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Challenges in Shaping Policy with Data

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1 Introduction

'We have solid evidence that keeping intake of free sugars to less than 10% of total energy intake reduces the risk of overweight, obesity and tooth decay,' said the World Health Organization's (WHO) Director of Nutrition for Health and Development when issuing international sugars guidelines in March 2015. 'Making policy changes to support this will be key if countries are to live up to their commitments to reduce the burden of non-communicable diseases' [1].

Data can influence policy to improve people's health. To combat the rising epidemic of non-communicable diseases, WHO synthesized international

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evidence and proposed policies to reduce sugar consumption. Data specialists can advise national lawmakers about likely efficacy of these policies to control the sugar content of foods and beverages or to persuade people to consume less sugar. They can also assist programme managers evaluate policy interventions as the examples from France, Mexico, Norway and the US in Box 3.1 illustrate.

Box 3.1 The Value of Data in Developing Policies to Curb Global Sugar Consumption [2]

Global data show that: (1) the number of people overweight or obese has reached epidemic proportions—in 2013, about 37 per cent of men and 38 per cent of women worldwide were overweight or obese; (2) excess weight increases the risk of some non-communicable diseases; and (3) excessive sugar consumption is one factor promoting overweight and obesity, yet from 2000–01 to 2013–14 global sugar consumption grew from about 130 to 178m tonnes.

Data from some countries show the benefits of policies aimed at:

- *Reducing availability of sugar and sugary products:* France enforced a school vending machine ban in 2005 and observed a significant reduction in calories, fat, sodium and, especially, free sugar intakes in the morning nutrition break.
- *Decreasing affordability of sugar and sugary products:* Mexico introduced a sugary drinks tax in 2014. Early results showed about a 10 per cent decrease in sales.
- *Reducing acceptability of sugar and sugary products and increasing acceptability of alternatives:* Norway initiated a nationwide school fruit programme in 2007. Students increased fruit and vegetable intake and reduced their unhealthy snack consumption.
- *Increasing awareness of sugar in products:* Los Angeles County, in the US, ran a multimedia campaign, in 2011–12, which increased public knowledge and over 60 per cent of respondents reported they were likely to reduce their daily intake of sugary drinks.

While policymakers use data and evidence to make and evaluate their decisions, they also base their choices on philosophical, historical and societal values, on available resources and legal considerations, and on internal influences and political pressures. For example, despite clear evidence that sugar consumption adversely affects health and the existence of an inventory of evidence-based policy responses, lawmakers struggle with demands of the sugar industry, and political arguments that sugar taxes limit people's freedom to choose what they eat [3].

Data providers and users do not communicate well. Policymakers appear to ignore evidence when it is politically expedient or even use unsubstantiated

data instead. They respond to media reports of emerging issues and demand scientists provide data to confirm or negate rumours. Researchers aim to provide objective evidence but don't always convey their findings clearly and succinctly, or even ensure that their findings are relevant to current policymaking priorities.

Evidence has influenced policy shifts in global health, for example, introduction of voluntary male medical circumcision programmes that prevent HIV transmission, laws enforcing wearing automobile seatbelts and motor bicycle helmets that have reduced deaths and brain injuries from traffic accidents, and legislation to control tobacco use that has dramatically reduced lung cancer rates. In each case, scientists communicated their findings sufficiently clearly to eventually convince advocates and policymakers to champion and implement these laws; and scientists have demonstrated reductions in morbidity and mortality after the laws came into force.

We explore how data specialists and policymakers can collaborate to set and implement policy. In the next section, we highlight the importance of data and evidence to health policymaking and describe the origins of evidence-based policymaking. In Sect. 3, we describe how policy stakeholders and data specialists interact during stages of policymaking, and in Sect. 4, we explain policymakers' different needs for and use of data and evidence. In Sect. 5, we suggest how data specialists and policy stakeholders can increase demand for and use of data and evidence in policymaking. We use the term *data* to describe factual information and the term *evidence* to describe conclusions scientists have reached after synthesizing or analysing data to answer specific policy questions.

2 Building Data and Evidence into Policymaking

Democratic governments recognize that they need data to govern. They invest in statistical offices and information systems so they can target resources to meet documented priorities (see Chap. 1). Health policymakers respond to evidence of growing challenges, such as HIV/AIDS, opioid use and the Zika virus, while they maintain and monitor control of obesity and diabetes, cholera, malaria, and maternal and infant mortality. To highlight areas for policy focus, governments need up-to-date, reliable and relevant information about

morbidity and mortality trends, and differences in health outcomes between geographic regions, racial groups or gender. Comparative data from international databases, such as WHO maintains, anchor new policy directions.

In the 1990s, politicians and researchers began to use the term *evidence-based policy*. This was in contrast to *opinion-based policy* which relies 'heavily on either the selective use of evidence (e.g. on single studies irrespective of quality) or on the untested views of individuals or groups, often inspired by ideological standpoints, prejudices or speculative conjecture' [4]. The UK used the term evidence-based policymaking in its 1999 Modernising Government White Paper, explaining that 'policy decisions should be based on sound evidence. The raw ingredient of evidence is information. Good quality policymaking depends on high-quality information, derived from a variety of sources—expert knowledge; existing domestic and international research; existing statistics; stakeholder consultation; evaluation of previous policies' [5].

The expression evidence-based policy draws on experience of *evidence-based medicine* in which researchers evaluate treatments or interventions through randomized trials (see Chap. 18). Policymaking requires a broader range of methods, as the 1999 UK White Paper indicated [6]. Davies et al. defined evidence-based policymaking as an approach which 'helps people make well-informed decisions about policies, programmes, and projects by putting the best available evidence at the heart of policy development and implementation' [7]. More recently, the Australian Productivity Commission defined the approach as 'a process that transparently uses rigorous and tested evidence in the design, implementation, and refinement of policy to meet designated policy objectives' [8]. The evidence-based approach to policy is not as compact as its equivalent in medicine since it synthesizes findings of different types of data collection. The approach draws not only on the findings of dedicated epidemiological and social studies, targeted focus group discussions, clinical trials and intervention studies, cost benefit analyses, modelling, impact evaluation of interventions, and systematic reviews but also on routinely collected data from government statistical and information systems.

3 Participants in Policymaking

We differentiate between policy stakeholders as follows:

Policymakers or lawmakers conceive and develop policy agenda and argue for policy adoption. They are elected or nominated to prepare laws that protect the health of the people they represent.

Programme managers interpret policy directives, implement and evaluate policies and suggest refinements and expansion. They work for governmental, non-governmental or private agencies at the state, provincial or district level, or for international institutions.

Policy watchdogs are individuals and institutions who look for gaps in policy and policy implementation and lobby for policy change. They include advocacy and community groups, non-governmental organizations, media, individuals devoted to specific causes, and whistle-blowers.

Although their roles overlap, we differentiate between data specialists as follows:

Data generators are statisticians, information technology specialists or data managers who run health information systems and prepare regular performance reports. They maintain routine health facility records for governmental, non-governmental and private institutions, or run censuses, civil registration systems or disease surveillance systems, or regularly undertake large- and small-scale surveys. They work nationally or internationally.

Data analysts include statisticians, epidemiologists, sociologists or health economists who design qualitative and quantitative studies and analyse, model and present data to provide evidence for policy. They work in academic, governmental and other research institutions anywhere in the world.

Data brokers are policy analysts who are intermediaries between data generators and analysts and policymakers. They gather data and evidence to address policy issues, analyse secondary data and big data, conduct systematic reviews and prepare policy briefs. Brokers work for academic and governmental institutions or for independent policy units to advise local, national or international lawmakers.

Evaluators work with programme managers to evaluate policy implementation at any level nationally or internationally. They develop frameworks, select indicators, interpret data and provide quantitative and qualitative, contextualized data on why certain outcomes are achieved or not.

4 Data in Different Stages of Policymaking

Table 3.1 summarizes the stages through which policy develops [9–11]. We highlight questions policy stakeholders ask and suggest which data and sources data specialists use to answer these questions. Although we present the stages in sequence, they are seldom linear and do not necessarily result in policy preparation or adoption. Their order and timing depend on political will to pursue specific policy solutions, availability of appropriate and well-presented

Table 3.1 The role of data in different stages of policymaking

Stage	Questions	Relevance of data	Type of data gathering
1 Problem recognition: Policymaker becomes aware of an emerging issue. *2 Agenda setting:* Policymaker firmly adopts the issue and begins to seek viable policy solutions.	What is the scale of the issue? Who does the issue affect and how? When and how often does the issue occur? Where does the issue occur? How do people perceive the issue? Why should the issue be prioritized?	Proponents offer evidence about the importance of the issue (collected by data generators and analysts); Data brokers advise policymakers about the quality and validity of data.	Routine data collected through health information systems; Epidemiological and social surveys; Trend analyses; Focus group discussions.
3 Policy formulation: Policymaker formulates and proposes a bill comprising specific policy proposals.	What interventions have addressed the issue successfully elsewhere? Who will the proposed policy target? When will the policy be implemented? Where will the policy focus? How much and what type of resources will policy implementation require? Why will the chosen policy combination succeed?	Data brokers synthesize and present evidence for potential strategies to address the issue and advise on their cost and benefits.	Literature reviews; Synthesis of clinical trials or intervention studies; National and international consultations on experience with potential strategies; Cost benefit analyses.
4 Policy adoption: Through policy legitimization, the policymaker persuades other lawmakers to adopt the bill as law.		Data brokers prepare policymakers to answer questions from other lawmakers to assist them in their decision-making.	Policy briefs collating answers to potential questions from the data gathering described above; Assessment of resources to implement.
5 Policy implementation: Programme managers develop a blueprint for implementation that can be monitored to assess achievement of policy goals.	What monitoring and evaluation framework is most appropriate? Who will benefit and how? Where will the evaluation happen? When will the evaluation be undertaken and how frequently? How will the stakeholders know if the policy is successful? Why is the evaluation necessary?	Programme managers and data generators agree on reliable and relevant indicators to monitor policy implementation.	Specification of the logical framework and the indicators of input, output, outcomes and impact.
6 Policy evaluation: Programme managers continually assess the impacts, costs of implementation and if the policy achieved its intended goals.		Programme managers and programme evaluators measure the indicators and changes in impact over time.	Monitoring and evaluation of implementation using health information systems, dedicated systems, targeted surveys, trials and focus groups.

evidence, and competing priorities for resource allocation. Some policies fail early but are re-introduced years later when public opinion changes, for example, legislature for gay rights in the US. Other policies may start with one set of expectations and then be co-opted to address a different issue.

4.1 Problem Recognition and Policy Agenda Setting

Policymaking begins when a lawmaker recognizes an issue and considers developing or amending policy to address it (Stage 1). Issues usually correspond to political agendas but may arise organically through advocacy by policy watchdogs or reports from data brokers (see examples in Box 3.2).

Box 3.2 The Evidence Informed Policy Network (EVIPNet) [12]

In 2005, the World Health Organization established EVIPNet to promote systematic and transparent use of health research evidence in policymaking. By 2015, the network covered 36 low- and middle-income countries promoting partnerships between policymakers, civil society and researchers to support policy and its implementation, using the best research evidence available. Two examples illustrate how the network shared its evidence with policymakers:

In 2013, alcohol consumption accounted for around 10 per cent of all deaths in Moldova—double the global average. An EVIPNet group identified the ready availability and low cost of beer and home-made wine as a cause. The team developed an evidence brief outlining policy options and held a policy dialogue which led the government to amend its alcohol control legislation and improve the National Alcohol Control Programme.

In Lebanon, one in four adults suffers from a mental illness; yet they have limited access to suitable primary health care. In 2014, the EVIPNet-supported Knowledge to Practice Centre prepared evidence briefs and held policy dialogues. As a result, Lebanon set up a national health psychosocial support task force, started training primary health-care workers about mental illness, and added psychiatric medications to the national essential drug list.

Members of the public may observe unprecedented traffic accidents at a particular location and work with police to propose speed limit changes. Professional organizations or non-governmental organizations may identify inadequacies in human resources and campaign to train and employ suitable health workers. Academics may demonstrate inequalities in people's access to health care and press policymakers to address gaps in delivery. The media may spotlight health problems through investigative reporting and help mobilize communities to consider options to decrease adverse outcomes. International organizations, such as WHO, provide evidence from different countries to

highlight global issues, as in the obesity example in Sect. 1. The Institute of Health Metrics and Evaluation provides comparative information on disease burden for more than 195 countries [13].

Data generators and data brokers may analyse national data sets and flag emerging trends and areas requiring new investments, for example, pockets of HIV infection in populations previously untouched by the disease. Lawmakers can face challenging sentinel events. For example, evidence of increasing numbers of deaths and overdoses from opioid use, and media stories of families losing their loved ones to the epidemic challenge US lawmakers to act. They can make additional investments in drug treatment, particularly in hot-spots where the epidemic is most notable, as well as change in professionals' pain medication prescription practices which have contributed to the opioid crisis [14].

To understand why they should prioritize an issue, lawmakers need to know the size of the problem, where and when it occurs, the most vulnerable groups, and how people perceive the issue. Convinced of its importance, the champion lawmaker firmly adopts the issue, develops an agenda (Stage 2), and engages other policymakers, stakeholders and constituent groups. To make a firm commitment, lawmakers ascertain what hard evidence exists that makes agenda setting a high priority. Increasingly, international data sharing contributes to raising awareness about policy imperatives, as well as potential policy solutions.

4.2 Policy Formulation and Adoption

Having agreed an agenda, lawmakers propose and formulate policy options (Stage 3). They expect data brokers to review successes and failures of interventions implemented elsewhere and consider how interventions might work or be adapted to context. This includes systematic reviews and grading of evidence from journal articles [15] and grey literature and examination of experts' perspectives about best practices. The World Bank's Disease Control Priorities is a major source of information about effective interventions for conditions contributing to the global burden of disease including economic evaluations of policy choices, particularly for low- and middle-income countries [16].

Lawmakers may request that data analysts gather and analyse new data—either qualitative or quantitative—to test acceptability of policy options, for example, to undertake focus groups of likely programme recipients, or public opinion surveys to check the public's and business' perspectives on policy direction. Data brokers will analyse routine data or mine data sets that have

not been analysed for this purpose. They may consider social determinants that could underlie the problem, for example, unsafe communities that prevent families from playing outside, or lack of viable transportation that impacts access to grocery stores and physical activity.

Box 3.3 Challenges to Policy Formulation Even with Strong Advocacy

Extensive evidence shows oral contraceptives (OCs) are one of the safest and most effective forms of contraception and consumers accept OCs well [17]. Most women, particularly living in low- and middle-income countries, have legal or informal over-the-counter (OTC) access to OCs, but women in the US, Canada and most of Western Europe require prescriptions [18]. Women in the US want OTC access to OCs, but advocates must overcome the prescription barrier.

Since 2004, in the US, reproductive health, rights, and justice organizations, non-profit research and advocacy groups, university-based researchers, and prominent clinicians have convened as the OC OTC Working Group. The group has gathered evidence and advocated for access to safe, effective, acceptable and affordable contraceptives. Several states have introduced pharmacist prescription/provision of hormonal contraception to increase access. But a drug company must apply to the US Food and Drug Administration to make OCs available OTC, a process likely to take several years.

The champion policymaker then articulates the policy proposal, or bill, and attempts to persuade other lawmakers to adopt it as law (Stage 4). The champion builds support for the bill using bargaining, persuasion and compromise. Other lawmakers raise questions that require data brokers to collect and provide additional information. For example, scientists have had to produce significant data about safety of routine immunization against communicable diseases to convince policymakers to continue enforcement. In California, for example, mobilized constituent groups advocate allowing parents to opt out of vaccination requirements but, because of evidence of public health ramifications in a population without sufficient immunity, legislators passed a law that eliminates personal and religious exemptions for children [19].

4.3 Policy Implementation and Evaluation

Once a bill passes into law, bureaucracies translate the law into guidelines or rules and regulations (Stage 5). National, state or local governments implement new legislation, such as agency activities and public expenditures, through public programmes.

Evaluators support lawmakers and programme managers to conduct systematic evaluation of a policy—its actual impacts, costs and whether it achieved its intended results (Stage 6) (see Chap. 4). They inform policymakers of future policy options and suggest refinements they might consider (Box 3.4). When a policy does not achieve expected results, data generators and evaluators may provide nuanced data analyses to show what it has achieved, for example for population subgroups.

Box 3.4 Rigorous Evaluation Can Shape Policy: The Progressa/Opportunidades/Prospera Initiative [20]

In 1997, Mexico introduced the Education, Health, and Nutrition Program, PROGRESA, to break the intergenerational transmission of poverty. The International Food Policy Institute evaluated the programme by comparing eligible households receiving the intervention of cash benefits with control households in seven states. Several waves of survey data collection, before and following initiation of the cash-benefits in the treatment villages, and other evidence, concluded the programme impacted improvements in health status and utilization of health services, schooling, food consumption and employment outcomes.

Policymakers decided to continue the initiative, but also to strengthen its requirements. Cash payments for families became dependent upon family compliance with programme requirements, so children attend school and family members receive preventative health care. The mother became the rights holders and the government decreased overheads and the potential for corruption by making cash payments directly to the families. Families must participate in an evaluation to help ascertain target measures considered most likely to lift families out of poverty. Implementation of this programme and its evaluation led the Mexican Congress to mandate that monitoring and evaluation become integral to public policymaking [21].

In Box 3.5, we summarize the technical responsibilities of data specialists throughout policymaking.

Box 3.5 Responsibilities of Data Specialists in Answering the Policy Stakeholders' Questions

Data generators: Policy recognition and agenda setting

Maintain the health information system; undertake surveys to address specific issues; ascertain the public's opinions on government services; present and visualize data; and clarify data limitations.

Data analysts: Translating data into evidence at all stages of policy development

Provide advice on design of qualitative and quantitative studies; analyse data by paying attention to trends and inequalities; develop models to estimate and predict results of policy options; analyse big data available through social media; present and visualize data; provide and explain statistical inference; and describe data limitations.

Data brokers: Agenda setting, and policy formulation and adoption

Assess whether stakeholders' interpretations are valid; decide whether available data provide sufficient evidence; request additional data generation to justify policy options; conduct secondary data analysis, meta-analyses and systematic reviews; undertake interviews, focus group discussions and polls of public opinion; make inter-country comparisons; analyse big data available through social media; and prepare policy briefs, press releases and social media.

Evaluators: Policy implementation and evaluation

Provide advice on the monitoring and evaluation framework; select and justify the indicators to be used; provide advice on data collection and analysis; and prepare timely and comprehensive reports.

5 Strengthening Mechanisms for Harnessing Data and Evidence to Policy

We have described opportunities for data to influence policy. Yet, as AbouZahr points out, 'Even when the evidence for policy change is unequivocal, getting it implemented in practice can be a fraught process, with considerable risks of failure' [22]. For example, despite extensive evidence, policymakers may not act if options seem counter-intuitive or contradict what they perceive to be the moral standards of society (Box 3.6).

Box 3.6 Policymakers May Ignore Evidence That Seems Counter-Intuitive or Contradicts Their Interpretation of the Moral Standards of the Society

People who inject drugs often share drug paraphernalia or engage in high-risk sexual behaviour, putting them at risk of blood-borne infections, such as HIV. A syringe service programme (SSP), or needle-exchange, is a cost-effective strategy to prevent the spread of infection in US settings [23]. By 2014, there were needle exchange programmes in 197 US cities [24]. Concerned that funding SSPs would condone illegal behaviour, rather than prevent adverse health outcomes, the US federal government initially ignored this evidence by implementing a total ban on funding SSPs, and after lifting the ban in 2010, they provided only restricted support. By 2011, the government provided support for needle exchange, but legal barriers, insufficient resources to comply with funding processes, local politics and programme culture made it difficult for programmes to function [25]. The government reinstated the ban in 2012, but effectively lifted it again in 2015 by permitting federal support for operational costs, but not syringes; this was in response to concerns about HIV outbreaks in new geographic areas and populations [26].

There is growing disbelief, distrust and even disdain for data among politicians and the general public. It is easy to surf the web and find statistics that support any argument, or indeed to make up *alternative* facts [27]. No statistics represent the truth; they only quantify a perspective on what is known at a point in time, and findings change with new investigations. For example, in the 1990s epidemiologists and WHO affirmed that dietary fat caused obesity and rising rates of cardiovascular diseases, and they supported policy to encourage low-fat options. A few years later they affected a U-turn and announced that data showed full-fat to be a healthier option because use of low-fat products increase sugar consumption [28]. Not surprisingly, the scientific process of ongoing discovery often results in modifications and sometimes, dramatic changes in available evidence. Constancy in results may not be feasible over time, making it imperative that scientists package their findings in a manner that allows policymakers to make decisions with the data available. In turn, this process allows scientists to further test and learn how evidence is (or is not) used in the implementation of policy. Clearly, the availability of data and evidence alone will not result in significant behavioural changes. In the case of nutrition, people feel uncomfortable about changing policies or eating habits without clear explanation of why.

The Internet and social media have dramatically changed the availability of information and the debate about the authenticity of evidence. Consumers of published information, including policymakers, may not have the training or education to be able to sift through which sources are credible and which actually counter established scientific findings. This places a particular burden on data brokers and policymakers who may not be prepared to respond to the unwarranted beliefs they encounter as they attempt to make evidence-based decisions.

Recognizing the *knowledge-to-action* gap, Yamey et al. identify two approaches to knowledge transfer and exchange between researchers and policymakers [29]. One suggests 'there is a series of steps—a linear pathway—from generating research evidence to evidence-informed policymaking' similar to the stages we described in Sect. 4. For example, the data broker develops evidence briefs that summarize the results of a systematic review or a randomized controlled trial and discusses policy implications, tailored to the needs and interests of a policymaker. The alternative *political economy* approach suggests both the research process itself and the transfer of research evidence to policy are heavily influenced 'by competing economic interests, social values, and power dynamics' [30, 31]. These external elements determine the research questions that are prioritized, funded and studied, and if and how evidence from the research is used in decision-making. In practice, both approaches can

operate in parallel, but it is important for researchers and policymakers to acknowledge how their approach influences the knowledge they share.

After extensive literature review on factors affecting use of evidence in policy, Oliver et al. concluded that the primary barrier to policy uptake of research evidence is that policymakers don't have adequate access to timely, relevant and quality information. They suggest that better collaboration between researchers and policymakers, with improved relationships and skills, could facilitate use of evidence in policymaking [32]. We propose ways in which data specialists and policymakers can increase demand for and use of data and evidence in policymaking.

Communicate Data specialists and policymakers can network to share and appreciate each other's perspectives through discussion fora and staff exchanges between research institutions and government departments [33]. For example, the Evidence Informed Policy Network (EVIPNet) (Box 3.2) has changed how decisions are made in 36 countries by bringing all stakeholders together to influence policy [12].

Invest in Flexible Open Information Systems Many data that health information systems collect are not directly useful to decision-makers. Davies et al. suggest these systems need to be more flexible in the source, scale and timing of information and propose a framework to assist data specialists ascertain decision-makers' needs [34]. Data generators can build improvements into waves of data collection, while remaining consistent in how they measure indicators over time. Open sharing of public data supports the public and policy watchdogs to decide if policies meet their needs.

Formulate Policy Questions That Clarify Data Needs Sometimes, scientists do not answer the question that interests policymakers. If they establish better communication, data specialists and data users can collaborate to formulate policy relevant questions. This will help them ascertain fit between questions and data sources and also temper policymakers' expectations of the time it takes to collate data and to conduct thoughtful and balanced analyses. One way to ensure relevance is to align research strategies to government development plans [33].

Tailor Data Collection and Analysis to the Time Available Policymakers sometimes demand information from data specialists before the findings are ready. Instead of requesting a full-scale dedicated survey, the data broker can undertake secondary analyses and actively mine existing, and sometimes under-

used, data-sets. Focus groups and in-depth interviews provide snapshots of opinions and explain quantitative findings. Triangulating information from multiple sources can provide additional insights [11].

Explore and Discuss Data Limitations Scientists must provide a margin of error for their primary conclusions and clarify the time period and populations to which their findings apply. They should control data quality and assess findings for consistency over time and between sources. They may need to collect more data to explain unexpected results. Data specialists can advise lawmakers about how to recognize reliable evidence [33]. It is better to discuss any limitations of the findings than to leave the policymaker vulnerable to being accused of over- or under-stating their case. Researchers should declare personal bias and why they chose to study a topic and they should watch out for unconscious bias when they interpret their findings.

Present and Disseminate Findings Clearly Policymakers have limited time to review information provided to them. Unlike research papers, policy briefs are short and contain only information essential to make a clear argument. Infographics can summarize the same information on a single page or poster using a combination of text, diagrams, graphs and maps. Findings can be disseminated as infographics, posters, flyers, interactive internet features, videos or PowerPoint presentations [35].

Oliver et al. argue that 'rather than asking how research evidence can be made more influential, academics should aim to understand what influences and constitutes policy, and produce more critically and theoretically informed studies of decision-making' [32]. The data broker is in a unique position to assess why some evidence translates into policy and why some does not and to increase future usefulness of evidence to policy. We suggest the broker uses the above list as criteria to assess the success or failure of knowledge translation, that is, (1) effectiveness of communication, (2) responsiveness of data systems, (3) formulation of policy questions, (4) timeliness of data collection and analysis, (5) limitations of findings, and (6) presentation and dissemination of evidence.

6 Conclusion

The strength and quality of data to support policy decisions depend on investments countries make to ensure their information systems are robust. In 2015, the world community committed to the Sustainable Development

Goals for achievement by 2030 [36], and called for investments in data systems to measure progress with these policies and interventions [37]. Later chapters in this book explore ways to strengthen these systems. We emphasize that the systems only exist to support decision-making and so they must meet users' needs. Where the structures do exist, it does not always follow that the information is relevant and readily available to answer specific policy questions. Data may be fragmented between different data sources making it difficult to gather and triangulate them to support a policy under development. Scientific knowledge about the efficacy of an intervention may exist but researchers are not able to communicate their findings to policymakers. Alternatively, the policymaker may simply ignore or mis-interpret the evidence.

We highlight the significance of what we call a data broker, a role filled by an individual scientist or a group providing advice on data for policy analysis. Data brokers understand the full range of data and research evidence available and have skills to work with data generators and analyst researchers to triangulate information to answer specific policy questions. They may work in a government policy unit or an independent policy watchdog group. The Regional East African Community Health (REACH), for example, operates as a knowledge broker between policymakers, researchers from universities and civil society [12]. In the US, the Kaiser Family Foundation serves as a broker by synthesizing and publishing information on topical policy issues for policymakers, the media, the health policy community and the public [24].

Over-riding all else, data specialists need training to work with policy stakeholders—lawmakers, programme managers and policy watchdogs—to understand their needs and ensure that the data they collect and the research they undertake is relevant, timely and clearly presented. Their training should include direct experience of decision-making so that they are prepared to work effectively with policymakers in translating data and evidence into policy. We recommend that data specialists provide training tailored to the needs of data brokers. Policymakers also need to understand the strengths and limitations of data in answering complex policy questions, as well as the amount of time needed to generate the data required to ascertain whether sufficient progress is being made. We suggest creating a learning environment in which both policymakers and data professionals are willing to continue to improve and refine, as well as learn from their policy directives. Many factors can interfere with fulfilling the intent and implications of the evidence provided. Sustained relationships between policymakers and data specialists and follow-up are critical to the

success of the evidence-to-policy process. Ongoing relationships also engage both sets of actors in a dynamic process which is at the heart of evidence-driven policy.

Key Messages

- Accessible, relevant and timely data can enhance policymaking.
- Open, flexible information systems, supplemented by dedicated studies, can provide data to inform and monitor policy.
- If data specialists and policymakers communicate effectively, they are more likely to translate data into action.
- Data specialists can improve their contributions to policymaking by examining why some evidence translates into policy and some does not.

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