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Effectiveness of tax and price policies in tobacco control

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ABSTRACT

Objective:

Over twenty experts on economics, epidemiology, public policy and tobacco control were asked by the International Agency for Research on Cancer to evaluate the strength of the available evidence on the effects of tax and price policies to prevent and reduce tobacco use.

Methods:

Draft papers presenting and assessing the evidence on the following topics were developed by the experts in an eight months period prior to the meeting: tobacco industry pricing strategies and tax related lobbying; tax, price and aggregate demand for tobacco; tax, price and adult tobacco use, use among young people and use among the poor; tax avoidance and tax evasion; and the economic, and health impact of tobacco taxation. Subsequently, papers were peer-reviewed, revised and re-submitted for final discussion at a six-day meeting at IARC in Lyon where a consensus evaluation of 18 concluding statements using the pre-established criteria of the IARC Cancer Prevention Handbooks took place. Studies published (or accepted for publication) in the openly available scientific literature were the main source of evidence for the review and evaluation; other types of publications were included when appropriate.

Results:

In support of 12 of the 18 conclusions, the experts agreed that there was sufficient evidence of effectiveness of increased tobacco excise taxes and prices in reducing overall tobacco consumption and prevalence of tobacco use and improvement of public health, including by preventing initiation and uptake among young people, promoting cessation among current users, and lowering consumption among those who continue to use. For the remaining 6 concluding statements the evidence was strong (4) or limited (2).

Conclusions: The evidence presented and assessed in IARC Handbook volume 14 documents the effectiveness of tax and price policies in the control of tobacco use and improvement of public health.

Effectiveness of tax and price policies in tobacco control

Introduction

Article 6 of the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) calls for Parties* to use tax and price policies on tobacco products to decrease tobacco use in the population.[1]

In May 2010 experts from 12 countries (the Working Group (WG), see Appendix) met at The International Agency for Research on Cancer (IARC) in Lyon, France to develop Volume 14 of the IARC Handbooks of Cancer Prevention series on the evidence for the effectiveness of tax and price policies in tobacco control.[2]

Methods

Using the methodology established for IARC Handbooks [3], studies published (or accepted for publication up to the week of the meeting) in the openly available scientific literature were the main source of evidence for the review and evaluation. Peer-reviewed government agency reports that were widely available were also considered. In exceptional cases, reports that were in their final form and publicly available, but subjected to varying extent of peer-review, were included if they were considered relevant to making an evaluation. The WG assessed the quality and limitations of the data when conducting their critical review and carried out a consensus evaluation of the strength of the evidence supporting eighteen conclusion statements.

*Countries who have legally signed and are bound to the Treaty.

Results and Conclusions

Table 1 presents the conclusion statements noting the strength of evidence in their support and providing brief comments and representative references to existing evidence. For 12 of the 18 statements the WG concluded that there was sufficient evidence. The majority of these related to the effectiveness of increased tobacco excise taxes and prices in reducing overall tobacco consumption and prevalence of tobacco use, including by promoting cessation among current users, preventing initiation and uptake among young people, and lowering consumption among those who continue to use.

The WG concluded that strong but not sufficient evidence supported four of the conclusion statements (see table); for example, that changes in the relative prices of tobacco products lead to some substitution with relatively less expensive products. While results from studies from a few countries report that increases in cigarette prices are associated with increased demand for other tobacco products, there are only a small number of these and additional research is needed to find out whether these findings apply elsewhere.

For two of the statements the WG considered there was only limited supporting evidence (see table); for instance, that the demand for tobacco products among low income populations in low- and middle-income countries is more responsive to price than is the demand for tobacco products among high-income populations. The evidence examined is mixed and varies with a country's circumstances; for example, in settings where there is ready access to low or untaxed and inexpensive tobacco products, low income tobacco users may be less sensitive to changes in prices.

Based on the extensive evidence reviewed, the WG recommended that "In order to improve public health by reducing tobacco use, governments should adopt relatively simple tobacco excise tax structures that emphasize specific taxes and that include regular tax increases that outpace growth in general price levels and incomes." [2] The WG added that governments should use tobacco tax revenues to fund comprehensive tobacco control programs and other health promotion activities, given that such programs lead to further reductions in tobacco use and improvements in population health. Finally, the WG recommended that a multi-national surveillance and monitoring system should be implemented that regularly collects data on tobacco use among adults and young people, tobacco product taxes and prices, price-reducing marketing and lobbying efforts of tobacco companies, tax avoidance and evasion, and tax administration and enforcement activities.

Table 1: Evidence for effectiveness of tax and price policies in tobacco control

	Conclusion statements	Evidence			Comments and references
		Sufficient ^a	Strong ^b	Limited ^c	
1	Increases in tobacco excise taxes that increase prices result in a decline in overall tobacco use.	X			There is a negative relationship between cigarette prices and cigarette consumption in countries at all levels of income based on aggregated data. Individual- or household-level data corroborate an inverse relationship between cigarette price and total demand.[4,5]
2	Increases in tobacco excise taxes that increase prices reduce the prevalence of adult tobacco use.	X			Studies based on survey data, prevalently from the USA, support this association, including for products other than cigarettes. Studies from other high-income countries support this finding. Survey data from low- and medium-income countries present challenges reflected in a large variation in price elasticities ^d and yet these studies tend to corroborate the findings from high-income countries. [6-8]
3	Increases in tobacco excise taxes that increase prices induce current tobacco users to quit.	X			A small number of studies from high-income countries report that higher prices increase smoking cessation. [9-11]
4	Increases in tobacco excise taxes that increase prices reduce the prevalence of tobacco use among young people.	X			Studies from low-, medium- and high-income countries find that smoking prevalence among young people decreases as prices increase. [12-14]
5	Increases in tobacco excise taxes that increase prices reduce the initiation and uptake of tobacco use among young people, with a greater impact on the transition to regular use.	X			Youth smoking initiation is responsive to changes in cigarette prices, with the price response being positively related to higher thresholds of smoking initiation in studies with longitudinal data. [15, 16]
6	Increases in tobacco excise taxes that increase prices lower the consumption of tobacco products among continuing users.	X			Studies from low-, medium- and high-income countries find that smoking intensity decreases as prices increase. [6,17]

7	Tobacco use among young people responds more to changes in tobacco product taxes and prices than does tobacco use among adults.	X			Studies that consider differences in price responsiveness by age from several countries generally find that tobacco use among young people will fall more in response to a price increase than will tobacco use among older people. [6, 18]
8	The demand for tobacco products in low-income countries is more responsive to price than is the demand for tobacco products in high-income countries.			X	There is evidence supporting this for many countries but with some exceptions, particularly where tobacco products have become increasingly affordable. [19]
9	In high-income countries, tobacco use among lower-income populations is more responsive to tax and price increases than is tobacco use among higher-income populations.		X		Some studies find no differences, but the majority of studies are consistent with economic theory in finding that tobacco use among lower-income populations responds more to price. [6,8,20]
10	In low- and middle-income countries, tobacco use among lower-income populations is more responsive to tax and price increases than is tobacco use among higher-income populations.			X	Relatively few studies from low- and middle-income countries assess differences in price responsiveness by income, with some finding greater response among lower-income populations while others find little difference.[7, 21-22]
11	Changes in the relative prices of tobacco products lead to some substitution to the products for which the relative prices have fallen.		X		Increases in cigarette taxes have been associated with higher use of other types of products (i.e. smokeless) or other brands of the same type of product.[23, 24]
12	Tobacco industry (TI) price discounting strategies, price-reducing marketing activities, and lobbying efforts mitigate the impact of tobacco excise tax increases.	X			Marketing techniques that reduce price include price discounts, sampling, specialty item distribution, coupons, others. The resulting reductions in price increase tobacco use. Tobacco companies lobbying efforts to influence tobacco tax levels, structures and the earmarking of tobacco tax revenues have been effective in deterring some governments from raising taxes. [25-28]

13	Tobacco tax increases that increase prices improve population health	X			The reductions in tobacco use that result from higher taxes and prices lead to reductions in the death and disease caused by tobacco use.[29, 30]
14	Higher and more uniform specific tobacco excise taxes result in higher tobacco product prices and increase the effectiveness of taxation policies in reducing tobacco use.	X			Specific excise taxes (those assessed based on quantity or weight) have a greater public health impact than ad valorem excise taxes (those assessed based on value) because they lead to relatively higher tobacco product prices. [31]
15	Tax avoidance^ and tax evasion+ reduce, but do not eliminate, the public health and revenue impact of tobacco tax increases.	X			Experiences in many countries demonstrate that tobacco use falls and revenues rise following a tax increase, even when there is increased tax avoidance and evasion. [32,33]
16	A coordinated set of interventions that includes international collaborations, strengthened tax administration, increased enforcement, and swift, severe penalties reduces illicit trade in tobacco products.		X		Countries have successfully reduced illicit trade in tobacco products through strong and coordinated multilateral efforts. However, relatively few countries have adopted comprehensive interventions and their longer term impact is not known or difficult to assess given that forms of tax avoidance/evasion can adapt/change in response to interventions to crack down on them. [34]
17	Tobacco tax increases increase tobacco tax revenues.	X			Higher tax rates result in higher tax revenues given that taxes account for a fraction of prices and that reductions in consumption are usually less than proportional to the increases in price that result from higher taxes.[19]
18	Tobacco tax increases do not increase unemployment.		X		Job losses in tobacco-dependent sectors are offset by increases in other sectors. [35-37]

Table Footnotes

^a **Sufficient Evidence:** An association has been observed between the intervention under consideration and a given effect in studies in which chance, bias and confounding can be ruled out with reasonable confidence. The association is highly likely to be causal.

^b **Strong Evidence:** There is consistent evidence of an association, but evidence of causality is limited by the fact that chance, bias or confounding have not been ruled out with reasonable confidence. However, explanations other than causality are unlikely.

^c **Limited Evidence:** There is some evidence of association between the intervention under consideration and a given effect, but alternative explanations are possible.

Other available criteria:

Evidence of No Effect: Methodologically sound studies consistently demonstrate the lack of an association between the intervention under consideration and a given effect.

Inadequate/No Evidence: There are no available methodologically sound studies showing an association; the available studies are of insufficient quality, consistency or statistical power to permit a conclusion regarding the presence or absence of a causal association between the intervention and a given effect. Alternatively, this category is used when no studies are available.

d Price elasticity of demand, which is a number without units, indicates by what percentage the quantity demanded changes in response to a one per cent change in the price.

[^] Tax avoidance includes legal activities and purchases in accordance with customs and tax regulations, most of which include the payment of some tobacco taxes, and are done by individual tobacco users, including cross-border shopping, tourist shopping, duty free shopping, Internet and other direct purchases, industry reformulation and/or repositioning.

⁺ Tax evasion includes illegal methods of circumventing tobacco taxes, such as the purchase of smuggled and illicit manufactured tobacco products. Those activities include both small and large quantities and often, but not always, involve efforts to avoid paying any taxes (i.e. small scale smuggling, large scale smuggling, illicit manufacturing, counterfeiting). Many of these activities are done by larger criminal networks or other large scale operations.

The World Bank classification of countries by income include, according to the 2008 GNI per capita, calculated using the World Bank Atlas Methods: high income: \$11,906 or more; upper middle income: \$3,856-11,905; lower middle income \$976-3,855; low income: \$975.

For the list of countries: http://data.worldbank.org/about/country-classifications/country-and-lending-groups#Low_income

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Competing interests:

No competing interests to declare.

References

- 1 World Health Organization. WHO Framework Convention on Tobacco Control. Geneva, Switzerland: World Health Organization, 2005:7-8.
- 2 IARC. IARC Handbooks of Cancer Prevention: Tobacco Control. Volume 14. Effectiveness of Price and Tax Policies for Control of Tobacco. Lyon, France: International Agency for Research on Cancer, (in press).
- 3 Working Procedures in: IARC Handbooks of Cancer Prevention: Tobacco Control. Volume 13. Evaluating the Effectiveness of Smoke-free Policies. Lyon, France: International Agency for Research on Cancer, 2009:327-334. <http://www.iarc.fr/en/publications/pdfs-online/prev/handbook13/index.php>
- 4 Becker GS, Grossman M, Murphy KM. An empirical analysis of cigarette addiction. The American Economic Review 1994;84(3):396-418.
- 5 Gallus S, Schiaffino A, La Vecchia C, Townsend J, Fernandez E. Price and cigarette consumption in Europe. Tob Control 2006;15(2):114-9.
- 6 Farrelly MC, Bray JW, Pechacek TF, Woollery T. Responses by adults to increases in cigarette prices by sociodemographic characteristics. Southern Economic Review 2001;68(1):156-65.
- 7 Kinh HV, Ross H, Levy D, Minh NT, Thi V. The effect of imposing a higher, uniform tobacco tax in Vietnam. Health Research Policy and Systems 2006;4(6):1-16.

- 8** Siahpush M, Wakefield MA, Spittal MJ, Durkin SJ, Scollo MM. Taxation reduces social disparities in adult smoking prevalence. *Am J Prev Med* 2009; 36: 285-91
- 9** Forster M, Jones AM. The role of tobacco taxes in starting and quitting smoking: duration analysis of British data. *Journal of the Royal Statistical Society* 2001;164(3):517-47.
- 10** Lopez-Nicolas A. How important are tobacco prices in the propensity to start and quit smoking? An analysis of smoking histories from the Spanish National Health Survey. *Health Econ* 2002;11(6):521-35.
- 11** Franz GA. Price effects on the smoking behaviour of adult age groups. *Public Health* 2008;122(12):1343-8.
- 12** Lewit EM, Coate D, Grossman M. The effects of government regulation on teenage smoking. *Journal of Law and Economics* 1981;24:24.
- 13** Van Walbeek C. Recent trends in smoking prevalence in South Africa--some evidence from AMPS data. *S.Afr.Med.J* 2002;92(6):468-72.
- 14** Kostova, D., Ross, H., Blecher, E., & Markowitz, S. Prices and cigarette demand: Evidence from youth tobacco use in developing countries. National Bureau of Economic Research Working Paper 15781, 2001:1-23.
- 15** Tauras JA, O'Malley PM, Johnston LD. Effects of price and access laws teenage smoking initiation: a national longitudinal analysis. *ImpactTeen Research Paper Series No 2*, the University of Illinois, Chicago; 2001: 5-44.

- 16** Cawley J, Markowitz S, Tauras J. Lighting up and slimming down: the effects of body weight and cigarette prices on adolescent smoking initiation. *J Health Econ* 2004;23(2):293-311.
- 17** Jimenez-Martin S, Labrega JM, Lopez A. Participation, heterogeneity and dynamics in tobacco consumption: evidence from cohort data. *Health Economics* 1998;7:401-414.
- 18** Lewit EM, Coate D. The potential for using excise taxes to reduce smoking. *J Health Econ* 1982;1(2):121-45.
- 19** Jha P, Chaloupka FJ. Curbing the epidemic governments and the economics of tobacco control. Washington D.C.: World Bank; 1999:1-118.
- 20** Townsend J, Roderick P, Cooper J. Cigarette smoking by socioeconomic group, sex, and age: effects of price, income, and health publicity. *BMJ* 1994;309(6959):923-7.
- 21** Onder, Z. The economics of tobacco in Turkey: new evidence and demand estimates. *Economics of Tobacco Control Series paper No 2, World Bank NHP Discussion paper; 2002:7-72.*
- 22** Nassar, H. The economics of tobacco in Egypt: a new analysis of demand. *Economics of Tobacco Control Series paper No 8, World Bank NHP Discussion paper; 2003:3-96.*
- 23** Ohsfeldt RL, Boyle RG, Capilouto E. Tobacco taxes, smoking, restrictions and tobacco use. In: Chaloupka FJ, Grossman M, Bickel WK, et al., editors. *The economics analysis of substance use and abuse: an integration of econometrics and behavioral economic research.* Chicago: University of Chicago Press; 1997:15-29.

- 24** Tsai YW, Yang CL, Chen CS, Liu TC, Chen PF. The effect of Taiwan's tax-induced increases in cigarette prices on brand-switching and the consumption of cigarettes. *Health Econ* 2005;14(6):627-41.
- 25** Tauras JA, Peck RM, Chaloupka FJ. The role of retail prices and promotions in determining cigarette brand market shares. *Review of Industrial Organization* 2006;28:253-84.
- 26** Gilmore A, Collin J, Townsend J. Transnational tobacco company influence on tax policy during privatization of a state monopoly: British American Tobacco and Uzbekistan. *Am J Public Health* 2007;97(11):2001-9.
- 27** Slater SJ, Chaloupka FJ, Wakefield M, Johnston LD, O'Malley PM. The impact of retail cigarette marketing practices on youth smoking uptake. *Arch Pediatr Adolesc Med* 2007; 161(5):440-5.
- 28** Balbach ED, Campbell RB. Union women, the tobacco industry, and excise taxes: a lesson in unintended consequences. *Am J Prev Med* 2009;37(2 Suppl):S121-S125.
- 29** Lightwood JM, Glantz SA. Short-term economic and health benefits of smoking cessation: myocardial infarction and stroke. *Circulation* 1997;96(4):1089-96.
- 30** Fichtenberg CM, Glantz SA. Association of the California Tobacco Control Program with declines in cigarette consumption and mortality from heart disease. *N.Engl.J Med.* 2000;343(24):1772-7.
- 31** World Health Organization. Tax manual on tobacco tax administration. Geneva, Switzerland: World Health Organization; In Press:1-99.

- 32** Merriman D, Yurekli A, Chaloupka F. How big is the worldwide cigarette smuggling problem? In: Prabhat J, Chaloupka F, editors. Tobacco control in developing countries. Oxford, UK: Oxford University Press; 2000:1-464.
- 33** Emery S, White MM, Gilpin EA, Pierce JP. Was there significant tax evasion after the 1999 50 cent per pack cigarette tax increase in California? *Tob.Control* 2002;11(2):130-4.
- 34** Joossens L, Raw M. Progress in combating cigarette smuggling: controlling the supply chain. *Tob.Control* 2008;17(6):399-404.
- 35** Warner KE, Fulton GA, Nicolas P, Grimes DR. Employment implications of declining tobacco product sales for the regional economies of the United States. *JAMA* 1996;275(16):1241-6.
- 36** Jacobs R, Gale F, Capehart T, Zhang P, Jha P. The supply-side of tobacco control policies. In: Jha P, Chaloupka F, editors. Tobacco control in developing countries. Oxford, UK: Oxford University Press; 2000:311-41.
- 37** Ahsan A, Wiyono N. The impact analysis of higher cigarette price to employment in Indonesia. Demographic Institute, Faculty of Economics, University of Indonesia, 2007. Final Report to the South East Asia Tobacco Control Alliance.

APPENDIX

The Working Group (by country alphabetical order) and collaborators:

Attending meeting:

F. Chaloupka, Chair (USA)
N. Nargis (Bangladesh; University of Dhaka, Dhaka),
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S. Delipalla, AM Perucic (Switzerland; World Health Organization, Geneva)
Z. Onder (Turkey; Bilkent University, Ankara)
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E. Blecher, (USA; American Cancer Society, Atlanta)
TW Hu, (USA; University of California, Berkeley)
D. Levy, (USA; HBSA of Pacific Institute for Research and Evaluation, Calverton)
H. Ross, (USA; American Cancer Society, Atlanta)
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Invited Specialist*:

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Contributing to Handbook volume 14 but unable to attend the meeting:

R. Iglesias (Brasil; Alliance for Tobacco Control, Rio de Janeiro)
M. Pekurinen (Finland; National Institute for Health and Welfare, Helsinki)
A. Yurekli (Switzerland; World Health Organization, Geneva)
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* An Invited Specialist is an expert in the subject under assessment, but also has declared a conflicting interest. Under such circumstances, the expert does not participate in the evaluation process while his expertise guides the description of general remarks on the intervention under assessment.

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