of the expected benefits of their work are realistic. Making these claims transparent to the public opens them to the scrutiny of the rest of the scientific community, as well as government and other institutions, and enhances accountability.

Table 3: The 'two communities' model of researchers and policymakers
Source: Buse et al. (2005). [6] Table 9.2 on P163.

	University researchers	*Government officials*
Work	Discrete, planned research projects using explicit, scientific methods designed to produce unambiguous, generalisable results (knowledge focused); usually highly specialised in research areas and knowledge.	Continuous, unplanned flow of tasks involving negotiation and compromise between interests and goals, assessment of practical feasibility of policies and advice on specific decisions (decision focused). Often required to work on a range of different issues simultaneously.
Attitudes to research	Justified by its contribution to knowledge; research findings lead to need for further investigations.	Only one of many inputs to their work; justified by its relevance and practical utility (e.g., in decision making); some scepticism of findings versus their own experience.
Accountability	To scientific peers primarily, but also to funders.	To politicians primarily, but also the public, indirectly.
Priorities	Expansion of research opportunities and influence of experts in the world.	Maintaining a system of 'good governance' and satisfying politicians.
Careers / rewards	Built largely on publication in peer-reviewed scientific journals and peer recognition rather than practical impact.	Built on successful management of complex political processes rather than use of research findings for policy.
Training and knowledge base	High level of training, usually specialised within a single discipline; little knowledge about policy making.	Often, though not always, generalists expected to be flexible; often little or no scientific training.
Organisational constraints	Relatively few (except resources); high level of discretion (e.g., in choice of research focus).	Embedded in large, inter-dependent bureaucracies and working within political limits, often to short timescales (a critical difference that we discuss in a later section).
Values / orientation	Place high value on independence of thought and action; belief in unbiased search for generalisable knowledge.	Oriented to providing high quality advice, but attuned to a particular context and constituents and to specific decisions.

TIMESCALES

The issues that require policymakers to act can be sudden and urgent (e.g., an epidemic), or long-term (e.g., rising prevalence of non-communicable diseases; NCDs), emerging environmental contaminants that may be toxic to humans). Besides the nature of the issue, operational considerations also impact the timeframe in which policymakers must act. Academia, on the other hand, operates mainly in a timescale that is more long-term, focusing on training and education, as well as taking the amount of time that is necessary for research projects to reach valid conclusions (e.g., longitudinal studies on the effects of lifestyle factors on NCD risks).

This difference in timescales is a reality that must be managed, but it need not be an insurmountable impediment to EBP. Open communication enables both communities to understand the context and constraints faced by the other. If a policy needs to be launched expeditiously with limited evidence, being open about the actual aims of the policy reduces the tendency for academia to see their participation as futile and leaves the way open for academia to remain engaged to advise policymakers on the possible options given the available evidence. Having mechanisms such as regular meetings or symposia, both at the working- and senior management-level, can serve to encourage open communication.

Another way of mitigating the 'mismatch' in timescales is through horizon-scanning where areas of potential policy action are identified before they become pressing issues. [41, p53-57] This gives more time to gather the evidence needed for decision making. Horizon-scanning should be a regular part of a government's efforts in prudent policymaking. In addition to giving the benefit of foresight, horizon-scanning informs the prioritisation of focus and resource allocation. Academic involvement in horizon-scanning brings expert insights and external viewpoints to challenge established ways of looking at things. Amanatidou et al. discussed the various methods of horizon-scanning and considered three approaches comprising different combinations of methods, all of which include expert participation. [42]

Policy must sometimes be made and implemented rapidly even though there is little or no evidence. This is true in outbreaks and crises, especially those that are unique. In such situations, policymakers must fall back on general experience and evidence from similar past events. Policies for precautionary measures are first made, and are adjusted as more evidence becomes available. During the 2003 SARS outbreak in Hong Kong, residents of Block E in Amoy Gardens were initially isolated as a precautionary measure after health authorities saw a steep rise in the number of SARS cases from that block and suspected an outbreak there. The cause of the disease spread in that block was unknown and the decision to isolate was made based on the hypothesis that bodily secretions containing the causative virus (later identified to be a novel coronavirus) might be transmitted via common systems that linked apartments. [43]

UNCERTAINTY

There is an inevitable uncertainty surrounding the actual impact of a policy or intervention. It is difficult to determine the independent impact of a policy intended to address long-standing, complex, multi-causal problems (which is usually the case for public health). [6, p166] Also, the context surrounding each issue

that a policy is meant to solve is unique. Regardless of the strength of the supporting evidence, it must be implemented in its intended context to find out if it does work there. There may also be unforeseen unintended effects (despite the EBP approach's effort to identify all unintended effects beforehand).

Acknowledging that uncertainty is inevitable creates the expectation for the policy process to involve repeated rounds of evaluation and refinement as more evidence emerge. Setting the right expectations minimises undue frustration to implementers and the public. It also helps avoid 'analysis paralysis' where decisions are stalled because of the need for near absolute certainty. This readiness to continually review and refine policies is especially crucial when policies need to be made under tight time pressure and there is limited evidence.

It is a reality that policy changes, even if evidence-based, may have political costs by giving the public a perception that the government is incompetent or flippant. There is a tension between the inherent need for evidence-based policies to be refined, and managing public perception. This can be addressed by adjusting the public's expectations through fostering an understanding of the nature and benefits of the EBP approach. Academia can play a key role in educating the public on the benefits of policies which are evidence-based, evaluated and refined, and help distinguish adjustments that are 'part of the process' from those that are not.

WILLINGNESS TO ACT ON WHAT THE EVALUATION EVIDENCE SHOWS

If evaluation shows that the policy does not work, there must be a willingness to correct or terminate it. [44] Repeatedly failing to do so can perpetuate a sense of futility within academia and the practitioner/managerial communities about the use of research in policymaking.

MAINTAIN CREDIBILITY OF ACADEMIC ADVICE THROUGH TRANSPARENCY

The evidence that is used to support a policy and the decision-making process should be open to scrutiny and feedback. It holds policymakers and their scientific advisers accountable to each other, the wider political and scientific community, and to the public. In addition, scientific advisers should make known the possible conflicts of interest (as is the practice in published works), as well as the methodology and data sources.

Indeed, the UK government's guidelines to policymakers on the use of scientific evidence suggest that "in public presentations, departments should wherever possible consider giving experts (internal or external) a leading role in explaining their advice on a particular issue. Independent scientific advisory bodies should have the ability to communicate relevant advice freely, subject to normal confidentiality restrictions, including when it has not been accepted. Scientific advisers should make clear in what capacity they are communicating, for example as Committee Chair or in an academic capacity." [45] This call for openness on the judgments and analyses in the policy decision process also includes research commissioned by the government. In their report, the UK's Science

and Technology Select Committee advised that "commissioned systematic reviews of the evidence base should usually be considered as research for the purposes of publication." [41, p49]

UK's Science and Technology Committee concluded that "ministers should explain publicly their reasons for policy decisions, particularly when a decision is not consistent with scientific advice and, in doing so, should accurately represent the evidence". [46] Some examples of policies that were implemented without solid evidence bases are the policies on communication to the public on the 'Act on CO_2' (designed to reduce the carbon footprints of individuals) and minimum alcohol pricing in the UK. [46, p21]

Such transparency creates a virtuous cycle that contributes towards encouraging the use of research in policy — availing the evidence and rationale to the public enhances awareness and engagement; this in turn increases the public's understanding of the use of research for policy.

MAKE POLICY-RELEVANT RESEARCH REWARDING FOR ACADEMICS

The type of research needed for creating and collating evidence that are immediately relevant to the policy process may not be the type of research that builds academic careers (i.e., work that is deemed scientifically groundbreaking). Career academics may not be willing or able to spend substantial time working in the EBP process. There is a need to better align the career interests of academics with the public good of contributing to population health. A possible step is for schools of public health to recognise that the discipline is inherently translational and consider such contributions when assessing academics for promotion and tenure. The opportunity to produce spin-off studies from the policy-related research will also be an effective stimulus; for example, permission to use research findings and data in the spin-off study.

TRAINING

Government officials can be equipped with the competencies for evaluating evidence for policymaking. A possible platform is through courses that train existing and would-be senior regulators in formal education and professional training. This is an area where academia can contribute significantly through curriculum development and offering courses for policymakers. Harvard University's Center for International Development, through its Evidence for Policy Design initiative, "trains current and future policymakers to utilise analytical tools and frameworks for smart policy design". It also conducts and disseminates research that solves policy design questions, and engages in policy dialogues. The department works closely with academics across Harvard, including those from the School of Public Health, Economics Department and Business School. [47]

Public health academics should also be trained in basic know-how for engaging in the policymaking process, to give them an understanding of the players, processes and power dynamics in policymaking. There should also be content to help academics understand the factors that policymakers consider, as well as educate academics on effective ways to communicate their ideas to policymakers. Basic know-how can be part of the general skills taught in formal public

health curriculum and more advanced training can be offered to those whose regular work intersects with policymaking. These courses can come about through cross-faculty modules with the departments teaching political science, policy studies and health communication.

POLICY DIALOGUES

The key features of policy dialogues embody elements that facilitate the effective engagement needed in fruitful academic-government collaboration. Policy dialogues are usually accompanied by a policy brief of the evidence relevant to the issue under deliberation. The European Observatory on Health Systems and Policies has successfully used policy dialogues to engage member states on a wide range of topics over several years. They have facilitated dialogues for individual countries, as well as for multi-country dialogues for those that face similar issues. [48]

The key features of a policy dialogue are: [48]

- It enables interactions between stakeholders (e.g., researchers, policy-makers, civil society health professionals, industry and the media);
- It integrates explicit knowledge with tacit knowledge to guide policy development;
- It is characterised by participatory and consultative processes; having clear objectives, being inclusive and transparent, providing an opportunity to reflect on the applicability of scientific evidence in different contexts, challenging science, promoting dialogue among different types of stakeholder and directly impacting on the decision itself.

OTHER PRACTICAL STEPS

Buse et al. (2005) have suggested other practical steps that researchers and policymakers can take to facilitate the use of research in policymaking. These are described in Table 4.

Table 4: Practical steps to reduce the 'gap' between research and policy
Source: Buse et al. (2005). [6] Table 9.3 on P170.

Steps to be taken by researchers	*Steps to be taken by policymakers*
❖ Provide a range of different types of research reports including newsletters, executive summaries, short policy papers, etc., all written in an accessible, jargon-free style and easily available (e.g., by hiring a scientific journalist to translate research reports into lay terms or training researchers in accessible writing style). ❖ Put on conferences, seminars, briefings and practical workshops to disseminate research findings and educate policymakers about research. ❖ Produce interim reports to ensure that findings are timely. ❖ Include specific policy implications in research reports. ❖ Identify opinion leaders and innovators, and ensure that they understand the implications of research findings. ❖ Undertake systematic reviews of research findings on policy-relevant questions, to enable policymakers to access information more easily. ❖ Keep in close contact with potential policymakers throughout the research process. ❖ Design studies to maximise their policy relevance and utility (e.g., ensure that trials are of interventions feasible in a wide range of settings). ❖ Use a range of research methods, including 'action-research' (i.e., practically-oriented, participative, non-exploitative research which directly involves the subjects of research at all stages, with a view to producing new knowledge that empowers people to improve their situation) and other innovative methods. ❖ Choose research topics that are important for future policy.	❖ Set up formal communication channels and advisory mechanisms involving researchers and policymakers to identify researchable questions, develop research designs and plan dissemination and use of findings, jointly. ❖ Ensure that all major policies and programmes have evaluations built into their budgets and implementation plans, rather than seeing evaluation as an optional extra. ❖ Publish the findings of all public programme evaluations and view evaluation as an opportunity for policy learning. ❖ Commission research and evaluation directly and consider having additional in-house research capacity. ❖ Establish intermediate institutions designed to review research and determine its policy and management implications (e.g., the National Institute for Clinical Excellence in England and Wales which advises patients, health professionals and the NHS on current 'best practice' derived from robust evidence syntheses). ❖ Provide more opportunities for the public and civil society organisations to learn about the nature of research, to be able to ask questions of researchers and policymakers concerning the use of research and to participate more actively in the policy process from an informed position. ❖ Encourage the mass media to improve the quality of their reporting and interpretation of research findings and their policy implications through devoting more time and effort to media briefing.

CONCLUSION

Academic-government partnerships in the policy process can contribute much to the success of public health policies. Schools of public health bring a unique set of benefits to the policy process. Public health is inherently translational, and while much can be achieved for population health independent of government efforts, public policy levers are still required for public health interventions to achieve population-wide impact efficiently and sustainably. The challenges that arise from the differences in academic and policymaking environments can be mitigated, and in doing so, foster an environment that is conducive to fruitful academic-government partnerships. Given that the political and leadership models, as well as the culture within academic environments vary among countries, the establishment of such partnerships is an evolving process and no two journeys are identical. As such, the journey will always be along an unchartered course and may even involve some setbacks. Nevertheless, the important thing is to not give up and keep moving forward.

REFERENCES

1. World Health Organization. Health policy. http://www.who.int/topics/health_policy/en/. Accessed 31 January 2017.
2. Davies P. Is evidence-based government possible? 4th annual Campbell Collaboration Colloquium Jerry Lee Lecture. 19 February 2004. Washington DC.
3. Brownson R, Fielding J, Maylahn C. Evidence-based public health: a fundamental concept for public health practice. *Annual Review Public Health*. 2009;30:175-201.
4. Paul C. The Politics of Evidence-Based Policy Making. London: Palgrace Macmillian; 2016.
5. Scott E, Dickert J. *From research to policy: the cigarette excise tax*. John F Kennedy School of Government;1993.
6. Buse K, Mays N, Walt G. *Making health policy*. England: Open University Press, MacGraw-Hill Education; 2005.
7. United Kingdom Chief Scientific Advisers. https://www.gov.uk/government/groups/chief-scientific-advisers. Accessed 9 March 2017.
8. About PCAST (President's Council of Advisors on Science and Technology). https://obamawhitehouse.archives.gov/administration/eop/ostp/pcast/about. Accessed 9 March 2017.
9. European Commission Scientific Advice Mechanism FAQs. https://ec.europa.eu/research/sam/index.cfm?pg=faq.
10. Unit PIR. What we do. http://www.piru.ac.uk/about-us/what-we-do.html. Accessed 10 March 2017.
11. National Institute of Health and Medical Reserach. About INSERM. http://english.inserm.fr/about-inserm/the-institute-missions. Accessed 9 March 2017.
12. Association of the Scientific Medical Societies. Tasks and Aims. http://www.awmf.org/en/awmf/tasks-and-aims.html. Accessed 17 May 2017.
13. The Netherlands Organisation for Health Research and Development. English brochure. https://www.zonmw.nl/uploads/tx_vipublicaties/ZonMw_corporate_EN_site.pdf. Accessed 13 March 2017.
14. The Netherlands Organisation for Health Research and Development. About ZonMw. https://www.zonmw.nl/en/about-zonmw/zonmw-in-the-netherlands/. Accessed 13 March 2017.
15. Health Intervention and Technology Assessment Program Thailand. Background. http://www.hitap.net/en/organization/background. Accessed 17 May 2017.
16. National Institute for Health and Care Excellence. About NICE. https://www.nice.org.uk/about. Accessed 17 May 2017.
17. National Academy of Sciences. About NAS. http://www.nasonline.org/about-nas/mission/. Accessed 17 May 2017.
18. Cochrane Collaboration. About Us. http://www.cochrane.org/about-us. Accessed 9 March 2017.
19. Campbell Collaboration. Our Vision, Mission and Key Principles. https://www.campbellcollaboration.org/about-campbell/vision-mission-and-principle.html. Accessed 9 March 2017.
20. International Drug Policy Consortium. About IDPC. http://idpc.net/about/about. Accessed 9 March 2017.
21. EBM+. About EBM+. http://ebmplus.org/about/. Accessed 13 March 2017.
22. Nesta. About Us. http://www.nesta.org.uk/about-us. Accessed 13 March 2017.
23. Alliance For Useful Evidence. About Us. http://www.alliance4usefulevidence.org/about-us/aboutus/. Accessed 13 March 2017.
24. Evidence Collaborative. About the Collaborative. http://www.evidencecollaborative.org/about-collaborative. Accessed 13 March 2017.
25. European Observatory on Health Systems and Policies. Mission Statement. http://www.euro.who.int/en/about-us/partners/observatory/about-us/mission-statement. Accessed 18 May 2017.
26. Chatham House. About Chatham House. https://www.chathamhouse.org/About. Accessed 18 May 2017.
27. The Brookings Institution. About Us. https://www.brookings.edu/about-us/. Accessed 17 May 2017.
28. American Enterprise Institute. About. http://www.aei.org/about/. Accessed 2 October 2017.

29. Health Promotion and Policy Research Unit. About Us. http://www.otago.ac.nz/heppru/about/index.html. Accessed 17 May 2017.
30. Centre for Evidence Based Policy. What we do. http://centerforevidencebasedpolicy.org/what-we-do/. Accessed 10 March 2017.
31. Harvard TC Chan School of Public Health. Policymaker Resources. https://www.hsph.harvard.edu/policy-translation-leadership-development/resources-for-policymakers/. Accessed 13 March 2017.
32. Hand L, Drexler M. Public health takes aim at sugar and salt. *Harvard Public Health: Fall 2009*. https://www.hsph.harvard.edu/news/magazine/sugar-and-salt/. Accessed 13 March 2017.
33. Loria K. New York soda ban proposal: public hearing gets impassioned. *The Christian Science Monitor*. 24 July 2012. https://www.csmonitor.com/USA/Society/2012/0724/New-York-soda-ban-proposal-Public-hearing-gets-impassioned. Accessed 13 March 2017.
34. Sapatkin D. Harvard study: soda tax would make Phila. healthier. *Philadelphia Enquirer*. Updated 28 April 2016. http://www.philly.com/philly/health/20160428_Harvard_study__Soda_tax_would_make_Phila__healthier.html. Accessed 13 March 2017.
35. Harvard TC Chan School of Public Health. Nutrition experts propose new class of low-sugar beverages to reduce role of sugary drink consumption in obesity and diabetes epidemics. *Press Releases*. 20 April 2009. https://www.hsph.harvard.edu/news/press-releases/low-sugar-beverages-sugary-drink-consumption-obesity-diabetes-epidemics/. Accessed 13 March 2017.
36. Harvard TC Chan School of Public Health. Spotlight on soda. *The Nutrition Source-Nutrition News*. 25 October 2016. https://www.hsph.harvard.edu/nutritionsource/2016/10/25/spotlight-on-soda/. Accessed 21 June 2017.
37. The University of Hong Kong School of Public Health. About us-Faculty and Staff-Academic Staff-Peiris, Joseph Sriyal Malik. http://sph.hku.hk/en/about-us/faculty-and-staff/academic-staff/peiris,-joseph-sriyal-malik. Accessed 21 June 2017.
38. Cartwright N, Hardie J. Causal roles. *Evidence-based policy: A practical guide to doing it better*: Oxford Scholarship Online; 2015.
39. Proctor RN. The history of the discovery of the cigarette-lung cancer link: evidentiary traditions, corporate denial, global toll. *Tobacco Control*. 2012;21(2):87-91.
40. UK Department of Health and Public Health England. New public health research partnerships to get £47.5m [press release]. 20 December 2013. https://www.gov.uk/government/news/new-public-health-research-partnerships-to-get-475-million. Accessed 21 June 2017.
41. House of Commons Science and Technology Committee. Scientific Advice, Risk and Evidence Based Policy Making Vol 1. London: The Stationery Office Limited; 2006.
42. Amanatidou E, Butter M, Carabias V, et al. On concepts and methods in horizon scanning: Lessons from initiating policy dialogues on emerging issues. *Science and Public Policy*. 2012;39(2):208-221. Doi: https://doi.org/10.1093/scipol/scs017.
43. World Health Organization. Severe Acute Respiratory Syndrome (SARS) - multi-country outbreak - Update 15. 2003. http://www.who.int/csr/don/2003_03_31/en/. Accessed 3 July 2017.
44. Banks G. Challenges of evidence-based policy-making. Australian Public Service Commission publication. Last update 19 June 2009. http://www.apsc.gov.au/publications-and-media/archive/publications-archive/evidence-based-policy. Accessed 3 July 2017.
45. Government Office for Science. The Government Chief Scientific Adviser's Guidelines on the Use of Scientific and Engineering Advice in Policy Making. Department for Business, Innovation and Skills:June 2010. United Kingdom. http://www.dods-training.com/system/files/protected/whitepaper/GCSA%20Guidelines%20Scientific%20Engineering%20Advice%20Policy%20Making.pdf. Accessed 3 July 2017.
46. House of Lords Science and Technology Committee. Second Report of Session 2010-12: Behaviour Change. 19 July 2011. The Stationery Office Limited:2011. London. https://publications.parliament.uk/pa/ld201012/ldselect/ldsctech/179/179.pdf. Accessed 19 July 2017.
47. Evidence for Policy Design. About EPoD. https://www.hks.harvard.edu/centers/cid/programs/evidence-for-policy-design/about-epod. Accessed 6 March 2017.
48. The Evidence-informed Policy Network (EVIPNet) Europe. Policy dialogue preparation and facilitation checklist. World Health Organization:2016. p2. http://www.euro.who.int/__data/assets/pdf_file/0017/323153/EVIPNET-PD-preparation-facilitation-checklist.pdf. Accessed 18 May 2017.

ACKNOWLEDGEMENTS

LIGHT wishes to thank the following reviewers for their insightful comments and feedback on drafts of the paper.

Professor David Heymann
Professor Kenneth E. Warner
Professor Fung Hong
Emeritus Professor Lee Hin Peng
Associate Professor Chew Suok Kai
Associate Professor Helena Legido-Quigley
Associate Professor Lim Yee Wei
Associate Professor Liow Chee Hsiang
Associate Professor Norbert Ludwig Wagner
Ms Ong Suan Ee

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LEADERSHIP INSTITUTE FOR GLOBAL HEALTH TRANSFORMATION (LIGHT)

To be the catalyst for transformational change in health and healthcare innovation and development for Singapore and beyond.

The Leadership Institute for Global Health Transformation (LIGHT) serves as a receptacle to work with relevant partners from around the world. It aims to be a progressive and meaningful think-tank to encourage cross-fertilisation of ideas and foster active collaboration to build a cadre of creative leaders. By studying issues and finding solutions to the health problems that confront Singapore and Asia, the Institute hopes to transform old paradigms of health to achieve enduring outcomes for communities in the country and region.

LIGHT adopts a cross-disciplinary approach in pursuing an active agenda to build up thought-leadership and core competencies in health development. There are many other international programmes that embody the cultivation and training of exceptional leaders, who will transform health and healthcare for a changing world. The Institute hopes to emulate these renowned programmes in strengthening its connections among research, teaching and practice to elevate its impact on the standards of public health and healthcare delivery.

Additionally, LIGHT has been conceptualised to further and strengthen the development of the School's regional and international engagement, and strives to be a regional centre for leadership excellence. This includes undertaking the important role in training future generations of leaders in healthcare both nationally and regionally in Southeast Asia.

For greater impact, LIGHT will also build upon the existing Global Health modules from the School's Masters of Public Health (MPH) programme. In doing so, the Institute hopes to excite, energise and empower new and young leaders who will spearhead this transformational movement to greater heights of achievements for better health.

SAW SWEE HOCK SCHOOL OF PUBLIC HEALTH
NATIONAL UNIVERSITY OF SINGAPORE

Turning discovery into healthier communities

Building upon more than 60 years of experience in research, training and practice in epidemiology and public health, the Saw Swee Hock School of Public Health (SSHSPH), National University of Singapore, was established in October 2011 as Singapore's first and only full-fledged national public health tertiary education institution. The School is also a member of the National University Health System (NUHS).

The School aims to continually foster healthier communities in Singapore and the region, and impact public health programmes and policies through its robust educational programmes and translational cross-disciplinary research work on cohort studies and life course epidemiology, infectious disease research, health technology assessments, health promotion, workplace safety and health, health systems evaluation and health services research. An interdisciplinary approach, augmented by rigorous training, applicable research and regional partnerships, places SSHSPH at the forefront of public health knowledge discovery and practice in Asia.

The School actively collaborates with many partners including the London School of Hygiene and Tropical Medicine, Karolinska Institutet, Harvard School of Public Health and University of Michigan School of Public Health. Its flagship programme, the Master of Public Health (MPH) degree, attracts students from a wide range of disciplines from within Singapore and throughout the region.