

HW has received honoraria for consulting or speaking from Abbott, Abvie, Biolex, BMS, Boehringer Ingelheim, Gilead, ITS, J/Janssen-Cilag, Medgenics, Merck/Schering-Plough, Novartis, Roche, Roche Diagnostics, Siemens, Transgene, and ViiV; and research grants from Abbott, BMS, Gilead, Merck, Novartis, Roche, Roche Diagnostics, and Siemens.

- 1 Höner zu Siederdisen C, Maasoumy B, Deterding K, et al. Eligibility and safety of the first interferon-free therapy against hepatitis C in a real-world setting. *Liver Int* 2014; published online Dec 30. DOI:10.1111/liv.12774.
- 2 Webster DP, Klennerman P, Dusheiko GM. Hepatitis C. *Lancet* 2015; published online Feb 13. [http://dx.doi.org/10.1016/S0140-6736\(14\)62401-6](http://dx.doi.org/10.1016/S0140-6736(14)62401-6).
- 3 Lohmann V, Körner F, Koch J, Herian U, Theilmann L, Bartenschlager R. Replication of subgenomic hepatitis C virus RNAs in a hepatoma cell line. *Science* 1999; **285**: 110–13.
- 4 Messina JP, Humphreys I, Flaxman A, et al. Global distribution and prevalence of hepatitis C virus genotypes. *Hepatology* 2015; **61**: 77–87.
- 5 Gower E, Estes C, Blach S, Razavi-Shearer K, Razavi H. Global epidemiology and genotype distribution of the hepatitis C virus infection. *J Hepatol* 2014; **61**: S45–57.
- 6 van der Meer AJ, Hansen BE, Fattovich G, et al. Reliable prediction of clinical outcome in patients with chronic HCV infection and compensated advanced hepatic fibrosis: a validated model using objective and readily available clinical parameters. *Gut* 2015; **64**: 322–31.

- 7 Westbrook RH, Dusheiko G. Natural history of hepatitis C. *J Hepatol* 2014; **61**: S58–68.
- 8 Ruane PJ, Ain D, Stryker R, et al. Sofosbuvir plus ribavirin for the treatment of chronic genotype 4 hepatitis C virus infection in patients of Egyptian ancestry. *J Hepatol* 2014; published online Nov 5. DOI:10.1016/j.jhep.2014.10.044.
- 9 Hézode C, Asselah T, Reddy KR, et al. Ombitasvir plus paritaprevir plus ritonavir with or without ribavirin in treatment-naïve and treatment-experienced patients with genotype 4 chronic hepatitis C virus infection (PEARL-I): a randomised, open-label trial. *Lancet* 2015; published online March 31. [http://dx.doi.org/10.1016/S0140-6736\(15\)60159-3](http://dx.doi.org/10.1016/S0140-6736(15)60159-3).
- 10 Maasoumy B, Port K, Calle Serrano B, et al. The clinical significance of drug–drug interactions in the era of direct-acting anti-viral agents against chronic hepatitis C. *Aliment Pharmacol Ther* 2013; **38**: 1365–72.
- 11 Wedemeyer H, Dore GJ, Ward JW. Estimates on HCV disease burden worldwide—filling the gaps. *J Viral Hepat* 2015; **22**: 1–5.
- 12 Wedemeyer H, Duberg AS, Buti M, et al. Strategies to manage hepatitis C virus (HCV) disease burden. *J Viral Hepat* 2014; **21**: 60–89.

Strategic science with policy impact

Evidence-based policy making is an important aspirational goal, but only a small proportion of research has the policy impact it might have. Most researchers are not trained to create policy impact from their work, engagement with policy makers is not encouraged or rewarded in most settings, and the communication of scientific findings occurs within the academic community but rarely outside it. There are exceptions, but little is done to systematically link scholarship to policy.

When the broad gap between evidence and policy is addressed in academic settings, the proposed solution is generally to disseminate research findings to the media and perhaps policy makers. This approach is helpful, but overlooks the importance of information flow from the policy world into research settings. The creation of a two-way policy bridge between researchers and policy makers can help to ensure that research addresses issues relevant to policy and that research findings are communicated in real time to policy makers who often must make decisions quickly. We propose a model to create tighter interaction between research and policy domains.

We define strategic science as research designed to address gaps in knowledge important to policy decisions, derived from the reciprocal flow of information between researchers and policy makers, and communicated not only in scholarly publications but

also in forms relevant to policy makers. Strategic science can complement traditional programmatic science to better realise the potential impact of scholarship on policy. We have developed a model of strategic science (figure), which we have applied to our work on nutrition policy, obesity prevention, and food systems research,^{1–11} but have designed the model to be broadly applicable for other fields of research.

The first step in our model is to identify agents for change and create reciprocal information flow between researchers and these actors. Investigators can be aware of questions that are relevant to policy, but it can also be helpful to identify and seek input from individuals or institutions in a position to make policy advances. Such input can uncover important gaps in knowledge that have not been identified in

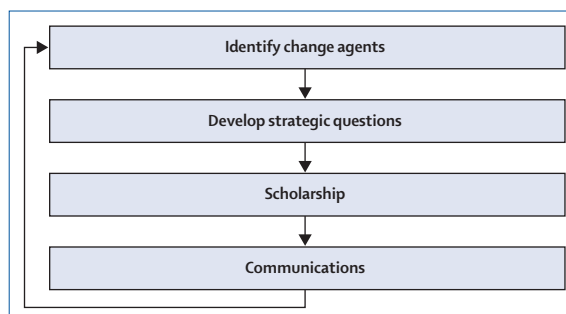


Figure: A model of strategic science designed to enhance links between science and policy



Published Online
February 19, 2015
[http://dx.doi.org/10.1016/S0140-6736\(14\)62397-7](http://dx.doi.org/10.1016/S0140-6736(14)62397-7)
See *Series* pages 2510, 2521, and 2534
See *Comment* *Lancet* 2015; **385**: 2326
See *Series* *Lancet* 2015; **385**: 2400, 2410, and 2422

the scientific literature and generate information flow back to the policy world. Change agents include elected leaders at any level of government, key individuals in regulatory agencies, legal authorities and legislators, the media, non-governmental organisations, and global institutions, such as the World Bank, the World Trade Organization, or WHO.

The second step is to develop strategic questions. Interactions between researchers and policy makers can help identify the questions that need to be addressed for the policy process to be fully informed. These questions can join with those produced by traditional scientific discovery to maximise the effect of science on policy. Examples of issues that could be emphasised by policy makers are the projected impacts of competing policy approaches to a problem, costs of implementation, public support for various policies, or how different approaches to framing a policy might affect perceptions.

The third step in the model is to undertake strategic studies. The strategic questions will generate the substance of the research itself, including research designs, hypotheses, and analyses.

The fourth step is to communicate information to strengthen the policy bridge. Traditional communication of scientific information through peer-reviewed, academic publications is essential because it ensures the work meets scientifically rigorous standards. Shortening the review and publication process is important to bring research in step with the real-time needs of policy makers. More ways to communicate research findings before publication could also be helpful. In addition, the communication of information back to policy makers is a key step. Scientific publications tend not to be helpful to policy makers in the absence of policy briefs, short summaries of what is known on an issue, and clear statements of the relevance of evidence to specific policy questions.

These four steps can create a feedback loop by which policy informs research and the results of research inform the policy process. Once established, the loop can create fruitful intersections of evidence and policy.

We believe that there is much unrealised potential for research to contribute to the common good by having the evidence base communicated more effectively to policy makers, and for scientists to be aware of the important questions in the policy world. This process begins with better information flow between scientists and change agents but also requires: infrastructure to support such activity within research settings; more effective convening of relevant parties; better means of communicating evidence in a timely way; and incentives for scientists to pursue this work and communicate it to change agents. Government and foundation funding for such work, and private sector funding where conflicts of interest can be avoided, could help advance this agenda for strategic science with a policy impact.

**Kelly D Brownell, Christina A Roberto*

Sanford School of Public Policy, Duke University, Durham, NC 27708-0239, USA (KDB); and Harvard T H Chan School of Public Health, Boston, MA, USA (CAR)
kelly.brownell@duke.edu

We declare no competing interests.

- 1 Roberto CA, Swinburn B, Hawkes C, et al. Patchy progress on obesity prevention: emerging examples, entrenched barriers, and new thinking. *Lancet* 2015; published online Feb 19. [http://dx.doi.org/10.1016/S0140-6736\(14\)61744-X](http://dx.doi.org/10.1016/S0140-6736(14)61744-X).
- 2 Roberto CA, Agnew H, Brownell KD. An observational study of consumers' accessing of nutrition information in chain restaurants. *Am J Public Health* 2009; **99**: 820-21.
- 3 Roberto CA, Larson PD, Agnew H, Baik J, Brownell KD. Evaluating the impact of menu labeling on food choices and intake. *Am J Public Health* 2010; **100**: 312-18.
- 4 Roberto CA, Baik J, Harris JJ, Brownell KD. The influence of licensed characters on children's taste and snack preferences. *Pediatrics* 2010; **126**: 88-93.
- 5 Harris JL, Schwartz MB, Ustjanauskas A, Ohri-Vachaspati P, Brownell KD. Effects of serving high-sugar cereals on children's breakfast-eating behavior. *Pediatrics* 2010; **127**: 71-76.
- 6 Brownell KD, Kersh R, Ludwig DS, et al. Personal responsibility and obesity: a constructive approach to a controversial issue. *Health Aff (Millwood)* 2010; **29**: 379-87.
- 7 Brownell KD, Frieden TR. Ounces of prevention: the public policy case for taxes on sugared beverages. *N Engl J Med* 2009; **360**: 1805-08.
- 8 Brownell KD, Farley T, Willett WC, et al. The public health and economic benefits of taxing sugar-sweetened beverages. *N Engl J Med* 2009; **361**: 1599-605.
- 9 Koplan JP, Brownell KD. The response of the food and beverage industry to the obesity threat. *JAMA* 2010; **304**: 1487-88.
- 10 Pomeranz J, Brownell KD. Advancing public health obesity policy through state attorney's general. *Am J Public Health* 2011; **101**: 425-31.
- 11 Brownell KD, Pomeranz JL. The trans-fat ban—food regulation and long-term health. *N Engl J Med* 2014; **370**: 1773-75.