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Optimizing the Institutional Design of Scientific Advisory Committees for Quality, Salience, and Legitimacy

Scientific evidence is relevant and important for nearly all of today's policy decisions (1,2). As a result, decision-makers continuously seek scientific advice, and the scientifically derived insights they receive are often held up as the ideal or even required basis for defensible policy choices. In this landscape, a myriad of scientific advisory committees (SACs) figure prominently, often with the promise of bringing scientific evidence to bear on identifying and assessing the options available to decision-makers (3,4). New committees are constantly being created, and old ones reformed (3,5). Yet, there is only sparse and scattered knowledge about what features of these committees make them effective. This means that today's SACs are probably not performing their function as effectively as possible and that attempts to reform existing SACs may not be as successful as might be hoped.

We will examine the relationship between the possible institutional designs of SACs and their effectiveness. Our project will identify and assess the determinants of the effectiveness of SACs and, on this basis, develop a framework and decision-support tool to inform future design and reforms of such bodies. The overall goal is to ensure a robust ecosystem of scientific advice and help maximize the chances of high-quality scientific research informing the decisions of policymakers, practitioners, and the public alike.

Scientific advisory committees of interest >

For the purposes of this project, a scientific advisory committee (SAC) will be defined as (a) a group of individuals with some kind of expertise (b) that provides advice to decision-makers (c) based on evidence from the natural or social sciences. Instead of "committee," some use the terms "body" or "panel". Instead of "scientific advisory," some use terms such as "expert," "technical," or simply "advisory" alone. Some understandings of these terms do not completely overlap with SACs as defined here. For example, for some of these other entities, like research ethics boards, the advice given needs not be based on evidence from the natural and social sciences.

SACs vary across multiple dimensions, giving rise to numerous types of these bodies. Some dimensions thought to be important are shown in Table 1.

Table 1. Dimensions of variation across SABs

TYPE OF ADVISOR	TYPE OF STRUCTURE	TYPE OF USER
THEMATIC FOCUS: HEALTH VS OTHER AREAS	FORMALIZATION: STATUTORY VS INFORMAL	REPORTING: INTERNAL VS EXTERNAL (RELATIVE TO USER'S INSTITUTION)
GOAL: ACTION-ORIENTED VS ASSESSMENT-ORIENTED	DURATION: PERMANENT VS TEMPORARY	JURISDICTION: WITHIN A SINGLE COUNTRY VS ACROSS COUNTRIES

This project seeks to inform the institutional design of a wide range of SACs, with a special emphasis on SACs providing advice to policy decision-makers on clinical, health systems, and public health matters at local, national, and global levels.

Among the transnational SACs, bodies of particular interest include the expert advisory committees and panels of the World Health Organization (WHO), as well as its scientific and study groups. WHO is continually seeking ways to improve how these SACs operate and has offered to support the University of Ottawa's Global Strategy Lab in its efforts to undertake this in-depth study of SACs, which in turn can inform WHO's own efforts. Specifically, WHO has offered to facilitate access to key informants, provide feedback on work-in-progress, provide meeting space and logistical support at WHO headquarters, and profile the outputs of the project within WHO. This support will both enhance the quality of the research and guarantee that the insights generated will reach key audiences.

While the project seeks to inform and draw lessons for many types of SACs, the project will be informed by and draw lessons from an even wider range of bodies. What additional types of SACs to include for this purpose will primarily depend on the quantity and quality of evidence pertaining to them. Some candidates include research ethics boards, royal commissions, parliamentary committees, public inquiries, citizen juries, political assemblies, and high-level "blue ribbon" panels.

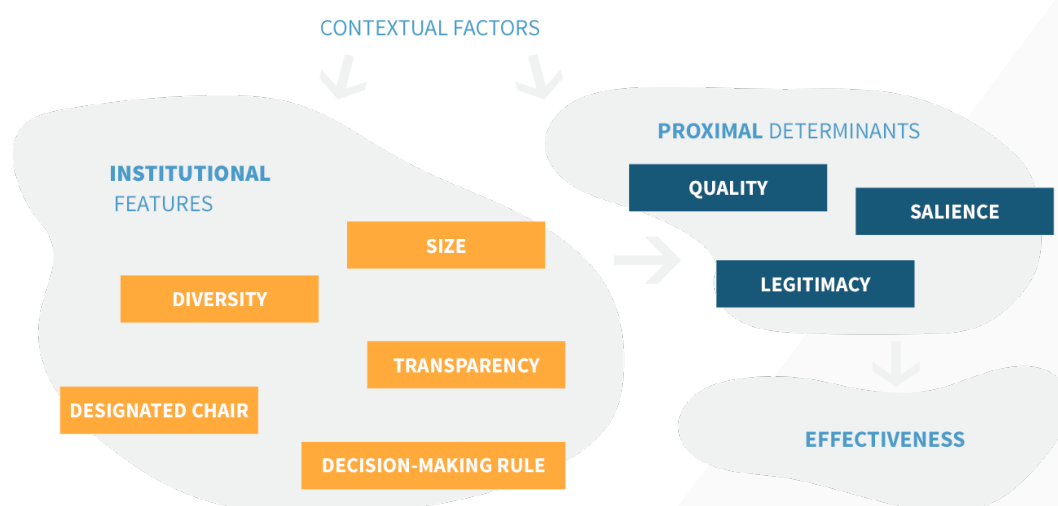
Assessing effectiveness and its determinants ›

The ultimate goal of SACs is commonly seen as maximizing the positive impact of subsequent decisions and minimizing negative, often unintended, consequences (6). In line with this thinking, one may consider three proximal determinants for the effectiveness of advice from SACs and indirectly of the effectiveness of SACs themselves: quality, salience, and legitimacy (7–9).¹ Quality involves the scientific adequacy and accuracy of the advice. Salience is about the relevance of the advice to the needs of decision-makers (9). Legitimacy reflects whether the process of generating the advice has been respectful of stakeholders' divergent values, unbiased in its conduct, and fair in its treatment of opposing views and interests (6).

The key question for the assessment of SACs is whether it achieves its goals, that is, whether it is effective. Accordingly, of ultimate interest is effectiveness in terms of impact on decisions (6). Yet, it can also be useful to study the effectiveness of SACs by examining their outputs (the advice it provides) and outcomes (behavior change among relevant decision-makers). As for the assessment of SACs, the key question for the design and reform of SACs is what institutional features will make them as effective as possible for their particular context.

Numerous institutional features influence the three proximal determinants of effectiveness. There are also contextual factors that influence effectiveness, but these are often harder to change (see Figure 1).

Figure 1. Relationships between institutional features, contextual factors, proximal determinants, and the effectiveness of scientific advisory committees



¹ Terminology varies widely. The myriad terms include the following: effectiveness, efficiency, quality, success, good practice, robustness, legitimacy, acceptability, soundness, credibility, coherence, rationality, feasibility, practicality, salience, and political connectivity. In the research literature, these are also combined in various different ways. WHO often uses the triad of “legitimacy, quality, and efficiency.”

Most of the institutional features of SACs discussed in the research literature represent design choices that are amendable to change by people seeking to make SACs more effective (13–15). Appendix A lists multiple features of SACs and factors in their immediate environment that have been proposed as potentially important institutional and contextual determinants of effectiveness.

The first category of determinants pertains to the subject matter on which the SAC is to provide advice. Candidate determinants include thematic focus, levels of generality, complexity, and controversy. Scientific advice differs also in terms of the extent to which it provides a direct recommendation for action, as opposed to providing a factual assessment or general statements about available scientific knowledge (1). For example, some SACs primarily provide forecasts or risk assessments (3), including many SACs concerned with environmental risks (16). The factors pertaining to the subject matter and nature of advice will in most situations function as contextual factors for the design and reform of SACs. However, their impact on effectiveness can help assess the merits of SACs as compared to their alternatives, such as just commissioning a systematic review. Understanding how these contextual factors influence effectiveness can also help decide whether one should expect any positive effect at all of an SAC in any given situation.

The second category pertains to the nature of the chief actors, as well as their relationships. The chief actors in the present context are the SACs and the target user of their advice.

The third category of determinants pertains to the processes in which SACs are directly or indirectly involved. The first stage includes the initial establishment of an SAC, and the second, the selection of members. The third stage is the SAC's generation of advice, which includes acquiring, assessing, and adapting scientific evidence, as well as considering other important factors like ethics and equity, perhaps through public consultation. The fourth stage is the SAC's delivery of its advice to the target user, through formal as well as informal channels. The fifth stage is the user's utilization of the advice. The SAC is not often directly involved in this latter stage, but what happens here is actually most important for determining the effectiveness of the advice and thereby the effectiveness of the SAC. The sixth stage is the monitoring and evaluation of the SAC's performance and feedback into design and reform efforts.

Obviously, some candidate determinants cut across these categories. The fourth category in Appendix A includes determinants that may do so to an extent that makes it useful to consider them separately. For example, transparency matters when selecting SAC members, holding meetings, releasing work products, drawing conclusions, and disseminating advice. Another cross-cutting determinant is the approach chosen to handle risk and uncertainty. This approach is crucial in the assessment of evidence as well as when communicating advice.

What we already know ›

While there is a large and growing literature on the science of scientific advice, especially to national governments, the literature on SACs and their determinants of effectiveness is limited. The research able to inform SACs is disparate and often pertains to committees that depart from the above definition of SACs, such as research ethics boards and citizen juries. Yet there exists, to our knowledge, no rigorous empirical study of the determinants of SACs' effectiveness. Instead, most existing work relevant are case studies and opinion pieces. This also seems to be the finding of Fretheim and colleagues, who attempted to review the literature on guideline-development groups with the goal of advising the design of these bodies (17). They found that the existing empirical evidence suggests that committee composition has an impact on the content of the recommendations that are made, but that there is limited research evidence to guide the exact composition of a committee. Against that background, the article offers some recommendations for the composition of guideline-development groups based on logical arguments and the experience of various organizations. WHO has also produced an Internal "Review of WHO's Committees for Securing External Expert Advice", which outlines types and goals of scientific advice, and recommendations based on observations of their own committees (8).

Among the topics discussed in the broader literature pertaining to SACs, there are some recurring themes. Among these are the possibility of collective shirking, where no one does any work due to the assumption someone else will do it, or groupthink, where individuals may be unwilling to bring up thoughts that go against the group's majority view (15). Another issue is leadership, with some scholars believing it is good to have a group leader (13), while others believing that a leader may sway all the other committee members (15). The benefits of instituting consensus versus majority decision-making processes in advisory committees, as well as the degree to which experts interact, have been closely examined by several authors (13,18,19). Two other recurring topics are conflicts of interest and transparency (20–22). While it has not been addressed in many scholarly articles, both the WHO and the UN's Intergovernmental Panel on Climate Change (IPCC) name regional representation as an important consideration when selecting experts for panels (8,16). Finally, the degree to which scientific advice is utilized by policy decision-makers or the public, and the nature of these groups' involvement, have been subject to much writing (23,4,24).

Some useful typologies of SACs have also been offered (1,3). In particular, a report by Glynn and colleagues provides a useful overview of national SACs in the European Union (3).

Objectives and approach >

The three primary objectives of this project are to: (P1) identify and assess the key determinants of SACs' effectiveness; (P2) develop a framework to inform the future design and reform of SACs for different contexts; and (P3) apply the insights and the framework to certain types of SACs. The latter set of SACs will include, but go beyond, WHO expert advisory committees.

Secondary objectives of the project are to: (S1) examine the roles SACs play today in the broader context of scientific advice and science/policy interactions; (S2) clarify the aims of SACs and the trade-offs between their various forms; (S3) describe the current landscape of SACs and develop a useful typology for them; and (S4) identify the most valuable topics for future inquiry and for observational and experimental studies in particular.

As means to achieving these ends, this project will synthesize available research evidence on the determinants of effectiveness for a wide range of SACs, from numerous bodies of literature, and across multiple disciplines. The insights will be integrated with the latest thinking on institutional design more generally.

The project will run from January 2016 to June 2017. The project will be conducted by a study team of 12–15 members. The project will be based at the University of Ottawa's Global Strategy Lab (GSL) with Dr. Steven J. Hoffman, Associate Professor of Law and GSL Director, as the principal investigator. Dr. Trygve Ottersen, Associate Professor of Medicine at the University of Oslo and Adjunct Professor of Law at the University of Ottawa, will be the content lead. The team will be supported by research staff at GSL and the Norwegian Institute of Public Health (NIPH).

Pending funding, there will hopefully be two workshops organized for the study team to come together – first to debate the big issues and then to present draft manuscripts for feedback. A third workshop could focus on disseminating findings to key decision-makers. The first two meetings are scheduled to take place in Summer 2016 and Winter 2017 in either Oslo, Ottawa, or Geneva.

The main deliverable will be a series of articles published in an international peer-reviewed open-access journal. A tentative outline of the series is provided in Appendix B. In addition, presentations will be given in a wide range of fora, and summary material targeting specific decision-makers will be prepared. Some of these presentations and this material will be specifically geared towards WHO.

Appendix A: Possible determinants of effectiveness ›

* Nature of the subject matter

- ▶ Thematic focus (e.g., health, environment, education)
- ▶ Generality
- ▶ Complexity
- ▶ Scientific controversy
- ▶ Public controversy

* Nature of the chief actors and their relationship

- ▶ Nature of the user of the advice
 - Level (e.g., local, national, international)
 - Role (e.g., clinician, manager, politician)
- ▶ Nature of the committee
 - Formalization (e.g., statutory vs informal)
 - Duration of operation (permanent vs temporary)
 - Size
 - Competence of members (e.g., type, level, diversity)
 - Representation (e.g., diversity in gender, age, area of residence)
 - Remuneration
- ▶ Nature of the committee-user relationship
 - Integration of committee (internal vs external to user)

* Process stages

- ▶ Establishment of the committee
 - Entity establishing the committee
 - Process leading up to the establishment
- ▶ Committee member selection
 - Management of conflict of interest
 - Democratic selection
- ▶ Advice-generation process
 - Existence of guidelines for the decision-making process (e.g., code of practice)
 - Leadership resources (e.g., time and financial)

- Type of evidence assessed
 - How evidence is accessed
 - Decision-making rule (e.g., consensus vs majority vote)
 - ▶ Advice-delivery process
 - Mode of communication with user
 - Scope of dissemination (public vs private)
 - ▶ Review process
 - Monitoring and evaluation of committee
 - Feedback loop for reform of committee
- * **Cross-cutting**
- ▶ Transparency, openness, and publicity
 - ▶ Accountability
 - ▶ Independence from user, political, and financial influence
 - ▶ Approach to risk and uncertainty

Appendix B: Tentative articles for the series ›

* Editorials

- ▶ E1: Introductory editorial
- ▶ E2: Guest editorial by national-level policy maker
- ▶ E3: Guest editorial by international-level policy maker

* Section A: Background analyses

- ▶ A1: The current landscape of scientific advisory committees
 - This article will map the current landscape of SACs, at both national and international levels, and develop a typology useful for the assessment and design of SACs.
- ▶ A2: The roles of scientific advisory committees
 - This article will analyze the role of SACs in the broader context of scientific advice (including alternatives such as single individual advisors), science-policy interactions, and expert advisory committees more generally (which may include ethics boards etc.). The article will provide historical background and discuss the importance of SACs in today's society and with today's norms for policy making. The article will also discuss the role of science more generally in today's society, including trends of trust and distrust. The article may also include a discussion of the aims of SACs and the trade-offs involved.
- ▶ A3: Key concepts and theories for the design of scientific advisory committees
 - This article will introduce and analyze the chief theories, frameworks, and tools available across disciplines to inform the design and reform of SACs. These theories, frameworks, and tools can be general and need not specifically targeted on SACs. This article will provide background to the article on the new framework and tool to inform the design of SACs.
- ▶ A4: Understanding effectiveness in the context of scientific advisory committees
 - This article will examine the meaning of "effectiveness" and the goals of SACs, and thoroughly discuss the proximal determinants of effectiveness: quality, salience, and legitimacy.
- ▶ A5: Conceptual framework for the study of scientific advisory committees
 - This article will lay out and discuss the conceptual framework that will inform the articles examining specific determinants of effectiveness in this series.
- ▶ A6: Opportunities and challenges for a science on scientific advisory committees

- This article will discuss the methodological needs and challenges for measuring effectiveness and for even thinking about developing a science on the institutional design of SACs. The article will discuss the many fields and disciplines that need to be integrated and describe key components of the methodological apparatus available. The article will also discuss how SACs can be studied despite great variation in the context they operate in, the challenges related to interpreting and measuring effectiveness, and the challenges and opportunities for observational and experimental studies.
- ▶ A7: A critical theory analysis of power relationships, structural inequalities, and epistemological violence in the institutional design of scientific advisory committees

* Section B: Articles addressing different determinant categories

- ▶ B1: Size and composition of scientific advisory committees
- ▶ B2: Selecting members and managing conflicts of interest
- ▶ B3: Guidelines and leadership
- ▶ B4: Accessing and assessing evidence
- ▶ B5: Managing controversy and decision-making rules
- ▶ B6: Delivering advice to user and the use of advice
- ▶ B7: Monitoring and evaluation of scientific advisory committees
- ▶ B8: Transparency, accountability, and public involvement
- ▶ B9: Independence

* Section C: Framework, applications, and future challenges

- ▶ C1: A new framework and tool to inform the design of scientific advisory committees
 - The article will present a new framework and decision-support tool to inform the design of new SACs and reform of existing ones, and to better understand what one can expect from SACs across settings. The framework will build on insights from the preceding sections and be applied in the other chapters in this section.
- ▶ C2: The design of scientific advisory committees for health technology assessment and priority setting for universal health coverage
- ▶ C3: The design of WHO's expert advisory committees

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