

The impact of tobacco control research on policy: 20 years of progress

Kenneth E Warner, Jamie Tam

Department of Health Management & Policy, School of Public Health, University of Michigan, Michigan, USA

Correspondence to

Professor Kenneth E Warner, Department of Health Management & Policy, School of Public Health, University of Michigan, 1415 Washington Heights, Ann Arbor, Michigan, USA; kwarn@umich.edu

Received 16 August 2011
Accepted 19 December 2011

ABSTRACT

Objectives To assess progress in tobacco control policy research and the relevance of research to policymaking.

Methods Over 100 experts were surveyed about their opinions on the body of research existing in 1992 and 2011 concerning 11 areas of tobacco control policy, the state of policy implementation in both years, the extent to which research has affected policy adoption and how experience with policy has influenced research. Case studies of how research and policy implementation have interacted were developed.

Results The body of research was not judged 'substantial' in any of the policy areas in 1992. In 2011, 6 of the 11 areas were evaluated as substantial. None ranked as substantial regarding policy implementation in 1992, but by 2011 half were so ranked for developed countries; in low-income and middle-income countries policy implementation moved from very low to moderate. Respondents judged the role of research in actual policymaking as 'substantial' regarding clean indoor air, taxation and cessation treatment policy. Case studies illustrate how research can directly affect policy (taxation), how policy and research can have iterative effects (clean indoor air), and how research and policy interact in the case of novel policies (graphic cigarette pack warnings). The role of research in the formulation of the Framework Convention on Tobacco Control is also examined.

Conclusions Policy research goals established in 1992 have been largely realised. For select tobacco control policies, research has made truly important contributions to saving lives. Evidence-based policy adoption will continue to be essential to minimising the toll of tobacco, especially in the world's poorer countries.

INTRODUCTION

In the first issue of *Tobacco Control* in 1992, Dr Ronald Davis, the journal's founding editor, identified 'the tracking and evaluation of tobacco control policy and legislation' as a journal priority.¹ The journal's first supplement, 'Policy Research: Strategic Directions',² published that same year, described the state of the art in several areas of tobacco policy research and defined a research agenda for the coming decades. In the forward, John Pinney claimed that 'there is a strong consensus within the tobacco control field that research that informs and supports policymakers and advocates can greatly enhance our efforts at preventing smoking and promoting cessation'.³

With this anniversary issue of the journal, we consider how policy research has fared in the intervening two decades. Our objectives were (1) to assess progress in tobacco control policy research and the relevance of research to policymaking and

(2) to examine how research and policy have interacted and influenced each other. We address the first objective by presenting findings from a survey of tobacco control experts regarding progress in research over the past two decades on a series of core policy areas. We also consider respondents' assessments of progress in the adoption and implementation of these policies, the role of research in influencing policy adoption and how policy experience can influence research. We then consider the often-complicated relationships between research and policy in three policy domains. We conclude with discussion of the role of research in the Framework Convention on Tobacco Control (FCTC).

We define tobacco control policy research as research describing the nature, adoption, or consequences of tobacco control policies, commonly undertaken to inform or support policymakers and advocates, as Pinney observed. We exclude other forms of research that have had an enormous influence on tobacco control policy. The seminal epidemiological publications linking smoking to lung cancer^{4–6} ultimately motivated the first modern-era tobacco control policies. However, that research was undertaken to evaluate an exposure–risk connection, not to prompt policy development. Similarly, the original epidemiological research on the health effects of secondhand smoke (SHS) exposure played a critical role in the evolution of clean indoor air laws,⁷ but its goal was to determine if SHS exposure caused lung cancer. More recently, documents research on tobacco industry knowledge and behaviour has discredited the industry,^{8,9} thereby supporting policy development, though the analysis was not focused on policy per se. Similarly, tobacco litigation—and legal research related to it—has resulted in judgments and settlements that have achieved the status of policy.¹⁰ Epidemiology, non-policy tobacco document research and legal research illustrate the importance of forms of research not strictly defined here as policy research. Were we to include these as policy research per se, there would be no useful distinction between policy research and any other form of tobacco and health research.

SURVEY METHODS

Using Qualtrics survey software,¹¹ we conducted an online survey to assess progress in tobacco policy research (a copy is available at <https://sites.google.com/site/tcpolicyresearch/>). We queried respondents about their opinions on: the quantity and quality of the research existing in 1992 concerning each of 11 areas of tobacco control policy; the quantity and quality of research on the same

policies in 2011; the state of implementation of each of the policies in both years in developed countries and, separately, in low-income and middle-income countries; the extent to which research has played a direct role in the adoption of each of the policies; and finally how experience with policy has influenced the nature and quantity of research for each of the policy areas.

Potential respondents, comprising 163 unique individuals, included: (1) *Tobacco Control* editors and Editorial Advisory Board members from the original volume of the journal (1992); (2) the same groups from the 2011 volume; and (3) coauthors of the 1992 'Policy Research' journal supplement papers. We eliminated as potential respondents 23 individuals who are deceased or long removed from tobacco control as well as those for whom we could not identify email addresses. Of the remaining 140, 105 (75%) completed the survey.

SURVEY FINDINGS

In all, 55% of survey respondents have been involved in tobacco control for more than 25 years, and 82% for more than 15 years. Three-quarters had a good working knowledge of developments in tobacco control research and policy throughout the 20-year period. Two-thirds are currently involved in tobacco control research, with 15% involved previously. Half are actively involved in running tobacco control programmes or developing or implementing policies. In all, 60% of respondents have spent most of their careers in North America, 29% in Europe, Australia, or New Zealand and 11% in Asia, Africa, or South America.

Progress in policy research since 1992

Table 1 presents respondents' rankings of the quantity and quality of the research pertaining to each of 11 policy areas in 1992 and at the time of the survey (April to May 2011). Our experts concluded that the bodies of research for nine of the areas were only 'moderate' in quantity and quality in 1992 (with an average score near 1.0, with the range being 'non-existent or limited', scored 0, to 'substantial', scored 2). The other two areas, illicit trade and tobacco product regulation, were regarded as then having little to no significant research. The two strongest areas of research as of 1992 were public education and information, and school health education. In 2011, in contrast, six

areas were evaluated as having a substantial body of research (in descending order from the highest score: clean indoor air laws and policies; taxation; warning labels; advertising and promotion bans; cessation treatment policy; and public education and information). The remaining five areas were considered to have a moderate body of research evidence. The areas evaluated as having the greatest growth in quality and quantity of research (defined as the difference in the 2 years' average scores) were warning labels, which increased by nearly a full point (0.95), and clean indoor air laws and policies, up 0.82 points.

Progress in policy adoption since 1992

We asked respondents about 'the extent of policy adoption' in the 11 policy areas in developed countries (DCs) and low-income and middle-income countries (LMICs) in 1992 and in 2011. The word 'extent' allowed respondents to consider how effectively policies were employed to achieve tobacco control. Thus, for example, respondents were certainly aware that virtually all DCs taxed cigarettes and required warning labels on packs by 1992. Yet they ranked the extent of policy adoption as less than 'moderate' for each (see table 2), likely reflecting the then weakness of text-only package warnings and the modest size of cigarette taxes.

For DCs, only five policies approached or achieved a ranking of 'moderate' in 1992. In descending order from the most extensively adopted, they are: school health education, public education and information, youth access laws, taxation and warning labels. None of the 11 policy areas came close to being ranked 'substantial'. By 2011, however, respondents ranked policy adoption 'substantial' for half of the policy areas, with 82% ranking clean indoor air policy as 'substantial', 66% for warning labels and 60% for advertising and promotion restrictions and taxation. None of the policy areas was ranked as 'non-existent or limited' by 2011.

For LMICs, in neither year did respondents evaluate policy adoption as 'substantial' for any policy area. In 1992, respondents believed that tobacco control policy was extremely limited—perhaps virtually non-existent—in the world's poorer countries. Only public education and school health education, and to a lesser extent taxation, scored discernibly above 0. By 2011, however, seven policies had risen to 'moderate', led by

Table 1 Survey respondents' evaluation of the quantity and quality of policy research in each of 11 policy areas in the years 1992 and 2011

Category	1992					2011				
	Non-existent or limited (0)	Moderate (1)	Substantial (2)	Not sure	Mean (95% CI)	Non-existent or limited (0)	Moderate (1)	Substantial (2)	Not sure	Mean (95% CI)
Advertising/promotion bans	24	32	26	23	1.02 (0.88 to 1.17)	2	27	62	14	1.66 (1.56 to 1.76)
Clean indoor air laws/policies	16	42	24	23	1.10 (0.97 to 1.23)	0	7	84	14	1.92 (1.87 to 1.97)
Illicit trade	51	18	5	31	0.38 (0.26 to 0.49)	10	53	21	21	1.13 (1.02 to 1.24)
Media counteradvertising	29	37	15	24	0.83 (0.69 to 0.96)	4	39	49	13	1.49 (1.38 to 1.60)
Public education/information	8	36	32	29	1.32 (1.19 to 1.44)	6	26	53	20	1.55 (1.43 to 1.67)
School health education	14	30	33	28	1.25 (1.10 to 1.39)	14	28	42	21	1.33 (1.19 to 1.48)
Taxation/price	16	41	23	25	1.09 (0.96 to 1.22)	1	25	64	15	1.70 (1.61 to 1.79)
Tobacco product regulation	47	27	8	23	0.52 (0.40 to 0.65)	9	49	34	13	1.27 (1.15 to 1.39)
Cessation treatment policy	21	37	17	30	0.95 (0.81 to 1.08)	4	26	58	17	1.61 (1.50 to 1.72)
Warning labels	35	35	13	22	0.73 (0.60 to 0.87)	0	30	63	12	1.68 (1.59 to 1.77)
Youth access laws	21	40	16	28	0.94 (0.80 to 1.07)	11	32	44	18	1.38 (1.25 to 1.51)

Table 2 Survey respondents' evaluation of the extent of policy adoption in each of 11 policy areas in developed countries (DCs) and low-income and middle-income countries (LMICs) in the years 1992 and 2011*

Category Type of country	1992		2011	
	DC (95% CI)	LMIC (95% CI)	DC (95% CI)	LMIC (95% CI)
Advertising/promotion bans	0.63 (0.52 to 0.75)	0.08 (0.03 to 0.13)	1.65 (1.55 to 1.74)	0.98 (0.87 to 1.08)
Clean indoor air laws/policies	0.63 (0.50 to 0.75)	0.03 (0.00 to 0.07)	1.85 (1.77 to 1.93)	0.94 (0.83 to 1.06)
Illicit trade	0.16 (0.08 to 0.25)	0.04 (0.00 to 0.07)	0.91 (0.79 to 1.03)	0.33 (0.23 to 0.42)
Media counteradvertising	0.57 (0.46 to 0.69)	0.04 (0.01 to 0.08)	1.17 (1.05 to 1.29)	0.44 (0.33 to 0.55)
Public education/information	1.04 (0.94 to 1.14)	0.34 (0.25 to 0.44)	1.48 (1.37 to 1.59)	0.94 (0.84 to 1.04)
School health education	1.09 (0.98 to 1.20)	0.33 (0.24 to 0.42)	1.29 (1.16 to 1.41)	0.75 (0.62 to 0.88)
Taxation/price	0.86 (0.75 to 0.97)	0.27 (0.18 to 0.36)	1.65 (1.55 to 1.74)	0.77 (0.65 to 0.89)
Tobacco product regulation	0.29 (0.20 to 0.39)	0.02 (0.01 to 0.05)	0.92 (0.78 to 1.05)	0.30 (0.21 to 0.39)
Cessation treatment policy	0.48 (0.36 to 0.60)	0.07 (0.02 to 0.12)	1.31 (1.19 to 1.43)	0.35 (0.25 to 0.44)
Warning labels	0.75 (0.63 to 0.87)	0.17 (0.10 to 0.24)	1.69 (1.59 to 1.78)	1.03 (0.92 to 1.15)
Youth access laws	0.96 (0.84 to 1.08)	0.14 (0.07 to 0.20)	1.52 (1.40 to 1.63)	0.73 (0.60 to 0.85)

*Numbers shown are mean scores where a response of 'non-existent or limited' is scored 0, 'moderate' is scored 1, and 'substantial' is scored 2. (For a breakdown of the rankings, as presented in table 2, go to <https://sites.google.com/site/tcpolicyresearch/>.)

warning labels, advertising restrictions, clean indoor air laws and public education.

Role of research in policy adoption and vice versa

Respondents were asked 'To what extent has research played a direct role in leading to policy adoption' in each of the policy areas. Table 3 presents their assessments. In general they believe that research has had a significant impact on tobacco control policy adoption. They rank research as having had a 'substantial' impact on clean indoor air policy, taxation and cessation treatment policy, and a 'modest' effect on all of the other policy areas.

We also queried respondents as to what extent experience with policy has affected the evolution of research. As table 4 demonstrates, respondents concluded that experience with clean indoor air policies, taxation and warning labels has 'substantially' affected research on these subjects, and it has had a 'modest' impact (generally leaning towards 'substantial') in the remaining eight areas.

Conclusions regarding survey findings

The survey has clear limitations. First, respondents are not representative of the tobacco control community as a whole, nor necessarily even the community of tobacco policy researchers. Still, they constitute a highly knowledgeable and logical group to address questions about progress in tobacco control policy research. Second, survey findings may well reflect recall bias. Clearly it is easier to describe the state of research today than to recall it 20 years ago. We cannot ascertain whether this potential

recall bias affects our findings, much less in which direction. A useful complement to the survey would be a detailed bibliographic analysis tracking the evolution of tobacco policy research over the 20-year period. Such a study would have the distinct advantage of accuracy with regard to the 'size' of the literature (ie, number of contributions). However, it would not necessarily be superior in evaluating quality.

These reservations notwithstanding, the survey results indicate that tobacco control experts perceive substantial growth in tobacco control policy research and policy adoption since the journal's founding in 1992. They find research highly useful in influencing actual policymaking and implementation in a handful of the 11 policy domains. Clearly the greatest deficiency is with regard to policy adoption in LMICs, something we expect to develop considerably as a result of the FCTC.

What the survey could not address are the nuances in the relationships between research and policy. We now examine select examples illustrating a variety of those relationships.

The complex relationships between research and policy

In the preface to the 1992 'Policy Research' supplement, Drs Simon Chapman and Michele Bloch observed, 'Political decisions to introduce tobacco control laws, regulations, policies and programmes often, although not always, reflect research findings. Publicity arising from research can inspire politically influential media and community debate about tobacco control policies as well as feed directly into particular decision-making forums'.¹² This statement begins to illustrate the complexity of the research-policy relationship. Research can influence policy

Table 3 Survey respondents' evaluation of the extent to which research has played a direct role in policy adoption in each of 11 policy areas

Policy	Extent of role of research in policy adoption					Mean (95% CI)
	No effect (0)	Small effect (1)	Modest effect (2)	Substantial effect (3)	Not sure	
Advertising/promotion bans	1	15	36	45	8	2.29 (2.14 to 2.43)
Clean indoor air laws/policies	0	2	20	75	8	2.75 (2.66 to 2.84)
Illicit trade	10	26	25	13	31	1.55 (1.38 to 1.73)
Media counteradvertising	6	19	41	28	11	1.97 (1.80 to 2.13)
Public education/information	3	17	43	28	14	2.05 (1.90 to 2.21)
School health education	8	21	33	22	21	1.82 (1.64 to 2.00)
Taxation/price	0	4	30	62	9	2.60 (2.50 to 2.71)
Tobacco product regulation	5	18	41	26	15	1.98 (1.82 to 2.14)
Cessation treatment policy	0	8	21	60	16	2.58 (2.46 to 2.71)
Warning labels	1	12	38	46	8	2.33 (2.19 to 2.47)
Youth access laws	7	24	33	27	14	1.88 (1.70 to 2.06)

Table 4 Survey respondents' evaluation of the extent to which experience with policy has influenced subsequent research in each of 11 policy areas

Policy	Extent to which policy experience has influenced subsequent research				
	Little or no effect (0)	Modest effect (1)	Substantial effect (2)	Not sure	Mean (95% CI)
Advertising/promotion bans	3	51	41	10	1.40 (1.29 to 1.51)
Clean indoor air laws/policies	3	26	66	10	1.66 (1.56 to 1.77)
Illicit trade	20	37	14	34	0.92 (0.78 to 1.05)
Media counteradvertising	12	41	36	16	1.27 (1.14 to 1.40)
Public education/information	14	46	23	22	1.11 (0.98 to 1.23)
School health education	19	41	17	28	0.97 (0.84 to 1.10)
Taxation/price	0	35	56	14	1.62 (1.52 to 1.71)
Tobacco product regulation	15	33	41	16	1.29 (1.15 to 1.43)
Cessation treatment policy	17	35	37	16	1.22 (1.08 to 1.37)
Warning labels	3	34	59	9	1.58 (1.48 to 1.69)
Youth access laws	15	41	30	19	1.17 (1.04 to 1.31)

directly, supporting or even inspiring its development and adoption. It can be used by advocates, bureaucrats and legislators when it suits their pre-existing objectives, and ignored when it does not. As well, research can be misused or distorted by industry to promote or defeat a policy measure.^{13 14} Finally, the direction of causality can be the opposite: experience with policy can influence the nature and directions of subsequent research. Below we illustrate research-policy relationships in the three policy domains ranked highest in quantity and quality of research in 2011 by our survey respondents: taxation, clean indoor air policies and warning labels. We also consider the role of research in the formulation of the FCTC.

Research directly influencing policy adoption: the case of taxation

In 1981 and 1982, two seminal economic studies demonstrated that price affected cigarette consumption by children¹⁵ and adults.¹⁶ Technical analyses, this research was not accessible to the media, legislators, or the public health community. The Harvard Institute for the Study of Smoking Behaviour and Policy sought to remedy this with a 1-day conference on the effects of tobacco taxation. An analysis translating the findings from these studies was commissioned for the conference.¹⁷ The exercise was timely. Congress had doubled the federal cigarette excise tax from 8 cents per pack to 16 cents as an urgent revenue matter effective 1 January 1983, but as a condition of securing votes for the revenue package, the legislation called for a return of the tax to its original rate of 8 cents on 1 October 1985. The paper demonstrated that up to 1 million young people would smoke who otherwise would not do so (ie, if the tax remained at 16 cents), with the smoking-produced death toll rising by hundreds of thousands. Distribution of the Harvard conference proceedings¹⁸ to members of the US Congress and presentation of the findings at a Senate hearing¹⁹ purportedly contributed to Congress's decision to reverse its decision to halve the tax.²⁰

This highly visible translation of research and subsequent work contributed to the eventual widespread acceptance of the importance of taxation for tobacco control.²⁰ Economists and activists collaborated on similar analyses to estimate how proposed tax increases in numerous countries would affect smoking, health and revenues. Analysts developed models that would allow activists to plug in their local data to estimate smoking and revenue consequences.

The conclusions from a now-extensive body of research^{21 22} were enshrined in the World Bank's 1999 report, *Curbing the Epidemic: Governments and the Economics of Tobacco Control*,²³ which became a principal source of authoritative evidence

during the negotiations on the FCTC. Scorned by the public health community three decades ago,²⁰ taxation has become a first principle of tobacco control internationally. It remains the single best example of translation of research into effective tobacco control practice.

A cyclical pattern of policy and research interaction: the case of clean indoor air policies

The relationship between research and policy is often quite complicated, frequently reversing direction several times. Clean indoor air (CIA) policy constitutes a case in point. Significant scientific evidence on serious risks associated with SHS post-dated the adoption of early CIA laws. In the USA, Arizona adopted the first statewide CIA law in 1973, with many states following suit over the next decade.²⁴ By today's standards (completely smoke-free workplaces), most of these early policies were 'primitive', merely requiring non-smoking sections in restaurants and other facilities. But they inaugurated what has become the hallmark of effective tobacco control: smoke-free indoor environments and the protection of non-smokers' rights and health.

The first major research publication on the mortality implications of SHS did not emerge until Hiriyama's landmark 1981 study of lung cancer in the non-smoking wives of smoking husbands in Japan.²⁵ A voluminous body of research followed, establishing the lung cancer and heart disease mortality risks associated with SHS, as well as other risks (asthma, ear infections in children, and so on).⁷ As this literature evolved, the argument favouring limiting, or banning, tobacco smoke in indoor environments strengthened; the basis for the laws changed from who should have the right to indoor air—smokers or non-smokers—and from hypothesised health risks to demonstrated risks. Throughout the world, laws were increasingly enacted to provide stronger protection against SHS.

With the introduction of completely smoke-free workplaces (including restaurants and bars) in the 1990s, hospitality industry proprietors and their organisations agreed, often supported by industry-funded studies,²⁶ that making their establishments go smoke free would cause their revenues to plummet. A brand new research literature emerged in response, evaluating the financial consequences of mandatory smoke-free policies to hospitality establishments. Initiated in 1994²⁷ and employing appropriate controls, studies demonstrated that restaurants in smoke-free communities did not lose revenue. A smaller literature on bar revenues found the same.²⁸ The arsenal of policy studies greatly assisted in political battles to adopt such policies, as did studies showing dramatic reductions in exposure

to tobacco smoke chemicals for workers in smoke-free environments.²⁹ Approximately 30 countries are smoke free as of 1 July 2011.³⁰

The most recent body of research on smoke-free laws relates to their impact on hospitalisations for heart disease. Beginning in 2004,³¹ multiple studies from around the world have demonstrated that hospitalisations for acute myocardial infarctions have fallen significantly following the adoption of smoke-free workplace policies,³² although there are contrarian views of the evidence.³³ If this effect is real, it is hard to imagine a policy that could so easily and quickly have an important public health impact. In the cycle of research and policy, these studies seem likely to be highly influential in states' and nations' future smoke-free policy debates.

New evidence and policy action in a contemporaneous context: the case of large, graphic cigarette pack warning labels

No area of tobacco control policy is currently experiencing more interest and activity than health-based requirements regarding cigarette packaging. Over the past decade, over 30 countries have adopted large, graphic pack warning labelling policies.³⁴ Australia has announced that it will require plain packaging.³⁵

Our survey respondents rated the quantity and quality of research on warning labels as higher than all other policy areas except for CIA laws and taxation. A recent review identified 94 studies with original findings relevant to health warning labels, 69 published after Canada became the first country to implement graphic warning labels in 2001.³⁴ Some of the earliest research on graphic warning labels may have promoted adoption of the policy in other countries. Policy practice has clearly influenced the nature of research as well. Much of the early research on health warning labels pertained to text-only labels. Research has evolved to more directly examine the impacts of graphic labels.

There are multiple policy objectives for warning labels, including increasing smokers' and non-smokers' knowledge of smoking's health risks, increasing intentions to quit and reducing smoking initiation among youth. The evidence indicates that the new labels do communicate risks more effectively, increasing smokers' intentions to quit and decreasing the appeal of smoking among young people.³⁴ Graphic warning labels may be especially important in communicating health risks to vulnerable and illiterate populations, as in many developing countries.

Ultimately, the value of graphic warning labels lies in their potential to decrease actual consumption through quitting and non-initiation. To date, there is little relevant empirical evidence. The increasing number of countries implementing such labelling provides ample opportunity for further research, however. The large, graphic warnings thus illustrate how early generation research can inform policymakers about consumers' self-reported reactions to new (or proposed) policy. However, determination of the ultimate impact on smoking per se must await the accumulation of evidence across multiple countries and its interpretation through sophisticated empirical research.

Research and the FCTC

The FCTC is quite fairly labelled an evidence-based treaty. The treaty's *raison d'être*, to improve the health of the world's population, derived from the voluminous research on the health consequences of smoking and of exposure to SHS. Most of the Articles in the FCTC³⁶ derive from sound application of a well developed policy research evidence base. Provisions relating to

taxation and price, smoke-free environments, advertising bans, cessation treatment and others directly reflect research findings. Delegates at the negotiating sessions referred frequently to the World Bank's *Curbing the Epidemic* report²³ in support of several of the treaty's central provisions. (KW observed this personally, serving as the World Bank's representative at four of the six negotiating sessions.)

The same cannot be said of all FCTC provisions, however. At least two do not follow logically from the research evidence. Article 16, prohibiting sales to minors, was a popular and, to many delegates, essential treaty component, the 'right thing to do' despite research that questions its worth, noted during the negotiations. In particular, research demonstrates that unless sales-to-minors policies are energetically enforced, the laws have little effect on smoking by minors.³⁷

Implementation of a sales-to-minors prohibition could have a serious implication beyond its ineffectiveness: Unless vigorous enforcement generates substantial fines paid by law violators, enforcement efforts can absorb tobacco control resources, especially scarce in LMICs. Those resources would be more efficiently devoted to evidence-based interventions found elsewhere in the treaty. As such, implementation of this policy risks limiting the effectiveness of a country's overall tobacco control effort.

A second measure inconsistent with the research evidence was Article 17: Provision of support for economically viable alternative activities. The principal 'alternative activity' envisioned is governmental support to encourage farmers to grow crops other than tobacco. *Curbing the Epidemic* finds this and other supply-side measures wanting: there is little evidence that they deter either tobacco growing or tobacco consumption. When supply is artificially curtailed in one location (ie, through other than normal market forces), it emerges in another.

This approach has considerable political appeal. It allows countries' leaders to publicly express concern for public health and for their farmers' welfare: in theory, the approach would mitigate any damage that might accrue to farmers' livelihoods as tobacco use declined. The approach can also serve as a mechanism to buy off farmer organisations' opposition to the FCTC and to national tobacco control legislation—a significant factor in the FCTC negotiations.

The approach ignores the fact that even great success with tobacco control will reduce global demand for tobacco only very gradually, thereby having little short-term effect on the demand for farmers' tobacco. In many LMICs, tobacco use is increasing, with successful tobacco control frequently meaning that the rate of growth will be curtailed (Mendez D *et al*, unpublished data, 2012). Because the demand for tobacco will increase or at best remain stable in such countries for the foreseeable future, farmers' livelihoods are not in jeopardy and subsidising them to switch to alternative crops will not reduce aggregate tobacco supply nor tobacco product demand. Further, as with sales-to-minors laws, resources devoted to crop substitution will compete with other, more effective uses of scarce tobacco control interventions, and resources required for subsidisation of crop substitution could be substantial.

Not all delegations to the FCTC supported inclusion of Article 17. Some worried about the cost implications, while others appealed to the absence of supportive evidence. Negotiators' lack of enthusiasm is illustrated by the ambivalence of the wording in the article and the fact that Article 17 is the shortest of all of the substantive articles in the treaty. Ultimately, however, the political rationale led to the Article's inclusion. Thus, while research can play a role in policy debates, political considerations will often trump best evidence.

The real import of the treaty, however, will be felt by countries' implementation of the specific protocols being developed by the Conference of the Parties (COP), nations that have ratified the convention. The COP meetings have yielded quite specific protocols regarding several of the evidence-based articles, including those pertaining to exposure to tobacco smoke, packaging and labelling, and tobacco advertising and promotion. These constitute binding obligations for the 174 member nations. The Article 17 working group has not yet issued any COP recommendation that Parties support farmers in growing alternative crops. This, combined with the article's weak wording, suggests that, at least for the near-term future, the COP will not impose any specific obligations to support this ineffectual supply-side policy. It is plausible, therefore, that the political considerations that led to the article's inclusion may not translate into specific costly policy obligations.

Article 16, on sales to minors, is far more explicit in its apparent eventual imposition of obligations on the Parties. However, the COP has not yet acted on this Article, possibly reflecting its limited potential to significantly deter young people from starting to smoke. Further, provision 16.4 in the Article provides that 'The Parties recognise that in order to increase their effectiveness, measures to prevent tobacco product sales to minors should, where appropriate, be implemented in conjunction with other provisions contained in this Convention'. Nowhere else in the FCTC is an equivalent provision found. This may indicate recognition of the limited potential of sales-to-minors laws by themselves. (We are grateful to a reviewer of the original submission to the journal for the insightful observations reflected in this and the preceding paragraph.) However, the Article does imply that eventually member nations will be expected to incur financial obligations to implement a policy not supported by the evidence.

CONCLUSIONS

According to our survey, the goals established by the authors of the 1992 *Tobacco Control* 'Policy Research' supplement have largely been achieved, if not completely. Survey respondents concur that the quantity and quality of policy research have grown substantially over the past two decades. A brief literature review will confirm the former (the number of new research contributions has grown rapidly since the early 1990s), and a more careful scrutiny of the papers' contents will support the latter—the conceptual, methodological and empirical sophistication of recent research greatly exceeds that of the earlier period.

Respondents concur, as well, that research has made substantial contributions to policy development, adoption and implementation regarding clean indoor air, taxation and cessation treatment, with modest but real contributions in all of the other policy domains. The major policies have been adopted widely throughout the developed world. Although policy adoption is at an earlier stage in LMICs, the growth in policy in these countries since the early 1990s has been impressive and encouraging. Our respondents recognised reverse causality as well, agreeing that experience with policy in developed countries and LMICs has influenced the nature and volume of research pertaining to each policy area.

Three examples of the relationships between research and policy—taxation, clean indoor air and warning labels—vividly demonstrate the strength of the contribution that research has to offer to the development, adoption and evolution of tobacco control policy. As discussion regarding the FCTC demonstrates,

What this paper adds

- ▶ While there is broad consensus within the tobacco control community that research has an important role in policy-making, the relationship between tobacco control policy research and policy practice across a range of tobacco control policies has not previously been examined systematically.
- ▶ Surveyed experts consider tobacco control research to have had the most substantial impact on policy with regard to clean indoor air, tobacco taxation and cessation treatment. They also report major growth in the quantity and quality of policy research and adoption since *Tobacco Control's* inception in 1992.
- ▶ Case studies of select policy domains demonstrate the dynamic relationships that exist between tobacco control research and policy.

however, research is but one of several important influences on tobacco control policy adoption. No policy observer would ever expect evidence to fully determine policy; the influence of economic and political interests necessarily and invariably plays an important role.

The cynical observer might conclude that economic and political interests constitute the only consequential influences. Our review suggests otherwise. We hearken back to John Pinney's assertion in the 1992 'Policy Research' supplement: '[T] here is a strong consensus within the tobacco control field that research that informs and supports policymakers and advocates can greatly enhance our efforts at preventing smoking and promoting cessation'.³ In developed countries, the tide has turned against tobacco. With the FCTC in force, the prospects for LMICs seem far brighter than at any time in the past two decades. Tobacco control policy research has made genuinely important contributions to public health. We anticipate more over the coming decades.

Competing interests None.

Provenance and peer review Commissioned; externally peer reviewed.

REFERENCES

1. **Davis RM.** The slow growth of a movement. *Tob Control* 1992;**1**:1–2.
2. Policy research: strategic directions. *Tob Control* 1992;**1**(Suppl):S1–56.
3. **Pinney J.** Foreword. Policy research: strategic directions. *Tob Control* 1992;**1**(Suppl):S1.
4. **Wynder EL, Graham EA.** Tobacco smoking as a possible etiologic factor in bronchiogenic carcinoma: a study of 684 proved cases. *JAMA* 1950;**143**:329–96.
5. **Doll R, Hill AB.** The mortality of doctors in relation to their smoking habits; a preliminary report. *BMJ* 1954;**1**:1451–5.
6. **Doll R, Hill AB.** Lung cancer and other causes of death in relation to smoking. A second report on the mortality of British doctors. *BMJ* 1956;**2**:1071–81.
7. **US Department of Health and Human Services.** *The Health Consequences of Involuntary Exposure to Tobacco Smoke: a Report of the Surgeon General.* Atlanta, GA: Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006.
8. **Malone RE, Balbach ED.** Tobacco industry documents: treasure trove or quagmire? *Tob Control* 2000;**9**:334–8.
9. **Anderson SJ, McCandless PM, Klausner K, et al.** Tobacco documents research methodology. *Tob Control* 2011;**20**(Suppl 2):ii8–11.
10. **National Association of Attorneys General.** *Tobacco Project. Master Settlement Agreement.* 1998. <http://www.naag.org/backpages/naag/tobacco/msa/> (accessed 11 Aug 2011).
11. **Qualtrics.** <http://www.qualtrics.com> (accessed 11 Aug 2011).
12. **Chapman S, Bloch M.** Preface. Policy research: strategic directions. *Tob Control* 1992;**1**(Suppl):S2–3.

13. **McGarity TO**, Wagner WE. *Bending Science: How Special Interests Corrupt Public Health Research*. Cambridge, MA: Harvard University Press, 2008.
14. **Michaels D**. *Doubt Is Their Product: How Industry's Assault on Science Threatens Your Health*. Oxford: Oxford University Press, 2008.
15. **Lewit EM**, Coate D, Grossman M. The effects of government regulation on teenage smoking. *J Law Econ* 1981;**24**:545–69.
16. **Lewit EM**, Coate D. The potential for using excise taxes to reduce smoking. *J Health Econ* 1982;**1**:121–45.
17. **Warner KE**. Consumption impacts of a change in the federal cigarette excise tax. In: *The Cigarette Excise Tax*. Cambridge, MA: Institute for the Study of Smoking Behavior and Policy, Harvard University, 1985:88–105.
18. **Institute for the Study of Smoking Behavior and Policy**. *The Cigarette Excise Tax*. Cambridge, MA: Institute for the Study of Smoking Behavior and Policy, Harvard University, 1985.
19. **Warner KE**. Testimony. *Hearing on Expiring Cigarette Excise Tax Provisions, Subcommittee on Taxation and Debt Management, Committee on Finance, United States Senate*. Washington: Government Printing Office, 10 September 1985.
20. **Scott E**. *From Research to Policy: the Cigarette Excise Tax*. Harvard University, Kennedy School of Government Case Program #C16-93-1233.0, 1993.
21. **Gallet CA**, List JA. Cigarette demand: a meta-analysis of elasticities. *Health Econ* 2003;**12**:821–35.
22. **Fong GT**, Chaloupka FJ, Yurekli A. Tobacco taxes as a tobacco control strategy. *Tob Control* 2012;**21**:172–80.
23. **Jha P**, Chaloupka FJ, eds. *Curbing the Epidemic: Governments and the Economics of Tobacco Control*. Washington: World Bank, 1999.
24. **US Department of Health, Education, and Welfare**. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General*. Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1989. (DHHS Publication No. (CDC) 89–8411).
25. **Hirayama T**. Non-smoking wives of heavy smokers have a higher risk of lung cancer: a study from Japan. *BMJ* 1981;**282**:183–5.
26. **Scollo M**, Lal A, Hyland A, et al. Review of the quality of studies on the economic effects of smoke-free policies on the hospitality industry. *Tob Control* 2003;**12**:13–20.
27. **Glantz SA**, Smith LRA. The effect of ordinances requiring smoke-free restaurants on restaurant sales. *Am J Pub Health* 1994;**84**:1081–5.
28. **Alamar B**, Glantz SA. Effect of smoke-free laws on bar value and profits. *Am J Public Health* 2007;**97**:1400–2.
29. **Hammond SK**, Sorensen G, Youngstrom R, et al. Occupational exposure to environmental tobacco smoke. *JAMA* 1995;**274**:956–60.
30. **American Nonsmokers' Rights Foundation**. *Smokefree Status of Workplaces and Hospitality Venues Around the World*. 1 July 2011. <http://www.no-smoke.org/pdf/internationalbarsandrestaurants.pdf> (accessed 12 Aug 2011).
31. **Sargent RP**, Shepard RM, Glantz SA. Reduced incidence of admissions for myocardial infarction associated with public smoking ban: before and after study. *BMJ* 2004;**328**:977–80.
32. **Meyers DG**. Smoking bans in public places result in a reduced incidence of acute myocardial infarction. *Expert Rev Cardiovasc Ther* 2010;**8**:311–13.
33. **Shetty KD**, DeLeire T, White C, et al. Changes in U.S. hospitalization and mortality rates following smoking bans. *J Policy Anal Manage* 2010;**30**:6–28.
34. **Hammond D**. Health warning messages on tobacco products: a review. *Tob Control* 2011;**20**:327–37.
35. **Rourke A**. *Australia passes plain-packaging cigarette law*. *The Guardian*. 10 November 2011. <http://www.guardian.co.uk/world/2011/nov/10/australia-plain-packaging-cigarette-law> (accessed 10 Dec 2011).
36. **World Health Organization**. *WHO Framework Convention on Tobacco Control*. <http://whqlibdoc.who.int/publications/2003/9241591013.pdf> (accessed 4 Nov 2011).
37. **Stead LF**, Lancaster T. Interventions for preventing tobacco sales to minors. *Cochrane Database Syst Rev* 2005;(1):CD001497.