GUIDELINES FOR CONTROLLING AND MONITORING THE TOBACCO EPIDEMIC

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Guidelines for controlling and monitoring the tobacco epidemic

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Acknowledgements

Introduction

Each year, tobacco is responsible for the deaths of some 3.5 million people, or one death every nine seconds. These numbers are increasing, and unless current trends are reversed, by the decade 2020–2030, tobacco will kill 10 million people a year, with 70% of these deaths occurring in developing countries. Since the early 1950s, scientific evidence has been accumulating to the point where more than 25 diseases are now known or strongly suspected to be causally related to smoking. However, the costs of smoking extend well beyond the tragic health consequences, encompassing large economic and social costs as well.

Reflecting the concern of the international community, the World Health Assembly has adopted a number of resolutions on tobacco control, including a call for the implementation of comprehensive tobacco control strategies. These measures are urgently needed not only in countries with an already burgeoning tobacco epidemic, but also in countries where the epidemic can still be prevented. This book makes frequent reference to these resolutions and gives guidance on their implementation.

Although countries are working towards implementing World Health Assembly resolutions concerning tobacco and its health effects, lack of knowledge and experience in establishing comprehensive, multisectoral policies may hinder their progress. For those who are interested in or responsible for implementing tobacco control policies and programmes, this book offers practical guidance for setting up and managing long-term, multisectoral, comprehensive tobacco control policies and programmes. The experiences of a number of countries are reviewed, and the results broken down into various subjects that should be addressed as countries develop or improve their tobacco control policies.

Tobacco control is not just a rigid application of guidelines. Countries are encouraged to take the general principles, suggestions and examples in this book and adapt them to their specific needs. It is up to individual Member States ultimately to determine what strategy to take to achieve comprehensive tobacco control.

This book has two parts:

— Part I: Action for tobacco control
— Part II: Monitoring the tobacco epidemic.

Action for tobacco control

Chapter 1 describes briefly the various elements of the tobacco epidemic and the extent of the damage it causes. Chapter 2 discusses how to prepare a national action plan on comprehensive tobacco control, with emphasis on a collaborative approach. The use of a tobacco tax to promote public health is addressed at length. Recognizing that there may be substantial resistance to increased tobacco taxes, specific counter-arguments are offered. Chapter 2 also offers operational suggestions for managing and evaluating comprehensive tobacco policies and programmes once they are implemented.

Chapter 3 provides recommendations on implementing comprehensive tobacco control, based on the experiences of countries that have achieved success in this area. Arguments to counter objections to effective tobacco control measures are also provided.

In developing a comprehensive tobacco control policy, countries will find it useful to assess their current tobacco situation — what has been accomplished and what needs to be done. Chapter 4 deals with groups or institutions that play a key (or supporting) role in tobacco control and those that may oppose these policies and programmes. The information support needed for comprehensive tobacco control is examined in Chapter 5. When relevant information has been collected and documented, it can be helpful to put it into a form that is functional and accessible. Chapter 5 offers guidance in preparing comprehensive country profiles on "tobacco or health" issues. These profiles will be an integral component of the information support used in implementing and monitoring the effectiveness of comprehensive tobacco control policies.

Monitoring the tobacco epidemic

Chapters 6 to 9 focus on data collection and analysis relating to tobacco and its health effects, i.e. epidemiological surveillance. The data, along with additional information suggested in Chapters 4 and 5, will help countries in monitoring and documenting the tobacco epidemic. This information will provide support to strengthening tobacco control policies and programmes.

Reliable data on the epidemic's evolution, particularly among population subgroups, are extremely useful for supporting tobacco control efforts. Chapter 6 explores the principles and issues of surveillance, including the role of disaggregated data for these population subgroups. This chapter provides an overview of the major data collection methods and analytical strategies, and assesses indicators and information sources that will help monitor tobacco consumption and disease occurrence. These principles hold true for both developed and developing countries.

Chapter 7 presents information on how to measure tobacco consumption on the basis of production, sales and trade data. The advantages and constraints of various approaches to measuring tobacco consumption are discussed. For example, indicators such as per capita consumption of cigarettes

can provide information on overall levels of tobacco consumption but do not address the smoking status of population subgroups.

Chapter 8 shows how such information requires population surveys and how to use them to provide tobacco use data that will help to focus tobacco control policies. Revised and updated WHO recommendations for measuring prevalence of tobacco use are provided. In order to promote global standardization in measuring prevalence, all countries are strongly urged to follow these guidelines in conducting surveys of tobacco use prevalence. Surveys of knowledge and opinions are highly dependent on the cultural context in which they are conducted and may lend themselves less well to international standardization. Nevertheless, guidance is given on survey techniques that will elicit policy-relevant information on knowledge of the health effects of tobacco use and public opinions on tobacco control policy options.

Support for tobacco control policy development is greatly enhanced by reliable and timely data on the health effects of tobacco use. Chapter 9 presents an overview of the principal data sources for mortality and morbidity and discusses methods for estimating current and future tobacco-attributable mortality.

The need for action now

It is already known that tobacco is the most important preventable cause of premature death in many countries, and that half of persistent smokers who start smoking in adolescence will die from their use of tobacco. The alarming growth in consumption of tobacco testifies to the powerfully addictive nature of nicotine and the unparalleled ability of tobacco companies worldwide to aggressively market their products, despite strong public health efforts to discourage their use. At the same time, because of the 30–40-year time lag between the onset of smoking and the peak in the deaths that it causes, the health risks of tobacco are still vastly underestimated, even by those authorities responsible for protecting and promoting public health. The need for effective global action against the tobacco epidemic is urgent. This book provides practical guidelines for such action. The sooner this action becomes truly global and effective, the earlier the epidemic will be overcome.

Part I

Action for tobacco control

Chapter 1

The need for tobacco control

I n the early 1950s, widely read and acknowledged scientific reports concluded that smoking is the major cause of lung cancer. Since that time, scientific evidence has accumulated to the point where more than 25 diseases, most of which are life-threatening, are known or strongly suspected to be causally related to smoking. Evidence shows that tobacco use, in all its forms, greatly increases the risk of premature death from a number of chronic diseases.

Even non-smokers are affected by tobacco. Involuntary exposure to tobacco smoke puts them at greater risk of lung cancer and a number of other diseases. Thus, tobacco is a major contributing factor to many diseases and is the largest preventable cause of premature death in many countries.

Each year, tobacco products kill some 3 million people worldwide, and this number is increasing. Unless current smoking patterns are reversed, WHO estimates that by the decade 2020–2030 tobacco will be responsible for 10 million deaths per year, with 70% of them occurring in developing countries. Most of these deaths and all of the millions of potentially tobacco-related deaths before 2020 will occur among people who already smoke. Failure to take serious preventive action now will result in tens of millions of people dying prematurely from an epidemic that is entirely avoidable.

The costs of tobacco go far beyond the tragic health consequences. Tobacco is also a significant economic burden on families and societies. In 1995, a number of international organizations and individuals met at the Rockefeller Foundation's Study and Conference Centre in Bellagio, Italy, under the auspices of the Canadian International Development Research Centre and concluded that:

"Tobacco consumption is a major threat to sustainable and equitable development . . . In the developing world, tobacco poses a major challenge, not just to health, but also to social and economic development, and to environmental sustainability."[1]

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[1] Bellagio statement on tobacco and sustainable development. *Tobacco alert*, October, 1995 (available from Tobacco or Health Programme, World Health Organization, 1211 Geneva 27, Switzerland).

A 1994 study by the World Bank estimated that the use of tobacco results in a global net loss of US$ 200 000 million per year, with half of these losses occurring in developing countries. These costs include direct medical care for tobacco-related illnesses, absenteeism from work, fire losses, reduced productivity and foregone income due to early mortality. There are also substantial costs that are not quantifiable but just as real. Among these are reduced quality of life for the smoker and those affected by second-hand smoke, as well as the suffering of people whose lives are affected by the loss or illness of a loved one. The tobacco burden can also be determined on a local scale. For example, in its 1993 report, the United States Congressional Office of Technology Assessment estimated that the total financial cost of smoking to the United States in 1990 was about US$ 2.60 per pack of cigarettes (the cost of a pack in the United States in 1990 was US$ 1.44).

Patterns of tobacco use and mortality

Despite widespread knowledge of the harm caused by smoking, only modest success has been achieved in global tobacco control. Worldwide, consumption of manufactured cigarettes more than doubled from 1967 to 1992, from 2.8 trillion (2.8 million million) to 5.7 trillion (5.7 million million) cigarettes, with per capita cigarette consumption increasing by 25% during the same period.

In developed countries, where smoking became widespread during the 1940s and 1950s, the effects of past smoking trends can now be seen. Almost 20% of all deaths in the 1990s in developed countries are due to tobacco products. In the 35–69-year age group, about 35% of deaths among men and 15% among women are caused by tobacco. Although smoking rates have generally declined among adults in developed countries, they have risen in developing countries.

World Health Assembly resolutions

Reflecting the international public health community's growing concern with the epidemic of tobacco-related disease, the World Health Assembly, the governing body of WHO, adopted 14 resolutions on both national and international tobacco control measures between 1970 and 1995 (see Annex 1). From 1986 to 1995 the Assembly passed nine major resolutions concerning "tobacco or health" issues and continues to reaffirm its commitment to tobacco control.

The World Health Assembly resolution WHA39.14 (1986) is particularly noteworthy in that it calls on WHO's Member States to implement comprehensive tobacco control strategies; these, as a minimum, should contain the following:

(1) measures to ensure that non-smokers receive effective protection, to which they are entitled, from involuntary exposure to tobacco smoke,

in enclosed public places, restaurants, transport, and places of work and entertainment;

(2) measures to promote abstention from the use of tobacco so as to protect children and young people from becoming addicted;

(3) measures to ensure that a good example is set in all health-related premises and by all health personnel;

(4) measures leading to the progressive elimination of those socioeconomic, behavioural, and other incentives which maintain and promote the use of tobacco;

(5) prominent health warnings, which might include the statement that tobacco is addictive, on cigarette packets, and containers of all types of tobacco products;

(6) the establishment of programmes of education and public information on tobacco and health issues, including smoking cessation programmes, with active involvement of the health professions and the media;

(7) monitoring of trends in smoking and other forms of tobacco use, tobacco-related diseases, and effectiveness of national smoking control action;

(8) the promotion of viable economic alternatives to tobacco production, trade and taxation;

(9) the establishment of a national focal point to stimulate, support, and coordinate all the above activities.

Elements one and four of this list were recalled in 1990, with the adoption of WHA43.16, urging all Member States:

(1) to implement multisectoral comprehensive tobacco control strategies which, at a minimum, contain the nine elements outlined in resolution WHA39.14;

(2) to consider including in their tobacco control strategies plans for legislation or other effective measures at the appropriate government level providing for:

    (a) effective protection from involuntary exposure to tobacco smoke in indoor workplaces, enclosed public places and public transport, with special attention to risk groups such as pregnant women and children;

    (b) progressive financial measures aimed at discouraging the use of tobacco;

    (c) progressive restrictions and concerted actions to eliminate eventually all direct and indirect advertising, promotion and sponsorship concerning tobacco.

These and other World Health Assembly resolutions concerned with tobacco and health effects of tobacco are entirely consistent with the *Ottawa*

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charter on health promotion,[1] which encourages the adoption of healthy public policies and the creation of supportive environments for health as part of a broad multisectoral approach to health promotion. Major non-governmental organizations (NGOs), such as the International Union Against Cancer (UICC) and the International Union Against Tuberculosis and Lung Disease (IUATLD), as well as the 9th World Conference on Tobacco or Health, have adopted positions similar to that of WHO. In addition, the World Health Assembly has requested WHO to assist countries in implementing comprehensive tobacco control policies and to monitor closely the evolution of the global epidemic of tobacco-related diseases.

The social acceptability of tobacco use

Effective tobacco control begins with the realization that tobacco is powerfully addictive. Researchers have rated nicotine as more addictive than heroin, cocaine or marijuana. Despite their strong desire to quit smoking, smokers often find their efforts futile. They are not helped in their struggle by ubiquitous tobacco advertising and promotion. Tobacco control strategies should consider such personal aspects as self-esteem and self-image, as well as external factors such as peer pressure, pricing and perceived social acceptability. With the exception of social norms in certain cultures and religions that discourage smoking among women, there are few societal taboos on smoking. Hence, since tobacco use is both legal and not widely discouraged, it is permissible to manufacture, market and, in most countries, advertise tobacco products.

It is also permissible to sell tobacco products through wholesale and retail outlets (even in pharmacies and hospitals in some countries), to trade them internationally, and to establish and promote new markets for them. Ultimately, this creates a web of government and economic interests that may be dependent on tobacco for all or part of their income. For example, entities as diverse as ministries of agriculture, advertising firms, small retailers, theatre groups and sports clubs may receive income or sponsorship money from the tobacco industry, and are likely to support continued tobacco trade and consumption. These closely linked interests serve to reinforce the social acceptability of smoking.

The social acceptability of tobacco use contradicts the strong health education and health promotion messages discouraging it. Psychologists have found that teenagers, with still-developing cognitive abilities, are likely to take the contradiction of health education and health promotion messages on the one hand, and publicly sanctioned tobacco advertising, marketing and tobacco use on the other, as licence to believe nothing at all. They are especially prone

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[1] Ottawa charter on health promotion. *Health promotion*, 1986, 1:iii–v.

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to cite these contradictions in justifying actions that suit their immediate desires, such as smoking.

The importance of effective tobacco control

Many countries have undertaken health promotion programmes and health education programmes to inform people of the hazards of tobacco. However, these efforts are continually undermined by the tobacco industry. Over 40 years of experience with health education and health promotion measures show that these measures alone are insufficient to combat the tobacco problem. If smoking is still perceived as socially acceptable, educational campaigns focused on the health hazards of tobacco use will have but modest results in getting large numbers of adults to stop smoking, or in preventing teenagers from starting. The net effect will be a well-informed population of continuing smokers. For better results, education and health promotion must be accompanied by other actions, particularly legislation and tobacco tax measures, that will reduce the social acceptability of tobacco use.

Favourable results are being seen in countries that have adopted comprehensive tobacco control programmes that ban tobacco advertising, place strong warnings on packages and controls on the use of tobacco in indoor locations, levy high taxes on tobacco, and provide traditional health education and smoking cessation programmes. From 1970 to 1995, comprehensive tobacco control policies were implemented, maintained and upgraded in Australia, Finland, France, Iceland, New Zealand, Norway, Portugal, Singapore, Sweden and Thailand. Tobacco consumption has remained low or is falling rapidly in these countries, providing clear evidence that the more comprehensive the policy, the more effective the solution. In other countries, partial tobacco control programmes and policies have produced only partial solutions to this very serious public health problem.

Effective and comprehensive tobacco control is desirable in every country, whether to reduce already numerous tobacco-related deaths or to prevent the development of a serious public health problem in countries where the use of tobacco is not yet widespread. In many developing countries, particularly among women, there is still time to avoid repeating the experience of the industrialized countries, where tobacco use quickly became widespread, long before the serious health effects of smoking were known. Now that these hazards are acknowledged, this information can and should be used to prevent the appalling global predictions of an epidemic of tobacco-related diseases from becoming a reality. Tobacco control may be a low priority for countries striving for economic and social development, while trying to reduce infectious diseases. But unless strong tobacco control measures are taken now, those lives saved through the prevention of early death from infectious diseases may be lost

in middle age as new generations of adolescents and young adults take up smoking.

Monitoring the tobacco epidemic

Policies and programmes to control tobacco use should be supported by reliable and timely information on the subject, its health consequences and the sociocultural elements which underlie its use. Given tobacco's prominent role as a major health hazard and the likelihood that the health effects will increase dramatically in the future, it is essential that the regular assessment of tobacco use and associated disease trends become an integral part of a country's health information system. Since the epidemic of tobacco-related diseases is constantly evolving, gathering appropriate information at regular intervals will help monitor and control it.

These efforts will be more effective if health promotion policies and programmes are based on internationally comparable information. Standardized approaches make it easier to monitor the global, regional and national tobacco situation and its health effects, and to evaluate the effectiveness of policies and programmes.

Background reading

Barnum H. The economic burden of the global trade in tobacco. *Tobacco control: an international journal*, 1994, 3:358–361.

Bellagio statement on tobacco and sustainable development. *Tobacco alert*, October, 1995 (available from Tobacco or Health Programme, World Health Organization, 1211 Geneva 27, Switzerland).

Chapman S, Wong WL. *Tobacco control in the third world: a resource atlas*. Penang, International Organization of Consumers Unions Regional Office for Asia and the Pacific, 1990.

Controlling the smoking epidemic. Report of the WHO Expert Committee on Smoking Control. Geneva, World Health Organization, 1979 (WHO Technical Report Series, No. 636).

Doll R et al. Mortality in relation to smoking: 40 years' observations on male British doctors. *British medical journal*, 1994, 309:901–910.

Growing up tobacco-free: preventing nicotine addiction in children and youth. Washington, DC, National Academy Press, 1994.

MacKenzie TD, Bertecchi CE, Schrier RW. The human cost of tobacco use. *New England journal of medicine*, 1994, 330:975–980.

Ottawa charter on health promotion. *Health promotion*, 1986, 1:iii–v.

Peto R et al. *Mortality from smoking in developed countries, 1950–2000*. Oxford, Oxford University Press, 1994.

Reid DJ et al. Choosing the most effective health promotion options for reducing a nation's smoking prevalence. *Tobacco control*, 1992, 1:185–197.

Smokeless tobacco control. Report of a WHO Study Group. Geneva, World Health Organization, 1988 (WHO Technical Report Series, No. 773).

Smoking and its effects on health. Report of a WHO Expert Committee. Geneva, World Health Organization, 1975 (WHO Technical Report Series, No. 568).

Smoking control strategies in developing countries. Report of a WHO Expert Committee. Geneva, World Health Organization, 1983 (WHO Technical Report Series, No. 695).

US Department of Health and Human Services. *Reducing the health consequences of smoking, 25 years of progress: a report of the Surgeon General.* Rockville, MD, Centers for Disease Control, 1989 (DHHS Publication, No. CDC 89–8411).

US Department of Health and Human Services. Smoking and health in the Americas: a 1992 report of the Surgeon General, in collaboration with the Pan American Health Organization. Atlanta, GA, Centers for Disease Control, 1992 (DHHS Publication, No. CDC 92–8419).

US Department of Health and Human Services. *The health consequences of smoking, nicotine addiction: a report of the Surgeon General.* Rockville, MD, Centers for Disease Control, 1988 (DHHS Publication, No. CDC 88–8406).

US Environmental Protection Agency. *Respiratory health effects of passive smoking: lung cancer and other disorders.* Washington, DC, US Environmental Protection Agency, 1993.

US Food and Drug Administration. Regulations restricting the sale and distribution of cigarettes and smokeless tobacco products to protect children and adolescents: Proposed rule 21 CFR, parts 801, 803, 804 and 897. Washington, DC, *United States Federal Register*, August, 1995.

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A national plan of action for comprehensive tobacco control

Goals and objectives

The goal of tobacco control efforts should be to reduce the mortality and morbidity caused by the use of tobacco products. This can be accomplished through a combination of the following:

— helping those who do not use tobacco to stay tobacco-free;
— promoting cessation of tobacco use by encouraging and assisting in cessation efforts;
— protecting the health and rights of children and adults by preventing involuntary exposure to environmental tobacco smoke.

The examples of planning structures and successful tobacco control plans highlighted in this book are not mandates to be followed rigorously. Rather, they should serve (along with examples of successful actions of other countries and other organizations) as guides to the planning process. However, the plan should be practical and viable in the country for which it is prepared, which means that it must be carefully adapted to the country's unique cultural features. The creation of a formal structure or planning and building of capacity are not goals in themselves but tools to achieve action and should be goal-oriented. They have value only insofar as they contribute to achieving these goals. Often, an informal group of individuals will effect the greatest change, so such efforts should be supported.

The following elements, derived from World Health Assembly resolutions and recommendations from other international and intergovernmental bodies, should be part of comprehensive national tobacco control programmes. (They are in no particular order of priority.)

1. Establishment and maintenance of an active national focal point to stimulate, support and coordinate tobacco control activities.
2. Establishment of an adequately financed and staffed national coordinating organization on tobacco and health issues.
3. Monitoring of trends in smoking and other forms of tobacco use, tobacco-related diseases and effectiveness of national smoking control action.

4. Effective promotion and education programmes aimed at smoking prevention and cessation of smoking.
5. Effective protection from involuntary exposure to tobacco smoke in transit vehicles, public places and workplaces.
6. Health care institutions that are smoke-free, and health care workers who set a good example by not smoking, and through their own training, and counselling and advocacy activities, emphasize the benefits of a smoke-free life.
7. Tobacco taxes that increase faster than price and income growth.
8. A portion of tobacco taxes used to finance tobacco control measures and to sponsor sports and cultural events.
9. A ban on all forms of tobacco advertising, promotion and sponsorship.
10. A legal requirement for strong, varied warnings on cigarette packages.
11. Restriction of access to tobacco products, including a prohibition on sale of tobacco products to young people.
12. Effective and widely available support of cessation of smoking.
13. Limitations on the levels of tar and nicotine permitted in manufactured cigarettes.
14. Mandatory reporting of toxic constituent levels in the smoke of manufactured tobacco products.
15. Strategies to provide economic alternatives to tobacco agricultural workers.

Examples of the implementation of tobacco control policies are now quite numerous. One such example, that of Nepal, is described in Box 1 which explains how the country selected from the above elements to suit its national situation.

Box 1. Planning tobacco control in Nepal

Nepal was able to implement many elements of its very practical national plan for tobacco control three years after preparing the plan of action. It has established a national focal point on tobacco, and there is effective protection from involuntary exposure to tobacco smoke in health care institutions, public places, workplaces and public transport. In addition, Nepal has improved programmes of health promotion and education aimed at smoking prevention and smoking cessation, and imposed a special tax on tobacco products, using the new revenue for public health improvement.

The country created activities, timetables and resource requirements for most of these elements of a comprehensive national tobacco control programme. However, the sophisticated infrastructure required to implement, monitor and enforce items 7, 11, 13 and 14 did not exist in Nepal, one of the world's poorest countries. Therefore, Nepal decided not to undertake action on these four elements, and to concentrate instead on the other elements, where real progress could be made.

WHO's plans of action

Strengthening tobacco control policies is a complex and serious matter. To be successful, it requires careful planning, and the plans need to be kept up-to-date. The Tobacco or Health programme at WHO headquarters was following a plan of action that had been endorsed by the World Health Assembly for the period 1988–1995. In May 1996 the 49th World Health Assembly endorsed the Tobacco or Health action plan for the period 1996–2000, which will guide WHO's global activities to strengthen tobacco control.

WHO headquarters plan of action

Briefly, the draft WHO headquarters plan of action outlines objectives, approaches and activities under three main programme components:

Programme component I: national and international tobacco control programmes

Objective: To promote the development and strengthening of national and international tobacco control programmes to prevent and reduce tobacco use.

The plan provides further details of three approaches and six activities to be pursued to fulfil this objective.

Programme component II: advocacy and public information

Objective: To promote the concept of tobacco-free societies.

The plan goes on to outline the approach to be taken to advocacy and public information and nine activities to be undertaken, including the regular publication of *Tobacco Alert*.

Programme component III: tobacco or health research and information centre

Objective: To collect, collate, prepare and disseminate valid information on tobacco-or-health epidemiology and on strategies to control tobacco consumption.

The plan outlines one approach and four activities to be undertaken to achieve this objective.

Some of WHO's Regional Offices have also been active in reviewing and updating their regional action plans concerned with tobacco and its health effects.

Regional WHO plans of action

Region of the Americas

Partnership is the cornerstone of the Latin American Interagency Plan of Action on Tobacco or Health. Launched in 1995, this plan draws on the resources of all its partner agencies — the Pan American Health Organization (PAHO), the Latin American Coordinating Committee for Tobacco Control (CLACCTA), the United States Centers for Disease Control and Prevention (CDC), the United States National Cancer Institute (NCI), the American Cancer Society (ACS), the International Union Against Cancer (UICC), and Health Canada. The plan's purpose is to provide technical support to participating countries to strengthen national tobacco control efforts. Its objectives are to establish a diagnostic baseline in six countries; establish, mobilize and optimize national coalitions for proper national and interagency programme implementation; and develop an evaluation instrument and system for monitoring the progress and products of the programmes.

The Interagency Plan of Action goes on to describe in detail how the first stage will be implemented. It describes three expected results, 11 results indicators, eight specific activities, and budgets for all activities. The plan provides an excellent framework for implementing and monitoring progress on tobacco control. There is every reason to be optimistic that this will strengthen tobacco control throughout Latin America.

Eastern Mediterranean Region

The following are items for action on tobacco and its health effects in the countries of the Eastern Mediterranean Region:

— researching issues related to smoking prevalence among youth and tobacco-related mortality;
— maintaining close working relationships with nongovernmental organizations;
— assisting and supporting those Member States which have not yet developed clear tobacco-or-health policies and programmes to do so, and helping to strengthen the tobacco control programmes of those countries which have already developed such programmes;
— encouraging public health administrators to promote legislation to protect individuals from the hazards of involuntary exposure to environmental tobacco smoke.

Items for action at the intercountry or regional levels are listed below:

• developing regional guidelines for comprehensive policies and programmes outlining various promotional activities to reduce tobacco consumption;

- preparing and disseminating health education materials in Arabic and other languages on smoking hazards and the need for tobacco control measures.

European Region

The current Regional Action Plan for a Tobacco-Free Europe proposes a number of specific projects under the following six action areas:

— alliances for a tobacco-free Europe;
— multisectoral tobacco policies;
— smoke-free environments;
— nonsmoking generations;
— support to smokers for quitting;
— stronger leadership and implementation capacity.

Western Pacific Region

The Regional Office for the Western Pacific has prepared an Action Plan on Tobacco or Health for 1995–1999 that proposes five objectives, together with related targets, activities and a timetable for implementation. The five objectives are as follows:

— to develop, implement and strengthen comprehensive national policies and programmes on tobacco control;
— to collect data on tobacco use;
— to support health advocacy, education and information;
— to support implementation of appropriate legislation;
— to achieve pricing policies in the region that deter tobacco use.

Health promotion

It is often claimed that the health hazards of tobacco use are so well known that it is no longer necessary to provide people with this information. Yet even in developed countries the magnitude of the risks of tobacco use and the benefits of, and assistance for, quitting are not appreciated. The result is that vast numbers of people are not empowered to make fully informed decisions about their own health. In developing countries, this lack of information is even more acute. Considerable efforts are needed to ensure that relevant messages are constantly brought to public attention worldwide. Also, there must be a means to teach children about the health hazards of tobacco use.

As detailed later in this chapter, the other key component of comprehensive tobacco policies will involve legislation, including adjustments to fiscal policy. Since budgetary constraints often require choices to be made, the best plans will include an optimal mix of culturally relevant and cost-effective

strategies. Such a mix can be constructed from the various categories of activities discussed below.

No-tobacco days

WHO sponsors an annual World No-Tobacco Day (on 31 May), for which it produces a variety of materials reflecting the theme chosen for that year. Celebration of that day, as well as other national no-tobacco days, weeks and months celebrated in some countries, has been a successful promotional tool for focusing public and media attention on tobacco issues. They would also be appropriate occasions for making policy announcements on tobacco issues. For countries where little in the way of strengthening tobacco control is feasible, celebrating World No-Tobacco Day is still possible. These events can be a useful tool in advancing comprehensive tobacco control efforts, and especially for promoting long-term policy development related to the theme of the celebration.

Media advocacy

The news value of issues related to tobacco and its health effects is a major potential interest to the media. They could be provided with interesting information and encouraged to prepare news, features and opinion articles on this topic. However, improved news coverage of tobacco and its health effects will not happen unless public health workers make it happen. Ample advice and experience exist on how this can be done.

News media are primarily interested in news; therefore, the surest way to gain exposure for tobacco issues in news media is to make the issues newsworthy. There has to be new information, a new activity or event, effectively and quickly communicated to the media, worthy of catching their attention. Influential or well-known personalities can be enlisted to create newsworthy events. Public health workers should strive constantly to produce new surveys, reports, anti-smoking activities, policy initiatives, and no-tobacco events and make sure that this latest information is communicated to the media. In this way, continuing public attention on tobacco and its health effects can be sustained at little or no cost.

For example, in Canada, Finland, Hong Kong, New Zealand and Norway, extensive public debates which led to the implementation of tobacco control policies have received prominent and prolonged media coverage, with frequent references to the health hazards of tobacco. While these policy debates took place, the countries experienced sharp declines in tobacco consumption, with further declines after comprehensive tobacco control policies were established.

There are other ways for the media to play a role in health education. Frequently, media will accept without charge, or are required to broadcast according to licensing requirements, public service messages. Health groups

can advocate the prominent positioning of messages about tobacco and its health effects. It may be possible, in countries where tobacco advertising is still allowed, to require the production and broadcast of health messages as a condition for the broadcast of tobacco advertising.

Paid media advertising

Where tobacco advertising is permitted, the tobacco industry typically devotes substantial resources to advertising and promoting tobacco products. In the United States in 1993 tobacco companies spent US$ 6200 million on tobacco advertising and promotion, nearly 5000 times the entire WHO budget for activities related to the health effects of tobacco in the same year. While spending on tobacco advertising may be more modest in other countries, it no doubt vastly exceeds the total amount that public health interests could spend to discourage tobacco use.

Health interests can never hope to match the spending by tobacco interests on paid media advertising, and probably should not try. Nevertheless, paid media advertising, when used with precision, can be an effective tool in a comprehensive effort to discourage tobacco consumption. One way of funding this would be to earmark a portion of tobacco taxes for this purpose.

The 1994 report of the United States Surgeon General, *Preventing tobacco use among young people* proposes that the following principles be applied to the design of paid media campaigns to discourage and prevent tobacco use.

- Target groups should be carefully differentiated.
- The planning of prohealth campaigns for young people should attend to the critical issues of message design . . . appealing to the needs and interests of the target group (e.g. peer approval, freedom, autonomy); using peer models, image appeals, or lifestyle appeals instead of cognitive appeals; providing novelty and humour; avoiding exhortation; using celebrity spokespersons cautiously; and demonstrating preventive skills.
- Messages should be carefully scrutinized by knowledgeable persons and by representatives of target groups to ensure that these messages are not conveying unintended effects that may eclipse their positive value.
- Diagnostic and formative research, including surveys and focus groups, should be employed at appropriate points throughout the creative process.
- Campaigns should be intense enough to ensure impact.
- Campaigns can be cost-effective.

School-based health promotion

The school is an extraordinary setting in which to improve the health of students, school personnel, families and members of the community. It offers

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opportunities to achieve significant health and educational benefits with investments of scarce education and health resources. Programmes that help build skills for resisting social influences to smoke, and those which have led to children encouraging their parents to quit, have been shown to have at least short-term effectiveness. Although a great deal of effort has been expended on school-based smoking prevention programmes, in many cases long-term evaluation results have been disappointing. The reason for this lack of success could be explained by the fact that these programmes were undermined by the social environments in which they took place. However, when these programmes are situated in the context of more comprehensive community interventions, modest long-term effects have been found.

Evaluating previous efforts can provide guidance in designing school-based smoking prevention programmes. At the same time, schools could introduce issues related to tobacco and health into their curricula where it is appropriate (e.g. biology, social sciences, mathematics, physics, chemistry, art) and encourage changes in the social environment that complement the messages delivered.

Community-based health promotion

Comprehensive health promotion programmes which involve community institutions and complementary local policy changes have shown considerable promise in both developed and developing countries. These types of programmes would have the potential to reach children who do not attend school regularly, a very high proportion of children in some developing countries. Other specific programmes targeted at street children are recommended. A community project that aimed to promote the benefits of not smoking is described in Box 2.

Sponsorship of cultural, sporting and community events

Sponsorship can occur in many forms, and even health groups or governmental agencies on a limited budget can convey their message through the

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Box 2. A community project promoted the smoke-free life in Nepal

A successful community project took place in the rural Kathmandu valley of Nepal. A community-wide effort involved schoolchildren, the school headmaster, parents, teachers, health care workers and the village council who worked together to promote the benefits of a smoke-free life. The main promotional technique employed was person-to-person communication in the school and in people's homes. Before the intervention, 85% of the men and 62% of the women were smokers. After the intervention, smoking dropped markedly, while remaining high in a non-intervention community in the same valley.

sponsorship of selected events. For example, in some cases governments already sponsor sporting teams or events and it would be easy to adopt the non-smoking theme, even with a simple logo on the athletes' uniforms. Box 3 describes sponsorship to promote a tobacco-free lifestyle in Switzerland. Some other examples are as follows:

- In 1994, the Hellenic Action Against Cancer (with WHO as a co-sponsor) organized an international antismoking youth festival in Athens, Greece. Participants were asked to create their own non-smoking messages through essays, athletics, music or other forms of artistic expression.
- Brazil's Tobacco Control Service hosts an annual "Run to Quit Smoking".
- A boat that was sponsored by and named after a smoking cessation aid registered to sail in a prestigious long-distance yachting race from South Africa to Brazil. After months of preparation, the captain was informed that, due to protests from the tobacco company that sponsored the race, the boat could not compete unless its name was changed. Considerable media coverage was generated, as health advocates asserted that tobacco companies have always been enthusiastic promoters of their own freedom of expression yet appeared to have less enthusiasm for these principles when counter to their own interests. The sponsors eventually agreed to let the boat participate in the race.

Although these types of limited activities serve a useful purpose, wherever possible countries should strive for a more encompassing sponsorship programme, as exemplified by health promotion foundations in a number of countries (see Box 4).

Box 3. Promoting a tobacco-free life in Switzerland

Creative use of health sponsorship is possible in countries with no legislative restriction on tobacco advertising and sponsorship. For example, in Geneva, Switzerland, a local government agency, CIPRET (*Centre d'Information pour la Prevention du Tabagisme*), has adopted a very creative approach to health sponsorship. With municipal funding, CIPRET has sponsored a number of carefully chosen sports and cultural activities, including rock concerts, as well as a long-distance car rally team, a racing yacht, a basketball team, and a motorcycle racer. At the sponsored events, positive messages help promote the benefits of a tobacco-free life. CIPRET also maintains a constant presence at community events, ranging from health fairs to car shows. Active participation in community events can thus be a very valuable and cost-effective health promotion strategy.

Box 4. Taxes fund health promotion in Australia and New Zealand

Pioneered by the state of Victoria, health promotion foundations are now operating in several Australian states, funded by a small portion of state tobacco taxes. These foundations have sufficient resources to replace all the sports and cultural events previously funded by tobacco companies with health promotion sponsorships that promote a comprehensive range of healthy lifestyles, including the benefits of a tobacco-free life. In addition, the foundations fund a variety of community sports and cultural events and organizations, as well as community development and tobacco policy research projects. The creation of these health promotion foundations had the effect of converting potential opponents of comprehensive tobacco control (former recipients of tobacco sponsorship monies) into supporters of the policy. Abundant documentation is available on the establishment and operation of these health promotion foundations.

Another effective sponsorship strategy was achieved in New Zealand, where comprehensive tobacco control legislation which banned nearly all forms of tobacco advertising, promotion and sponsorship was instituted. New Zealand established a highly successful Health Sponsorship Council, funded by general taxation revenue, that conducts a broad range of health promotion activities, including those in favour of a tobacco-free life.

Cessation of smoking

Considering that the goal for smoking control is a reduction of smoking-related mortality, special emphasis must be given to maximizing the number of individuals who quit smoking. As documented in the 1990 report of the United States Surgeon General, cessation of smoking prevents diseases; it prevents the occurrence of disease (primary prevention) and it reduces the risk of further disease in those who quit smoking (secondary prevention). This means that cessation of smoking is a major means of reducing smoking-related mortality. Further, cessation reduces mortality within just a few years, while prevention of onset of smoking does not influence mortality statistics until some 30–50 years later, when today's young people reach the ages where smoking-related deaths occur. Nicotine has now been clearly recognized as a drug of addiction in the 1988 United States Surgeon General's Report and WHO's *International classification of diseases*, in the same category as heroin or cocaine.

For the individual smoker, quitting requires two things: motivation to quit and ability to overcome dependence-related obstacles. Intermediate objectives for smoking control policies should therefore include both strengthening smokers' motivation to quit and weakening dependence-related difficulties. Different smokers have different needs according to the nature and strength of their dependence.

Although 75–80% of smokers, where this has been measured, want to quit

and about one-third have made at least three serious attempts to do so, less than half of smokers succeed in stopping permanently before the age of 60. Nicotine dependence is clearly a major barrier to successful cessation. Therefore, smoking control policies should contain both activities to strengthen smokers' motivation to quit (health education, public information, price policies, smoke-free policies, behavioural treatments, etc.) and activities to reduce dependence-related difficulties for smokers to quit (behavioural and pharmacological treatment).

In countries with well-developed health care systems, most people consult a physician or dentist at least once a year and attach great importance to their advice. Brief but firm advice has been associated with sustained smoking cessation among 5% of smokers, considerably more than the 1% or 2% a year who quit in the absence of such advice. When coupled with nicotine replacement therapy (NRT), brief advice from a physician can result in still further improvements in one-year smoking cessation rates. Although there can be an initially higher cost for NRT, it can be more cost-efficient in the long run for both individuals and governments. There are also reasons to consider alternative nicotine replacement maintenance systems for those individuals who cannot break their dependence on nicotine but wish to reduce the health consequences associated with obtaining their nicotine from tobacco products. However, nicotine is a drug, and its use may carry with it certain risks, particularly when used other than as advised. Patients with heart problems, in particular, risk further cardiovascular complications if they continue to smoke while using NRT. Current evidence indicates that NRT, when used as advised, has few adverse effects. However, those using NRT should be warned that smoking while using NRT is inadvisable. As a rule, advice and information from trained persons are important for all potential users of NRT, in order to determine its proper use.

To achieve successful cessation of smoking on a very large scale, special cessation programmes are not enough. Currently, only a few health professionals are trained in the treatment of tobacco dependence. All health professionals, including doctors, nurses and pharmacists, should be given both basic and in-service training so that they are capable of providing advice and treatment for tobacco dependence.

In preparing national tobacco control plans and strategies, planners may wish to encourage the provision of a broad range of smoking cessation strategies that would include combinations of the most effective group programmes of smoking cessation, physician advice and, where appropriate, nicotine replacement therapy. Countries with national health systems should include counselling and treatment for nicotine addiction as a benefit covered by their national health insurance programmes.

Mass media programmes not only can create a climate for quitting smoking but can also give advice and tips on how to quit smoking. These may reach millions of people and are a useful adjunct to individual advice from a health professional.

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Health protection

Legislative measures

A number of World Health Assembly resolutions call for comprehensive tobacco control measures. Many analysts have concluded that, ultimately, the most effective action on these kinds of measures will require the creation of legislation (see Box 5). Countries have been specifically counselled against accepting voluntary regulation of advertising and package labelling from the tobacco industry. Resolution WHA43.16 specifically urges consideration of legislative, rather than voluntary, controls on tobacco advertising.

Environmental tobacco smoke has been easier to deal with through voluntary and administrative arrangements because employers often recognize the benefits of a smoke-free workplace. However, legislation is the only way to guarantee protection. A range of measures, from voluntary to legislative, and practical ways of implementing them, have been the subject of advisory kits prepared in support of the World No-Tobacco Days of 1991, 1992 and 1993, addressing the subjects of smoking in public places, smoking in work-places and smoking control in health care institutions, respectively. These documents should prove useful resources in designing staged approaches to progressively improving protection from involuntary exposure to tobacco smoke.

Countries with successful comprehensive tobacco control strategies have legislated in all the areas mentioned above. Taxation law, usually dealt with by departments of finance, is addressed later in this chapter. Other matters that are addressed most effectively by legislation are discussed here.

Annex 2 contains the text of a model law on tobacco control that can be adapted to differing national situations. Since cultures, languages, systems of government and legislative processes differ widely from country to country, countries should study the examples of tobacco control legislation from other countries as appropriate. Those responsible for drafting new tobacco control legislation should also consider how to use other countries, legislative experience to best meet their own requirements. Systems of regulation and enforcement differ so widely from country to country that no suggestions are offered in that area. Nevertheless, health and legislative officials may wish to study the enforcement and regulatory experience of other countries in preparing enforcement and regulatory provisions for their own.

Some countries may not be able to adopt truly comprehensive legislation in a single step. Although WHO recommends such laws for all countries, many countries may require a series of steps to attain this goal. Each step along the way should be seen as part of the long-term effort, taking into consideration each country's specific situation. At the same time, to avoid passing numerous small pieces of legislation, it is often better to pass broad laws. The limits of what is politically feasible at any point in time can be accounted for in the drafting of these laws. For example:

Box 5. Key legislative measures needed for comprehensive tobacco control

Legislation is critical to comprehensive tobacco control. The range of legislative measures is necessarily broad, given the number of things which must be done in order to achieve effective control of the tobacco epidemic. The necessary measures are such that it can be best to take the position followed by many governments when dealing with other drugs and have a single piece of legislation giving broad regulatory control over all aspects of tobacco manufacturing, importation, marketing and use. Alternatively, it may be necessary to pass several different laws. In any case, the relevant laws can give authority for the following:

- The accessibility of tobacco products should reflect the gravity of harm associated with their use. This effort should include:
  - a taxation law that reduces affordability;
  - an end to tobacco sales in health care, educational and athletics facilities;
  - an end to tobacco sales in vending machines and from self-service displays;
  - the effective elimination of tobacco sales and distribution to children.
- There should be full and free consent among users and potential users of tobacco products. This would entail the following:
  - an end to all direct and indirect forms of tobacco advertising, because tobacco advertising is inherently misleading;
  - an end to the misleading messages conveyed on tobacco labelling and packaging;
  - prominent, detailed and frequently updated health information on (and possibly in) tobacco packaging and at point of sale;
  - full public disclosure of all product toxins and additives;
  - mandated public health education efforts, including efforts to educate the public about the role of the tobacco industry;
  - guaranteed assistance to those who wish to cease using tobacco products, and assistance for tobacco users seeking compensation for their harm.
- There should be protection for the health, rights and well-being of those who do not use tobacco products. This should include:
  - a guarantee of smoke-free public spaces, workplaces and public transit;
  - guaranteed and simplified methods of redress for those harmed by environmental tobacco smoke;
  - legislated protection from (or compensation for) fires and other environmental harm caused by tobacco products.
- The legislation should control the product itself. It should include:
  - the ability to ban specified categories of any nicotine delivery products;
  - control over the additives which can be, or must be, added to tobacco products;
  - control over allowable levels of toxic ingredients found in tobacco products;
  - the ability to require modification in tobacco products.

- some requirements can be stipulated to come into force at a later date;
- if some current activities promoting tobacco cannot be stopped, they might be phased out and new activities prevented;
- general requirements can contain regulatory authority allowing for

further health protection measures to be developed by regulation or ministerial order.

These latter provisions are key components of a comprehensive legislative approach to tobacco control. For example, large and prominent health warnings, covering 10% or more of the package face, are now required in a number of countries, including Australia, Iceland, Singapore, South Africa and Thailand.

In many jurisdictions, positive enforcement strategies to help enforce restrictions on cigarette sales to minors have been found to be helpful. Typically, these strategies involve recruiting young people under the legal age for purchasing cigarettes to assist in surveying and enforcing legislative provisions restricting cigarette sales to minors.

Fiscal measures

The WHO advisory kit prepared for World No-Tobacco Day 1995, on the theme of the economics of tobacco control, explains why the tool of tobacco taxation should be used to obtain funding for improved tobacco control programming, increased government revenue and reduced tobacco consumption (see Box 6). It offers compelling reasons for a fiscal policy of progressively increasing tobacco taxes to strengthen national tobacco control. Selected items from the kit are reproduced in Annex 3.

The major purpose of tobacco taxation policy is to make tobacco products less affordable and reduce consumption. Often this requires increasing prices beyond what is necessary to surpass inflation. This is because income growth can also stimulate the demand for tobacco, a particularly acute problem in some developing countries with rapidly growing economies. For example, in some countries there may be a high prevalence of tobacco use but low incomes restrain consumption. Without compensatory tobacco tax increases, economic growth could lead to a rapid rise in tobacco use unless checked by tax increases that keep pace with the greater affordability of tobacco products.

Increased tobacco taxes, above the rate of inflation, and earmarking a proportion of the proceeds to finance the other tobacco control measures that comprise the comprehensive national tobacco control programme, have been repeatedly recommended. Adoption of such measures will make all tobacco control measures both effective and self-financing. This is especially important in developing countries where financing of new public health initiatives could be difficult.

Another fiscal measure that can be used is to limit the pre-tax selling prices of tobacco products. This compensates for the extremely high profits tobacco companies could otherwise obtain due to the industry's monopolistic nature, and allows increased tobacco tax revenue without additional changes in retail prices. Brazil witnessed the result of such a system in the 1980s when an inflation control strategy prevented tobacco companies from raising prices.

Box 6. Fiscal measures: highlights

- In addition to devastating health consequences, it has been estimated that tobacco use is responsible for a global net loss of US $200 000 million each year, half of it in developing countries.
- Raising the price of tobacco products through tobacco tax changes is likely to be the single most significant step towards reducing consumption of tobacco products.
- Increasing tobacco taxes and designating a portion of these taxes to replace tobacco sponsorships of sports, arts and cultural programmes will reduce the economic clout of the tobacco companies while promoting healthful messages.
- Establishing minimum allowable pricing for tobacco products will keep price-sensitive consumers (particularly young people) out of the market, and may prevent them from ever starting to smoke.
- In the absence of government intervention, tobacco use can be expected to rise as disposable incomes rise. This is particularly significant for the many developing countries that are experiencing very high growth rates.
- Thus, prices for tobacco products should rise regularly to cover normal inflation, to ensure that they do not become more affordable as incomes rise, and to give existing smokers the incentive to quit.
- Taxing all tobacco products ensures that substitution of other tobacco products (including smokeless tobacco and tobacco for roll-your-own cigarettes) is not encouraged.
- High tobacco taxes bring not only health but financial benefits to governments. This additional revenue could be used to fund such things as health care or health promotion, or may allow reductions in other taxes.
- Tobacco taxes are relatively easy to administer, so that only a small portion of the revenue raised needs to be spent on collection.
- Tobacco tax increases have been shown to be relatively popular among the public, even among smokers, especially if the purpose of preventing young people from starting smoking is understood.

Since they could not enhance profits through price increases, the tobacco companies lowered costs. The result was that advertising and promotional activities were reduced significantly; this was reversed when price controls were relaxed.

A broad range of arguments may be raised to oppose tobacco taxes. These range from concerns about smuggling to claims that a cheap tobacco policy is a benefit to the poor (often, ironically, when the revenue tobacco generates could provide them with real benefits — such as basic health care).

Economic alternatives to tobacco

Given the powerfully addictive nature of tobacco, only slow and gradual changes in tobacco consumption can be expected, even in the best of circumstances. This means that there will be time for smooth economic adjustment as displaced tobacco workers move to alternative forms of economic activity.

Nevertheless, good long-range planning can anticipate long-term declines in the tobacco industry. Addressing economic alternatives for tobacco workers can also be good strategy. It can dissuade departments of agriculture, tobacco agricultural workers, and others who benefit financially from the tobacco industry from opposing tobacco control plans and encourage support for a comprehensive national tobacco control strategy. Countries with large tobacco growing areas could ask for assistance in the development of alternative crops from the Food and Agriculture Organization (FAO) of the United Nations.

Part of Canada's successful comprehensive tobacco control strategy included subsidies to tobacco farmers to take up alternative forms of economic activity. One-time cash payments were also made to tobacco farmers who agreed to retire from the tobacco business. In one decade, tobacco consumption dropped by about 40% in Canada, the number of tobacco farmers fell by half, and the tobacco-growing regions of the country experienced strong economic growth as new forms of economic activity opened up. Other countries, including Brazil, Malaysia and the Philippines, are looking into economically feasible alternatives to tobacco.

In Bangladesh, a successful community demonstration project in a tobacco-growing region succeeded in not only reducing rates of tobacco consumption in the community but also converting a large number of farmers from tobacco to food production. Also, in this region, food production was shown to be more lucrative than tobacco production.

Building capacities

Building capacities involves developing human, financial and structural resources with long-term sustainability to support tobacco control. In developing the infrastructure to institute tobacco control measures, it is necessary to keep the goals in mind. Sometimes a process or activity that can help on one issue can be unnecessary or even counterproductive on another. For example, a focal point for tobacco control can be a catalyst for significant improvements in public health, but could also be an impediment to action if its mandate or direction is not clearly focused on achieving the best results for tobacco control.

The optimal level of capacity for tobacco control is whatever is needed to achieve the determined goals. In practice, tobacco control often starts with a single committed person or a small group of people, and certain issues may remain in their sphere. At other times, it will require the development of detailed information, broad coalitions and a sustained funding base. The development of issue-specific strategies can allow the appropriate level of resources to be applied to each situation while the development of an overall capacity can ensure the resources for future actions. However, to achieve sustained, comprehensive tobacco control, broad popular support is required.

Because capacity-building is inherently goal-oriented, it can play a key role in tobacco control by:

— giving newly interested individuals or groups a foundation for successful tobacco control work;
— providing those already working on tobacco control with additional sources of information and evaluation;
— developing an infrastructure for tobacco control that can continue operating regardless of changing conditions in the country.

In some countries capacity-building involves offering courses to interested people or developing a system to exchange and distribute information. Capacity-building for tobacco control will be greatly enhanced by the ability to gain and use information, increasing support within and beyond government and neutralizing opposition. The following chapters deal with these issues.

Monitoring and evaluation

Good national plans for tobacco control will also include a programme of continuous monitoring of all relevant factors related to tobacco and its health effects, as detailed in Chapters 4–9. Some of this can be done relatively easily and with limited resources.

Good planning will also include provision for careful evaluation of progress, successes and failures as policy and programme implementation proceeds. The results of such evaluation will then be used to revise and update planning and programming, in an effort to be more successful at discouraging tobacco consumption.

Evaluating tobacco control can require careful advance planning. To incorporate sound evaluation strategies into national tobacco control programmes, readers should refer to a companion volume entitled *Evaluating tobacco control activities: experiences and guiding principles*.

Conclusion: key points

The following are key points to remember when preparing plans of action for comprehensive tobacco control:

• Establish a national tobacco control policy and organization.
• Implement a national programme with the following key components:
  — health education, including assistance with cessation;
  — legislation to ban sales of tobacco products to children and direct and indirect advertising of tobacco products; prominent health warnings on tobacco products; guarantee of smoke-free public spaces, workplaces and public transit; legislation to establish control and require reporting of levels of toxic ingredients found in tobacco products;

— tax and price policies, including making tobacco products less affordable by increasing taxes above the rate of inflation, and earmarking a portion of tobacco taxes to fund health promotion activities and sponsor sports and cultural events.
- Develop human, financial and structural resources with long-term sustainability to support tobacco control.
- Where possible, monitor and evaluate tobacco control programmes.

Background reading

Action Plan on Tobacco or Health for 1995–1999. Manila, World Health Organization Regional Office for the Western Pacific, 1994.

Chapman S, Richardson J. Tobacco excise and declining tobacco consumption: the case of Papua New Guinea. *American journal of public health*, 1990, 80(5):537–540.

Chapman S, Lupton D. *The fight for public health, principles and practice of media advocacy.* London, British Medical Journal Publishing Group, 1994.

Chollat-Traquet C. *Evaluating tobacco control activities: experiences and guiding principles.* Geneva, World Health Organization, 1996.

Cigarette advertising and promotion in the United States, 1993. Washington, DC, Federal Trade Commission, 1995.

Death or taxes, a health advocate's guide to increasing tobacco taxes. Toronto and Ottawa, The Non-Smokers' Rights Association, and Washington, DC, Advocacy Institute, 1990.

Galbally R. *How to set up a health promotion foundation.* Copenhagen, WHO Regional Office for Europe, 1994.

Glynn TJ, Anderson DM, Schwarz L. Tobacco use reduction among high-risk youth: recommendations of a National Cancer Institute Expert Advisory Panel. *Preventive medicine*, 1991, 20(2):279–291.

International Union Against Cancer. *Tobacco control fact sheets* (Nos. 1–10). Geneva, UICC, 1993.

Krueger RA. *Focus groups, a practical guide for applied research.* Newbury Park, CA, Sage Publications, 1988.

Russell M. Help and treatment for addicted smokers. *World health forum*, 1995, 16:19–21.

Sweanor DT, Martial LR, Dossetor JB. *The Canadian tobacco tax experience: a case study.* Toronto, Nonsmokers' Rights Association and The Smoking and Health Action Foundation, 1993.

Tang JL, Law M, Wald N. How effective is nicotine replacement therapy in helping people to stop smoking? *British medical journal*, 1994, 308:21–26.

The media and tobacco: getting the health message across. *Advisory kit and press kit*, 1994 (available from: Tobacco or Health Programme, World Health Organization, 1211 Geneva 27, Switzerland).

Tobacco control: the role of the media. Geneva, World Health Organization (in preparation).

Tobacco-free Europe. Action Plan. Copenhagen, WHO Regional Office for Europe, 1993.

US Department of Health and Human Services. *Major local tobacco control ordinances in the United States.* Rockville, MD, National Institutes of Health, 1993.

US Department of Health and Human Services. *Media strategies for smoking control guidelines.* Rockville, MD, National Institutes of Health, 1988.

US Department of Health and Human Services. *Preventing tobacco use among young people. A report of the Surgeon General.* Atlanta, GA, Centers for Disease Control and Prevention, 1994.

Victorian Health Promotion Foundation. *Annual report 1994.* Melbourne, VicHealth, 1994.

Wallack et al. *Media advocacy and public health, power for prevention.* Newbury Park, CA, Sage Publications, 1993.

Warner KE. *Consumption impacts of a change in the federal cigarette excise tax.* Ann Arbor, MI, University of Michigan, 1985.

Women and tobacco. Geneva, World Health Organization, 1992.

Implementing a national plan of action

S ince mid-century, over 60 000 scientific reports have been written on the effects of tobacco, forming an impressive body of evidence that supports such conclusions as:

— tobacco will kill half of lifelong smokers who start smoking in adolescence and continue throughout their lives, and half of them in middle age;
— in the 1990s, tobacco kills one person every 10 seconds; without effective public health action, this rate will rise to one every three seconds by the decade 2020–2030;
— tobacco smoke contains 43 known cancer-causing agents;
— health authorities recommend no human exposure to tobacco smoke, either by active or passive means.

Despite the acknowledged dangers of tobacco worldwide, bookshelves of health departments and NGOs overflow with excellent but unaccomplished or half-realized plans of action to strengthen national tobacco control programmes. Too often, these plans are not put into effect because health planners are unsuccessful in overcoming the powerful opposition to tobacco control programmes or fail to mobilize support properly in favour of tobacco control. This makes the task of implementing comprehensive tobacco control programmes and policies especially challenging and quite unlike attacking other important public health problems.

Attempts to implement comprehensive tobacco control policies are sure to face formidable opposition from tobacco interests. Without a clear strategy for surmounting such opposition, any new plans for tobacco control risk joining previous unfulfilled plans.

It is impossible to write a precise prescription for how to surmount opposition to tobacco control measures. The challenge is less like trying to cure a disease and more like trying to win a football match. Much preparation is necessary, but the course of action will seldom be predictable. Strategies can be advanced, but they must be flexible in adjusting to the actions of the opposition. To continue the sporting analogy, it would be unreasonable to expect to win every game. Inevitably, there will be setbacks along the way. But public health will prevail with a carefully designed, well-executed plan.

Seven principles for putting tobacco control plans into action

1. *Be prepared*

   In 1994, the largest commercial tobacco company had annual operating revenues of US$ 65 billion, approximately equal to the gross national product of Portugal or Israel. Tobacco companies are prepared with voluminous documentation to defend their economic interests in any debates about tobacco control. The forces of public health can be equally well prepared with well-researched, reliable information.

   Successful tobacco control will be helped by use of the techniques for gathering and employing information, profiles and plans discussed in this book. This does not mean that all the information has to be memorized, but that much of it should be quickly retrievable and used to achieve policy change.

2. *Be flexible*

   Given the inevitable opposition to tobacco control policies, there will be roadblocks to certain policy initiatives. For example, opposition may appear to a legislative proposal for a ban on tobacco advertising. Rather than attempting the impossible, the savvy public health worker will redirect efforts to other parts of the plan for tobacco control. Effort could be focused on securing higher tobacco taxes and better protection from tobacco smoke in the workplace instead. Blocked initiatives can be readdressed later, when the climate for their implementation is more favourable.

3. *Seize opportunities*

   Public health workers working on issues of tobacco and its health effects should use every opportunity to help build support for strengthened tobacco control.

   For example, news reports about temporary withdrawal of a bottled water product from the market because of suspected benzene contamination prompted some health advocates to prepare material for the news media pointing out that, from their cigarettes, smokers are exposed daily to far more benzene than they would receive from a lifetime of drinking bottled water at the suspected levels of contamination.

4. *Turning potential losses into gains*

   Promotional activities and other events that run counter to the interests of improved tobacco control can be identified. When appropriate, imaginative strategies should be employed to redirect events and activities that favour tobacco use into events and activities that favour public health, as illustrated in Box 7.

5. *Identify and use arguments that will motivate others*

   The process of building consensus in favour of tobacco control will take public health workers far beyond the health sector to areas where public

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Box 7. Turning tobacco promotion into health promotion

In 1981, an Australian tobacco company staged a promotional contest with a $25 000 prize to find an Australian cowboy to serve as a model of Australian masculinity for advertising their brand of cigarette (and to replace the American cowboys usually seen in the advertisements for this popular cigarette brand). A group of Australian tobacco control activists, which included a number of physicians, asked Frank, a victim of tobacco-caused illnesses, who continued to smoke through a tracheostomy, if they could sponsor him for the contest. Frank agreed. Posters with Frank's picture and the caption "Will Frank win?" were distributed. Although Frank did not win, three out of four newspaper columns reporting the contest results described Frank's entry in the contest. The contest, a tobacco control "loss", was turned into a public health "gain", with a little determination and imagination. This was one of many publicity-attracting activities that, years later, led to comprehensive tobacco control legislation in Australia, including a ban on promotional contests such as the one Frank had entered.

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health concerns are of lesser importance. Rather than asserting what should be done to reduce health hazards, greater progress will be made if arguments appeal to the financial interests of the target audience. For example, when approaching departments of finance it should be stressed that new revenue can be raised from tobacco taxes, that public opinion surveys show that these taxes will be popular (or at least generate less opposition than other forms of taxation), that money will be saved in the long run, and that required new expenditures will be more than offset by new revenue. It should also be mentioned that this activity will support public health goals.

Tobacco control advocates can appeal to the financial concerns of airline companies by showing that more customers are demanding smoke-free flights and that customer service would be improved if more such flights were offered. Protection of their staff and lower cleaning and maintenance costs on smoke-free airplanes can be cited, in addition to compliance with a resolution of the International Civil Aviation Organization, calling for all international flights to be smoke-free by 1 July 1996. Eventually, the added benefit of improved public health protection can be mentioned.

The cost-saving interests of businesses and industries can be called on by showing that protection from involuntary exposure to tobacco smoke will improve health, reduce absenteeism, maintenance and cleaning costs, and fire risks, improve employee morale, and protect employers from potential liability for exposing workers to a known health hazard.

To summarize, tobacco control advocates should identify the major concerns of potential collaborators, then demonstrate how their requested contribution to strengthened tobacco control will enhance their interests.

6. *Be active*

Mobilizing the support of others requires more than letter-writing. If the assistance of a finance minister is needed to raise tobacco taxes, then a careful strategy to achieve this policy change is needed. A significant way of gaining this support is to use the information on tobacco and its effects on health (Chapters 4 and 5) to write a carefully researched brief to the finance minister with effective arguments for the requested policy change. It will also be important to demonstrate a broad base of support from re-spected organizations. Continuing contact with the minister, ministerial aides, public service tax policy researchers and advisers, and the press should be part of the process of seeking a tax policy change. After presenting the brief to the minister and holding a high-level meeting to review it, polite and persistent contact with ministerial aides will be helpful in answering questions and encouraging progress towards the policy's implementation.

Similar active approaches will be needed to encourage policy changes in all other sectors that can make a positive contribution to strengthening comprehensive national tobacco control policies.

7. *Be persistent*

The task of achieving comprehensive tobacco control can be daunting; it is worth remembering that the longest journey begins with a single step. Public health workers are encouraged to begin by undertaking modest tobacco control efforts, and assume additional efforts as experience is gained. Many people have found that organizing celebrations of World No-Tobacco Day is a good place to start.

Tobacco interests will persist in their vigorous efforts to defend their lucra-tive trade, so public health workers must be equally persistent in their efforts, often in the face of apathy and minimal funding.

A long-term view needs to be maintained since arguments in favour of tobacco tax increases may not meet with immediate success. However, government budgets are reviewed annually and increased tobacco taxes may result when the budgets are presented a year later. Similarly, repeated calls for tobacco advertising bans may be necessary. Persistence is also required in defending tobacco control measures once they are achieved.

Seven strategies for tobacco control

1. *Make tobacco control a top public policy priority*

Making tobacco control a top public health priority is not enough. The extent of the tobacco problem must be emphasized along with the range of measures to combat it and the fact that the epidemic can be reduced and lives saved. It must become a top public policy priority. Since most of the required policy changes lie beyond the health care sector, tobacco control

must compete for public policy attention with other public health issues and a whole range of other public policy issues. Public health workers should be relentless in citing global, national and local information on the seriousness of the health hazards of tobacco use, the number of people who smoke and the number of deaths that smoking will cause. Novel and simple presentations of basic information are best.

2. *Make tobacco control self-financing*

There may be objections that tobacco control measures are too expensive for governments to implement. These objections can be met by demonstrating that the World Bank estimates that comprehensive strategies being developed are among the most cost-effective public health actions and will result in net gains in government revenue. Many tobacco control measures, like the creation of smoke-free areas, can be achieved at little or no cost. In other cases, legislation could oblige tobacco companies to assume the costs of health warnings on packages and of testing for toxic constituents. Raising tobacco taxes will result in reduced tobacco consumption and increases in the government's tobacco taxation revenue.

Through increases in tobacco taxes, comprehensive tobacco control strategies can pay for themselves and for other public health improvement and community development projects. They can also replace tobacco sponsorship of sports and cultural events. As mentioned in Chapter 2, Australia and other countries have demonstrated the successful operation of health promotion foundations financed by earmarked tobacco taxes.

Very modest increases in tobacco taxes resulting in very modest increases in the real price of cigarettes (3% or less) may have little noticeable effect on consumption. However, they could still result in large enough increases in revenue to finance a comprehensive set of tobacco control activities. The case for self-financing of all tobacco control measures through increased tobacco taxation needs to be made often and emphatically to ministers of finance and their advisers.

3. *Get help from your friends*

Chapter 4 describes a broad range of potential participants in a national tobacco control programme. But their participation cannot remain potential; it must become active. Encourage interested people to submit articles on tobacco and health issues to academic journals, to give presentations at major sessions of health, consumer, youth, legal, environmental and women's conferences, and to appear as experts in government committee hearings. Urge health educators to include tobacco and health issues in the curricula of training programmes for health professionals. Encourage medical colleagues to counsel their patients about smoking cessation. Finally, congratulate and praise effective action in favour of tobacco control.

Friends can play vital roles but involvement of more than just a few of them will be a key feature in forging the consensus essential to successfully implementing comprehensive tobacco control policies.

4. *Win new friends and get help from them too*
By creating financial dependency, tobacco interests are able to inhibit sponsored cultural and sports organizations, advertising firms, the media and tobacco farmers from speaking out in favour of comprehensive tobacco control strategies. Sometimes, representatives of these groups are pressed into service to support tobacco industry positions and policies. But if proposed tobacco control policies include provisions for sponsoring cultural and sports organizations, for advertising and media placement expenditure for health promotion, and for financial incentives for tobacco farmers to convert to alternative forms of economic activity, then there is potential to win enthusiastic new allies for comprehensive tobacco control in all of these quarters. This will isolate tobacco interests in their opposition to public health measures discouraging tobacco use.

Environmental groups, religious organizations and people interested in reduction of taxes other than tobacco taxes (e.g. income taxes) are potential allies in favour of tobacco control.

5. *Answer those opposed to tobacco control measures*
Tobacco interests will always raise objections to proposals for effective tobacco control. Because of the efficient multinational organization of the tobacco industry, it is possible for it to develop, finely hone and test arguments and objections to tobacco control in one country, then quickly deploy the same strategies, arguments and objections to tobacco control wherever they are needed around the globe. Sometimes, even the same practised spokespersons are sent to other countries to raise the same arguments and objections.

Fortunately, many public health workers are equal to the challenge posed by these kinds of tactics and have prepared responses to arguments commonly advanced by representatives of the tobacco industry. The tobacco industry case is so weak that it resorts to using the same arguments and the same spokespersons long after they have been discredited and answered. Therefore, public health workers can study arguments and counter-arguments that have been used before and be prepared with swift and effective responses when such arguments arise in their countries. With regard to advertising, for instance, Box 8 lists several arguments commonly used by the tobacco industry to defend the advertising of tobacco products and shows how each of these arguments can be countered.

One cannot promote cigarettes without implicitly promoting smoking. The link between advertising and cigarette smoking is not always easy to assess for advertising is only one factor that influences people's decision to smoke. Nevertheless, countries such as Norway have found that an advertising ban leads to a downturn in consumption trends over an extended period. Box 9 looks at the effects of Norway's ban on tobacco advertising in the light of arguments put forward against it by the tobacco industry.

Box 8. Countering arguments in support of tobacco advertising

1. **Since tobacco can be legally sold, advertising it should be legal too.**
   This argument assumes that it is acceptable to advertise any product that is legal, and that only illegal products should not be advertised. This deflects us from the main point, which is not the legal status of tobacco but its public health status. It has been said that, if tobacco was invented in a laboratory tomorrow, with all the information known about it available, no government would permit it to be sold. However, the health risks of tobacco were realized long after its use was widely established. Making tobacco illegal is not a feasible option, but that is no justification for encouraging its use by advertising. In addition, although many countries prohibit the sale of tobacco to children, children and adults alike are exposed to tobacco advertising.

   "Freedom to advertise" is essentially the advertisers' right to persuade people to use nicotine, an addictive drug. Having induced dependency, tobacco will kill half of all regular smokers. Although other potentially dangerous products are advertised (e.g. cars, alcohol, sugar), tobacco is the only product that kills people when used as intended.

2. **Advertising does not increase smoking but encourages smokers to change brands.**
   The tobacco industry claims that its advertising does not promote smoking but only persuades people who already smoke to change to a different brand of cigarette. However, except in the few cases where a product has a very limited market, advertising seeks to maximize sales and expand the market. Tobacco certainly does not have a restricted market for many people, especially children, who do not smoke might be persuaded to start. Even where cigarettes are manufactured and marketed by a government-owned monopoly, and there is therefore no need to persuade smokers to switch brands, advertising is carried out.

3. **Advertising is aimed at adults who smoke and not at children.**
   Learning to smoke occurs almost always in childhood or adolescence. A person who is a non-smoker at the age of 20 is unlikely to take it up later. Many young smokers continue to smoke throughout their lives so they are important to the tobacco industry. Is it possible that advertising has no influence on children who do not smoke but who are likely to do so soon, yet will influence them to change brands as soon as they start?

4. **Advertising persuades smokers to change to "safer" cigarettes.**
   In some countries with advertising bans a high proportion of smokers use non-filter cigarettes, while in some countries that allow advertising the smoking of filter cigarettes is very popular. These cases have been cited to justify cigarette advertising as a means of persuading smokers to use "safer" cigarettes. However, this argument is highly dubious since there are other countries (such as India, Mexico and Pakistan) where advertising is permitted yet most cigarettes smoked are non-filter.

Adapted from: Chapman S. *Pushing smoke: tobacco advertising and promotion.* Copenhagen, WHO Regional Office for Europe, 1988 (Smoke-free Europe, No. 8).

Box 9. The effects of Norway's ban on tobacco advertising

Norway introduced a total ban on tobacco advertising in 1975. At that time opponents of the ban put forward a number of arguments against it. It is useful to look in retrospect at these arguments against a ban on tobacco advertising.

1. **A ban would weaken the Norwegian advertising industry.**
   In fact, the annual increase in advertising sales in Norway was higher in the 8 years after the ban was introduced (4.3%) than in the 8 years before (3.6%).

2. **A ban would weaken the competitiveness of Norwegian cigarette manufacturers in comparison with foreign producers.**
   Most cigarettes smoked in Norway are hand-rolled. Before the ban, Norwegian brands had about 95% of this market and maintained this proportion after the ban. In the case of manufactured cigarettes, the market share of Norwegian brands fell by about two-thirds during the 10 years before the ban and continued to fall at the same rate during the 10 years afterwards.

3. **A ban would lead to fewer jobs in the Norwegian tobacco industry.**
   The number of employees in Norway's tobacco industry fell by 2.7% in the 10 years before the ban, as against 2.6% in the 10 years afterwards.

4. **A ban would worsen the economic situation of the press.**
   During the eight years before the ban sales of advertisements of all kinds to Norwegian newspapers went up by 3.9%, as against a 5.6% increase in the 8-year period after the ban.

5. **A ban would prevent smokers from being encouraged to switch to less dangerous products.**
   The tar content of cigarettes in Norway has gone down just as quickly as in nearby Denmark which does not have a ban, and the proportion of low-tar cigarettes has gone up at least as fast in Norway as in Denmark.

6. **A ban would be counter to the freedom of expression guaranteed by the constitution.**
   Legal experts and the judicial authorities concluded this was not so.

7. **A ban would be difficult to implement and enforce.**
   Generally both the tobacco industry and the retailers have complied with the ban. Persons responsible for infringements have been informed and have taken action to comply. It has not been necessary to take cases to court. Police authorities say the tobacco advertising ban is a good example of how legislation can be enacted without adding to the burden of the police.

8. **A ban would have little effect on total consumption of cigarettes.**
   Sales of tobacco increased sharply in Norway during the 1950s and 1960s, levelled off in 1970, started to decrease in 1975 and have declined ever since. Surveys showed that smoking increased among young people up to 1975 when it started to decline. The percentage of smokers among 15-year-old girls, for instance, rose from 3% in 1957 to 28% in 1975 but dipped below 20% by 1985.

Summarized from: Bjartveit K. Fifteen years of comprehensive legislation: results and conclusions. In: *The global war: proceedings of the Seventh World Conference on Tobacco and Health.* Perth, Health Department of Western Australia, 1990.

6. *Anticipate opposition to tobacco control and be ready to respond*
   In the heat of public debate, the forces of public health and tobacco interests will be anxious to show massive popular support for their position. In most countries, sensible tobacco control measures of the sort proposed by the World Health Assembly will enjoy far wider support than arguments advanced by tobacco interests. If questionable tactics are used by tobacco interests, their arguments could be severely weakened if these tactics are unmasked and exposed to public scrutiny.

7. *Never assume victory*
   Even after tobacco control legislation is passed or new taxes are implemented, tobacco interests will continue to work to circumvent the laws or make them less effective. Tobacco interests will never give up trying to weaken tobacco control measures, so the forces of public health can never give up defending them. Tax increases can be eroded by inflation. The intent of legislation requiring strong health warnings on packages can be mitigated by the clever use of lettering that blends nearly invisibly into its background. Taxes must be raised to compensate for price and income increases, and closely written regulations must leave little room for tobacco companies to interpret regulations to their advantage.

Background reading

Bjartveit K. Fifteen years of comprehensive legislation: results and conclusions. In: *Tobacco and health 1990: the global war. Proceedings of the Seventh World Conference on Tobacco and Health, Perth, 1990*. Perth, Health Department of Western Australia, 1990.

Chapman S. *Pushing smoke: tobacco advertising and promotion*. Copenhagen, WHO Regional Office for Europe, 1988 (Smoke-free Europe, No. 8).

Chapman S, Lupton D. *The fight for public health, principles and practice of media advocacy*. London, British Medical Journal Publishing Group, 1994.

Kill B. What civil servants can do to get legislation passed. In: Slama K, ed. *Tobacco and health*. New York/London, Plenum Press, 1995.

Tobacco Alert, October 1992 (available from: Tobacco or Health Programme, World Health Organization, 1211 Geneva 27, Switzerland).

Tobacco costs more than you think. *Advisory kit*, 1995 (available from: Tobacco or Health Programme, World Health Organization, 1211 Geneva 27, Switzerland).

US Department of Health and Human Services. *Strategies to control tobacco use in the United States: a blueprint for public health action in the 1990s*. Rockville, MD, National Institutes of Health, 1993.

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Obtaining support for tobacco control

C hapter 1 refers to World Health Assembly resolutions concerned with tobacco and its health effects. Of particular importance is the 1986 resolution WHA 39.14 outlining the essential components of comprehensive tobacco control programmes. But which entities should be involved and what role should they play? How should the situation be analysed in each country to determine the future direction of tobacco control activities? This chapter provides guidance in this area.

The participants in a national tobacco control programme

In ensuring the highest possible standards of public health, governments play a major role in tobacco control. While health departments play a lead role in this domain, they must also collaborate with other government departments, the media, voluntary organizations, professional organizations and business and industry. The following section describes ideal ways each of these entities can contribute to a comprehensive national tobacco control policy.

The government sector

A strong political will and government commitment to reduce tobacco-caused diseases are critical in developing and maintaining effective tobacco control policies. If policies are to be truly comprehensive, tobacco control activities should extend to virtually all government departments.

The following sections describe roles that ministries can play in comprehensive tobacco control. These suggestions apply at the national level and may apply at the state or provincial level as well. This is especially true in large countries like Brazil, where national government activities are needed in addition to those of the various ministries in the 26 state governments. The examples given are illustrative only; the division of responsibility among ministries will vary greatly between countries.

Health ministry

Normally, the national health ministry has the major responsibility for health promotion and health protection and, therefore, has a lead role in tobacco control. However, occasionally this role is assumed by another ministry. Wherever lead responsibility for tobacco control may lie, that ministry should ensure that a focal point is established to stimulate, support and coordinate tobacco control activities.

Finance and treasury ministries

Ministries of finance and the treasury are usually responsible for setting tax policy and collecting taxes. As previously mentioned, raising tobacco taxes discourages tobacco consumption, particularly among young people, and at the same time increases government revenues. Imposing and collecting tobacco taxes is usually one of the logistically least difficult forms of tobacco taxation. Health ministries can play an important role in making a case to finance ministries for a viable, comprehensive, health-oriented tobacco taxation policy.

Customs and excise ministries

These ministries can benefit from working with public health workers interested in tobacco control by learning of new proposed directions in tobacco taxation, often by sharing consumption information. They can also help tobacco control efforts by:

— providing information on smuggling and working with health bodies on developing anti-smuggling measures, such as prominent and non-counterfeitable tax markings;
— providing detailed information on current and past tobacco taxation levels, tobacco sales and tobacco tax revenues;
— alerting health groups to measures being used by tobacco companies or others to legally circumvent the intent of tobacco tax laws, or to exploit favourable tax treatment of particular products.

Trade and commerce ministries

Sometimes, to promote business development, national ministries of trade and commerce may promote the establishment of tobacco manufacturing plants, or factories for the manufacture of tobacco industry supplies. They may provide additional incentives to tobacco companies, including low-interest loans, tax concessions or land, buildings, building materials, machinery and equipment at below-market prices.

This runs counter to the recommendations on tobacco control of the World Health Assembly (Resolution WHA39.14) and to the spirit of the current World Bank economic development policy. Encouraging the develop-

ment of tobacco industries poses a threat to the health of the population. When health is threatened, long-term social and economic development are also threatened. Health and economic development authorities now agree that short-term economic gains from supporting the development of the tobacco industry are, in the long term, detrimental to health, social and economic development.

New opportunities exist for trade and commerce ministries to provide incentives for industrial development that can replace other economic activity in the tobacco growing and manufacturing sectors. Trade and commerce ministries can provide economic alternatives to tobacco growing and manufacturing, to bring national policies in line with those of WHO and the World Bank.

Where ministries have authority to ensure orderly functioning of retail trade, they can use it to limit where tobacco products can be purchased, such as eliminating sales in health and educational establishments. Licensing authority can also be used to prohibit sales to minors.

Consumer affairs ministry

A ministry of consumer affairs can often contribute to a comprehensive policy of tobacco control by implementing regulatory requirements on tobacco marketing, advertising, packaging and labelling. This ministry may also be responsible for regulatory control of tobacco testing and disclosure of information on tobacco additives and toxic constituents. Alternatively, the health ministry may administer such legislation and regulation with support and collaboration from the ministry of consumer affairs.

Agriculture ministry

Agriculture ministries typically provide economic and technical assistance to farmers; often tobacco farmers benefit from these programmes. Since tobacco is often seen as an important cash crop, these farmers may receive special subsidies or technical assistance. Like tobacco manufacturing industries, tobacco agriculture is regarded as an inadvisable route to health improvement and economic development by WHO and the World Bank. Upon request, FAO will assist countries in developing economic alternatives to tobacco growing. Agriculture ministries should cease providing incentives for developing tobacco agriculture. The most comprehensive tobacco control policies will result in slow declines in tobacco demand, leaving plenty of time for economic adjustment in the agricultural sector. While per capita demand for tobacco may slowly drop, absolute demand for the product will probably remain stable or increase because of population growth. Truly comprehensive tobacco control policies, recognizing the slowly decreasing demand for tobacco leaf, could provide assistance for economic readjustment in the tobacco agricultural sector. However, compensation plans for farmers should be tied strictly to attaining health goals.

Ministries of external affairs and international trade

These ministries can do the following:

— analyse balance of payments on tobacco and related industry inputs and outputs;
— provide sound advice on the international law implications of tobacco control policy proposals;
— assist in promoting the development of complementary tobacco control in neighbouring countries;
— respond to challenges by foreign tobacco companies who might attack domestic tobacco policies.

Government ministries concerned with developing foreign markets for locally produced products and for overseeing imports and exports of goods can also contribute to comprehensive tobacco control policies. Tobacco creates a net loss to the majority of developing countries. An international trade policy that followed the recommendations of WHO and the World Bank would subject both imported and domestic tobacco products to similar taxation, controls on marketing, advertising and labelling. Coordinated international policy can also move towards phasing out government subsidies for tobacco growing and export. Since tobacco control policies have been recommended for all nations, the long-term economic prospects for tobacco and products as an export commodity are ultimately unfavourable. At the same time, if farm subsidies were phased out, countries with comparative advantages in the growing of tobacco would not face significant declines in production for the foreseeable future.

External trade ministries of developing nations with emerging tobacco manufacturing industries should be especially wary of authorizing the use of scarce foreign exchange reserves for purchasing tobacco machinery, tobacco leaf and other tobacco manufacturing inputs. The expectation of economic development benefits, even in the short term, can be thwarted if such development significantly depletes foreign exchange reserves.

Law and justice ministries

As previously mentioned, tobacco control legislation plays an important role in a country's comprehensive tobacco control programme. Resolution WHA43.16 (1990) of the World Health Assembly has urged all Member States "to consider including in their tobacco control strategies plans for legislation or other effective measures . . ." (see Annex 1). For those countries heeding this resolution, the collaborating efforts of the ministry of justice and the ministry of health will be vital in developing, implementing, administering and enforcing tobacco control legislation.

The justice ministry can also do the following:

— provide vigorous defence against legal challenges to tobacco control legislation;

— provide advice on constitutional matters and international treaty obligations;

— assist in developing and drafting tobacco control laws and regulations.

In most countries government inspection and enforcement authorities are responsible for law enforcement of smoke-free areas, advertising restrictions, restrictions on sale of tobacco products to minors and other tobacco control legislation. Police departments or inspection and enforcement authorities can likewise help in enforcing tobacco control laws and other related statutes, such as anti-smuggling laws.

Ministries of labour, transport and public service personnel

Ministries of labour, or the equivalent, should ensure effective protection from involuntary exposure to tobacco smoke in enclosed public places through legislation, regulations, standards or guidelines. Protection from environmental tobacco smoke should be ensured in such places as worksites, public transport vehicles and government buildings, particularly those serving the public. Many governments have already found that implementing smoke-free policies in their own workplaces is quickly followed by the voluntary adoption of similar policies in the private sector.

Transportation authorities can be encouraged to abolish tobacco advertising in public transport and to provide protection from environmental tobacco smoke in public transport vehicles. Regarding international transportation, bilateral or multilateral agreements may need to be negotiated.

Education ministry

A comprehensive tobacco control policy would not be complete without the involvement of the education ministry. Health and education authorities could require the following:

— that children receive effective education about the dangers of tobacco use and the benefits of a tobacco-free life at repeated intervals throughout their educational careers;

— that all schools be smoke-free for staff and students alike, to provide protection from involuntary exposure to tobacco smoke and to provide smoke-free role models to children;

— that teacher training and in-service training for teachers include how to teach tobacco-related matters in schools;

— that health science schools (including medical, dental and nursing schools) include, as part of the curriculum, information on tobacco and health, tobacco dependence, and intervention techniques for cessation of smoking, and encourage an advocacy role for health professionals.

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Ministry of the environment

This ministry can contribute to comprehensive tobacco control by providing assistance in the following areas:

- protection of the environment from deforestation, from the use of toxins in tobacco manufacturing, from the excess use of wood cure tobacco, from the excess use of paper in cigarette manufacturing, excess litter, excess use of agricultural chemicals, and from forest fires and property fires related to tobacco and smoking materials;
- protection from involuntary exposure to tobacco smoke in indoor environments under the ministry's jurisdiction, in countries where this responsibility is assigned to the ministry of the environment.

Defence ministry

Many young people are in the armed forces. The armed forces can contribute to comprehensive tobacco control by promoting the health and fitness of its personnel and minimizing its long-term health costs by adopting policies that favour a smoke-free life, such as:

- giving protection from involuntary exposure to tobacco smoke in all indoor locations;
- requiring that all tobacco products sold in military establishments be sold at a price at least as high as in adjoining non-military areas, which could have the double benefit of reducing tobacco use and preventing smuggling.

Culture and sports ministries

These ministries can provide support to comprehensive tobacco control policies by:

- using designated tobacco taxes to promote healthy lifestyles through sponsorship of sports and cultural events;
- insisting that events they sponsor be smoke-free and free of all tobacco promotion;
- protecting athletes from being used to endorse tobacco products;
- promoting prominent sports and cultural personalities as role models for healthy lifestyles, free from tobacco.

Religion ministries

Where present, religion ministries or religious groups can support tobacco control policies by:

- marshalling support for tobacco control in religious communities;
- ensuring that places of worship are smoke-free;

— encouraging religious leaders to serve as role models by refraining from smoking.

Other levels of government

Some elements of tobacco control policies may be best administered by local government. These could include:

— providing protection from involuntary exposure to tobacco smoke in enclosed areas under local jurisdiction;
— enforcing restrictions on sales of tobacco products to minors, limiting and regulating points of retail sale of tobacco products;
— encouraging health education on tobacco;
— providing smoking cessation instruction;
— controlling tobacco advertising.

Where local government plays a role in tobacco control, national health authorities should provide support and encouragement. Local government can also adopt model tobacco control legislation, the successful elements of which may be introduced later at provincial or national level.

The media

While the media can be used to promote tobacco, media can also support tobacco control. Billboards, newspapers, magazines, radio and television can all be valuable means of disseminating educational messages on the health hazards of tobacco use and of reporting progress in implementing tobacco control programmes (see Box 10).

Even if there is no legislated ban on advertising, health forces can persuade newspapers to adopt editorial positions in favour of a ban on tobacco advertising. This strategy has been pursued successfully in certain countries. In many cases, the editorial position taken by newspapers in favour of a ban on advertising was accompanied by voluntary refusals (based on health and ethical criteria as well as pressure from health organizations) to accept tobacco advertising. There are also successful international publications that have a long history of voluntarily refusing tobacco advertising.

Although some media mistakenly believe that substantial revenue will be lost if they support tobacco control efforts, either through editorials or by refusing to accept tobacco advertisements, research indicates that this is not the case.

Media can:

— choose to refuse tobacco advertisements;
— offer, free of charge, public service promotional and educational messages about the hazards of tobacco use.

Opportunities for media collaboration should be explored.

> ### Box 10. A newspaper publicized the hazards of tobacco use in Papua New Guinea
>
> At the suggestion of WHO staff in Papua New Guinea, a local newspaper began publishing a periodic health supplement, sponsored by pharmaceutical companies. The supplement contained regular features on the hazards of tobacco use. Advertising revenue was sufficient for the production of advertisement-free versions of the supplement in both English and the local language. In this form, the government was pleased to send it to community health workers throughout the country, for use with the local populations. Thus, collaboration between a newspaper and public health workers succeeded in providing information about the hazards of tobacco use to an entire country, at no monetary cost to WHO, the government or the media.

Health professionals

The advice and treatment given by health professionals can be a major factor in whether or not a person tries and succeeds in quitting smoking. Brief and consistent advice from a health professional to stop smoking has been identified as a leading strategy to reduce tobacco use. However, health professionals often do not even address the issue of tobacco and, when they do, it may be discussed in a perfunctory manner. This problem is frequently compounded by high rates of tobacco use among the health professionals themselves. In these circumstances, it is even less likely that smoking cessation will be addressed. Obviously, the effectiveness of health advice about the dangers of smoking will be reduced further if the patient observes the health professional smoking.

Doctors

In developed countries, most people visit a physician at least once a year, presenting an ideal opportunity for effective anti-smoking counselling. Even in countries where there is less direct contact with physicians, their opinions on health questions are still respected. However, in many countries, the rates of tobacco use among physicians are as high or even higher than rates among the general population.

In response, groups such as the European Medical Association: Smoking or Health (EMASH), Doctors Ought to Care (DOC) in the United States, and Physicians for a Smoke-free Canada (PSC) engage in some of these activities:

— working to increase physicians' awareness of the health consequences of tobacco use and to discourage them from using tobacco;

— promoting the effective use of appropriate interventions with patients to encourage and support cessation of smoking;

— working as advocates for improvements in national tobacco control policies.

Other international medical groups, such as the World Medical Association (WMA) and International Doctors against Tobacco (IDAT) can play a key role in tobacco control. Box 11 gives the text of a resolution by the International Society and Federation of Cardiology urging health professionals both not to smoke and to encourage non-smoking among their colleagues.

Nurses

Nurses account for the largest number of health professionals, and their counsel and example can have an important influence on the smoking behaviour of their patients. However, in certain countries, even where smoking prevalence among physicians is low, among nurses it is about as high or higher than in the general population. Nurses can serve as positive non-smoking role models, counselling patients about smoking, including cessation.

Pharmacists

In the countries where tobacco products are sold in pharmacies, pharmacists' professional organizations have been working actively to change this.

Box 11. International Society and Federation of Cardiology: resolution regarding physicians and smoking

Whereas
the International Society and Federation of Cardiology is dedicated to the prevention of cardiovascular disease throughout the world, in co-operation with its member cardiac societies and foundations.

Tobacco smoking is identified as a major risk factor involved in the serious morbidity and mortality due to cardiovascular disease across the world. Physicians, and especially cardiologists, are ideally positioned to recognise the impact of tobacco on health, to serve as role models to their patients and to the public, and to pursue advocacy against tobacco with governmental organizations.

Significant public health benefit and reduction in disease occurrence can be achieved by diminishing the prevalence of smoking.

Therefore, be it resolved that
the International Society and Federation of Cardiology urges all its member societies and foundations to initiate or intensify vigorous efforts to persuade their membership to stop smoking, to promote non-smoking policies among their physician colleagues and other health professionals, including students of medicine and of the health professions, and to make health care sites, as well as all meetings in which those organizations are involved, smoke-free.

Resolution adopted by the Executive Board of the International Society and Federation of Cardiology, 16 September 1995.

However, success has been far from universal, and efforts must continue to restrict the sale of tobacco products in pharmacies. In connection with the sale of cessation aids, pharmacists can play an important role in instructing and counselling their customers.

Dentists and other health professionals

Dentists have a strong interest in tobacco control because they see oral and other health problems arising from tobacco use. They are prevention-oriented and can advise their patients, especially young people, about smoking prevention and smoking cessation.

Where possible, health professional societies should unite to support and encourage the establishment of comprehensive national tobacco control policies. Their effectiveness in this community and political activity will be enhanced if the various health disciplines coordinate their activities among themselves and with other voluntary organizations working towards tobacco control.

Other voluntary and professional groups

In many countries, other voluntary organizations, such as service clubs, youth groups, consumer groups, environmental groups, women's organizations and religious organizations, have lent their support to the development of comprehensive national tobacco control programmes. For example, youth groups have participated in organizing and carrying out World No-Tobacco Day celebrations. Some religious groups are also keenly interested in tobacco control activities. Specifically, the Seventh-Day Adventists, a Christian group, offer smoking cessation courses in many countries. In Malaysia, the Islamic Medical Association is active in tobacco control. Smoking is strongly proscribed by the Sikh and other religions.

Health organizations

Health organizations, such as national heart, lung and cancer societies, along with anti-drug and anti-tobacco groups, play key roles in the development of comprehensive national tobacco control programmes. In some countries, these organizations have large numbers of members and supporters, and can play a major role in collaborating with governments in offering health education and smoking cessation programmes in schools, health centres and other community settings. These groups also have potential for international collaboration.

Health organizations play a significant role in:

— supplying information on tobacco and health issues to decision-makers and the media;

— lobbying governments to improve their tobacco control policies and programmes;

— providing support and encouragement to businesses and industries to become smoke-free;

— encouraging the media and others to support the development of comprehensive tobacco control programmes at all levels of society.

Teaching and helping professions

Members of the teaching and helping professions, including educators and social workers, can set an example of non-smoking as the social norm. These organizations can lend their support to other groups calling for general improvement in national tobacco control policies. Teachers can advocate smoke-free schools and more effective and more frequent school-based smoking prevention programmes.

Lawyers

Laws are essential to effective tobacco control; lawyers can advocate for legislative changes, help in the drafting and amendment of laws, respond to tobacco industry arguments and monitor the enforcement of existing laws. They can also assist efforts to apply general laws (such as those on consumer protection, packaging or advertising) to tobacco products. The role of lawyers has expanded in recent years as pro-tobacco forces try to fight public health measures by using complicated legal arguments based on such things as constitutionality or international trade agreements. Local legal experts, or those available through international organizations, can usually respond to the alleged problems and prevent the delay, weakening or termination of health measures.

Lawsuits against tobacco companies are receiving greater attention in some countries; an important development for tobacco control that can attain significant results, in terms both of outcomes and of the information made public as a result of these cases. However, litigation against tobacco companies is an expensive and time-consuming exercise. For most countries it is often better to concentrate legal resources on developing legislative interventions, or in litigation directed towards issues such as smoke-free spaces, bans on tobacco advertising, and the application of existing laws.

Business, industry and labour unions

Involuntary exposure to tobacco smoke in the workplace is a problem that touches all sectors of business and industry, and they can contribute to its solution. Government ministries could establish regulations to provide protection from passive smoking. Yet, rather than wait for these to be implemented,

businesses and industries should develop smoking control policies of their own. Labour unions, with their history of concern for the health and safety of workers, have a natural role in this area. These policies can be put in place without compromising profits or interests. Government could then benefit from business and industry experience with smoking-control policies, and the government regulations, once imposed, would be more relevant to the population they are meant to serve. Finally, as some recent jurisprudence has shown, employers who fail to provide their workers with sufficient protection from involuntary exposure to tobacco smoke may be liable for damages that courts could oblige employers to pay to employees who are harmed or feel aggrieved by tobacco smoke in the workplace.

Some business sectors, such as drug companies developing pharmaceutical aids to smoking cessation, will support tobacco control measures. Large sectors of industry are starting to recognize the benefits of a smoke-free workplace and offer assistance with quitting smoking. In many countries, life insurance companies, on the basis of actuarial calculations, offer much lower premiums to non-smokers.

Opposition to national tobacco control programmes

Attempting to implement the policies mentioned above will, no doubt, encounter opposition from the tobacco industry and its allies who receive financial benefit, directly or indirectly, from the industry. The tobacco manufacturing industry maintains a web of supporters among its suppliers and clients, including tobacco growers, packaging suppliers, advertising firms, media which accept tobacco advertising, and wholesalers and retailers. In South Asia, for example, this affiliation extends to the industries involved in the growing and processing of temburni (used to wrap *bidis*, the most popular smoking product in India) and betel nuts and leaves (used in conjunction with a wide variety of chewing tobacco products in India).

Along with the sectors that do business with tobacco companies, many others have become dependent on the tobacco industry, either because they have been purchased by tobacco companies in diversification strategies or because their sports or cultural pursuits have benefited from tobacco sponsorship.

To overcome the opposition to comprehensive tobacco control strategies, techniques and arguments can be used which have been successful worldwide. This information is often easily obtainable. It is also important to evaluate available information for its accuracy; information from tobacco interests should be scrutinized for veracity, quality of documentation, and possible biases. Tobacco interests will examine and challenge information distributed by health interests. Therefore, preparing information that is accurate, scientifically sound and well-documented is crucial.

Tobacco is everyone's problem

Many people smoke and are therefore at risk of developing tobacco-related diseases. Those who do not smoke have colleagues, friends or relatives who do, and they risk prematurely losing a friend or relative to a tobacco-related disease. The preventable premature death of millions of well-trained and well-experienced people in their most productive middle years is a collective loss that transcends national boundaries. Many non-smokers suffer from involuntary exposure to tobacco smoke and also risk developing tobacco-caused diseases. Such a broad-based problem requires broad-based solutions, involving many sectors of society.

Conclusion: key points

The following are some of the groups or institutions whose support will be useful in working toward comprehensive tobacco control policies and programmes:

— government ministries;
— other levels of government;
— the media;
— health organizations and health professionals;
— voluntary organizations;
— professionals, including lawyers, educators and religious leaders.

Background reading

Health services: our window to a tobacco-free world. *Advisory kit*, 1993 (available from: Tobacco or Health Programme, World Health Organization, 1211 Geneva 27, Switzerland).

Medical care expenditures attributable to cigarette smoking, United States, 1993. *Morbidity and mortality weekly report*, 1994, 43(26):469–472.

Raw M, White P, McNeill A. *Clearing the air. A guide for action on tobacco.* London, British Medical Association, 1990.

Reid DJ et al. Choosing the most effective health promotion options for reducing a nation's smoking prevalence. *Tobacco control*, 1992, 1:185–197.

Tobacco price and the smoking epidemic. Copenhagen, WHO Regional Office for Europe, 1994 (Smoke-free Europe, No. 9).

World Bank. World Development Report, 1993: investing in health. New York, Oxford University Press, 1993:86–89.

World smoking and health: packaging and health warnings. American Cancer Society, Vol 18, No 2, 1993.

Information support for tobacco control

I nformation is already available from various sources to support tobacco control policies and activities. It is possible to implement policy measures based on international data before substantial local data have been collected. For example, an automobile proven defective in 20 countries need not be subject to rigorous testing in the 21st before action is taken. Sufficient data exist to undertake such policy changes as providing better protection from involuntary exposure to tobacco smoke. In certain cases, however, it might be helpful to have specific national or local information to strengthen arguments for tobacco control policies. For example, conducting a national or local prevalence survey (as outlined in Chapter 8) or estimating future health effects of current smoking patterns (as described in Chapter 9) would prove valuable.

Many countries have available information on their own tobacco situation which can inform policy research, development and debate in favour of strengthened tobacco control activities. A country may have decades of taxation information readily accessible from its ministry of finance, which can be used to support increasing taxation of tobacco products. Existing information on such indicators as measures of tobacco consumption and prevalence, tobacco-related mortality and morbidity, knowledge, attitudes and opinions concerning tobacco and health issues, and knowledge of groups and institutions that are likely to support or oppose tobacco control policies should be documented. Additional information on social, economic and political factors related to tobacco control issues is also worth recording.

While some information is available from the tobacco industry, its reports should be reviewed critically before the information contained in them is accepted. Factual information will prove helpful in combating arguments (such as those initiated by the tobacco industry) against tobacco control. This can be useful in the resulting public debate. Carefully organized systems of documentation, reference and retrieval for documents are important to keep track of information.

Many examples of tobacco and health documentation systems exist. They range from simple collections of information on tobacco and its health effects, maintained by an individual in a small NGO, to sophisticated technical information collections that have existed for years. WHO maintains a health data-

base covering the entire world. Another outstanding example of a sophisticated information collection is the Technical Information Center of the United States Office on Smoking and Health.[1] This office maintains the world's most complete bibliographical source on issues related to smoking and health. Information from this source is available at no charge to anyone on request. While few will find it necessary to have such extensive documentation on the tobacco epidemic, every country would benefit from having a readily accessible repository of key national and international documents on tobacco and its effects on health.

What is desirable is a minimum set of data and information capable of delineating the population groups most affected by the tobacco epidemic, the presence and significance of the tobacco industry in the country, and the policy responses that have already been implemented or are in the process of being implemented. Based on many countries' experiences with tobacco control measures, WHO has prepared a list of indicators which should be monitored by each country in order to effectively support the health policy process. These indicators can be grouped under six broad headings:

— sociodemographic characteristics;
— tobacco production, trade and industry;
— tobacco consumption;
— prevalence of tobacco use;
— mortality and morbidity;
— tobacco control measures, organizations and institutions.

The full list of recommended indicators under each of these sections is given in Annex 4.

There are many other sources to draw upon in cases where official statistics are unavailable or incomplete. For example, much information is available from tobacco companies' annual and quarterly reports and other reports issued periodically. Commercial surveys of public opinion, media placements and industrial activity are also valuable sources of data, along with news reports (including business news) and tobacco trade journals. Public computer networks such as Internet and those of organizations working on tobacco control (such as SCARCNET, operated by the Advocacy Institute, Washington, DC, United States, and Globalink, operated by the International Union Against Cancer, Geneva, Switzerland) can be valuable sources of information and advice. International organizations, such as the United Nations Statistical Office, WHO, the United Nations Conference on Trade and Development (UNCTAD), FAO, the Organization for Economic Cooperation and

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[1] Technical Information Center, Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control, 1600 Clifton Road, Rhodes Building, MS K-12, Atlanta, Georgia 30333, United States of America. Tel: 1 404 488 5708.

Development (OECD), and the European Union (EU) can also be good resources for international comparisons.

A brief description of where to find data relevant to social, economic and political factors is given below.

Economic information

Many governments collect and publish economic statistics on the status of the tobacco industry. Even when the information is unpublished, it may be available from relevant government departments, which may include a central statistical office and the departments of finance, revenue, agriculture, industry, consumer affairs and communication.

The tobacco industry

Since tobacco control policies affect the tobacco industry, it is imperative to understand the industry's structure. Governments collect some of this information. Other sources include the tobacco industry itself, reports on the industry by stock market analysts, reports from commercial market monitoring agencies (media tracking agencies and others), and various international data sources.

There may be not-for-profit organizations promoting tobacco use. Tobacco industry associations, tobacco growers' associations, smokers' freedom societies and various organizations defending "freedom to advertise" may be found in this category. These organizations will almost always be closely tied to the tobacco industry, usually through financial support. Since many of these will be dedicated to delaying or derailing public health actions to control tobacco, attention should be focused on discovering everything about these organizations in order to be well-prepared to defend public health policy proposals favouring tobacco control.

If there is a tobacco-growing industry in the country, the nature of this industry should be fully documented according to operating revenues, the number of farmers, the proportion of agricultural production, the proportion of exports accounted for in monetary terms by tobacco growing, the proportion of all tobacco produced for local consumption and for export, and an overall assessment of historical trends and future prospects for tobacco agriculture.

Analysis should describe the manufacture, production and trade of finished tobacco products and cover the tobacco industry structure, and the role of the transnational tobacco companies in production, import and export of tobacco. The analysis should extend to describing the number of factories, the number of workers in manufacturing, wholesale and retail trade, the proportion of workers in the tobacco sector, and the value of tobacco production, wholesale and retail trade, as well as the value and importance of tobacco imports and exports.

Tobacco in the national economy

It is important to ascertain the nature of the tobacco industry in the national economy. In developing countries where foreign exchange reserves may be low or in deficit, it is crucial to document the amount of foreign currency reserves spent to purchase tobacco leaf, tobacco machinery and other goods and services related to the country's tobacco production. The nature and extent of government support to tobacco growing and manufacturing industries, as well as the government support by the tobacco industry, should be recorded.

Frequently, economic analyses of the place of tobacco in the national economy are produced on behalf of the tobacco industry. Tobacco industry reports frequently state the number of persons, or full-time equivalent persons, who work in the tobacco industry. Such presentations often overstate the number of persons the tobacco industry employs by several times using one or more of the following means:

— counting employment indirectly created by tobacco industry jobs (e.g. by counting a fraction of the jobs created in goods and services industries because tobacco workers, like everyone else, buy goods and services with their employment income);

— counting all tobacco company family members as employed in or dependent on the tobacco industry;

— counting farmers who grow tobacco as one of many crops as full-time tobacco workers;

— counting part-time or transient workers as full-time workers.

If resources were not devoted to tobacco, they would be employed in other productive economic activities which would also generate employment and tax revenues. It would then be fair to conclude that aggregate economic results would be about the same, with and without tobacco. In fact, some studies show that the overall effect on the economy would be positive, with a net increase in jobs as tobacco consumption declines.

Relative cost to the consumer

Consumer expenditures on tobacco should be tracked, and this can be done in a variety of ways: as a proportion of all consumer expenditure, as a percentage of per capita gross national product, as a percentage of per smoker gross national product, or as the average number of minutes of labour required to earn the price of 20 cigarettes. Even with only the knowledge of the prevailing price of the most popular local brand of cigarettes and the local minimum wage, it is still possible to calculate the minutes of labour required to earn the price of a package of cigarettes. For example, it was calculated that a smoker earning the minimum wage in Côte d'Ivoire must devote almost two and a half

Table 1. Selected costs of tobacco use,
Canada, 1989 (Can$ × 10^9)

Costs	Age groups		
	35–64	**65 +**	**Total**
Health costs			
Direct care	1.3	0.6	1.9
Premature mortality	4.1	2.7	6.8
Disability	0.6	0.1	0.7
Perinatal mortality			0.1
Property and forest fires			0.1
Retail expenditures on tobacco			
Tobacco taxes			5.5
Manufacturers' and trade margins			2.7
Total expenditures related to tobacco			17.8

Source: *Tobacco or health: status in the Americas.* Washington, DC, Pan American Health Organization, 1992 (Scientific Publication, No. 536). Reproduced by permission of the publisher.

hours of every working day just to earn the price of a package of cigarettes. Alternatively, the price of cigarettes could be equated to the cost of staple goods or desirable consumer goods.

Overall economic costs of tobacco

The economic consequences of tobacco can serve future campaign planning. There are many analyses that provide this information for developed countries. Summary information on the economic costs for one country, Canada, is given in Table 1. Even partial analysis of the economic costs of tobacco, as has been done for China, can be a very useful form of policy research.

The economic costs of health care attributable to smoking have been estimated using several different methodologies. Rice et al.[1] used an attributable risk methodology to estimate both the direct costs (due to tobacco-related illnesses) and the indirect costs (due to work loss, premature death, and loss of housekeeping services). For the United States, this methodology relied on the reported utilization of medical care for neoplastic, cardiovascular, and pulmonary diseases, obtained from large national surveys. Coupled with the prevalence of smoking, these relative rates of utilization for current and former smokers compared with never smokers (those who never smoked) were used, like the relative risks for death among exposed smokers, to calculate a smoking-

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[1] Rice D et al. The economic costs of the health effects of smoking, 1984. *Milbank quarterly,* 1986, 64(4):489–547.

attributable fraction that could be applied to the United States total health care costs by cost category to produce a national estimate of smoking attributable direct costs. A smoking-attributable fraction was also developed for work-loss days and lost housekeeping to estimate smoking-attributable indirect morbidity costs, and the estimated losses for a given year of life lost for a man or woman dying prematurely due to a smoking-related illness at a given age were summed to obtain indirect mortality costs. In the 1980s, these total losses were US$ 65 000 million per year, of which US$ 24 000 million was for direct medical care.

Variations on the methodology developed by Rice et al. have been used to estimate the costs of tobacco use in other countries as well. The attributable risk methodology relies on the assumption that smokers and never smokers do not differ from each other with respect to other risk factors, access to care, health status and utilization patterns for medical care. Clearly, these assumptions must be addressed.

In 1994, researchers at the University of California, Berkeley, made a more sophisticated estimate of the marginal (or excess) health care costs attributable to smoking, using data from the National Medical Expenditure Survey II (NMES-II). This survey collected detailed medical utilization histories from 35 000 persons on four separate occasions during 1987–1988. In addition, costs for utilization were obtained directly from providers, and the individual risk factor histories were obtained from the participants on a supplementary survey.[1] Thus, utilization, demographics, risk profiles, and costs could be estimated on average for each individual.[2] This model provides the most precise estimate and methodology on the economic costs of smoking to date. Projecting to 1993, the smoking-attributable economic costs for the United States were US$ 50 000 million.[3] These costs reflected the high rates of medical inflation, but did not include costs due to cigarette-caused fire deaths and injuries, perinatal disease costs generated by smoking among mothers and pregnant women, or indirect losses associated with disability and premature death. Hence, the estimate is a minimum estimate of the economic costs of smoking, and the objections raised by use of the previous methods have been largely overcome.

The most important ingredient in the above methodology has been the development of a survey that can link health risk behaviour, health status, costs and medical care utilization patterns. For most developing countries, this will not be possible. However, by including smoking history on surveys of house-

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[1] Miller LS et al. *Medical care expenditures attributable to cigarette smoking: methodology, descriptive statistics, parameter, and expenditure estimates.* Berkeley, University of California, 1994 (Center for Family and Community Health Monograph).

[2] Duan W et al. A comparison of alternative models for the demand for medical care. *Journal of business and economic statistics*, 1983, 1:115–126.

[3] Medical care expenditures attributable to cigarette smoking, United States, 1993. *Morbidity and mortality weekly report*, 1994, 43(26):469–472.

hold expenditures (which are performed by many countries to assess economic conditions and capabilities) similar economic studies may be possible. Here, data development is a priority, and the use of extensive economic models is necessary to make an accurate assessment of the economic impact of smoking on a national health care system.

Not all the costs of tobacco are relatively easy to measure, or even capable of measurement. But that does not preclude useful documentation. For instance, the tobacco-related death of a prominent local person in arts, politics or business might be seen as one of the most well-recognized costs of tobacco use. The same applies to the cost of supporting an incapacitated family member or the cost associated with lower educational achievements of children due to parents' tobacco expenditure or their early death. The truly significant costs of tobacco use are measured not in money but in the tragic and unnecessary loss of human health and lives.

Tobacco advertising

Where advertising is permitted (even if there are restrictions), tobacco companies' largest single expenditure will be devoted to advertising and promotion, exceeding the amount spent to purchase tobacco leaf. Tobacco control advocates should document the most popular forms of tobacco advertising, promotion and marketing in their country and gather comprehensive information on the brands available, their tar/nicotine levels and their target markets.

Tobacco control advocates should note the nature, extent and effectiveness of all legislation or regulation of tobacco marketing, advertising and promotion, as well as the status of voluntary agreements operated either by the tobacco companies themselves or through some formal or informal agreement with the government.

Enterprises and associations benefiting from tobacco advertising and promotion can be identified and reported. These will cover a broad range — everything from small enterprises that install billboards, to municipal transportation authorities that receive revenue for advertising cigarettes on city buses, to theatre and dance groups that receive financial support from tobacco companies. Some estimate of the total number of people involved in tobacco advertising and promotion activities could be useful to understand the extent of tobacco industry influence in the advertising sector.

National tobacco control policies

On a positive note, in many countries, some form of government activity to control tobacco is already taking place. About half of all countries have some form of anti-tobacco legislation or regulation, and most countries have some form of anti-tobacco activity. Whatever activities are going on, they should be noted, since it is very difficult to make tobacco control policies more compre-

hensive without a sound knowledge of their current status. In the governmental sector, it is critical to identify the nature, extent and effectiveness of tobacco-related health promotion and health education activities, as well as prevailing practices to support cessation of smoking.

In reviewing national policies it is useful to ask the following questions:

- *Does the accessibility of the product reflect the gravity of harm associated with its use?* Clearly a product that has no safe level of consumption and kills half of its users should not be sold cheaply, in health care facilities, in vending machines or to children.
- *Does the legislation promote full and free consent among users and potential users of tobacco products?* Misleading images and messages, such as those of tobacco advertising and alluring packaging, should be prevented. There should be prominent and detailed health information on (and possibly in) tobacco packaging and at point of sale. There should be full public disclosure of all product toxins and additives. There should also be appropriate mandated public health education, including efforts to educate the public about the role of the tobacco industry, and a require-ment for the provision of assistance to those who wish to cease using tobacco products.
- *Does the legislation ensure that the use of tobacco products does not put at risk the health of those other than the direct user of the product?* This means effective protection from involuntary exposure to tobacco smoke in such places as public spaces, workplaces and public transit.
- *Does the legislation give authority to require product modification?* Virtually all other consumer products are subject to rigorous government con-trols. Controls on the manufacturing of tobacco products, and limits on which tobacco products will be allowed for sale, can greatly influence future addiction and death rates.

To an increasing extent, protection from involuntary exposure to tobacco smoke is being provided in health care institutions, transit vehicles, public places and workplaces, with varying degrees of success. Much of this protection is provided through national, regional and local legislation, various administra-tive rules and voluntary agreements. Documentation and analysis of the extent and effectiveness of current levels of protection from involuntary exposure to tobacco smoke will form part of the initial reports needed to further improve national tobacco control policies.

The status of laws or regulations that prohibit selling or giving tobacco products to children and adolescents should be noted. If the laws are in place and not enforced, as is often the case, this should be documented.

Taxes, prices and consumption

Tobacco taxes are a significant component of comprehensive tobacco control. Typically, tobacco taxation policy is set in the ministry of finance,

while the actual tax collection is performed by the ministry of revenue. In federal states, two or even three levels of government may collect tobacco taxes. Whatever the state of current tobacco taxation, making tobacco control policies more comprehensive requires a thorough understanding of the current nature and extent of tobacco taxation and its relative importance as a source of government revenue.

For every 10% increase in real price (the price after inflation is taken into account), consumption will fall by a smaller amount, ranging from 2% to 8%. Among adolescents and people with low incomes, even larger decreases in consumption have been observed for every 10% increase in price. The significance of this observation for public health is that price can be increased through tobacco taxation, causing a fall in tobacco consumption, while simultaneously increasing government taxation revenue. This phenomenon can be used to good advantage in constructing tobacco control strategies.

Public opinion surveys

Chapter 8 identifies questions on public opinions about various tobacco control policy options as suitable candidates for inclusion in surveys of knowledge, attitudes and practices concerning tobacco consumption. Documentation of public opinion on various tobacco control measures, derived from the findings of such surveys is vital for improving the comprehensiveness of tobacco control policies and supporting proposed government action. Most surveys show that a majority of the population favours all of the elements of a comprehensive tobacco control policy as recommended by the World Health Assembly, with some of these measures even supported by smokers.

Country profiles

Country profiles can serve a variety of purposes. Different levels of detail may be needed, ranging from a concise summary of information on tobacco and its health effects (see Annex 5 for an example of this using data for Indonesia, from WHO's *Tobacco or health: a global status report*[1]) to more extensive descriptions of the situation.

A question that will inevitably be asked in any national policy debate on tobacco and its health effects is, "How does the tobacco and health situation in our country compare with that of other countries?" Information obtained from other countries will help provide answers to this question.

WHO publications like those mentioned above and the quarterly journal *International digest of health legislation* are valuable information bases for planning and programming international tobacco control. Publications of WHO's affiliated agency, the International Agency for Research on Cancer, and other

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[1] *Tobacco or health: a global status report.* Geneva, World Health Organization, 1997.

international organizations like UICC, are also useful sources of information on international tobacco control.

Conclusion: key points

To most effectively support strengthened tobacco control policies and programmes, a current and reliable picture of the tobacco situation specific to a country is needed. For many countries, there is already a wealth of easily accessible data. Where possible, the information on the following should be obtained:

— socio-demographic characteristics;
— tobacco production, trade and industry;
— tobacco consumption;
— prevalence of tobacco use;
— tobacco-attributable mortality and morbidity;
— tobacco control measures, organizations and institutions;
— tobacco in the national economy;
— tobacco advertising and promotion; and,
— public opinion on tobacco issues.

Background reading

Barnum H. The economic burden of the global trade in tobacco. *Tobacco control: an international journal*, 1994, 3:358–361.

Bartlett JC et al. Medical care expenditures attributable to cigarette smoking, United States, 1993. *Morbidity and mortality weekly report*, 1994, 43(26):469–472.

Cigarette advertising and promotion in the United States, 1993. Washington, DC, Federal Trade Commission, 1995.

Collishaw NE, Myers G. Dollar estimates of the consequences of tobacco use in Canada, 1979. *Canadian journal of public health*, 1984, 75:192–199.

Duan W et al. A comparison of alternative models for the demand for medical care. *Journal of business and economic statistics*, 1983, 1:115–126.

Durston B, Jamrozik K, eds. *Tobacco and health 1990: the global war. Proceedings of the Seventh World Conference on Tobacco and Health, Perth, 1990.* Perth, Health Department of Western Australia, 1990.

Gray N, Daube M, eds. *Guidelines for smoking control,* 2nd ed. Geneva, International Union against Cancer, 1980.

Manning WG et al. The taxes of sin. Do smokers and drinkers pay their way? *Journal of the American Medical Association*, 1989, 261:1604–1609.

Miller LS et al. Medical care expenditures attributable to cigarette smoking: methodology, descriptive statistics, parameters, and expenditure estimates. Berkeley, University of California School of Public Health, 1994 (monograph).

Pekurinen M. *Economic aspects of tobacco smoking: is there a case for government intervention in Finland?* Helsinki, VAPK Publishing, 1992 (National Agency for Welfare and Health, Research Report 16/1991).

Raw M, White P, McNeil A. *Clearing the air. A guide for action on tobacco.* London, British Medical Association, 1990.

Rice D et al. The economic costs of the health effects of smoking, 1984. *Milbank quarterly*, 1986, 64(4):489–547.

Roemer R. *Legislative action to combat the world tobacco epidemic* (2nd edition). Geneva, World Health Organization, 1993.

Tobacco or health: a global status report. Geneva, World Health Organization, 1997.

Tobacco or health: status in the Americas. Washington, DC, Pan American Health Organization, 1992 (Scientific Publication, No. 536).

Tobacco taxes in the European Union: how to make them work for health. London, Health Education Authority, 1994 (booklet produced for European seminar on tobacco taxation policy, London, 1–2 December 1994).

US Department of Health and Human Services. *Smoking and health in the Americas: a 1992 Report of the Surgeon General, in collaboration with the Pan American Health Organization*. Atlanta, GA, Centers for Disease Control, 1992.

US Department of Health and Human Services. *Smoking-attributable mortality, morbidity, and economic costs*. Computer software and documentation, SAMMEC II. Atlanta, GA, Centers for Disease Control, 1990.

Warner EK. Cigarette taxation: doing good by doing well. *Journal of public health policy*, 1984, 5(3):312–319.

World Health Organization. *Legislative responses to tobacco use*. Dordrecht, Martinus Nijhoff, 1991.

Part II

Monitoring the tobacco epidemic

What kinds of data are needed?

L aboratory, clinical, and epidemiological studies have demonstrated repeatedly that tobacco in all its forms greatly increases the risk of premature death from chronic diseases, among them coronary heart disease, stroke, chronic bronchitis and emphysema, and cancers of the lung, larynx, mouth, oesophagus, pharynx, pancreas and bladder. Tobacco use is also a contributing factor to cancers of the kidney and cervix.

Additional adverse health conditions including other respiratory diseases, peptic ulcers and pregnancy complications, are caused or exacerbated by tobacco use. The adverse effects of smoking while pregnant range from low birth weight (one of the strongest predictors of infant mortality) to increased incidence of spontaneous abortion, prematurity, still-birth and sudden infant death syndrome. Tobacco used in smokeless forms, such as for chewing or snuff taking, is a major cause of oral cancer. These health complications are compounded in developing countries because access to health care is limited and resources to treat diseases caused by tobacco use are often scarce.

Exposure to environmental tobacco smoke is a cause of disease, including lung cancer, in non-smokers. Children of parents who smoke have a greater risk of lower respiratory tract infections such as bronchitis and pneumonia than children of non-smoking parents. The incidence and severity of asthma in children is also greatly aggravated by passive smoking. There may be a cumulative effect of environmental tobacco smoke in that those children exposed to maternal smoking before birth generally continue to be exposed to environmental tobacco smoke after birth.

Policies and programmes to control tobacco use can be assisted by reliable and timely information about the pattern, extent and trends of tobacco use in the population, the health and economic consequences of tobacco use, and the sociocultural factors which underlie it. Tobacco's prominent role as a major health hazard, and the likelihood of its health effects increasing dramatically in the future, make it clear that the regular assessment of tobacco use and associated disease trends should be an integral part of a country's health information system.

WHO and the International Agency for Research on Cancer together with other agencies concerned with tobacco control (particularly UICC), have proposed questionnaires, definitions and guidelines for conducting tobacco use

surveys among the general population (adults and young people), as well as among health professionals and school teachers. While these documents are intended to facilitate comprehensive data collection efforts, it has been necessary to update them to reflect advances in knowledge and survey procedures. The following chapters address this need.

Epidemiological surveillance

Unlike the natural history of infectious diseases, where the time between infection and disease manifestation is typically short, there is a long delay between persistent smoking and full health effects. The risk of lung cancer, for example, depends strongly on the duration of smoking. As a result, current lung cancer rates are largely determined by the smoking patterns of two or three decades ago. This long delay, illustrated schematically in Figure 1, is a chief source of misunderstanding about the health effects of tobacco. The model depicted in Fig. 1 is an approximation based on the experience of developed countries and shows the various phases of the tobacco epidemic with exposure rising first among males (with a two- to three-decade delay in death caused by tobacco) and then among females (with a comparable delay before the health effects are felt). The implications of this model for developing countries are clear — the health hazards of smoking are not yet evident simply because men in these countries have not been smoking manufactured cigarettes long enough to experience the full health effects. There is an even greater urgency to prevent widespread smoking among women in developing countries who, by and large, do not smoke.

Standardization

Standardized approaches facilitate global, regional and national monitoring of the tobacco epidemic, and the evaluation of the effectiveness of policies and programmes to control it. In order for WHO to comply effectively with the World Health Assembly's request to assist countries to implement comprehensive tobacco control policies and to monitor closely the evolution of the global epidemic of tobacco-related diseases, it is imperative that national policies and programmes be based on internationally comparable principles and procedures. A major aim of this book is to promote the use of standardized measures and approaches for the continuous assessment of tobacco use and its impact on health.

The need for appropriate data

For policies and programmes to be effective in reducing overall tobacco use and subsequent health consequences, information must be collected on tobacco use within specific population groups. The most important categories of a population for which specific data are required include:

Fig. 1 The four stages of the tobacco epidemic

WHO 97318
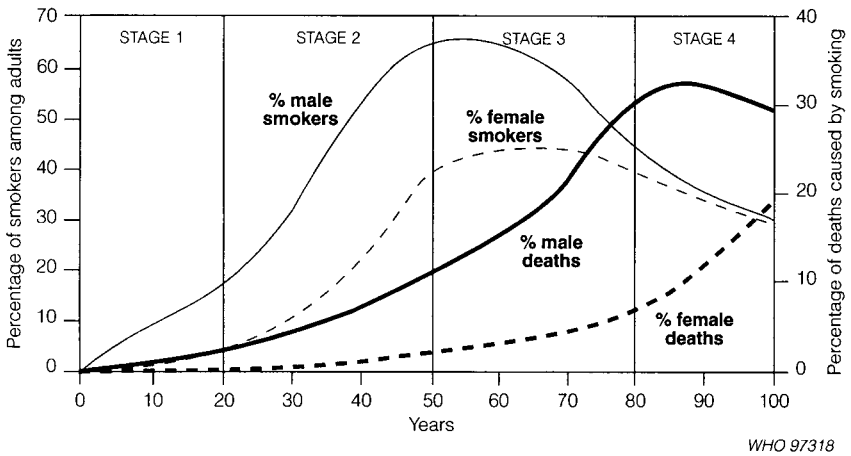
Typically, smoking prevalence first rises sharply among men, often reaching a maximum level where 60–70% smoke. Two to three decades later, deaths from smoking begin to rise in men. The same pattern occurs later among women, as they typically reach maximum smoking prevalence 15–20 years after men do so. About 30 years after the maximum prevalence level for men has been attained, cigarette smoking can cause up to one-third of all male deaths and an even higher proportion (40–45%) of deaths among middle-aged men.
Source: Lopez AD, Collishaw NE, Piha T. A descriptive model of the cigarette epidemic in developed countries. *Tobacco control*, 1994, 3(3):242–247. Reproduced by permission of the publisher.

Sex:	Men usually begin to smoke before women do and in much larger numbers. Thus female prevalence generally does not reach the same level as that for men, and reaches a peak only several years later (see Fig. 1). Combined data for men and women will mask these major sex differences in smoking behaviour and should be avoided.
Age:	The classical pattern of age-specific prevalence, at least in developed countries, is for younger age groups to begin smoking first, with older women smoking much less. In some southern European countries, typically about half of all adolescent girls smoke but less than 5% of women above ages 55 or 60 do so. As these cohorts of younger smokers age, prevalence also rises among older age groups as well, in the absence of smoking cessation. Hence, it is absolutely essential to collect prevalence data by broad age groups.
Socioeconomic status:	Prevalence has been found to vary markedly according to socioeconomic status. At the earlier stages of the tobacco epidemic, it is frequently the higher social groups, who can afford cigarettes, who smoke most. As health cam-

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paigns take effect, prevalence tends to fall first among this better educated group, with the result that lower socioeconomic groups have the highest prevalence, with the gap widening over time.

Monitoring diseases

In addition to collecting and monitoring data on group-specific tobacco use patterns, it is equally necessary to monitor trends in diseases related to tobacco use. This is much more difficult and expensive and, as a result, reliable cause-of-death data to assess changes in tobacco-induced diseases are not widely available in developing countries.

Monitoring diseases in populations is at best an indirect indicator of the health hazards of smoking since some diseases are caused by several risk factors or exposures. However, among all diseases, lung cancer can be a useful index of the overall extent of the health consequences of smoking in populations where it is known that lung cancer is strongly associated with smoking.

Measuring the use of tobacco

In most countries, smoking is the major way in which tobacco is used and is the cause of most of the diseases arising from tobacco. Thus, the term "smoking" is used in this section. However, in some countries, smokeless tobacco use is widespread, and is a major cause of diseases such as oral cancer. In these countries, smokeless tobacco use should be monitored separately.

Globally, manufactured cigarettes are the most common tobacco product. Therefore, the extent of tobacco use is most satisfactorily and easily measured in terms of cigarette consumption. However, vast amounts of tobacco are also smoked in ways that are difficult to measure because the quantity of tobacco used by individuals during a single smoking occasion cannot be easily assessed. This is particularly true of hand-rolled cigarettes, *bidis*, pipes, and a range of other hand-made smoking devices.

The two ways of measuring smoking levels and patterns are by *population surveys* and by *per capita adult consumption* (based on sales data or trade and production data). Provided that the limitations of each approach are considered, both methods are valuable, each complementing the other to give a better understanding of the extent of the tobacco epidemic.

Smoking prevalence

Surveys of the prevalence of tobacco use in a population are discussed in greater detail in Chapter 8 but are briefly referred to here to distinguish them from methods to ascertain tobacco consumption. Prevalence surveys measure individual or group behaviour, such as differences according to sex, age group,

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socioeconomic status, race/ethnicity, immigrant status, educational level or occupation. They can be influenced by such factors as cultural norms, the social acceptability of smoking, perceived confidentiality or fear of disclosure. Differences will arise according to the manner in which information is obtained — whether through a face-to-face interview, questionnaire, or telephone survey. Biochemical validation of data, such as by testing for cotinine in the saliva, although difficult and costly to obtain, is scientifically valuable and should be encouraged whenever feasible.

National probability surveys provide reasonably valid estimates of the prevalence of cigarette smoking (usually within 1–3 percentage points of the biochemically validated estimates). Under-reporting of prevalence may be more common in societies where, for example, smoking is unacceptable among women or among certain religious groups. Prevalence is likely to be under-reported among groups where the demand for abstinence is high, such as cardiac patients and pregnant women who have been advised to quit. Smokers may under-report the number of cigarettes they smoke daily, most likely by rounding down.

Under-reporting of smoking also appears to be more common among adolescents than among adults. Prevalence estimates for adolescents, especially younger adolescents, are lower in household settings than in school-based surveys, most likely because of the respondents' concerns about privacy. Recent innovations to protect confidentiality in the household setting have resulted in estimates of prevalence among adolescents that are about twice as high as were previously observed.

Per capita cigarette consumption

Per capita consumption (the total number of cigarettes sold or otherwise estimated to have been consumed, divided by the population size) can be used to assess trends in the smoking of manufactured cigarettes within the population concerned. In the past, it has been common to estimate per capita consumption based on the total population. However, it is much more appropriate to relate consumption to the age group most likely to smoke cigarettes. In most societies, children do not account for a significant proportion of all tobacco consumed. Since most population statistics are available for five-year age groups, the most convenient denominator (as used by WHO) is the population 15 years old and over. To assess the consumption of cigarettes (or other tobacco products) in a population, it is recommended to calculate consumption per adult aged 15 years and over. This will facilitate global monitoring of the epidemic, although it is recognized that the age chosen often differs between countries. While this does not invalidate the estimates, it makes comparisons between countries very difficult.

Assuming that excise tax and trade data are reliable, and that the population census data are accurate, the estimated per capita data can give a fairly accurate measure of the smoking behaviour of a society as a whole. Per capita

consumption can be used as an indicator of changes resulting from increases in price or taxation, or as a measure of the effectiveness of anti-smoking campaigns or legislation. However, it cannot provide information on the smoking behaviour of specific groups, nor identify changing patterns of smoking within different groups that may contribute to overall changes among the population as a whole. For example, over a period of years there could be a decrease in consumption among men and an increase among women, yet there may be no apparent change in the overall per capita consumption figures. Similarly, per capita consumption could be falling, despite very marked increases in smoking by members of younger age groups.

Conclusion: key points

- Data and information on tobacco use and its impact on health, and particularly how the epidemic is evolving, are useful for supporting tobacco control efforts. Countries are encouraged to collect data on their own populations: local evidence is both scientifically interesting and politically useful.
- The complexity of the tobacco epidemic, with the characteristic long delay between persistent smoking and its full health effects, means that data need to be collected on current tobacco use patterns as well as on diseases causally related to smoking.
- Both tobacco use prevalence and per capita adult consumption are key indicators of current population exposure to tobacco and should be monitored regularly.
- Other data and information are also important as part of the policy support system, including economic data, public opinion surveys and information about the implementation of tobacco control measures, specifically legislation on advertising and marketing practices.
- It is critical that data on prevalence and consumption (as well as subsequent mortality data) be collected for key subgroups of the population. Tobacco use patterns vary widely among population subgroups, as does mortality from tobacco-related causes. Effective policy responses should be based on reliable local information about tobacco consumption, smoking prevalence and the health consequences of tobacco use.

Background reading

Beaglehole R, Bonita R, Kjellström T. *Basic epidemiology*. Geneva, World Health Organization, 1993.

Lopez AD, Collishaw NE, Piha T. A descriptive model of the cigarette epidemic in developed countries. *Tobacco control*, 1994, 3(3):242–247.

US Department of Health and Human Services. *Reducing the health consequences of smoking: 25 years of progress: a report of the Surgeon General.* Rockville, MD, Centers for Disease Control, 1989 (DHHS Publication No. (CDC) 89-8411).

Monitoring tobacco consumption

Action against the tobacco epidemic requires a clear understanding of the epidemic's scope. The amount of tobacco consumed in a population is one important measure of the magnitude of its tobacco problem. Consumption figures generally can be estimated from published data based on a variety of sources, not all of which may be equally accurate. Caution is urged, therefore, when working with data on consumption.

Tobacco consumption is generally estimated indirectly from data on the sale, manufacture, trade and taxation of tobacco products. Indirect estimation means that several factors, such as the consumption of "roll-your-own" cigarettes, the popularity of home-grown tobacco, smuggling, and tax exemptions may affect consumption estimates. In many countries, estimates of consumption take into account these and other potential sources of error.

In most countries, tobacco use is synonymous with cigarette smoking. However, in many parts of the world, tobacco is used in a variety of other forms. Thus, when estimating consumption, it is essential to specify the type of tobacco being used. As a minimum, consumption should be estimated separately for two categories, smoking and smokeless tobacco use. Ideally, the consumption data should then be divided into different types of smoking and smokeless tobacco use, where these are common.

Therefore it is preferable to monitor total tobacco consumption subdivided into different categories, such as cigarettes, other smoking materials, and smokeless tobacco use, wherever any of these are prevalent. However, if this is not possible and only data on consumption of manufactured cigarettes are available, then these data should be monitored and reported since they alone in most countries will provide a good indication of the extent of tobacco use in the population.

Estimating cigarette consumption

Manufactured cigarettes are an important source of revenue for most governments and, therefore, they usually monitor carefully production, sales, import, and export data. A useful and internationally comparable indicator for estimating cigarette consumption can be derived as follows:

Total estimated cigarette consumption in a country in a given year = cigarette production + cigarette imports − cigarette exports (in that year). From this,

Annual per capita cigarette consumption per adult can be derived as follows:

$$\frac{\text{cigarette production} + \text{cigarette imports} - \text{cigarette exports}}{\text{population 15 years of age and over}}$$

One can divide a country's estimate of annual per capita consumption by the proportion of smokers in the population (as estimated by a nationally representative survey) to produce an estimate of the mean number of cigarettes smoked per smoker per day.

Consumption-based estimate of the average number of cigarettes smoked per smoker per day =

$$\frac{\text{Annual per capita cigarette consumption per adult}}{\text{Proportion of the population 15 years of age and over that smokes}} \times \frac{1}{365}$$

The nature of the estimate of the proportion of smokers in the population will affect the accuracy of the results since the estimate of annual per capita consumption includes cigarettes smoked by all smokers, whether daily or occasional. If the proportion of smokers used to prepare the consumption-based estimate is daily smokers, the procedure will yield an overestimate of cigarettes smoked per day by daily smokers. If the proportion used refers to all smokers, this will underestimate the number of cigarettes smoked per day by daily smokers.

This consumption-based estimate of the mean number of cigarettes smoked per day by smokers is likely to be substantially higher than the survey-based estimate (calculated from smokers' self-reports), consistent with the finding that smokers tend to under-report the number of cigarettes they smoke each day. Fig. 2 illustrates the extent of this under-reporting on the basis of data for the United States. For most countries, the consumption-based esti-mate of the mean number of cigarettes smoked each day by smokers should fall between about 10 and 30; if numbers outside this range are obtained, data should be re-examined.

Sources of data

In principle, data on the sale of tobacco products in a given year will provide the most direct indication of the amount of tobacco consumed by the population in that year. Sales data are generally closely monitored by govern-ments for tax collection purposes and can be obtained from government publications or agencies. Where reliable sales data are not available, consump-tion can be indirectly estimated from data on the production and trade of

Fig. 2 Mean number of cigarettes smoked daily by adult smokers, United States, 1965–1992
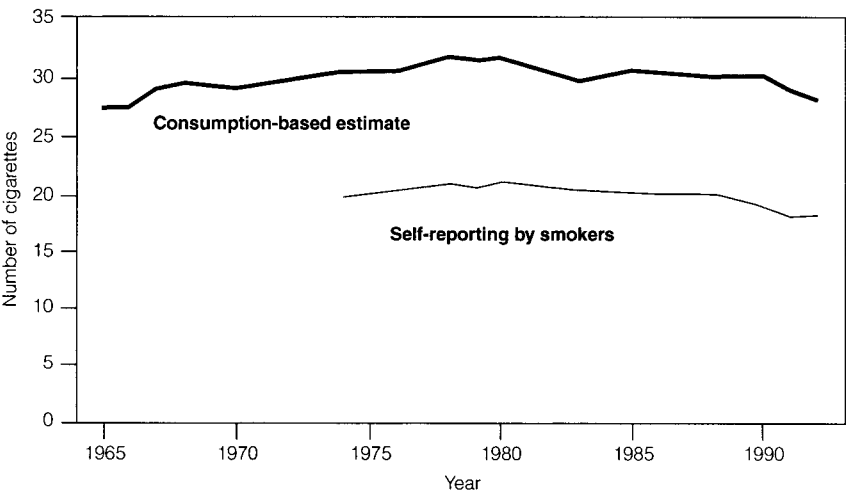
Source of data: United States Centers for Disease Control and Prevention.

tobacco products. These statistics are most commonly available for manufactured cigarettes. Government statistical offices collect and publish these data. Statistics on the production and trade of tobacco products are routinely reported to the United Nations Statistical Office and published in the United Nations *Statistical Yearbook*. The United States Department of Agriculture (Tobacco, Cotton and Seeds Division) also collects these data through a network of country offices.

For each country, population data are generally available from the census department or central statistics office. These data are typically available for geographic or administrative regions of a country and can be used for calculating variations in per capita consumption within a country, where the appropriate cigarette consumption data are also available. Periodic estimates of population size and age–sex structure are published biennially by the United Nations Population Division. These estimates are a convenient and comparable source for making comparisons between countries and may be used where reliable national population estimates are not available.

Problems in the use of per capita data

Although per capita consumption is a valuable indicator of overall smoking levels, some limitations must be considered. For example, although cigarette production figures are typically based on the assumption of one gram of

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tobacco per cigarette, this is not always the case. In the past, cigarettes frequently contained more than one gram of tobacco. Conversely, in some countries in recent years, one cigarette now contains less than one gram of tobacco (Fig. 3).

For some countries, cigarette production data may not be available and any published statistics may have been estimated from the weight of tobacco produced. This will increase the possibility of built-in biases depending on the sources. If the estimate of cigarette production remains constant for many years, or if it appears to be unrealistically high or low compared with similar or neighbouring countries or other data sources, the estimate may be unreliable. In other countries, although there may be an abundance of data from different sources, they may not be in agreement. Therefore, one should consider all data for their apparent validity and also for their consistency among different data sources.

Smuggling can seriously distort estimates of apparent consumption. For example, smuggling has been estimated to account for 10–30% of consumption in Belgium and Canada, and consumption estimates for these countries have been adjusted to take this into account. Such an adjustment is possible in only a few countries. There are, however, many other methods which may be used to develop more accurate estimates of the level of smuggling. Law enforcement and tax collection officials may have such estimates, as might the tobacco

Fig. 3 Weight of tobacco per cigarette, Canada, 1949–1991
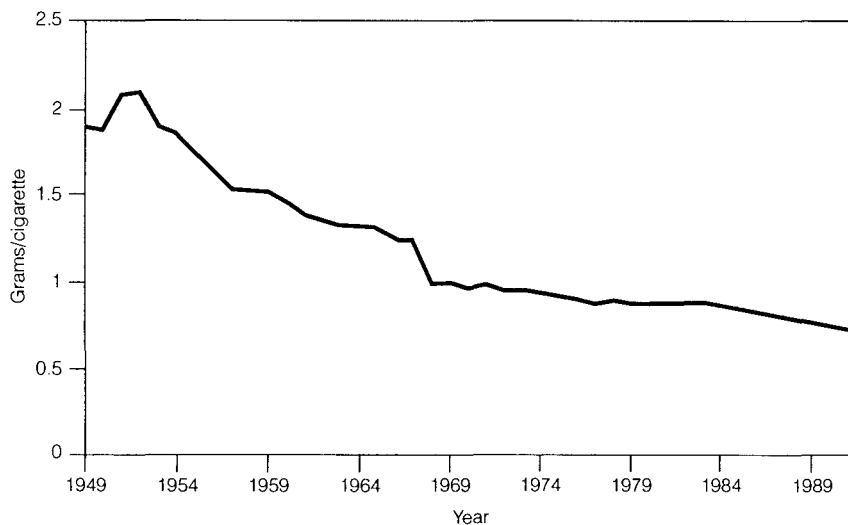
WHO 97320

Source of data: Health Canada.

industry (though biases should be considered in using such data). Efforts to reduce total smuggling, such as prominent tax markings and increased fines and law enforcement, can not only reduce the level of smuggling but make its detection (and therefore overall measurement of tobacco consumption) much easier. In 1994, smuggling represented about 5% of world manufactured cigarette consumption. It is possible to make this approximate estimate of global smuggling by examining the excess of world cigarette exports over imports. Smuggling has been increasing during the 1980s and 1990s. By 1994, roughly 30% of all cigarettes that were "exported" by tobacco companies appear to have ended up going through the hands of smugglers rather than through legal distribution channels.

For countries with a small indigenous population but a very large transient (e.g. tourist) population, care must be taken to distinguish between the consumption of the two groups. Sometimes this is possible because different taxes are levied on sales to the indigenous and transient populations, and a ratio of consumption for the two groups can be established. For example, in Cyprus, the indigenous adult population of 522 000 buys cigarettes taxed at the national rate, but a transient population of about 1.5 million tourists a year and a non-indigenous population of military personnel and their families all buy untaxed cigarettes. Countries with this kind of system can develop a more accurate estimate of domestic consumption by requiring different accounting for, taxation of, or markings on, cigarettes sold at different rates.

Excessive year-to-year fluctuations in per capita data are unusual, except in times of warfare or national catastrophe. When fluctuations do appear in trends, they should be viewed with caution. Minor fluctuations in per capita consumption trends can be removed by using statistical smoothing techniques such as three-year moving averages.

Cigarette sales data only approximate true cigarette consumption in any given year. Not all cigarettes produced or imported into a country will be consumed in that year. If beginning-of-year and end-of-year cigarette inventories do not vary greatly from each other, the estimated trend in consumption, based on production and trade of cigarettes, may be reasonably reliable. Annual sales data may also be affected by the timing of shipments from producers and stockpiling among wholesalers and retailers. Such actions can be an effort to undermine health measures by making them look less effective or less necessary. They can also be related to tobacco control measures since companies ship out additional cigarettes to avoid approaching tax increases or new regulations requiring improved health messages on packages.

Consumption figures, based on cigarette sales data, may also suffer inaccuracies due to the use of home-grown tobacco and other forms of cigarettes, which are generally at least as hazardous as manufactured cigarettes. These include "roll-your-own" or hand-rolled cigarettes, which are popular in a number of countries, as well as *bidis* (traditional locally-produced cigarettes) which are extremely common in countries of South Asia. In India, for example, *bidis* account for between 80% and 90% of all smoked tobacco products,

including cigarettes. To ignore them would lead to a massive underestimation of current and future health effects of tobacco use in India. Wherever reliable estimates of the consumption of these types of cigarettes are available, they should be included in the overall population estimate of cigarette consumption.

Estimating per capita consumption: the example of Australia

To illustrate how these issues affect estimated consumption trends, different estimates of cigarette consumption in Australia are summarized in Fig. 4. Three time series are shown. The series labelled A is based on national sales data. Series B consists of estimates of cigarette consumption based on production and trade data (production + imports − exports/population 15+), and series C is the same source (i.e. production and trade data) with the inclusion of estimates for roll-your-own cigarettes. The overall trend pattern is broadly similar between series A and series B (sales and production/trade data), indicating that indirect methods to estimate consumption may well provide a good approximation to actual consumption in many countries. The effect of roll-your-own cigarettes (estimated as 85% of loose tobacco sales in this case) is to push up the trend line estimated from production and trade data, with the

Fig. 4   Estimated time series of cigarette consumption in Australia, 1970–1993, based on different sources
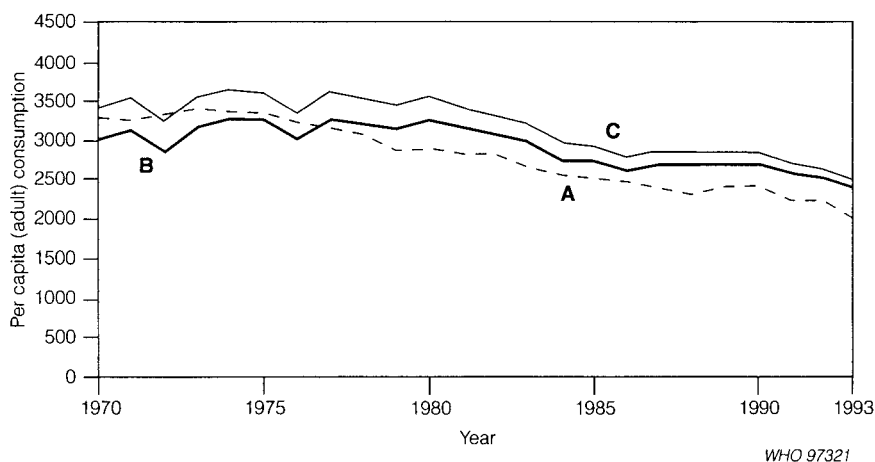
Series A: Based on sales data.
Series B: Indirectly estimated from production and trade data (ignoring stocks).
Series C: Based on production and trade data, adjusted for estimated hand-rolled cigarette consumption.
Source of data: Department of Health and Family Services, Canberra, Australia.

effect progressively diminishing over time as the popularity of these cigarettes in Australia has declined.

Conclusion: key points

- Consumption data are useful as an indicator of the overall severity of the tobacco epidemic (as measured by the extent of tobacco use in a population).
- For countries without recent prevalence data, consumption data may be relatively easy to calculate from readily available sources.
- Monitoring the tobacco epidemic through the use of consumption estimates is a relatively inexpensive procedure.
- In countries where it is possible to get historical data from sources such as the branch of government that monitors tobacco taxation or tobacco sales, trends in tobacco consumption can be directly estimated.
- When interpreting cigarette consumption data, limiting factors such as smuggling and the exclusion of roll-your-own cigarettes should be considered.

Background reading

Joosens L, Raw M. Smuggling and cross-border shopping of tobacco in Europe. *British medical journal*, 1995, 310:1393–1397.

Nicolaides-Bourman A, Wald N, Forey B, Lee P (eds). *International smoking statistics.* Oxford, Oxford University Press, 1993.

United Nations Statistical Yearbook. New York, United Nations (see latest available year).

Monitoring tobacco use

Prevalence of tobacco use in the population is one important measure of the magnitude of the tobacco problem. Additionally, with information about the prevalence of tobacco use in different subgroups of the population, the high risk groups for tobacco use can be identified. This information is helpful for planning effective health education and intervention programmes for appropriate target groups.

Knowledge about prevalence levels strengthens the position of tobacco control advocates in lobbying for tobacco control measures. If an intervention or educational programme is launched in the community, then the prevalence data can be used to establish the baseline for evaluating the effectiveness of the programme. Repeated periodic prevalence surveys in the same population group are particularly useful in identifying trends in tobacco use behaviour.

Because tobacco is used in a variety of forms, when measuring prevalence it is essential to specify the type of tobacco being used, especially when more than one type of tobacco use is common. For example, in India, prevalence of overall tobacco consumption, as well as of *bidi* smoking, betel-quid chewing and other uses, should be reported.

Defining terms

Global monitoring of the tobacco epidemic and comparisons between countries require a standardization of terms and concepts that must be defined concisely. Key definitions are given below.

Any population can be divided into two categories, smokers and non-smokers.

A   A *smoker* is someone who, at the time of the survey, smokes any tobacco product either daily or occasionally.
Smokers may be further divided into two categories:

A1 A *daily smoker* is someone who smokes any tobacco product at least once a day (with the exception that people who smoke every day, but not on days of religious fasting, are still classified as daily smokers).

A2 An *occasional smoker* is someone who smokes, but not every day. Occasional smokers include:

A2 i)   *Reducers* — people who used to smoke daily but now do not smoke every day.

A2 ii) *Continuing occasional* — people who have never smoked daily, but who have smoked 100 or more cigarettes (or the equivalent amount of tobacco) and now smoke occasionally.

A2 iii) *Experimenters* — people who have smoked less than 100 cigarettes (or the equivalent amount of tobacco) and now smoke occasionally.

B   A *non-smoker* is someone who, at the time of the survey, does not smoke at all.
    Non-smokers can be divided into three categories:

B1 *Ex-smokers* are people who were formerly daily smokers but currently do not smoke at all.

B2 *Never-smokers* are those who either have never smoked at all or have never been daily smokers and have smoked less than 100 cigarettes (or the equivalent amount of tobacco) in their lifetime.

B3 *Ex-occasional smokers* are those who were formerly occasional, but never daily, smokers and who smoked 100 or more cigarettes (or the equivalent amount of tobacco) in their lifetime.

These definitions can be used to classify the population according to their lifetime smoking status. In particular:

C   *Ever smokers* are defined as those who have ever smoked at least 100 cigarettes (or the equivalent amount of tobacco) in their lifetime.

A specific subcategory of interest is those who have smoked, or now smoke, every day.

C1 *Ever daily smokers* are defined as persons who are currently daily smokers, reducers or ex-smokers.

The relationship between these categories is shown in Table 2.

Some common categories of smoking status for individuals can then be readily constructed, as follows:

Smokers = daily smokers (A1) + occasional smokers (A2 (i–iii))

Ever smokers = daily smokers (A1) + occasional smokers (A2 (i–iii))
               + ex-smokers (B1) + ex-occasional smokers (B3)

Ever daily smokers = daily smokers (A1) + reducers (A2 i)
                     + ex-smokers (B1)

Ex-smokers = ex-daily smokers (B1)

In a subsequent section of this chapter, details are provided about the relationship between these categories of smoking status and the responses to the seven core questions on individual smoking behaviour, which are proposed to assess smoking practices from population surveys.

Table 2. Classification of the population according to current and previous smoking status

Previous smoking status	Current smoking status		
	Daily (A1)	**Occasionally (A2)**	**Non-smoker (B)**
Daily smokers	Daily smokers (A1)	Reducers (A2 i)	Ex-smokers (B1)
Never smoked daily but smoked 100 or more cigarettes	—	Continuing occasional smokers (A2 ii)	Ex-occasional smokers (B3)
Never smoked daily and never smoked as much as 100 cigarettes	—	Experimenters (A2 iii)	Never-smokers (B2)
Never smoked at all	—	—	Never-smokers (B2)

Smokeless tobacco use: The above definitions apply equally well to smokeless tobacco use (e.g. snuff, betel-quid chewing, other chewing tobacco).

Tobacco user is a person who is either a smoker or a smokeless tobacco user, or both.

Understanding prevalence

Prevalence of smoking is defined as the "proportion (usually expressed as percentage) of the population who are smokers (both daily and occasional) at a point in time". In other words:

$$\text{Prevalence of smokers (in \%)} = \frac{\text{Number of smokers in the population being surveyed}}{\text{Total size of the survey population (smokers and non-smokers)}} \times 100$$

Example: A survey of 400 men and 500 women aged 15 and over yielded 200 men and 50 women who smoked. Male smoking prevalence is therefore:

$$\frac{200}{400} \times 100 = 50\%$$

Female smoking prevalence is similarly calculated as:

$$\frac{50}{500} \times 100 = 10\%$$

Note of caution: Prevalence estimates should always be calculated for males and females separately. If a total prevalence estimate is also required (i.e. for both sexes combined), then it may be calculated as the sum of the male and

female smokers divided by the sum of the male and female sample populations, provided that there has not been over-sampling of either sex in the sample population. In other words, the sample composition should accurately reflect the population sex composition for this procedure to be valid. In this example, the combined prevalence (male + female) is calculated as:

$$\frac{200+50}{400+500} \times 100 = 27.8\%$$

It is not appropriate to calculate total prevalence as the simple arithmetic average of male and female prevalences without weighting the sex-specific prevalences to reflect the actual sex composition of the population.

Thus, for calculating prevalence of smoking, two numbers are required: a numerator and a denominator. The numerator is the number of smokers and the denominator is the number of persons from which smokers are derived (and includes smokers as well as non-smokers). The population for which the prevalence is being determined is reflected in the denominator. For example, if the denominator represents a specific community, the figure would refer to the prevalence of smoking in that community. If the numerator and denominator refer to a specific subgroup, then the prevalence refers accordingly to that particular subgroup.

Prevalence should be calculated separately for different subgroups of the population according to age, sex and other relevant sociodemographic characteristics such as educational level, ethnicity and linguistic groups. In each case, the number of smokers in the subgroup should be divided by the total number of persons (smokers plus non-smokers) in that subgroup of the population to calculate subgroup-specific prevalence.

If diverse types of tobacco use are present, it is possible to calculate prevalence of different methods of tobacco consumption from the same data set. When doing so, the denominator would remain the same and only the numerator would change. For example, the numerator should be the number of *bidi* smokers when estimating the prevalence of *bidi* smoking.

The foregoing definitions of prevalence should be used to calculate the prevalence of different categories of tobacco use. For example,

$$\text{Prevalence of daily smoking} = \frac{\text{Number of daily smokers in the surveyed population}}{\text{Total size of the surveyed population (daily smokers, plus occasional smokers plus non-smokers)}} \times 100$$

$$\text{Prevalence of smokeless tobacco use} = \frac{\text{Number of smokeless tobacco users (daily and occasional)}}{\text{Total size of the surveyed population (daily smokeless tobacco users, occasional and non-users)}} \times 100$$

It is useful to monitor the process of quitting smoking. For ex-smokers, two prevalence measures can be calculated. The first of these defines the percentage of ex-smokers in the entire population and is calculated as follows:

$$\text{Prevalence of ex-smokers} = \frac{\substack{\text{Number of ex-smokers} \\ \text{in the surveyed population}}}{\substack{\text{Total size of the surveyed population} \\ \text{(ever smokers and never-smokers)}}} \times 100$$

One problem with the above measure is that it does not give a clear indication of quitting behaviour among those who may be classified as ever daily smokers. To provide information on the percentage of ever daily smokers who are ex-smokers, a new measure, the prevalence of cessation, should be used. This is defined as follows:

$$\text{Prevalence of cessation} = \frac{\substack{\text{Number of ex-smokers} \\ \text{in the surveyed population}}}{\substack{\text{Number of ever daily smokers} \\ \text{in the surveyed population}}} \times 100$$

Other terms, such as the "quit rate", the "quit index", or the "quit ratio", have also been used to describe this or a similar measure.

Questions for assessing tobacco use

For determining prevalence, the smoking status of each individual in the sample needs to be established. To do this, a series of questions, or a questionnaire that can be administered to the sample, should be developed. The questionnaire should be prepared carefully because the accuracy, completeness and usefulness of the data are largely dependent on the questionnaire.

Assessing smoking

The following core questions are recommended for assessing smoking status. In a questionnaire, these questions should be accompanied by other questions seeking sociodemographic information on the respondents (as a minimum, age, sex and socioeconomic status).

Q 1 Have you ever smoked? (Y/N). If no, stop interview/questionnaire here.

Q 2 Have you ever smoked at least 100 cigarettes or the equivalent amount of tobacco in your lifetime? (Y/N).

Q 3 Have you ever smoked daily? (Y/N).

Q 4 Do you now smoke daily, occasionally, or not at all?

Q 5 On average, what number of the following items do/did you smoke per day?

— manufactured cigarettes
— hand-rolled cigarettes
— *bidis*
— pipefuls of tobacco
— cigars/cheroots/cigarillos
— goza/hookah.

Q 6 How many years have you smoked/did you smoke daily? (To be asked only of ever-daily smokers.)

Q 7 How long has it been since you last smoked daily? (To be asked only of ex-daily smokers.)
— less than one month
— one month or longer but less than six months
— six months or longer but less than one year
— one year or longer but less than five years
— five years or longer but less than 10 years
— 10 years or longer.

Assessing use of smokeless tobacco

Apart from smoking, tobacco is used in smokeless forms. The most common is oral use, which may consist of chewing a tobacco product or applying the product on the gums. It may also include nasal use. For assessing smokeless tobacco use, the following additional questions are recommended.

Q 1 Have you ever used smokeless tobacco? (Y/N). If no, stop interview/questionnaire here.

Q 2 Have you ever used smokeless tobacco at least 100 times in your lifetime (Y/N).

Q 3 Have you ever used smokeless tobacco daily? (Y/N).

Q 4 Do you now use smokeless tobacco daily, occasionally, or not at all?

Q 5 On average, what number of the following items do/did you use per day?
— snuff (oral use)
— snuff (nasal use)
— chewing tobacco
— betel quid
(there is a great diversity of smokeless tobacco products used in different countries and this list should be modified accordingly).

Q 6 How many years have you used/did you use smokeless tobacco daily? (To be asked only of ever-daily users.)

Q 7 How long has it been since you last used smokeless tobacco daily? (To be asked only of ex-daily users.)
— less than one month
— one month or longer but less than six months
— six months or longer but less than one year

— one year or longer but less than five years
— five years or longer but less than 10 years
— 10 years or longer.

Clarifying the core questions

The following notes are intended to clarify the core questions for assessing smoking status. They should assist interviewers and those responsible for data processing, in addition to those responsible for overall survey management.

Q 1 Those who have smoked very few (even one) cigarette(s) in their lifetime should still answer "yes" to this question.

Q 2 Smoking 100 cigarettes is approximately the same as smoking one cigarette per day for three to four months, or occasional smoking for about one year.

Q 3 If desired, the qualification "for at least six months" could be added to preserve comparability with previous WHO definitions.

Q 4 This refers to current smoking status at the time of the survey.

Q 5 This list of items should be adapted to suit local tobacco use patterns. Some of these items may not be used and therefore should be excluded, but others not listed might be common and therefore should be included. If some items are smoked, but the average is less than one per day, use the number zero. For former daily smokers, the average should refer to the time when they were daily smokers.

Q 6,7 The actual daily amount smoked should be recorded. Pre-coded categories such as 1–10 per day, 11–20 per day etc. should be avoided. This question should be asked only of ever daily smokers (i.e. those who answer "yes" to Q 3 and/or who answer "daily" to Q 4). Enter number of years. If less than one year, code as zero. Do not count time periods when the person was not smoking.

Q 7 This question should be asked only of ex-daily smokers (i.e. those who answer "yes" to Q 3 and "occasionally" or "not at all" to Q 4). Enter number of years. If less than one month, code as zero. Do not count time periods when the person was not smoking. Respondents who have stopped smoking as recently as one day prior to the survey should still be classified as ex-smokers (with a duration of less than one month).

Tobacco use in special populations

Women of reproductive age and pregnant women

Because there are additional risks of smoking which are unique to women of reproductive age and pregnant women, there is often a need for more

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detailed knowledge of tobacco use patterns among these populations. The standard questions to elicit smoking prevalence information should still be asked, with additional questions on intentions to quit, knowledge of health hazards and opinions about tobacco and health, as appropriate.

Health professionals: practitioners, teachers and students

Health professionals are highly respected in their communities. People frequently turn to them for advice and example on health matters. For this reason, exemplary behaviour, knowledge, practice and opinion of health professionals, both in practice and in training, are critical elements in advancing tobacco control policies. Surveys of health professionals, in practice and in training, should include standard questions on smoking prevalence. They should also include questions on knowledge of the health effects of tobacco and questions about curricular content and health professional practice regarding counselling patients on cessation of tobacco use.

Adolescents

Surveys of adults will contain more items on quitting than on initiation, because adults are more likely to quit smoking than are adolescents. Conversely, surveys of adolescents should focus on the process of initiation, because most people start smoking in adolescence.

Adolescent smokers appear to be more likely than adult smokers to misclassify themselves as non-smokers. This bias appears to be more common in household surveys than in school surveys. Confidentiality is more likely to be compromised in household interviews. Steps to improve the confidentiality of the household setting, such as by administering the survey instrument as a self-administered questionnaire, are likely to improve the validity of survey estimates of smoking prevalence. Smoking status of adolescents should never be assessed by proxy reports because parents, who are likely to provide answers, are often unaware that their children smoke.

The questions and definitions used for adults can be applied to adolescents, with some modifications. Since adolescents are in the process of establishing a daily pattern of smoking behaviour, a much smaller percentage of adolescents than adults who have smoked in the previous month will be daily smokers. Among persons who ever smoked daily, the process of progressing from first trying a cigarette to smoking daily usually takes about 2–3 years. The following questions are recommended:

To assess ever smoking: Ask "Have you ever tried or experimented with cigarette smoking, even one or two puffs?"

Age of first use: If the person has tried smoking, ask "How old were you when you first tried a cigarette?"

Number of lifetime cigarettes smoked: If the person has tried smoking, ask "How many cigarettes have you smoked in your entire life?"

Frequency of smoking: For those who have ever tried smoking, ask whether they now smoke daily, less than daily but at least once a week, less than weekly but at least once a month, less than monthly, or not at all.

Likelihood of smoking: A series of questions is recommended to determine if an adolescent has a firm resolve not to smoke. For example, adolescents who report that they will not try a cigarette soon, who would definitely not smoke a cigarette if one was offered by one of their close friends, and who state that they are definitely not going to smoke at any time during the next 12 months, can be classified as not susceptible to smoking. Less definitive negative responses, positive responses, refusals, don't knows, and missing responses would result in the classification of the person as being susceptible to smoking. Among adolescents who have never tried smoking, those who are susceptible to smoke are more likely than those who are not to subsequently try smoking and to progress to daily smoking.

Minors' access to cigarettes: Adolescents should be asked how they obtain their cigarettes. The questions should be phrased either in general terms as in "How do you usually obtain the cigarettes you smoke?" or, more specifically, "How did you obtain the last cigarette you smoked?" Response items should include: purchased in a store, purchased from a vending machine, from a friend or sibling, from one of my parents, had a friend purchase them for me, and stole them from a store. This information will be extremely useful to policy-makers in countries where the sale of tobacco products to minors is illegal.

Selecting key questions

While it is strongly recommended always to ask the seven core questions to assess smoking behaviour, in some cases it may be possible to include only one or two questions (for example, in a population census or a large nationally representative survey).

If only one question is permitted, it is recommended to ask the following:

Do you now smoke daily, occasionally or not at all?

This question will permit the assessment of the main categories of current smoking status, but nothing else.

If this is to be asked in a population where smokeless tobacco use is significant (e.g. prevalence of 5% or more), the question may be amended as follows:

Do you smoke, use smokeless tobacco only, use both or none, and how frequently (daily, occasionally or not at all)?

If there is an opportunity to ask two questions, then it is recommended either to ask an additional question about daily consumption of tobacco or to ask about previous history of tobacco use. These questions might be formulated as follows:

(for all respondents) *Have you ever smoked daily, occasionally or not at all?*

— *daily*
— *100 or more cigarettes, but never daily*
— *not at all, or less than 100 cigarettes in your lifetime.*

(for daily users) *How many of the following items do you smoke, chew or apply per day?*
— *manufactured cigarettes*
— *hand-rolled cigarettes*
— *bidis*
— *pipefuls of tobacco*
— *betel quids*
— *snuff.*

By combining responses to the first and last questions, the prevalence of all major categories of smoking status (current and lifetime) can be determined.

Collecting data

A questionnaire can contain two types of questions: close-ended and open-ended. In close-ended questions, the number of possible responses is limited — the respondent must choose from a group of predetermined responses. Open-ended questions are those where the respondent is not given responses to choose from, and replies are not categorized in advance. For example, the questions "why did you start smoking?" or "why did you stop smoking?" would generally fall in the open-ended category. Open-ended questions need to be coded before any statistical analysis can be done and thus are time-consuming and more difficult to analyse, especially for large samples. Therefore it is recommended that the questionnaire be limited to close-ended questions wherever possible.

Since it is almost impossible to re-interview the same individuals for additional information, the questionnaire should include all the information required at the time of analysis. Sufficient details, such as age, sex, educational level, age at smoking initiation or duration of use should be ascertained. Also, the interviewer should check the responses for errors and inconsistencies before leaving the interviewee. It is recommended that only key questions that will contribute to the survey's objectives should be included. While there is little additional cost involved in collecting other information of interest during a prevalence survey, inclusion of unrelated items could dilute the overall quality of data collection, and would require a longer time commitment from the interviewee. Therefore it is recommended to avoid including unrelated questions in the questionnaire. To ensure this, plan analysis beforehand.

Every question in a questionnaire should be defined precisely and exact criteria specified whenever necessary. Even a question that sounds simple and straightforward may mean different things to different persons. For example,

the question "Are you a smoker?" seems clear. But this does not indicate whether the respondent is a daily or occasional smoker. To avoid problems and confusion, it is best to define clearly the criteria (as recommended in this chapter) and include them in an instruction manual. Further, it is strongly recommended to use the standardized questions proposed above, taking into account the cultural context of the population to be surveyed.

The instruction manual should detail all the steps to be taken by the interviewer before and during the interview. It should also contain an explanation of each question in the questionnaire, the definitions, the criteria, the range of possible answers, and examples of unacceptable answers. The instruction manual is important, not only for the interviewer, but as a reference for the investigator, especially while writing the report. In the interview-administered situation, interviewers should receive training to ensure uniform use of the questionnaire.

Pretesting, an important part of the process of developing a questionnaire, is performed by administering the questionnaire to selected individuals who have similar characteristics to the target population. The purpose of pretesting is to discover potential problems or identify questions that may be misinterpreted, so that the questionnaire can be revised before it is administered to the larger population. Pretesting does not require a very large sample but it may need to be repeated several times until the final questionnaire is adopted. A convenience sample of about 50 people covering all important subgroups might be used for this purpose.

There are several methods of obtaining responses to survey questions. With a self-administered questionnaire, the questionnaires are given or mailed to prospective interviewees who fill them out by themselves. This is a common method in developed countries. However, in many developing countries with high rates of illiteracy, this method has only limited applicability. It may be feasible and effective only for certain better-educated segments of the population, such as doctors and other health professionals, office workers, or college students. The strengths and weaknesses of different approaches to completing questionnaires are summarized in Table 3.

In developing countries, the most common method of obtaining survey data is through a trained interviewer. Generally, the questions are asked during a face-to-face interview in which the interviewer asks the interviewee all the questions, one by one, and records the answers. Explanations, if necessary, are given as included in the questionnaire and instruction manual. Leading questions, or questions that provide a specific answer or category of answer as being more desirable than others, should be avoided (for example, "How many cigarettes do you smoke, about 10 per day?"). If possible answers are to be supplied as part of a question, then all possible answers should be placed before the interviewee.

It is also feasible to ask the questions by telephone, particularly in developed countries where telephones are commonplace. In fact, random digit dialing is a common method of sample selection in developed countries.

Table 3. Strengths and weaknesses of various data collection approaches

Type of survey and mode	Developing countries		Developed countries	
	Strengths	Weaknesses	Strengths	Weaknesses
Interview/household	— Questions are easily explained — Higher response rate	— Most expensive[a] — Less privacy may lead to under-reporting	— Questions are easily understood — Higher response rate	— Most expensive[a] — Less privacy may lead to under-reporting
Interview/telephone	— Cheaper than household — Questions are easily explained	— Few households might have telephones — Difficult to obtain a representative sample — Less privacy may lead to under-reporting	— Cheaper than household — High telephone coverage minimizes bias	— Less privacy may lead to under-reporting
Self-administered questionnaire/ household	— Questions can be explained and responses can be clarified — Higher response rate	— Much more expensive than mail — High illiteracy rate may require assistance with the questionnaire (increasing the cost and reducing privacy)	— Privacy — Responses can be clarified — Higher response rate than mail	— Much more expensive than mail
Self-administered questionnaire/ mail	— Privacy — Relatively cheap — Avoids interviewer bias	— High illiteracy rate — Skip patterns may be difficult to comprehend — Very low response rate	— Privacy — Relatively cheap, allowing larger samples — Avoids interviewer bias	— Low response rate in some cultures — Responses cannot be clarified and skip patterns may be hard to understand

[a] Among all survey options.

However, in most developing countries this method is not widely applicable because telephone ownership is limited.

If the selected interviewee is not available, it may be tempting to ask a close relative or a friend of the interviewee about the tobacco use of the person originally selected. For a survey of prevalence of tobacco use, such a procedure is not recommended.

When distributing self-administered questionnaires by mail, special efforts should be made to obtain a high response rate. The questionnaire should be typographically neat and should give the impression that it will be easy to complete. A friendly cover letter should also be included. It is important to send out reminders as necessary. The first reminder should go out shortly after the original mailing. Subsequent reminders might be accompanied by an extra copy of the questionnaire. Up to three or four reminders may be required to achieve the desired response rate (which should be at least 70%).

Selecting a sample

The most important part of a prevalence survey is the selection of the sample that forms the "denominator", or the population whose smoking behaviour is being assessed. The prevalence data refer to prevalence in the population group which forms the denominator. In other words, the prevalence refers to the population, or segment of the population, that is represented by the denominator.

Sometimes the denominator in a prevalence survey does not represent an easily identifiable or representative segment of the overall population. In such instances the prevalence has only limited value. In fact, all else being equal, the usefulness of prevalence estimates is directly proportional to the representativeness of the denominator, in terms of the population that is being studied.

Probability sampling

Since is it not possible to ask everyone in a population about their smoking status, a sample is selected which should yield a prevalence level similar to that in the whole population. The most appropriate method for selecting such a sample is probability sampling, in which each individual in the population has a known, specific probability of being included in the sample. Such a procedure requires prior information about the population and careful selection of the sample. Ideally, one would have a list of individuals (or their identification numbers) in the population, and the required number of interviewees could be selected by a simple random sampling procedure.

Random sampling does not mean haphazard or "at will" sampling. Random sampling is a scientific sampling procedure that provides a known probability for each member of the population to be included in the sample, and is generally accomplished by the use of random numbers. Lists of random num-

bers are available in several publications, and most computers can also generate random numbers.

The selection procedure is simple. Suppose there are 9000 individuals numbered from 0001 to 9000. Since a computer-generated random number lies between 0 and 1, multiply it by 10 000, discard the fractional part and select the individual corresponding to the integer part in the sample. For example, if the random number generated by the computer is 0.4632717, then multiplying by 10 000 yields 4632.717. Disregarding the fractional part (i.e. number after the decimal) gives the number 4632. The individual corresponding to this number in the survey population is then chosen for inclusion in the sample. If the integer is more than 9000, disregard the number and repeat the procedure until the desired sample size is obtained. Duplicate selections should be discarded as well.

Generally, it is impossible to have a list of all individuals in the population, but it may be possible to get a list according to groups of houses or wards (small geographical units defined for administrative purposes). For example, the census office can often supply a list of wards in a city with a detailed breakdown of the population of each ward. In such cases, rather than selecting individuals by random sampling, a ward can be considered as the sampling unit and the desired number of wards selected. Every person in selected wards may be included in the sample (see Annex 6, case study 1), or a random sample of individuals may be chosen from each randomly selected ward (two-stage sampling) (see Annex 6, case study 2). An example of a multi-stage sampling scheme for a national household survey is given in Annex 7.

The disadvantages of this form of sampling are that it is expensive and time-consuming to search for each selected sampling unit (or individual). In addition, this form of sampling requires prior information about the population, which may not always be available in developing countries.

Although probability sampling may not be feasible for an individual investigator, especially on a large or national scale, this approach is often used by various government agencies for their own purposes. It may be possible to persuade an agency to collect information on tobacco use if it is collecting related information. For example, in India, the National Sample Survey collected information on household expenditure on tobacco as part of its household expenditure survey. In Malaysia, the Dental Department in the Ministry of Health conducted a survey of tobacco habits as part of a survey on oral precancerous lesions (see Annex 6, case study 2).

Non-probability sampling

Probability sampling is the only scientifically valid way of assessing prevalence in the community. Every effort should be made to obtain prevalence data in this way. However, if resources are not available to do so, then other less desirable methods which have been used in the past might be considered.

These are described below. It is extremely important that, whenever these methods are used, the limitations of the results should be clearly described in the survey report.

Opportunistic sampling. Due to the difficulties of probability sampling, it may be tempting to interview easily accessible individuals, such as in a crowded market place. Obviously, such a sample would not be representative of the population of the entire city since everyone is not equally likely to be at that place. Additionally, the interviewer might only approach individuals who seem friendly and, among them, many would refuse. Thus, without being able to identify the segment of the population of the city that is represented by the sample, the prevalence estimate would be of little use. This procedure is therefore not recommended.

Hospital sampling. If resources are very limited, one method would be to interview persons coming into a hospital, with the permission and cooperation of hospital authorities (see Annex 6, case study 3). It would not be appropriate to interview patients because many more smokers have health problems and are more likely to be patients compared with non-smokers. However, the friends and relatives who accompany the patients may be interviewed. If it is not possible to interview each person who is eligible, a selection procedure should be decided in advance. For example, depending upon the arrival rate and capacity for interviewing, the accompanying person of every third or fourth patient might be interviewed.

If this approach is used, give careful attention to the choice of hospitals, such as large and small units, and public and private institutions, in order to cover as wide a population as possible.

Hospital sampling requires few resources because the services of only one or two interviewers are required. The chances of cooperation are high in this setting, since the patients' relatives and friends typically have time to answer a few questions on tobacco use.

This method is not equivalent to probability sampling, since everyone in the population is not equally likely to come to the hospital.

Occupational groups. Prevalence can also be relatively easily estimated for different occupations, professions or employment status in a particular office or industry. Prevalence obtained in this way is not representative of that of the population. Whenever these data are presented, it should be made clear that they refer only to the occupation group in question. One advantage is that since the group is already well-defined, enough information should be available for simple random sampling, if a sample is required. Once the management's cooperation is obtained, there should be few obstacles to getting responses from individual members. If all members of the group are literate, costs can be reduced by using self-administered questionnaires rather than face-to-face interviews.

The prevalence obtained using this procedure could be fairly representative of the selected group. Since the group is highly specialized, extrapolation to the general population is not advisable. Despite these limitations, it may be

preferable to study such well-defined and stable groups, rather than samples from the general population, if long-term follow-up is the main goal (see Annex 6, case study 4).

Sample size

The most important factor in establishing the reliability or precision of the estimated prevalence is the size of the sample. The larger the sample size, the more reliable the estimated prevalence, provided that the sample is a probability sample. If the sample size is small, the chance that the prevalence estimated from the sample is close to the true prevalence is reduced, and the prevalence estimate from the survey could be substantially different from the true prevalence.

The reliability of the prevalence estimate in a simple random sample is proportional to the square root of the sample size. Therefore, reliability (precision) increases somewhat slowly with an increase in sample size. As a guide, the reliability of the sample estimate of prevalence should be within five percentage points of the true prevalence figure. Table 4 gives details of the required sample size according to the prevalence estimate and the precision required. A sample size of less than 1000 could yield unreliable estimates, especially if subgroup estimates are required and participation is not very high. For most population-based prevalence surveys, a sample size of 2000–4000 adults would typically be required to yield reasonably reliable estimates for population subgroups of interest.

In addition to a single estimate for the whole population, and separate estimates for men and women, prevalence for different subgroups should also be sought. In such cases, the reliability of the estimate would be determined by the size of the subgroup sample. Therefore, when determining the overall sample size, the reliability of estimates within desired subgroups should be taken into consideration.

As discussed earlier, these statistical considerations are valid and meaningful only if the sample is a probability sample. For other methods, where there is no precise idea of the population from which the sample was drawn, confidence intervals and other statistical procedures have little meaning and the prevalence estimates should be viewed with great caution.

Measuring changes over time

To measure changes in tobacco use over time, repeated surveys are necessary, using the same data collection techniques to ensure comparability of data. It is essential to use the same set of core questions asked in the same way and processed and reported in a similar fashion for the same subgroups as before.

Table 4. Required sample size for estimating smoking prevalence (P) with specified precision (d) using a simple random sample and a 95% confidence interval

d	P										
	5%	**10%**	**15%**	**20%**	**25%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**
±1%	1825	3457	4898	6147	7203	8067	9220	9604	9220	8067	6147
±2%	456	864	1225	1537	1801	2017	2305	2401	2305	2017	1537
±3%	203	384	544	683	800	896	1024	1067	1024	896	683
±4%	114	216	306	384	450	504	576	600	576	504	384
±5%	73	138	196	246	288	323	369	384	369	323	246
±10%	18	35	49	61	72	81	92	96	92	81	61

d is the precision required (in percentage points) on either side of the prevalence estimate **P**. It is recommended that **d** be no greater than ± 5%, and preferably smaller.

For example, if the anticipated prevalence of smoking in a population (or population subgroup) is 20%, and we require that the true prevalence be estimated within five percentage points (with 95% confidence), then we should require a sample size of 246. Normally this would be only for a specific subgroup such as males aged 15–24, and hence the total sample size for a general population survey would have to be much larger to permit sufficiently reliable estimates for each age and sex category of the population. As a minimum, a sample size of about 2000 would be required (1000 men, 1000 women) to give reasonably reliable estimates for broad age groups and for men and women separately.[1]

For monitoring changes in the prevalence of tobacco use in the population, each new survey should select a sample that is independent of those used earlier. If survey methods need to be changed for subsequent surveys, every effort should be made to measure the impact of the change on estimated prevalence. For example, each of the survey methods should be applied to appropriate samples at the same time to evaluate the effect of different survey methods.

As a minimum, repeat surveys should be conducted every five years at the same time of year. If resources permit, surveys should be conducted more frequently, optimally each year. If resources are limited, it is strongly recommended to conduct more frequent prevalence surveys on a modest scale at shorter intervals rather than conducting large prevalence surveys at longer intervals. One reason for doing this is that data from successive surveys can be pooled to make estimates for subgroups. This is particularly recommended when the epidemic is evolving rapidly.

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[1] For sample sizes based on more complex sampling designs and other confidence intervals, see Lwanga SK, Lemeshow S. *Sample size determination in health studies: a practical manual.* Geneva, World Health Organization, 1991.

Data preparation, analysis and presentation

For comparability of data, standardized questionnaires for data collection and standardized protocols for the processing of data and the presentation of results must be used (e.g. in tables).

Editing data

The first task in the analysis phase is to carry out the cleaning-up or editing of the data. This implies checking the data for consistency and checking the responses for completeness and accuracy. It is important to monitor the number of missing answers and to check for inconsistencies in responses (e.g. if a certain number of cigarettes per day have been reported for non-smokers).

In principle, some of these inconsistencies can be eliminated by carrying out the following procedures:

— checking data against the questionnaire (to exclude eventual data entry errors when an inconsistency appears in a data file);
— entering the data twice into the computer;
— establishing "rules" for recording one of the variables in question (e.g. if a respondent has answered "no" on Q 1, "yes" on Q 2, and responded 10 on the number of cigarettes in Q 5, then inconsistencies may be handled by defining the answers to these three questions as missing, thus excluding the respondent from the reporting of the variables in question. However, this situation would not have arisen if all responses had been checked and corrected by the interviewer at the time of the interview).

Computing response rates

For computing a response rate for a survey, the following data should be recorded:

N = total number of persons in the original random sample.

D = number of persons who could not be approached because they had died or emigrated. These people are then excluded from the denominator.

M = number of persons eligible for the study and available for answering the questionnaire $(M = N - D)$. The eligibility criteria should be defined before the full work begins, and should be strictly adhered to.

R = number of persons who actually replied to the questionnaire.

The survey response rate will be: $\dfrac{R}{N-D} \times 100$

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Prevalence of different tobacco habits

It is important to realize that the number of respondents is not the same for each question (e.g. non-smokers will not be asked to answer the question on the number of cigarettes smoked daily). Therefore, the number of respondents may or may not coincide with what is the relevant basis for calculation of prevalence percentages. The following two examples may help to clarify this point.

- "Daily smokers" are those who answer "daily" to Q 4. The prevalence of this category is not the proportion of those who answer daily out of the three possible answers to this question since this distribution does not refer to the whole survey population but only to those who have answered "yes" to Q 1. Those who answer "no" to Q 1 must be added to the denominator to arrive at the correct prevalence figure for daily smokers.
- "Non-smokers" are identified as the sum of those who answer "no" to Q 1 and those who answer "not at all" to Q 4. The appropriate denominator for calculating their prevalence would then be the total number of respondents to Q1.

For the purposes of data processing, the following correspondence rules table (see Table 5) provides a guide to the responses to the core questions, which should be used to classify respondents into various categories of smoking. These guidelines assume that all inconsistencies in the data are identified and resolved.

In preparing computer programs for processing data, these combinations can readily be translated into standard "if . . . then . . ." statements, whereby the desired "defined variables" can be created.

These same general principles will also be applicable to the analysis and presentation of data on the use of smokeless tobacco.

When assessing patterns of total tobacco use it should be kept in mind that there may be a certain overlap between smokers and users of smokeless tobacco. The prevalence of a category such as "daily tobacco users" (including smokers or users of smokeless tobacco or both) cannot be derived simply by adding the prevalence of "daily smokers" and "daily users of smokeless tobacco" since the combined users would then be counted twice.

All categories of tobacco users should be analysed and presented separately for males and females. For each sex, data should be presented by age. Ten-year age groups starting with 15–24 years will generally be sufficient. Broader age ranges could also be used, especially when the sample size is relatively small. If this is necessary, then a recommended age breakdown is 15–24 years, 25–44 years, 45–64 years, and 65+ years.

Table 6 provides an example of the calculation and presentation of prevalence estimates from a hypothetical set of survey data.

Table 5. Correspondence rules

Category	Corresponding responses to questions on the core questionnaire
Daily smokers	**Q 4 "daily"**
— of cigarettes only	**Q 5:** a number >0 on the line(s) for manufactured or hand-rolled cigarettes and 0 on all other lines
— of both cigarettes and other forms of tobacco (mixed smokers)	**Q 5:** a number >0 both on the line(s) for cigarettes and on at least one other line
— only of forms of tobacco other than cigarettes	**Q 5:** zero on the line(s) for cigarettes and a number >0 on at least one other line
Occasional smokers	**Q 4 "occasionally"**
— who are former daily smokers (reducers)	Combination of Q 4 "occasionally" and Q 3 "yes"
— who have never smoked daily but have smoked 100 or more cigarettes (continuing occasionals)	Combination of Q 4 "occasionally" and Q 3 "no" and Q 2 "yes"
— who have never smoked daily and have smoked < 100 cigarettes (experimenters)	Combination of Q 4 "occasionally" and Q 3 "no" and Q 2 "no"
Non-smokers	**Q 1 "no" or Q 4 "not at all"**
— who are former daily smokers (ex-smokers)	Combination of Q 4 "not at all" and Q 3 "yes"
— who have never smoked daily but have smoked 100 or more cigarettes (ex-occasionals)	Combination of Q 4 "not at all" and Q 3 "no" and Q 2 "yes"
— who have never smoked at all or have smoked less than 100 cigarettes and never daily (never-smokers)	**Either** Q 1 "no"; **or** combination of Q 2 "no" and Q 3 "no" and Q 4 "not at all"
Ever smokers	Q 1 yes
Ever daily smokers	Q 3 yes

N.B. For each of the above categories, prevalence percentages should be based on the total number of respondents to Q 1.

When reporting prevalence estimates from a survey, care should be taken not to exaggerate the precision of the figures. At most, one decimal place should be reported.

Reporting of results from surveys of adolescent smoking requires a different approach, because the rates of tobacco use change rapidly during adolescence. The frequency of smoking categories discussed under *Adolescents* (p. 83) should be used. Ideally, these should be reported for single years of age for each year of age from 10 to 19, with summary reporting for the groups 10–14 and 15–19. Unfortunately, the costs of obtaining statistically reliable data for single years of age may be prohibitive. If this is the case, then data could be reported for the age groups 10–12, 13–14, 15–16 and 17–19, with summary reporting

Table 6. Hypothetical example of the presentation of survey data on smoking behaviour

Age group (years) Sex	15–24		25–44		45–64		65+		All ages	
	M	F	M	F	M	F	M	F	M	F
Desired sample size	244	250	189	213	467	479	263	362	1163	1304
Actual number of respondents	244	243	189	212	457	476	257	350	1147	1281
Missing answers (data)	0	7	0	1	10	3	6	12	16	23
Prevalence estimates (calculated on the basis of actual number of respondents, ignoring missing data)										
Daily smokers (%)	20	34	26	37	30	31	19	15	24	29
Occasional smokers (%)	19	18	14	9	10	6	4	3	12	8
Non-smokers (%)	61	48	60	54	60	63	77	82	64	63
Total (%)	100	100	100	100	100	100	100	100	100	100

for the age groups 10–14 and 15–19. At a minimum, statistically reliable information should be obtained and reported for the age groups 10–14 and 15–19.

Tobacco consumption levels

Tobacco consumption levels may be reported in various ways. For daily cigarette smokers, the analysis should include the mean number of cigarettes smoked per day by smokers as well as the distribution of smokers according to some classification of cigarettes smoked per day. This could be, for example, <4, 5–14, 15–24, 25 and over; or 1–7, 8–12, 13–17, 18–22, 23–27, and 28 or more. These categorizations are suggested to avoid a "digit preference" among smokers who often tend to report consumption in numbers which are multiples of 5 or 10 — i.e. 5, 10, 15 or 20 cigarettes per day. If the number of smokers is small, the categories may be collapsed in a way which is judged most appropriate to overcome this problem.

Using survey data to make population estimates

In many countries, the data obtained from probability samples are used to estimate the number of people in the entire population who use tobacco. In order to make such population estimates, data (or projections) are required on the sociodemographic characteristics (usually age, sex and ethnicity) of the population. A set of "weighting factors" is applied to the survey sample data to permit the calculation of population estimates. The weighting factors are used to adjust the survey data so that they accurately reflect the characteristics of the general population.

When this technique is applied, the data for one individual in the sample could actually represent that of thousands of people in the population. In order to conduct such a procedure, an appropriate statistical textbook or a sampling statistician should be consulted. The calculation of confidence intervals and tests of statistical inference require specialized computer software programs when weighted data are used.

Countries that use unweighted data should report estimates separately for males and females because the proportion of each sex in the sample is usually different from that in the overall population. Countries that use weighted data can report estimates for subgroups and for the total population.

Additional questions on tobacco use, knowledge and attitudes

Where resources are available, it can be extremely useful to ask additional questions on tobacco use, knowledge and opinions.

Tobacco use

Additional questions on tobacco use could include those that reveal further information on the following:

- Age at which first experimentation with tobacco took place and age at which daily tobacco use began. This question should be given priority for inclusion in surveys dealing with tobacco use initiation.
- Brand of cigarette most commonly used, tar levels of cigarettes regularly smoked, and whether smokers use filter-tipped or non-filtered cigarettes.
- Interest in quitting. This could include questions such as: "During the past 12 months, have you quit smoking for one day or longer because you were trying to stop smoking?" and "Would you like to completely stop smoking cigarettes?"
- Whether a health professional (doctor, dentist, nurse, pharmacist) has given advice to stop smoking.
- Indicators of nicotine dependence, such as length of time before first cigarette after waking. Categories recommended for classifying responses are: <5 minutes, >5 but <30 minutes, 30–60 minutes, >60 minutes.
- Exposure to environmental tobacco smoke at home, in the worksite and in public places. This could include the number of hours exposed and whether a member of the family smokes at home.

Health knowledge

Understanding the public's appreciation of the health risks of tobacco use can greatly assist tobacco control efforts. Information has a powerful influence

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on behaviour; thus strategies are needed that give people sufficient information to make informed decisions about their health. Finding out exactly what people know is necessary to determine further steps for package warnings, health education campaigns and other measures. Thus, an important consideration in surveying health knowledge is whether or not smokers made their decision to smoke with sufficient knowledge of the potential risks involved.

- *Recall of the diseases caused.* Simply knowing that tobacco is "bad", or responding positively when asked if tobacco use causes a particular disease does not show the extent of understanding of critically important health information. This is one instance where an open-ended question is recommended, such as: "To the best of your knowledge, what, if any, are the health hazards related to smoking?" When this question was asked in a 1990 Canadian survey, only 20% of respondents identified heart disease as a potential health hazard.
- *Awareness of the probability of contracting such diseases.* Respondents may recall that smoking causes lung cancer but may believe there is only minimal risk of their getting the disease.
- *Awareness of the prognosis.* The following question would determine awareness of the seriousness of tobacco-induced disease: "To the best of your knowledge, what percentage of lung cancer cases result in death?" According to the 1990 Canadian survey, one-third of respondents reported that they did not know and only 14% were able to give the correct answer (i.e. more than 80%). The vast majority underestimated the risk.
- *Awareness of the benefits of quitting.* An individual who believes that quitting smoking will not reduce the risk of a heart attack ("I've smoked for 30 years so the harm is already done") cannot make informed decisions.

Public opinion

Public opinion surveys can support and assist government policy concerning tobacco control legislation. In most cases, there is widespread support for comprehensive tobacco control measures, particularly those which prevent children from starting smoking. It is often found that smokers also support tobacco control activities since they usually do not want their children to smoke. The results of public opinion surveys can also be a very powerful means of countering tobacco company arguments.

Although public opinion surveys can be combined with surveys on prevalence or health knowledge, they are usually undertaken as separate surveys and are best related to current political possibilities for tobacco control action. For example, if a government is proposing a ban on tobacco promotion, it is useful to design a questionnaire that focuses on this issue. Public opinion surveys can also help governments to decide on alternatives, such as whether to raise taxes

on tobacco or on another product. A major advantage of public opinion surveys is that they can be conducted in a short period of time.

Public opinion surveys can be conducted by governments but are usually conducted by university research departments, health institutes or market research organizations. Because public opinion surveys may serve as a powerful support for tobacco control, the survey design must be of high standard, with the questions free from bias. In order to increase the utility of the findings, data should be sought and analysed according to such subgroups as age, sex, and perhaps political affiliation (where applicable), as well as smoker/non-smoker status. The following are examples of commonly surveyed topics:

— smoke-free areas;
— ban on sales to minors;
— ban on street vendors;
— ban on free samples;
— tobacco tax;
— use of tobacco tax to fund health promotion and sports/arts sponsorship;
— ban on tobacco advertising/promotion;
— health warnings.

Examples of questions used in public opinion surveys conducted in Canada are found in Annex 8.

Workplace surveys

Surveys which involve the entire workforce in the decision whether or not to implement smoking bans (or restrictions) in the workplace are a key component in the successful implementation of such bans. It is important, of course, that the final decision reflects, as closely as possible, the wishes of the workforce. A survey of all employees prior to making a workplace smoke-free can identify support for this type of policy, and can assess current smoking patterns, areas of concern and desire for assistance with giving up smoking. Once a non-smoking policy is implemented, surveys can then monitor compliance. An example of a workplace survey is found in Annex 9.

Precautions when conducting surveys

When selecting subjects for prevalence surveys, every attempt should be made to eliminate self-selection, since it is generally accepted that self-selected individuals may not be representative of the population. Any prevalence data obtained using a sampling process where self-selection was involved may provide a biased estimate although it is difficult to obtain an idea of the magnitude or even direction of the bias.

When conducting a survey interview, it is important to minimize the number of non-responses. Some individuals may not be available when

contacted for an interview, or may refuse to take part. It is best to avoid the temptation to select additional individuals to make up for the lost sample size. Since it is generally accepted that respondents are different from non-respondents, a high non-response rate would substantially bias the estimated prevalence. For example, in a house-to-house survey, the subgroup most difficult to interview is usually working males. Their smoking patterns may be very different from those of other sectors of the population. In this case, it is advisable to commit additional resources to extra efforts to interview the non-respondents.

Whenever feasible, face-to-face interviews should be conducted in private, using responses obtained directly from the interviewee. If other individuals are within hearing distance of the interview, the interviewees may not give accurate answers. As discussed earlier, in some cultures women may not be comfortable talking about their tobacco habits in front of others. In other cases, young people may not give accurate responses concerning their tobacco habits in front of parents or elders.

Conclusion: key points

- Accurate data on the prevalence of tobacco use in the total population, among men and women, and among specific subgroups are the most important and useful measures of the magnitude of the tobacco epidemic in a given population.
- Probability sampling is the only scientifically valid procedure for estimating prevalence in a population.
- It is extremely important to avoid self-selection in the sample, and to minimize the level of non-response.
- Prevalence surveys should be repeated at least every five years, and if possible annually, in order to monitor trends in tobacco use behaviour.

Background reading

Giovino GA et al. Epidemiology of tobacco use and dependence. *Epidemiologic reviews*, 1995, 17(1): 48–65.

Gray N, Daube M. *Guidelines for smoking control*, 2nd ed. Geneva, International Union against Cancer, 1980.

Gupta P, Mackay J. How to conduct a prevalence survey. Geneva, International Union against Cancer, 1993 (Tobacco Control Fact Sheets, No. 10).

Lwanga SK, Lemeshow S. *Sample size determination in health studies: a practical manual.* Geneva, World Health Organization, 1991.

Mehta FS et al. Epidemiologic and histologic study of oral cancer and leukoplakia among 50 915 villagers in India. *Cancer*, 1969, 24:832–849.

Rahkonen O, Berg M, Puska P. Relationship between educational status, gender and smoking in Finland, 1978–1992. *Health promotion international*, 1995, 10(2):115–120.

The evaluation and monitoring of public action on tobacco. Copenhagen, WHO Regional Office for Europe, 1988 (Smoke-free Europe, 3).

US Department of Health and Human Services. *Reducing the health consequences of smoking: 25 years of progress. A report of the Surgeon General.* Rockville, MD, Centers for Disease Control, 1989.

US Department of Health and Human Services. *The health consequences of smoking: chronic obstructive lung disease. A report of the Surgeon General.* Rockville, MD, Centers for Disease Control, 1984.

Chapter 9

Assessing the health effects
of tobacco

A fundamental principle of public health action has been the need to
determine the causes of ill-health (specifically, the causes of epidem-
ics), and reliably to document and monitor the evolution of disease due to
various exposures. This central role of epidemiology in promoting public health
is as important for chronic diseases as it is for infectious diseases. Indeed,
chronic diseases and their causes need to be monitored with the same degree of
vigilance as epidemics of infectious disease.

The use of tobacco products has brought about an epidemic which has
already killed millions in developed countries and is threatening to kill many
more in developing countries. In 1964, the United States Surgeon General's
first official report on smoking and health concluded that "cigarette smoking
is a health hazard of sufficient importance in the United States to warrant
appropriate remedial action". In 1971, the Royal College of Physicians of the
United Kingdom declared smoking to be "as important a cause of death as
were the great epidemic diseases that affected previous generations in this
country". Subsequent reports have documented the progression of the
epidemic.

The epidemic of tobacco-related deaths that began in a handful of devel-
oped countries has spread to all of them. The general pattern is for deaths to
rise first for men and subsequently for women, reflecting sex differences in
smoking behaviour. By the end of the 20th century, cigarette smoking will have
killed about 62 million people in developed countries (52 million men, 10
million women). In the early 1990s, one in four male deaths and, more
importantly, one in three male deaths in the age group 35–69 years were caused
by smoking.

Smoking-attributable death rates are currently lower among women than
men but are rising rapidly. For example, the proportion of female deaths in
middle age due to smoking has increased six-fold since 1955, rising from 2% to
13% by 1995. WHO estimates that about half of all tobacco-related deaths
occur at ages 35–69 years, making tobacco the most important cause of
premature death in developed countries.

This chapter presents some basic epidemiological concepts helpful in
understanding the relationship between tobacco and disease. Data sources for
mortality and, to a lesser extent, morbidity are discussed and methods are

presented for estimating or projecting tobacco-attributable mortality. Several procedures are suggested to assist countries in determining what methods are most appropriate for them.

Collecting and interpreting epidemiological data

Most countries have some system for collecting and analysing health information. The coverage and reliability of these data vary widely according to the country's level of health development. Developed countries have national vital registration data on causes of death which are both complete and reliable. All deaths in these countries are registered and all, or virtually all, deaths are medically certified as to the underlying cause. On the other hand, morbidity data are much less complete, even in these statistically advanced countries. For example, only a handful of developed countries have national cancer incidence registries (although many more have registries that cover part of the population).

In developing countries, the availability of data on mortality and morbidity is much less uniform, and it is important to realize that there are great differences in developing countries' capacity to monitor tobacco-related diseases. In some countries of Latin America and East Asia, for instance, reliable national mortality statistics are available, at least for adults, which can be used to assess the local importance of these diseases. In many other parts of the developing world, data that are available are often unrepresentative, unreliable and out of date. The challenge is to decide how best to use whatever data are available so as to maximize their utility in support of local action to control tobacco use. Where reliable data to monitor the health hazards of tobacco use are not available, efforts should be made to collect them using one or more of the approaches described in this chapter.

Basic data and definitions

Information about the size, structure and geographical distribution of a population is essential if data on health status (i.e. mortality and morbidity) are to be correctly interpreted. When assessing and monitoring the extent of the tobacco epidemic in a population, it is essential to have reliable data on population size by *age and sex* so that rates of disease can be calculated from data on cases of disease or deaths in the same population. In many instances, the epidemiologist has information on the number of cases or deaths from lung cancer or other smoking-related diseases but, without information on the size and composition of the population at risk of incurring these diseases, the value of the data for epidemiological surveillance is much reduced.

A key requirement, therefore, is that all data on the number of cases of disease or of deaths be related to an identifiable population at risk so that rates

of disease occurrence or death can be calculated. Disease incidence is strongly dependent on age and sex, with rates for the major tobacco-related diseases being higher for males and increasing sharply with age. Therefore, it is strongly recommended that population data be sought and analysed separately for males and females and on the basis of age. For most purposes, the 10–year age groups — 15–24 years, 25–34, 35–44, 45–54, 55–64, 65–74, 75 and over — are desirable. However, broader age groups such as 15–44, 45–64 or 69, and 65 (or 70) and over are still useful analytical categories if data for these are the only data available.

The crude mortality rate (M) in a specific population is defined as the number of deaths (D) in that population in a given period of time (usually one year) divided by the population (P) in which the deaths have occurred. Usually the population at the middle of the year is used as the basis for calculations. Rates are usually expressed as the number of deaths per 1000 (or some multiple of 1000) per year, i.e.

$$M = \frac{D}{P} \times 1000$$

Mortality rates always need to be calculated for specific age groups, and separately for men and women. An example of age-specific data is given in Table 7.

A crude incidence rate for a disease is similarly defined and calculated, but instead of deaths we count the number of new cases of disease which are reported for a population in a year. Age-specific and sex-specific incidence rates are defined similarly to rates for mortality.

Table 7. Example of data on lung cancer deaths available from vital registration or some similar source

Age group	Number of deaths	Population at risk (mid-year population)	Age-specific lung cancer death rate (per 1000 population)
35–39	140	1 650 000	0.08 $\left(= \dfrac{140}{1650000} \times 1000 \right)$
40–44	480	1 850 000	0.26
45–49	1070	1 840 000	0.58
50–54	2090	1 670 000	1.25
55–59	3000	1 340 000	2.24
60–64	3200	1 100 000	2.91
65–69	2900	900 000	3.22
70+	3600	1 400 000	2.57

Age-specific disease or death rates are not always easy to interpret, particularly as the number of age categories increases. Summary indices of disease rates over all ages, or over broad age groups, greatly assist the interpretation of overall disease levels. Moreover, they provide more reliable information on disease patterns and trends. For example, the crude mortality rate from lung cancer might be increasing in a population simply because the population is aging, without any underlying increase in lung cancer risk.

Two simple indices are widely used in epidemiology to summarize age-specific rates:

- *Cumulative incidence (or mortality) rate (CIR or CMR).* This is defined as the sum of the age-specific rates between two ages. If, as is generally the case, age-specific rates are available by five-year age groups (e.g. 15–19, 20–24, etc), then the cumulative incidence (or mortality) rate is defined as five times the sum of the five-year age-specific death rates, i.e.

$$CMR = 5\sum_{x=a}^{x=b} M_x$$

where a is the starting age of the age-interval, b is the upper limit of the age interval, and M_x is the age-specific death rate for each five-year interval between ages a and b.

Taking the data in Table 7, the cumulative mortality rate from lung cancer between ages 35 and 69 would be: $5(0.08 + 0.26 + 0.58 + 1.25 + 2.24 + 2.91 + 3.22) = 52.7$ per 1000.

- *Age-standardized incidence (or mortality) rate (ASR).* This is calculated to facilitate comparisons of disease rates among populations with different age structures (overall rates of disease are very much influenced by population age structure since chronic disease rates rise steeply with age). It is essential to have age-specific rates for this purpose. The ASR is calculated by multiplying age-specific rates by certain arbitrary weights and summing them over all age categories. The weights are, in fact, the number of people in each age group in a hypothetical "standard" population.

Thus, the ASR is the rate which would be expected in a hypothetical population with a standard age structure. In practice, any population age structure could be chosen as the standard, although it is preferable to choose a standard which is not too different from that of the populations under study. Two widely used population age standards are the "world" and "European" standards. The age composition of these hypothetical populations is given in Annex 10. Changing the age standard will affect the level of the age-standardized rates being compared, but their comparative rank order should be largely preserved.

Table 8. Example of age-standardized death rates (based on data in Table 7)

Age group (years)	Age-specific lung cancer death rate (per 1000)	Standard population size	Expected number of lung cancer deaths in the standard population
35–39	0.08	7 000	0.56
40–44	0.26	7 000	1.82
45–49	0.58	7 000	4.06
50–54	1.25	7 000	8.75
55–59	2.24	6 000	13.44
60–64	2.91	5 000	14.55
65–69	3.22	4 000	12.88
35–69		43 000	56.06

Example: To calculate the age-standardized death rate from lung cancer at ages 35–69 from the data given in the previous example, we proceed as follows:

Step 1: Calculate age-specific death rates (already done in the example).

Step 2: Multiply (or weight) each of these death rates by the corresponding population in the standard. This gives the expected number of deaths, by age, in the standard population.

Step 3: Add the expected number of deaths over the age groups of interest, and divide by the total population size in the standard population to obtain the ASR. This last step is facilitated by choosing a multiple of 1000 as the total standard population size since death rates are usually expressed per 1000.

This procedure yields an age-standardized death rate at ages 35–69 of 1.30 per 1000 population (choosing, arbitrarily, the European standard), as shown in Table 8.

On the basis of the data in Table 8, the ASR at ages 35–69 $= \dfrac{56.06}{43\,000} \times$ 1000 = 1.30 per 1000 population.

Monitoring tobacco-related morbidity

The prevalence of smoking is defined in Chapter 8. Prevalence of a disease is defined in a similar way as the proportion of the population who have the disease at a given point in time:

$$\text{Disease prevalence (DP)} = \frac{\text{Number of existing cases of the disease (in a year)}}{\text{Mid-year population size}} \times 1000$$

The words "incidence" and "prevalence" are sometimes used synonymously. This is incorrect. Incidence is a measure of the risk of disease, whereas prevalence is a measure of the existing number of cases of disease in the population at a point in time. They are closely related since prevalence depends on current and past incidence, the duration of the disease, and mortality.

Morbidity indicators of relevance for assessing the tobacco epidemic are, in effect, measures of incidence or prevalence. Although incidence of disease is unquestionably the most appropriate measure of the evolution of tobacco-related diseases, it is intrinsically more difficult to obtain than mortality statistics. Few reliable, comprehensive data collection systems exist for monitoring the incidence of major chronic diseases. The most notable exception is cancer, for which several countries have established some system of data collection which is representative of at least part of the population. However, even in developed countries, incidence data are rarely collected for the entire population, but rather for defined geographical areas. The International Agency for Research on Cancer (IARC) routinely monitors cancer incidence and periodically publishes data from cancer registries around the world in its publication *Cancer incidence in five continents*. IARC has also published guidelines for the establishment and maintenance of cancer registers.

Other sources of information on morbidity include hospital records and data from other health establishments, including general practices. Although the diagnostic information on these records can give a useful (though general) idea of the occurrence of tobacco-related diseases in the population served by these facilities, the data tend to be biased in that they reflect disease occurrence among those who have access to health services. They do not reflect patterns of disease in poorer populations who may not have access to these services but who nonetheless incur tobacco-related illnesses. Though these records may yield indirect evidence about tobacco-related disease trends in a population, they do not yield reliable measures of disease incidence and are frequently based on small numbers. Thus, the observation that a particular hospital recorded 62 new cases of lung cancer in a year is not, by itself, useful for disease monitoring. Even a comparison with records from earlier years, which may show far fewer cases of lung cancer, is at best suggestive that lung cancer is rising, but is not a reliable monitoring tool for assessing trends in the disease since it may reflect changes in population size, better diagnosis or greater access to health care facilities or both.

Reliable data on chronic disease incidence for diseases other than cancer are even less accessible. In many developed countries, good community-based registration systems for cardiovascular diseases exist as a result of WHO's MONICA (Monitoring of Trends and Determinants of Cardiovascular Diseases) initiative, which was established in the mid-1980s to monitor trends in

cardiovascular disease incidence and in related risk-factor exposures, including smoking. About 40 centres are collaborating in this project. Because of the strict criteria for diagnosis and the standardization of data collection and registration procedures, it is an invaluable source of data on cardiovascular morbidity for these populations. However, establishing and maintaining cardiovascular disease registries is very costly, and may be more appropriate for research and development purposes than for national surveillance.

Several countries are working to develop hospital discharge reporting systems to obtain relevant information on incidence trends for major chronic diseases (e.g. acute myocardial infarction). This requires that a degree of standardization of diagnostic criteria be achieved across hospital record systems. These data should be linked with mortality registration to provide the overall incidence (fatal and non-fatal) of cases of disease. Provided that all hospitals treating patients in a given geographical area participate, and the population of that area is known, this procedure will yield useful estimates of disease incidence.

Periodic health surveys are another source of data on morbidity from chronic diseases. Although these methods may provide adequate information about levels of illness, they are inadequate for assessing chronic disease patterns. Many surveys ask broad questions about symptoms from which specific medical diagnoses must be drawn. However, since many chronic diseases have similar symptoms, diagnosis is often difficult. This is compounded by the fact that symptoms are self-reported by respondents who may lack the ability to identify specific symptoms, or who may often under-report disease or symptoms. Thus, health surveys are generally of limited value in assessing specific tobacco-related disease incidence and prevalence. Some surveys ask whether the respondent has been told by a physician that he or she has a specific disease. Data obtained in this way can provide a broad indication of disease levels in representative samples of the population.

When reliable and comprehensive morbidity data are available, they have the potential for providing a more complete assessment of the health effects of tobacco use than mortality data alone. This is particularly relevant for those smoking-related diseases that are rarely fatal (i.e. peripheral vascular disease), or for diseases in which a long period of illness precedes death (i.e. chronic bronchitis or emphysema). A decision must be made as to whether the additional morbidity information for a representative group of the population warrants the resources required to reliably obtain it.

Monitoring tobacco-related mortality

A major advantage of using mortality data to assess the evolution of tobacco-related diseases is that they are generally widely available and unambiguous: death is a singular event for which most societies have instituted some form of legal registration. This is not the case for morbidity which can be defined in several ways.

The most common source of mortality data is vital registration systems which are operative in most countries. In such a system, a civil registration office is notified within a short time of each death, and a certificate with basic demographic details of the deceased (e.g. age, sex, place of residence) is issued. The certificate also states the underlying cause of death, chosen according to the rules and procedures of the *International statistical classification of diseases and related health problems* (ICD).[1] For all developed countries, and for some developing countries, all or virtually all deaths are registered and the cause of death is medically certified. For these countries, reliable data on the age and sex structure of the population are also generally available for the calculation of mortality rates. For these 50–60 countries or territories, representing about 30% of the world's population, mortality from chronic diseases can be monitored with reasonable confidence, although even for these populations the validity of diagnosis could be further improved (for example, by greater use of autopsy). WHO's *World health statistics annual* is an international compilation of mortality data.[2]

In some countries, sentinel surveillance points have been established to serve as vital registration areas for specific population groups. In this case, all vital events, including deaths, are registered for the population under surveillance (usually a defined administrative area such as a county, province or city). All deaths should be medically certified and estimates of the population size and age and sex structure for the catchment area should be available. If such sentinel sites are distributed throughout a country or area, they can collectively provide a very good basis for monitoring disease incidence, and particularly mortality. For example, the Chinese disease surveillance point system is a statistically representative collection of about 135 sentinel sites, covering over 50 000 deaths (in 1993).

Other procedures in use for the collection of cause-specific mortality data on chronic diseases include lay reporting of causes of death, retrospective surveys, and the analysis of hospital records. Some of these approaches suffer from the same diagnostic problems or biases mentioned earlier for morbidity data. Lay reporting is a practical and generally inexpensive means of obtaining data at community level. In this approach, a non-medical team visits the household of the deceased to enquire about symptoms and to gather related information on the deceased prior to death. From this information, a diagnosis is made about the cause of death, using standardized algorithms. This diagnosis should be validated on a sample basis by a physician visiting the household. Such a system is operated by about 1400 primary health care centres throughout India. Evaluations and use of these data suggest that, while they are helpful in delineating major disease or injury levels, they are not sufficiently accurate for monitoring specific chronic diseases related to tobacco use.

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[1] *International statistical classification of diseases and related health problems. Tenth revision.* Geneva, World Health Organization, 1992–1994.

[2] *World health statistics annual.* Geneva, World Health Organization.

In summary, only vital registration or sentinel surveillance sites of known reliability and completeness are likely to be useful for monitoring mortality from the major chronic diseases caused by tobacco. Rather than attempt to monitor mortality rates for all diseases associated with tobacco use, it is recommended that attention be restricted to those diseases most strongly linked with tobacco use or those which are major causes of adult mortality or both. These diseases are (ICD-9/ICD-10 numbers in parentheses):

— lung cancer (162/C33, C34)
— cancer of the mouth, oesophagus, larynx and pharynx (could be grouped) (140–150,161/C00–C15, C32)
— ischaemic heart disease (410–414/I20–I25)
— cerebrovascular disease (430–438/I60–I69)
— chronic obstructive pulmonary disease (COPD) (490–2, 494–6/J40–J44, J47) (this is primarily chronic bronchitis and emphysema).

In addition, it is useful to monitor death rates from all cancers (140–209/C00–C97) and all causes of death combined.

Focusing on these conditions will greatly reduce the analytical problems that would otherwise occur when analysing vast data sets on 30–50 causes; very little additional information would be gained from examining more detailed causes at considerably greater effort.

Fig. 5 Cohort mortality trends from lung cancer at ages 55–59, males, selected developed countries
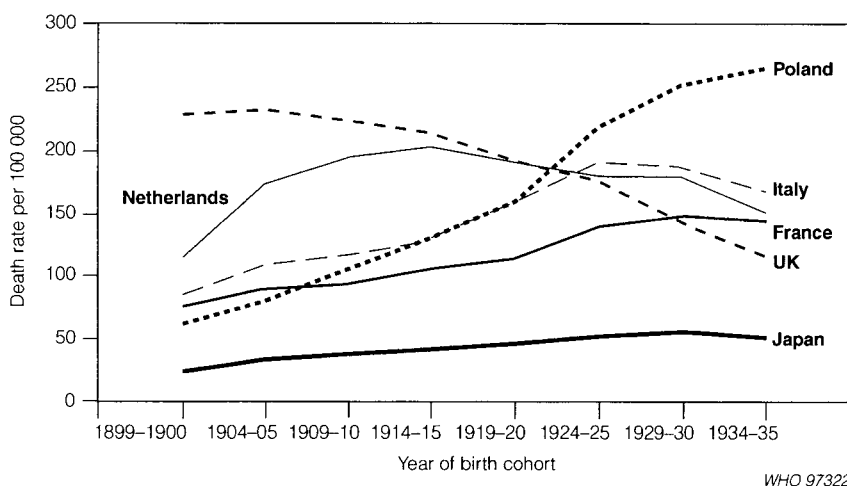
Source of data: Peto R et al. *Mortality from smoking in developed countries, 1950–2000.* Oxford, Oxford University Press, 1994.

The degree of age detail for the collection and analysis of mortality statistics should also be considered for epidemiological surveillance. Death from the major chronic diseases related to tobacco use is relatively rare prior to age 35 or so. It is recommended that mortality statistics be compiled, wherever possible, according to the five–year age groups from 35–39 to 80–84 and 85 and over. For presentation of data, including graphs of trends in death rates for specific diseases, 10–year age intervals from 35–44 to 65–74 and 75 and over may be more appropriate.

Trend analyses should focus not only on time trends in disease (e.g. changes over a decade, or over a specific period such as 1970–1995) but equally on cohort patterns. Figure 5, for example, shows how lung cancer mortality for men at ages 55–59 years in selected countries has changed for successive birth cohorts, beginning with men born at the turn of the century. This type of presentation illustrates very clearly the so-called cohort effect, whereby the progressive increase (or decrease) in smoking among successive birth cohorts is reflected, decades later, in progressively rising (or falling) lung cancer rates.

Risk and causality

Public health specialists responsible for assessing the health effects of tobacco must be aware that the diseases caused by tobacco use also involve other factors. Smoking in developed countries causes most lung cancer, but not all. Cigarettes cause some, but not all, heart and other vascular disease. Smoking and smokeless tobacco use cause many, but not all, cancers of the mouth, pharynx, larynx and oesophagus. Therefore, knowledge of levels and trends of diseases caused by tobacco use is not sufficient for a full understanding of the progression of the tobacco epidemic. The introduction of effective tobacco control measures is much better served if more precise information is available about the burden of various diseases attributable to tobacco use and how the pattern is changing.

Since epidemiology is an empirical science (it would be unethical to conduct intervention studies that actually produce disease), the "proof" that tobacco causes disease is based on the range and weight of evidence that has accumulated about the relationship between tobacco use and the diseases associated with it. In other words, proof is established in the legal sense, meaning "beyond reasonable doubt". Over the years, the criteria for deciding causality have evolved from those originally laid down for infectious diseases. In chronic disease epidemiology more extensive criteria have been defined to establish causality. The main ones are listed in Table 9 with brief details about how these criteria have been applied to demonstrate the causal association between smoking and lung cancer.

The measures of disease occurrence most familiar to public health workers are the death rate and the incidence rate. Both of these measures, and

various summary statistics derived from them, such as the age-standardized death rate and the cumulative incidence rate, are indicators of absolute risk. Absolute risk indicates the likelihood of an individual developing a disease or dying from it in a given year. Among different population groups absolute risk can vary substantially depending on a variety of factors — particularly exposure to a hazardous substance such as tobacco. A hypothetical example of different absolute risks for two population groups is given in Box 12.

Data on absolute risk of death from various diseases, and on the incidence of cancers, are available for many populations. By themselves, these data do not indicate the importance of a particular exposure (e.g. cigarette smoking) since in most countries mortality or incidence rates are available only for the entire population and not for subgroups such as smokers and non-smokers. However, in some countries, specific studies of population groups consisting of smokers and non-smokers have been undertaken, thereby allowing comparison of mortality among smokers and non-smokers for each major disease caused by smoking. Dividing the death rate from a disease among smokers by the rate among never-smokers indicates how many times higher the mortality from that disease is among smokers compared with never-smokers. This measure is known as the relative risk (see Box 12) because it summarizes the absolute risk of death of smokers relative to that of never-smokers. It is the basis of the statement that smokers may have a death rate from a specific disease that is up to 30 times higher than that of never-smokers.

An even more useful piece of information for defining the need for tobacco control strategies is the population attributable risk (PAR). This meas-

Table 9. Criteria for causality and their application in the case of smoking and lung cancer

Criterion	Strength of the association between smoking and lung cancer
Dose-response	The longer a person smokes, the higher the risk; the more cigarettes smoked per day, the higher the risk.
Temporal (time) sequence	Smoking precedes the onset of disease by 2–3 decades.
Strength of the association	The risk of getting lung cancer is 20–25 times higher among smokers (of long duration) compared with never-smokers.
Effect of cessation	Stopping smoking reduces the risk; the benefits increase with longer duration of cessation.
Concordance with other evidence	The carcinogenicity of tobacco has been demonstrated in laboratory studies on animals and chemical analyses of tobacco smoke.
Consistency of findings among studies	Thousands of independent studies in different parts of the world, using different methods, have confirmed the association.

Box 12. Risks in epidemiology

A) Absolute risk

Suppose in population A of 100 000 people who smoke (exposed), 250 people die from lung cancer in a given year,

then their *absolute risk* is 250/100 000.

Suppose also in population B of 100 000 non-smokers (not exposed), 10 people die from lung cancer in the same year,

then their *absolute risk* is 10/100 000.

B) Relative risk

The *relative risk* (RR) of lung cancer death $= \dfrac{\text{absolute risk among cohort A}}{\text{absolute risk among cohort B}}$

$$= \frac{250}{10} \text{ or } 25$$

C) Population attributable risk

If 40% (P) of a population are smokers (exposed),
then the *population attributable risk* of lung cancer (PAR) due to smoking is calculated as

$$PAR = \frac{P(RR-1)}{P(RR-1)+1}$$

$$= 0.9 \text{ or } 90\%$$

In other words, 90% of all lung cancer deaths in this population are caused by smoking

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ure provides an estimate of the proportion or percentage of mortality (or morbidity) from a given disease in a population which can be attributed to tobacco use. When rates of lung cancer or heart disease are high, the case for urgent tobacco control action is further strengthened if it is possible to demonstrate the proportionate impact (frequently substantial) of tobacco use alone on those rates. Box 12 gives the formula for calculating PAR on the basis of the prevalence of smoking (P) and the relative risk (RR) of death or incidence (comparing smokers with never-smokers) for a given disease. The derivation of this formula is demonstrated in Annex 10.

Quantifying the relationship between tobacco use and disease

The effect of tobacco use on health was first quantified in the early 20th century when an increased risk of oral cancer in smokeless tobacco users was

reported from India. Further research into the health effects of tobacco use, particularly cigarette smoking, was stimulated by the observation that lung cancer, which was extremely rare, had risen sharply among men in countries such as the United States and the United Kingdom during the 1940s. Early epidemiological studies to investigate the causes of this new epidemic examined several hypotheses about the reasons for the increase, including air pollution and tarring of roads. With their now famous case–control study that was carried out in the late 1940s, in which patients with and without the disease were asked about their exposure to a variety of factors, Doll and Hill concluded that "smoking is an important factor in the production of carcinoma of the lung". Similar conclusions were reached in a study carried out by Wynder and Graham, and others, around the same time in the United States.

In 1951, to confirm their findings, Doll and Hill questioned 60 000 doctors in the United Kingdom about their smoking habits and other exposures which might account for higher death rates in smokers. They followed up the 40 000 doctors who had replied to their questionnaire and within a few years the early results from this cohort study confirmed the higher lung cancer rates among smokers.

The study by Doll and Hill demonstrated for the first time that myocardial infarction (heart attack), chronic lung disease (especially bronchitis and emphysema) and various other diseases were also related to smoking. Several other prospective studies in Europe, Japan and the United States further confirmed the causal relationship between smoking and atherosclerotic cardiovascular diseases (coronary heart disease, stroke, peripheral vascular disease). Even though the relative risk from smoking for cardiovascular diseases is generally lower than for cancers caused by smoking, the number of cardiovascular deaths due to smoking is larger in most developed countries than the number of cancer deaths due to smoking since cardiovascular diseases are much more common.

So far, about 25 causes of death that are significantly associated with tobacco use have been identified. Some of these are minor conditions that are comparatively uncommon, and hence the excess risk among smokers does not lead to a great many deaths. Others, however, are major public health problems in a number of countries (e.g. ischaemic heart disease), and thus the excess risk of smokers from such diseases contributes significantly to overall levels of mortality.

Table 10 provides a summary of the major diseases caused by smoking, and the relative risks for smokers versus never-smokers (based on data from the USA). Relative risks are shown separately for men and women and for two different time periods. The relative risks calculated from the American Cancer Society's first Cancer Prevention Study (CPS-I) refer to the period 1959–1965. The relative risks calculated from the second Cancer Prevention Study (CPS-II) refer to 1982–1986, about 25 years later. Almost without exception, the relative risk in CPS-II increased substantially due to a longer duration of smoking, although some of the increase may have been the result of other

Table 10. Estimated relative risks for current cigarette smokers, CPS-I (1959–65) and CPS-II (1982–86)

Underlying cause of death	Men		Women	
	CPS-I	**CPS-II**	**CPS-I**	**CPS-II**
CHD, age ≥35	1.8	1.9	1.4	1.8*
CHD, age 35–64	2.2	2.8*	1.8	3.0*
Cerebrovascular lesions age ≥35	1.4	2.2*	1.2	1.8*
Cerebrovascular lesions age 35–64	1.8	3.7*	1.9	4.8*
COPD	8.8	9.6	5.9	10.5*
Cancer: lip, oral cavity and pharynx	6.3	27.5	2.0	5.6
Cancer: oesophagus	3.6	7.6	1.9	10.2*
Cancer: pancreas	2.3	2.1	1.4	2.3
Cancer: larynx	10.0	10.5	3.8	17.8
Cancer: lung	11.4	22.4*	2.7	11.9*

CHD = coronary heart disease.
COPD = chronic obstructive pulmonary diseases.
* 95% confidence intervals do not overlap between CPS-I and CPS-II (see text for a description of these surveys).
Source of data: Reducing the health consequences of smoking: 25 years of progress. A report of the Surgeon General. Rockville, MD, Centers for Disease Control, 1989.

factors. For example, women in CPS-I had been smoking for about 10–20 years, whereas women of comparable age in CPS-II had been smoking for 30 years or more. In the early 1960s, the relative risk of lung cancer among male smokers was 11.4 times that of lifelong male non-smokers. Twenty-five years later, this relative risk had doubled to 22.4 for males, and had risen from 2.7 to 11.9 for women.

This increase in relative risk for smoking-related diseases with longer duration of smoking has been found in other populations as well. For example, Fig. 6 shows the steady increase in relative risk of lung cancer among male smokers in Japan. The fact that the relative risk of lung cancer is still substantially below that of the United States merely reflects the fact that smoking in Japan has been a much more recent phenomenon than in countries such as the United Kingdom and the United States. With longer exposure, relative risks for lung cancer and other smoking-related diseases can be expected to rise in Japan in much the same manner as they have done elsewhere.

Estimating relative risk

Two types of epidemiological study can be used to estimate relative risks: prospective (cohort) studies and case–control studies. The principal features of

Fig. 6 Relative risks (smokers versus non-smokers) from lung cancer, males, Japan, 1966–1981

Year (of follow-up)
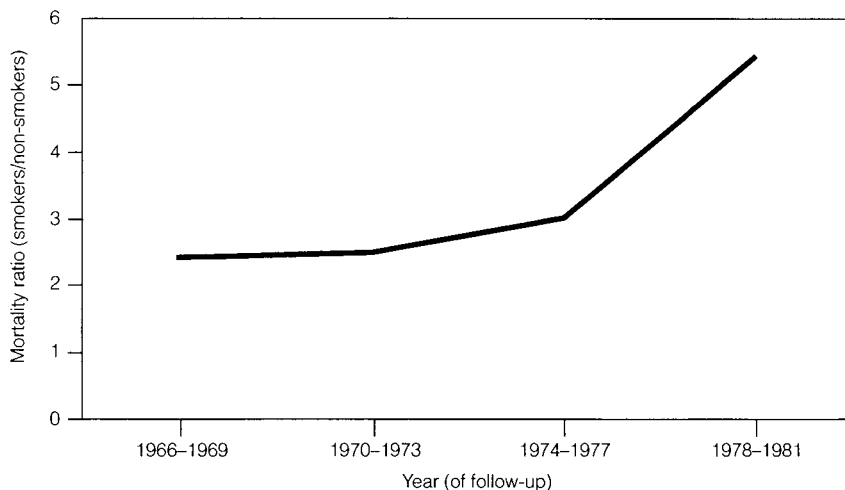
WHO 97323

Source of data: Hirayama 6-prefecture cohort study (*N* = 265 000).

each of these study designs are outlined below. More details about the conduct and analysis of these studies are given in standard epidemiological texts listed in the background reading at the end of this chapter. In addition to the diseases mentioned above, these studies have also been used to assess other health risks due to tobacco use, including the effects on reproductive health and the effects on non-smokers.

Prospective studies

The basic idea of these studies is to interview a group of people about their smoking practices, exposure to other risk factors (e.g. alcohol, air pollution), personal characteristics (sex, age, height, weight, blood pressure) and medical history, and then to monitor their morbidity and mortality from various diseases over several years. The success of a prospective study rests on being able to identify the deaths, and especially the cause of death, of persons participating in the survey (i.e. the cohort). Provided that mortality follow-up is feasible, the death rates of tobacco users (especially smokers) and life-long non-users can be compared, and relative risks calculated.

The great advantage of prospective studies is that they enable scientists to monitor change in disease-specific relative risks over time by comparing death

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rates of smokers and non-smokers in sequential periods of follow-up (i.e. every five years). Moreover, prospective studies yield information on relative risks of death from a variety of diseases.

There are major problems in carrying out prospective studies, especially in developing countries. These studies are expensive, time-consuming and very dependent on the quality and availability of data on cause of death. The linkage of baseline survey data with mortality data requires adequate personal identification information. Follow-up can be further complicated by high migration rates.

The magnitude of health hazards from smoking and other use of tobacco in developing countries needs to be urgently studied and monitored as the epidemic of tobacco-related diseases in developing countries evolves. To encourage and facilitate this research, WHO, in collaboration with IARC and the University of Oxford in the United Kingdom (a WHO collaborating centre) has established a network of prospective studies on tobacco-related mortality in several developing countries, including Argentina, Brazil, China, Cuba, Egypt and India. This research will yield local evidence on how the risks of tobacco use are changing, which will be useful both for local action to control tobacco use and for global monitoring of the epidemic.

Case–control studies

In this study design, individuals with a given disease (cases) are compared with persons without the disease (controls) drawn from the population from which the cases arose. Controls are selected in such a way as to be comparable to cases in terms of age, sex and other sociodemographic characteristics. For example, in a case–control study of lung cancer, controls should preferably be healthy people, but they might also be patient controls (including cancer controls) drawn from patients with diseases not causally related to smoking. In a typical case–control study, information would be collected from all subjects on a variety of exposures, including tobacco use, occupation, history of disease, indoor air pollution and so on. By comparing the proportion of smokers among the cases and the controls, an odds ratio (or approximate relative risk) can be calculated.

The advantage of case–control studies over prospective studies is that they are relatively inexpensive, can be done rapidly with a relatively small number of individuals (typically a few hundred), and give information on current risks very soon after the study has been completed. Their main limitations are that they are restricted to the one disease under study and that they do not show how the epidemic of tobacco-related diseases is changing unless they are repeated periodically. Both types of study design are useful for estimating relative risks, and either or both could be carried out in developing countries, depending on the availability of resources and epidemiological skill, and the purposes of the investigation — whether for monitoring the progress of the epidemic or assessing current risks.

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Calculating the number of deaths caused by tobacco

For stimulating tobacco control action in a community, reliable information on mortality caused by tobacco use is extremely helpful. One means of calculating this death toll is to compute the population attributable risk (PAR) for each major disease caused by smoking (as described in Annex 10). Multiplying the PAR by the number of deaths observed in a population from each of these causes gives the estimated number of deaths caused by tobacco. This should be done separately for men and women in each age group. Thus, tobacco-attributable mortality (TAM) from disease (i) can be expressed as:

$$TAM(i) = PAR(i) \times D(i)$$

where PAR(i) is the tobacco-attributable fraction for disease (i) and D(i) is the number of deaths from disease (i). Smoking-attributable mortality is defined in a similar way, with the PAR in this case referring only to smoking risks.

When calculating the PAR, it is preferable that both prevalence of smoking and relative risks come from the same population at approximately the same period. Differences in smoking patterns, consumption, type of cigarette smoked and so on mean that the tobacco exposure of contemporary populations (as measured by prevalence) and earlier cohorts will not be identical, and may not even be similar in many cases. This is particularly true in situations where tobacco consumption, and particularly cigarette smoking, has only recently become widespread as, for example, in developing countries. As demonstrated in Table 10 and Fig. 6, relative risks rise with increasing duration of smoking. It is inappropriate to use relative risks from populations with long smoking histories such as the United States or United Kingdom to estimate smoking-attributable mortality in developing countries. This approach is likely to exaggerate estimates of smoking-attributable deaths in these countries.

The direct method for calculating smoking-attributable deaths will yield reliable estimates for countries where smoking histories are comparable to those of populations used to derive the relative risks. Thus, for the United States, the Centers for Disease Control and Prevention (CDC) routinely calculate smoking-attributable deaths using the attributable risk formula. CDC has developed a computer-based package for calculating smoking-attributable mortality, morbidity and economic costs (SAMMEC) which facilitates the monitoring of the epidemic in developed countries with smoking histories comparable to the United States. Country-specific relative risks should preferably be utilized with such software programmes.

Indirect methods for estimating mortality attributable to smoking

Smoking-attributable mortality can also be estimated by assuming that the current lung cancer rate in a given country reflects adequately the entire

smoking history of that country, in terms of prevalence, duration, intensity and relative risk for lung cancer. Implicit in this approach is the basic assumption that lung cancer is essentially unicausal (i.e. with smoking as the cause) and that other co-factors have a negligible impact. This also implies that lung cancer mortality among non-smokers is similar in countries to which this method is applied. There are other causes of lung cancer, some of which have been identified, such as asbestos, while others are still unknown and can result in comparatively high lung cancer rates in non-smoking women. This has been observed in Chinese women, for example. Hence, this approach should be applied only to countries where the assumptions about lung cancer are valid, and where reliable data on causes of death are readily available.

A more detailed description of the method is given in Annex 10. The results of the application of the method to all developed countries have been published.[1] Variations on this approach have been reported which have yielded essentially similar results. Annex 10 also describes, for example, the method applied to data for Latin American countries.

Both of these indirect approaches yield reasonably reliable estimates of smoking-attributable mortality in populations which have reliable vital statistics on causes of death and in which lung cancer death rates among non-smokers are likely to be similar to those observed in the United States. WHO may be contacted for assistance in their application.

Projecting future mortality attributable to smoking

None of the methods described above for estimating current smoking-attributable mortality are likely to apply to the majority of developing countries where reliable data on causes of death, and information on lung cancer rates among non-smokers, are generally not available. However, many of these countries do have reliable data on smoking prevalence and the question arises as to how to use this information to support the implementation or strengthening of tobacco control policies and strategies.

A priority for prevention is to reduce future mortality from current smoking patterns. It is recommended, therefore, to use current prevalence to estimate future deaths from tobacco and to use these projections to draw attention to the need for current action to control tobacco use.

To make the projections, a valid estimate of current smoking prevalence in young adults (e.g. age 20–24) is required. Since most regular smokers are already persistent smokers by this age, this prevalence figure will give a good indication of those likely to be exposed to the risk of a tobacco-related death in the future.

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[1] Peto R et al. *Mortality from smoking in developed countries, 1950–2000.* Oxford, Oxford University Press, 1994.

Prospective studies in populations with long smoking histories, such as the United States and the United Kingdom, suggest that death rates for smokers are between two and three times those for non-smokers at all ages. If smokers have at least a two-fold excess mortality at all ages, then at least half of them will eventually die from smoking, either in middle age or in old age. We do not know what future smoking patterns will be and how smoking will interact with other factors that could increase disease risks. Consequently, future health hazards of smoking may be substantially different. For example, a reduction in prevalence could be expected to lead to lower risks in the future. To estimate the future deaths from current smoking patterns, a useful reference group is children and adolescents aged 0–19 years (see Box 13).

Evidently these projected numbers of deaths will be lower if there is substantial quitting among those young people who currently smoke or if the health hazards of tobacco use in developing countries differ from those observed elsewhere, or both.

This type of information, or the more detailed current estimates of smoking-attributable deaths now available for developed countries, can and should be used by tobacco-control advocates to highlight the need for urgent tobacco control action to combat the global epidemic. It is also clear that an epidemic of this magnitude needs to be monitored with much greater confidence and reliability. Prospective studies, which will do so, are urgently required in developing countries to assess current hazards, and to monitor the much greater epidemic which, based on current smoking patterns, is yet to occur.

Box 13. Estimating future deaths from current smoking patterns

Suppose N is the number of children and adolescents alive today at ages 0–19 in any given population. Further, suppose the prevalence of smoking in the population (preferably at ages 20–24) is P. Then $N \times P$ is the estimated number of future smokers among those alive today, aged 0–19, and $\frac{1}{2} \times N \times P$ is the projected number of smoking-attributable deaths among those alive at ages 0–19. For example, suppose for a developing country that we know:

N = number of children alive at ages 0–19 = 2 000 000
P = smoking prevalence at ages 20–24 = 30%

Then the future number of smokers is estimated to be 600 000 (0.3 × 2 000 000), of which 300 000 are predicted to die from smoking, half (150 000) in middle age and half in old age. At the global level, this procedure leads to a prediction of at least 200–300 million deaths from smoking among those currently alive today at ages 0–19. Most of these deaths will occur around the middle of next century when annual mortality from tobacco is projected to be 10–15 million.

Conclusion: key points

- Denominators (i.e. population data) are critical for calculating rates of disease and should always be used. These should be both age-specific and sex-specific.
- Care should be taken to ensure that denominators (population data) are those from which numerators (cases of or deaths from tobacco-related disease) are derived. Too often, cases are drawn from restricted samples, or are otherwise under-reported, yet are compared to the total population of a region or country, thus grossly underestimating disease levels.
- There are many sources of population data, but the most reliable will usually be population censuses (typically carried out every 5–10 years), combined with intercensal estimates of the population by age and sex. Data from population censuses are collected and compiled for administrative regions of a country (as are intercensal estimates) which should facilitate the calculation of disease rates for population subgroups within a country. In some countries, continuous population registers are available and may be used as sources of population data.
- Several sources of morbidity data might be available, including hospital records, data from other health services, disease registries, and health surveys. Data from health services relate only to persons who have consulted those services and cannot generally be related to a population at risk in order to calculate disease rates. They should therefore be used with caution.
- Good data on cancer incidence (and on cardiovascular events) are available for certain populations, and may be used to determine rates of disease. It is strongly recommended that this source of data be encouraged, strengthened and utilized for monitoring chronic disease illness levels and trends. These registers should also be used to help develop and validate incidence monitoring systems based on hospital discharge records.
- Health surveys have been widely used to collect data on self-reported illnesses. Those that are only symptom-based are generally of limited use for reliably monitoring disease trends. Better data can be obtained from surveys that ask about physician-diagnosed conditions.
- Methods are available to estimate the number of deaths due to tobacco use. These should be used only when the assumptions of these methods have been met. In particular, it is not appropriate to use disease-specific relative risks derived from studies in developed countries to estimate deaths from smoking in developing countries.
- For policy purposes, a useful estimate is the projected number of deaths among young people which might be expected on current smoking patterns.

- Reliable data on the health effects of tobacco use are useful for monitoring the tobacco epidemic and for guiding policy action; however, enough is known about the extremely hazardous nature of tobacco to take action now to reduce consumption.

Background reading

Akiba S, Hirayama T. Cigarette smoking and cancer mortality risk in Japanese men and women. Results from reanalysis of the six prefecture cohort study data. *Environmental health perspectives*, 1990, 87:19–26.

Cancer incidence in five continents. Lyon, International Agency for Research on Cancer, (see latest available year).

Cancer registration: principles and methods. Lyon, International Agency for Research on Cancer, 1991.

Doll R et al. Mortality in relation to smoking: 40 years' observations on male British doctors. *British medical journal*, 1994, 309:901–911.

Doll R, Hill AB. Smoking and carcinoma of the lung. Preliminary report. *British medical journal*, 1950, (30/9)ii:739–748.

Doll R, Peto R. *The causes of cancer: quantitative estimates of avoidable risks of cancer in the United States today*. Oxford, Oxford University Press, 1981.

Esteban D et al. *Manual for cancer registry personnel*. Lyon, International Agency for Research on Cancer, 1995 (IARC Technical Report, No. 10).

Lay reporting of health information. Geneva, World Health Organization, 1978.

Lilienfeld AM, Lilienfeld D. *Foundations of epidemiology*, 2nd ed. Oxford, Oxford University Press, 1980.

MacMahon B, Pugh TF. *Epidemiology: principles and methods*. Boston, Little Brown, 1970.

Peto R et al. *Mortality from smoking in developed countries, 1950–2000*. Oxford, Oxford University Press, 1994.

Rothman KJ. *Modern epidemiology*. Boston, Little Brown, 1986.

US Department of Health and Human Services. *Smoking and health in the Americas: a 1992 report of the Surgeon General, in collaboration with the Pan American Health Organization*. Atlanta, GA, Centers for Disease Control, 1992.

World health statistics annual. Geneva, World Health Organization (see latest available volume).

Wynder EL, Graham EA. Tobacco smoking as a possible etiologic factor in bronchiogenic carcinoma; a study of 684 proved cases. *Journal of the American Medical Association*, 1950, 143:329–336.

Zaridze D, Peto R, eds. *Tobacco: a major international health hazard*. Lyon, International Agency for Research on Cancer, 1986 (IARC Scientific Publication, No. 74).

Glossary

The definitions given below apply to the terms used in these Guidelines; they may have different meanings in other contexts.

Algorithm. A set of rules or steps which should be followed in order to arrive at a product or decision. For example, an algorithm may include a series of logical questions, the responses to which will lead to the diagnosis of a specific disease.

Areca nut. The fruit of the areca catechu tree. Areca nut is commonly combined with betel leaves, slaked lime and tobacco and chewed as betel-quid, particularly in areas of south-east Asia. In north-east India, the use of fermented areca nut (tamol) is common.

Betel-quid. A mixture which typically consists of areca nut, tobacco, slaked lime and sweetening/flavouring agents, wrapped in a betel leaf. Betel-quid is chewed in Bangladesh, Cambodia, India, Malaysia, Sri Lanka and other Asian countries.

Bidis. Small handrolled cigarettes wrapped in a piece of dried temburni leaf and tied with a small string. Bidis are used extensively in areas of south-east Asia. Bidis are the most commonly smoked tobacco product in India.

Catchment area. A clearly defined geographical or administrative area whose population has access to a specific facility, such as a hospital.

Chilum. A straight, conical pipe made of clay. Chilum smoking is practised mostly among males in the northern rural areas of India. The pipe is held vertically and, to prevent the tobacco from entering the mouth, a pebble or stopper is inserted into the top of the chilum. The entire pipe is usually filled with tobacco, and the mouth-piece is wrapped with a wet piece of cloth to protect the mouth from the heat and to serve as a filter.

Cohort. A group of people who share a common characteristic (e.g. people born in the same year) and who are under study for a specific purpose (e.g. to compare the subsequent mortality of smokers in the cohort with non-smokers in the cohort).

Confounding. The action or contribution of factors which complicates comparisons between two or more groups with regard to a characteristic under study. In the case of smoking, comparisons of the mortality of smokers and non-smokers might be affected by differences between the two groups that are unrelated to smoking. For example, smokers might be less health-conscious than non-smokers in that they may have poorer dietary habits or may be more likely to consume alcohol at harmful or hazardous levels.

Crude mortality rate. The most basic measure of the level of mortality in a population, calculated by dividing the number of deaths in the population by the size of the population (usually approximated by the mid-year population).

Environmental tobacco smoke (ETS). Smoke that a person inhales from sources other than by directly smoking a cigarette. It is composed of the smoke that is:
— exhaled by the smoker (second-hand smoke);
— burns off the tip of the cigarette (sidestream smoke);
— seeps through the paper and filter of the lit cigarette (lateral stream smoke).

Excess mortality. The amount by which the death rate for a given population group (i.e. smokers) exceeds that of another population group chosen as a reference or standard (e.g. non-smokers).

Excise tax on cigarettes. Taxes levied on cigarettes. There are two basic methods of tobacco taxation:
— nominal or specific taxes (based on a set amount of tax per cigarette or gram of tobacco);
— *ad valorem* taxes (assessed as a percentage mark-up on the price of tobacco products).

Hookah. An Indian water pipe consisting of a receptacle for water which has an opening on the top to which a long wooden stem is fixed; at the top of this stem, a small bowl is attached for tobacco. The tobacco is smoked through a long tube fixed to an outlet on the side of the receptacle. Cut, shredded tobacco moistened with molasses is kept in the bowl and burned with charcoal. The smoke is drawn through the water which cools and filters it.

Lay reporting. A system for determining the cause of death of people who die in countries where there is no accurate vital registration system. The method is based on a list of symptoms reported by a family member of the deceased to a non-medically trained interviewer.

Manufactured cigarettes. Tobacco wrapped in paper and manufactured by machine.

Moving average. A statistical procedure which is used to smooth out annual fluctuations in a time series such as annual cigarette consumption levels or annual death rates. For example, suppose death rates are available for each year from 1970 to 1990. One then calculates the average value of the rates for 1970, 1971 and 1972. Next, one calculates the average of the rates for 1971, 1972 and 1973, etc. In this way, a series of average rates based on three consecutive calendar year rates is constructed which will result in a much smoother trend than the annual data. If five consecutive years are averaged each time, then the series is referred to as a five-year moving average.

Nicotine replacement therapy (NRT). Pharmacological treatment used as an aid to smoking cessation. It may include such devices as transdermal patches, nicotine gum, and nicotine nasal sprays and inhalers.

Nongovernmental organization (NGO). Organized group of individuals who may collaborate on specific issues, often in association with governments. Examples of NGOs that work on tobacco issues include cancer societies, anti-drug use citizens' groups, and associations of health professionals.

Population subgroup. A particular group of people who share some common demographic characteristic such as age (e.g. all people aged 35–69 years) or sex (e.g. all females). Usually a subgroup forms part of the total population of a country.

Risk. The likelihood of incurring a particular event or circumstance (e.g. risk of disease measures the chances of an individual contracting a disease).

Roll-your-own (RYO) cigarettes. Cigarettes made by the smoker from processed tobacco.

Sentinel surveillance points/sites. A geographical area or population for which births, deaths, migration and other demographic events are closely and reliably monitored.

Smoking-attributable death. This is a death that is attributable to smoking. This term is rarely used to describe the likelihood that an individual's death was caused by smoking, but rather to describe the proportion of deaths in a population which are estimated to have been caused by smoking.

Standardization. A procedure whereby the same principles are used to prepare or calculate questions, statistics or methodological procedures in order to make their application to different populations comparable.

Stockpiling (of tobacco products). A process of increasing wholesale or retail inventories of tobacco products, such as cigarettes. This is often done in anticipation of expected tax increases.

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Annexes

Resolutions of the World Health Assembly on "tobacco or health" issues, 1970–1995

WHA23.32

The Twenty-third World Health Assembly,

Having considered the report of the Director-General;

Recalling the resolutions on this subject adopted by the Executive Board, the Directing Council of the Pan American Health Organization/Regional Committee for the Americas, and the Regional Committee for Europe;

Conscious of the serious effects of smoking in promoting the development of pulmonary and cardiac disease, including bronchopulmonary cancer, chronic bronchitis, emphysema and ischaemic heart disease;

Being aware that bronchopulmonary cancer is at present increasing in all countries of the world where records are available in a form which permits assessment;

Holding that health agencies must now demonstrate their concern for the reduction of the main causal factor in diseases related to smoking; and

Considering that smoking of tobacco during meetings may constitute a nuisance to non-smokers,

RESOLVES that:

(1) all those present at meetings of the Assembly and its committees be requested to refrain from smoking in the rooms where such meetings are held;

(2) the Director-General be requested:

(a) to consider the desirability of making the subject for World Health Day "The health consequences of smoking," on the earliest possible occasion;

(b) to call the attention of all Members and Associate Members to the report on limitation of smoking and to suggest that the advantages of applying the recommendations on pages 19 and 20 of that report should be considered in all countries;

(c) to consider convening an expert group to recommend further action that might be taken to discourage smoking;

(d) to examine to what extent and by what educational methods young people might be persuaded not to begin smoking;

(e) to bring to the attention of FAO the need for studying crop substitution in tobacco-producing countries;

(f) to report to the Executive Board at its forty-seventh session and to the Twenty-fourth World Health Assembly on the action proposed and the financial consequences for the Organization.

May 1970

WHA24.48

The Twenty-fourth World Health Assembly,

Having considered the report of the Director-General;

Recalling the resolutions on this subject adopted by the Twenty-third World Health Assembly, the Executive Board, and the respective Regional Committees;

Recognizing the relationship between smoking and the development of pulmonary and cardiac disease, including lung cancer, ischaemic heart disease, chronic bronchitis and emphysema; and

Believing that a sustained effort by health and education authorities and others is needed to reduce tobacco smoking and to prevent the extension of the habit, with special attention to young people and pregnant women,

1. THANKS the Director-General for his report;

2. ENDORSES the recommendations contained therein;

3. CALLS UPON all Member States and Associate Members to give all possible consideration to putting these recommendations into effect; and

4. REQUESTS the Director-General:

(i) to continue to assemble information on the health effects of

        tobacco smoking and the action being taken by countries to reduce the habit;

(ii) to place emphasis on the control and prevention of smoking as an integral part of operating programmes as and when feasible;

(iii) to continue in co-operation with the United Nations, the specialized agencies and the appropriate non-governmental organizations to foster a greater awareness of the health hazards of smoking and to take whatever action is deemed necessary to reduce them, and particularly to draw the attention of the Food and Agriculture Organization of the United Nations to the necessity of undertaking a study on crop diversification in tobacco-growing areas in view of the expected decrease in tobacco consumption;

(iv) to stimulate the strengthening of health education activities, including the production, dissemination and exchange of educational materials to discourage the habit of smoking; and

(v) to produce a code of practice that can guide governments in the formulation of legislative action relevant to the health consequences of smoking.

May 1971

WHA29.55

The Twenty-ninth World Health Assembly,

Recalling resolutions EB45.R9, WHA23.32, EB47.R42 and WHA24.48 concerning the health hazards of smoking and ways towards its limitation;

Noting with satisfaction that the recent WHO Expert Committee report on smoking and its effects on health, prepared in accordance with resolution EB53.R31 and reviewed favourably by the Executive Board at its fifty-seventh session, provides a thorough and authoritative summary of current knowledge in the field and contains a number of important recommendations for WHO and the Member States;

Considering that the results of the Third World Conference on Smoking and Health, held in New York in June 1975, gave further support to the evidence and proposals presented by the WHO Expert Committee;

Recognizing the indisputable scientific evidence showing that tobacco smoking is a major cause of chronic bronchitis, emphysema and lung cancer as well as a major risk factor for myocardial infarction, certain pregnancy-related and neonatal disorders and a number of other serious health problems, and also has harmful effects on those who are involuntarily exposed to tobacco smoke;

Seriously concerned about the alarming worldwide trends in smoking-related mortality and morbidity and the rapidly increasing consumption of tobacco, especially in cigarettes, in countries in which it was not previously

widespread, and about the growing number of young people and women who are now smoking;

Recognizing that an effective strategy to tackle the problem requires a concerted effort consisting of educational, restrictive and legislative measures, combined with coherent taxation and price policies, and supported by continuous research and evaluation on a multidisciplinary basis;

Noting that very few countries have thus far taken effective steps to combat smoking;

Believing that no organization devoted to the promotion of health can be indifferent in this matter, and that WHO has an important role to play in promoting effective policies against smoking, as envisaged in the Sixth General Programme of Work of WHO covering the period 1978–1983;

1. URGES governments of Member States to identify the actual or anticipated health problems associated with smoking in their countries;
2. RECOMMENDS governments of Member States:
   (1) to create and to develop effective machinery to coordinate and supervise programmes for control and prevention of smoking on a planned, continuous and long-term basis;
   (2) to strengthen health education concerning smoking, as a part of general health education and through close collaboration with health and school authorities, mass media, voluntary organizations, employers' and employees' organizations and other relevant agencies, taking into account the different needs of various target groups, laying emphasis on the positive aspects of non-smoking, and supporting individuals wishing to stop smoking;
   (3) to consider steps which can be taken towards ensuring that non-smokers receive protection, to which they are entitled, from an environment polluted by tobacco smoke;
   (4) to give serious consideration to the legislative and other measures suggested by the WHO Expert Committee in its recent report on smoking and its effects on health;
3. REQUESTS the Director-General:
   (1) to continue, and intensify, WHO's antismoking activities;
   (2) to collate and disseminate information on smoking habits, smoking-related health problems and smoking control activities in Member States;
   (3) to give assistance and encouragement to research in smoking and health, with particular emphasis on studies that are directly relevant to the assessment and improvement of the effectiveness of antismoking activities;
   (4) to promote the standardization of:
      (a) definitions, measurement methods and statistics concerning smoking behaviour, tobacco consumption and the occurrence of smoking-related morbidity and mortality;

(b) laboratory techniques used for the quantitative analysis of the harmful substances in tobacco products;

(5) to give assistance, upon request, to governments in the formulation, implementation and evaluation of their policies and programmes to combat smoking;

(6) to continue, in cooperation with the United Nations, the specialized agencies and appropriate nongovernmental organizations, to make all efforts deemed necessary to reduce smoking; and particularly to work out with the Food and Agriculture Organization of the United Nations and with the United Nations a joint strategy for crop-diversification in tobacco-growing areas with a view to avoiding the anticipated economic consequences of reducing tobacco consumption in the world as a whole for public health reasons;

(7) to convene an expert committee in 1977 or 1978 to review and evaluate the world situation in regard to smoking control;

(8) to report to a future Health Assembly on developments in this field.

May 1976

WHA31.56

The Thirty-first World Health Assembly,

Recalling resolutions EB45.R9, WHA23.32, EB47.R42, WHA24.48, EB53.R31 and WHA29.55 concerning the health hazards of tobacco smoking and ways towards its limitation;

Recognizing the increasing and indisputable scientific evidence showing that tobacco smoking is a major cause of chronic bronchitis, emphysema and lung cancer, as well as a major risk factor for myocardial infarction, certain pregnancy-related and neonatal disorders and a number of other serious health problems, and that it also has harmful effects on those who are involuntarily exposed to tobacco smoke;

Seriously concerned at the alarming increase in production and consumption of cigarettes during the last two decades in some of the countries, particularly developing countries, in which it was previously not widespread, and at the extensive promotional drive for the sale of cigarettes being carried out on radio and television, in newspapers and other news media, and through association with sporting and cultural events, often inducing young people to smoke tobacco;

Noting that few countries have so far taken comprehensive action to effectively combat smoking through educational, restrictive and legislative measures for the control of publicity and advertisements in the news media, combined with coherent taxation and price policies for tobacco cultivation and cigarette production;

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Believing that WHO has an important role in promoting effective policies against smoking, as envisaged in the Sixth General Programme of Work covering the period 1978–1983 inclusive;

1. URGES Member States:
   (1) to strengthen health education programmes concerning tobacco smoking as a part of general education, through close collaboration among health and education authorities and other relevant agencies, taking into account the different needs of the various target groups;
   (2) to adopt comprehensive measures to control tobacco smoking, *inter alia* by providing for increased taxation on the sale of cigarettes and restricting as far as possible all forms of publicity for promotion of smoking;
   (3) to protect the rights of non-smokers to enjoy an atmosphere unpolluted by tobacco smoke;
   (4) to seek economically sound alternative undertakings to replace tobacco growing and processing, where appropriate;
2. REQUESTS the Director-General:
   (1) to continue to intensify WHO's activities in connexion with control of tobacco smoking;
   (2) to collaborate with Member States, the United Nations, the specialized agencies and appropriate nongovernmental organizations as required, in the formulation, implementation and evaluation of programmes to combat smoking, including studying possibilities for crop diversification in tobacco-growing areas;
   (3) to cooperate with Member States upon request in developing measures for the control of publicity with regard to smoking through the news media, especially newspapers, radio and television;
   (4) to give urgent consideration to having non-smoking as a theme for World Health Day as soon as possible, and in this and other ways to give maximum publicity to an antismoking campaign;
   (5) to encourage research as to the causes of tobacco smoking;
   (6) to report on progress in this field not later than the Thirty-third World Health Assembly.

May 1978

WHA33.35

The Thirty-third World Health Assembly,

Recalling resolutions EB45.R9, WHA23.32, EB47.R42, WHA24.48, EB53.R31, WHA29.55, and WHA31.56 concerning the health hazards of tobacco smoking and WHO's role in the limitation of this harmful habit;

Noting the report of the WHO Expert Committee on Smoking Control;

Reiterating its firm conviction that the effect of tobacco smoking is now a major public health problem in all industrialized countries and in many developing countries and that it will become so in the near future in all other developing countries unless action is taken now;

Mindful of the ill-effects of smoking, particularly on risk groups such as pregnant women, lactating mothers and children;

Seriously concerned about the aggressive promotional drives for the sale of cigarettes that occur in developing as well as developed countries, thus inducing the new generations to take up the habit of smoking;

Alarmed by the fact that advertising practices using psychological means in both industrialized and developing countries have the effect of inducing and perpetuating smoking habits, especially among youth;

Encouraged by the existence of total bans, restrictions or limitations on tobacco advertising in several countries;

Noting encouraging signs of expanded national activities and of increasing public awareness of the harmful health effects of cigarette smoking in many countries, partly as a result of WHO's efforts and of this year's World Health Day on "Smoking or health: the choice is yours";

Realizing that national and international strategies to combat the spreading of the habit of smoking must be carried out on a continuous, long-term basis;

Believing that WHO has an essential role to play in promoting effective smoking control policies;

1. URGES Member States:
   (1) to strengthen, and to initiate where lacking, the smoking control strategies outlined in the above-mentioned resolutions, laying special emphasis on educational approaches, particularly with respect to youth, and on measures to ban, restrict or limit advertising of tobacco products;
   (2) to support WHO's action in the field of smoking and health;
2. REQUESTS the Director-General:
   (1) to further develop an effective WHO action programme on smoking and health, clearly defining lines of responsibility and priority areas, and taking into account the multidisciplinary and intersectoral character of the relationship between smoking and health;
   (2) to ensure that WHO plays a leading role in coordinating international activities and to strengthen collaboration with other United Nations agencies and with relevant nongovernmental organizations, and, particularly, to pursue the study on crop diversification in tobacco-growing areas in collaboration with FAO;
   (3) to collaborate with Member States in their efforts to reduce smoking;

(4) to consider problems caused by the marketing and consumption of tobacco, particularly in developing countries;

(5) to mobilize financial and other resources for the implementation of the programme;

(6) to report on progress of this programme to the Thirty-fifth World Health Assembly.

May 1980

WHA39.14

The Thirty-ninth World Health Assembly,

Recalling resolutions WHA31.56 and WHA33.35 on the health hazards of tobacco smoking and the WHO action programme on smoking and health;

Deeply concerned by the current pandemic of smoking and other forms of tobacco use, which results in the loss of the lives of at least one million human beings every year and in illness and suffering for many more;

Believing that the battle between health and tobacco must and can be won for the sake of human health;

Encouraged by the existence of total bans, restrictions or limitations on tobacco advertising in several countries;

1. AFFIRMS:

(1) that tobacco smoking and the use of tobacco in all its forms is incompatible with the attainment of health for all by the year 2000;

(2) that the presence of carcinogens and other toxic substances in tobacco smoke and other tobacco products is a known fact; and that the causal link between tobacco and a range of fatal and disabling diseases has been scientifically proven;

(3) that passive, enforced or involuntary smoking violates the right to health of non-smokers, who must be protected against this noxious form of environmental pollution;

2. CALLS for a global public health approach and action *now* to combat the tobacco pandemic;

3. DEPLORES all direct and indirect practices the aim of which is to promote the use of tobacco, as this product is addictive and dangerous even when used as promoted;

4. URGES those Member States which have not yet done so to implement smoking control strategies; these, as a minimum, should contain the following:

(1) measures to ensure that non-smokers receive effective protection, to which they are entitled, from involuntary exposure to tobacco smoke, in enclosed public places, restaurants, transport, and places of work and entertainment;

(2) measures to promote abstention from the use of tobacco so as to protect children and young people from becoming addicted;

(3) measures to ensure that a good example is set in all health-related premises and by all health personnel;

(4) measures leading to the progressive elimination of those socioeconomic, behavioural, and other incentives which maintain and promote the use of tobacco;

(5) prominent health warnings, which might include the statement that tobacco is addictive, on cigarette packets, and containers of all types of tobacco products;

(6) the establishment of programmes of education and public information on tobacco and health issues, including smoking cessation programmes, with active involvement of the health professions and the media;

(7) monitoring of trends in smoking and other forms of tobacco use, tobacco-related diseases, and effectiveness of national smoking control action;

(8) the promotion of viable economic alternatives to tobacco production, trade and taxation;

(9) the establishment of a national focal point to stimulate, support, and coordinate all the above activities;

5. APPEALS to other organizations of the United Nations system:

(1) to support WHO in all ways possible within their fields of competence;

(2) to show solidarity with WHO's efforts to stem the spread of tobacco-induced diseases by protecting the health of non-smokers on their premises, as this action would have a major exemplar role;

(3) to help Member States in identifying and implementing economic alternatives to tobacco cultivation, production and trade;

6. REQUESTS the Director-General:

(1) to strengthen the present programme on smoking and health without waiting for its official introduction in the Eighth General Programme of Work, as a visible and resolute attitude on the part of WHO would provide Member States with encouragement and support, which are necessary prerequisites to abating the smoking pandemic before the year 2000;

(2) to mobilize support for the present programme on smoking and health in terms of funds and manpower which would ensure adequate programme continuity on a long-term basis;

(3) to coordinate activities in support of WHO's action on smoking and health with other organizations of the United Nations system at the highest executive level;

(4) to continue and strengthen collaboration with nongovernmental organizations as appropriate;

(5) to ensure that WHO plays an effective global advocacy role in tobacco and health issues and that, in common with other health institutions, it plays an exemplar role in non-smoking practices;

(6) to provide support to national smoking control efforts;

(7) to report on progress to the Executive Board at its eighty-first session and to the Forty-first World Health Assembly.

May 1986

WHA40.38

The Fortieth World Health Assembly,

Bearing in mind the objective of the World Health Organization contained in Article 1 of the Constitution "the attainment by all peoples of the highest possible level of health";

Recalling resolution WHA39.14 on "Tobacco or health";

Expressing its satisfaction at the measures increasingly being taken by Member States to reduce smoking;

Gratified at the decision taken by the Director-General of WHO to declare the WHO premises a smoking-free area;

Aware that the consumption and use of tobacco result in serious health consequences, as well as economic and social problems, notably in developing countries;

Noting that on 7 April 1988 the World Health Organization will celebrate its fortieth anniversary;

1. CALLS UPON all Member States, as part of their continuing efforts to reduce the smoking pandemic, through all appropriate means including, where applicable, legislative and regulatory measures:

   (1) to celebrate 7 April 1988 as world no-smoking day;

   (2) to encourage the population, by all appropriate means, to desist from smoking and from using tobacco in all other forms on that day;

   (3) in conjunction with governmental and nongovernmental organizations, to use the occasion to launch, or strengthen existing, anti-smoking campaigns and health promoting initiatives;

   (4) to encourage vendors to refrain voluntarily from selling all forms of tobacco on that day; and

   (5) to inform the Director-General on actions taken in response to this resolution;

2. APPEALS to all manufacturers of tobacco and those who promote its consumption, in the spirit of this resolution and of resolution WHA39.14, to refrain voluntarily from all publicity activities in all countries, especially in developing countries, and calls upon the press and all the other media in each country voluntarily to do likewise;

3. REQUESTS the Director-General to report to a subsequent World
Health Assembly on the action taken in this regard.

May 1987

WHA41.25

The Forty-first World Health Assembly,

Recalling resolutions WHA31.56, WHA33.35 and WHA39.14 and
emphasizing the importance of ensuring that these resolutions are fully
implemented;

Having considered the Director-General's report on Tobacco or Health,
the comments on it by the Executive Board and the report of the Advisory
Group on a WHO Global Action Plan on Tobacco or Health;

Encouraged by the response to the first world no-smoking day on 7 April
1988;

REQUESTS the Director-General to draw up a plan of action, bearing in
mind the recommendations of the Advisory Group and covering in particular:

(i)   the special problems of developing countries which at present de-
      pend upon tobacco production as a major source of income;
(ii) targets and intervention plans including consideration of future no-
      smoking days, for example, on annual World Health Day;
(iii) the administrative and management structure including relations of
      this programme with other programmes of the Organization;
(iv) resource needs;
(v)   sources of finance and other support

for submission, through the Programme Committee, to the eighty-third session
of the Executive Board.

May 1988

WHA42.19

The Forty-second World Health Assembly,

Recalling resolution WHA39.14 and resolution WHA41.25 requesting
the Director-General to draw up a plan of action on tobacco or health for
submission through the Programme Committee to the eighty-third session of
the Executive Board;

Recognizing that the use of tobacco is responsible worldwide for more
than two million premature deaths annually;

Recalling that active efforts are needed to resolve the economic issues
involved in reducing tobacco production;

Concerned at the fact that, while tobacco consumption is decreasing in
developed countries as a result of effective health promotion supported by

appropriate legislations and regulations, the developing countries are registering increases in tobacco consumption;

Reaffirming that the health services should clearly and unequivocally publicize the health risks connected with the use of tobacco and actively support all efforts to prevent the associated diseases;

1. THANKS the Director-General for having already accelerated implementation of the WHO programme on tobacco or health;
2. APPROVES the plan of action for the WHO programme on tobacco or health for 1988–1995 as proposed by the Director-General and endorsed by the Executive Board;
3. REQUESTS the Director-General:
   (1) to continue to support this programme as outlined in the plan of action and to mobilize extrabudgetary funds for its implementation;
   (2) to support national authorities, at their request, in taking measures to disseminate information on the health risks of tobacco, to promote life-styles without tobacco, and to control the promotion of tobacco consumption;
   (3) to work, in close collaboration with national health authorities, with organizations of the United Nations system, and with relevant nongovernmental organizations in official relations with those organizations, to ensure that both health and economic aspects are fully taken into account;
   (4) to review the impact of tobacco production on the economy, environment and health of the populations in developing countries which depend upon tobacco production as a major source of income, and to report on this issue to the Forty-third World Health Assembly;
   (5) to collaborate actively with FAO and other relevant United Nations agencies with a view to developing agricultural projects that demonstrate how crop substitution programmes can be implemented in countries whose economies depend heavily upon tobacco production; and to encourage such countries to implement these programmes;
4. RESOLVES that each year 31 May shall be World No-Tobacco Day

May 1989

WHA43.16

The Forty-third World Health Assembly,

Recalling the strong statement on the issue of smoking and health made by the President in opening the Forty-third World Health Assembly;

Recalling resolutions WHA33.35, WHA39.14, WHA41.25 and WHA

42.19 on the health hazards of tobacco smoking and the WHO programme on tobacco or health;

Recalling the requirement contained in resolution WHA42.19 concerning a review of crop substitution and the health and economic aspects of tobacco production and consumption;

Recalling further that resolution WHA39.14 urged Member States to implement a comprehensive nine-point smoking control strategy;

Encouraged by:

(a) the significant progress made by many Member States in the implementation of this strategy;

(b) the continuing decline in tobacco consumption in Member States that have adopted comprehensive smoking control policies;

(c) recent information demonstrating the effectiveness of tobacco control strategies, and in particular:

— legislation or other measures to provide protection from involuntary exposure to tobacco smoke in workplaces, public places and public transport;

— policies to achieve progressive increases in the real price of tobacco;

— comprehensive bans and other legislative restrictive measures to control effectively direct and indirect advertising, promotion and sponsorship concerning tobacco;

Deeply concerned by increasing evidence of the dangers to health of passive smoking and by a new WHO estimate that, unless current smoking rates decrease, there will be 3 million tobacco-related deaths per year during the 1990s, and that this figure will rise sharply to 10 million deaths per year by the 2020s;

Believing that millions of future premature deaths can be avoided if current smoking rates are quickly and substantially reduced;

1. URGES all Member States:

(1) to implement multisectoral comprehensive tobacco control strategies which, at a minimum, contain the nine elements outlined in resolution WHA39.14;

(2) to consider including in their tobacco control strategies plans for legislation or other effective measures at the appropriate government level providing for:

(a) effective protection from involuntary exposure to tobacco smoke in indoor workplaces, enclosed public places and public transport, with special attention to risk groups such as pregnant women and children;

(b) progressive financial measures aimed at discouraging the use of tobacco;

(c) progressive restrictions and concerted action to eliminate eventually all direct and indirect advertising, promotion and sponsorship concerning tobacco;

2. NOTES that, in countries where more than one level of government exists, national authorities may not have complete jurisdiction over these issues;

3. REQUESTS the Director-General:

   (1) to intensify support for the 1988–1995 plan of action for the WHO programme on tobacco or health;

   (2) to ensure the provision of sufficient budgetary resources to assist Member States in implementing comprehensive tobacco control programmes;

   (3) to ensure that the report requested in resolution WHA42.19 is presented to the Forty-fourth World Health Assembly;

   (4) to monitor and report biennially to the Health Assembly on the progress and effectiveness of Member States' comprehensive tobacco control programmes;

   (5) to report to the Forty-fourth World Health Assembly on the progress made in assistance to countries that depend on tobacco production as a major source of financial resources for health and development, with emphasis on measurement of efficacy of such assistance.

May 1990

WHA44.26

The Forty-fourth World Health Assembly,

Recalling resolutions WHA33.35, WHA39.14, WHA41.25 and WHA42.19 on the health consequences of tobacco consumption and the WHO "tobacco or health" programme, formerly the action programme on smoking and health;

Recalling in particular resolution WHA43.16, which urges all Member States to adopt effective measures to prevent involuntary exposure to tobacco smoke in enclosed public places and public transport;

Recognizing that there is no safe level of exposure to tobacco smoke;

Aware of the technical problems of ensuring a smoke-free environment in many public conveyances, especially trains and aircraft;

Congratulating the transport authorities and companies that have adopted measures to offer their passengers a smoke-free environment and encouraging all those responsible for public transport to do likewise;

Deeply concerned about the dangers to the health, and the violation of the right to health, of non-smokers caused by enforced, or passive, smoking and about the WHO-approved estimates that the annual number of deaths in the world attributable to smoking will be about three million in the 1990s,

1. URGES all Member States:

   (1) to adopt appropriate measures for effective protection from involuntary exposure to tobacco smoke in public transport;

(2) to ban smoking in public conveyances where protection against involuntary exposure to tobacco smoke cannot be ensured, and to adopt effective measures of protection wherever possible;

(3) to promote educational activities necessary to make people aware of the importance of protecting themselves and their families, especially children, against passive smoking, for example, while travelling in private cars;

2. REQUESTS the Director-General:

(1) to collaborate with the International Civil Aviation Organization and all competent international and national agencies in developing guidelines and recommendations for a smoke-free travel environment in all types of public conveyances;

(2) to support Member States at their request in implementing effective measures to protect people against involuntary exposure to tobacco smoke in public transport;

(3) to keep the Executive Board and the Health Assembly informed of the progress made in implementing this resolution as an element of the WHO "tobacco or health" programme.

May 1991

WHA45.20 Multisectoral collaboration on WHO's programme on "tobacco or health"

The Forty-fifth World Health Assembly,

Having considered the Director-General's report on collaboration within the United Nations system and noting the relevance of that collaboration in approaching issues such as "tobacco or health";

Recalling resolutions WHA42.19 and WHA43.16 regarding the socioeconomic and development implications of tobacco in the countries that depend on tobacco production as a major source of income;

Reaffirming the need for multisectoral strategies, including the involvement of other organizations of the United Nations system, in dealing with the complexities and difficulties of the subject of "tobacco or health";

Recalling the Executive Board's decision at its eighty-ninth session (EB89(16)) on the action taken by the Director-General in reporting to the Economic and Social Council of the United Nations and the reaffirmation of the orientation given to WHO's programme on "tobacco or health";

Concerned about the lack of appropriate follow-up activities to the Director-General's report to the session of the Economic and Social Council in July 1991 on the need for multisectoral collaboration within the United Nations system on the problem of "tobacco or health";

Concerned about the economic effects of reduced production in the tobacco-producing countries which are still unable to develop a viable economic alternative to tobacco,

1. THANKS the Director-General for his report, and for bringing to the attention of the Economic and Social Council the need for collaboration within the United Nations system on the complex issue of "tobacco or health";
2. REQUESTS the Economic and Social Council to put the subject of "tobacco or health" on the agenda of its next session so that the subject is officially discussed with an appropriate follow-up in the United Nations General Assembly and in organizations of the United Nations system;
3. REQUESTS the Director-General:
    (1) to continue to seek and to facilitate multisectoral collaboration on WHO's "tobacco or health" programme within the United Nations system;
    (2) to bring to the attention of the Economic and Social Council WHO's concern over socioeconomic problems of tobacco production and difficulties associated with assistance to the countries dependent on tobacco production, as reflected in the report on the implementation of resolutions WHA42.19 and WHA43.16.

May 1992

WHA46.8 Use of tobacco within United Nations system buildings

The Forty-sixth World Health Assembly,

Noting the report of the Director-General on the implementation of resolutions WHA42.19, WHA43.16, and WHA45.20 relating to the WHO programme on "tobacco or health",

Recalling that resolution WHA43.16 urged all Member States to provide, through legislation or other measures, protection from involuntary exposure to tobacco smoke in workplaces, public places and public transport;

Recalling that resolution WHA45.20 asked the Director-General to continue seeking and facilitating multisectoral collaboration on WHO's "tobacco or health" programme within the United Nations system;

Noting with satisfaction that the important question of "tobacco or health" has been included on the agenda for the next session of the United Nations Economic and Social Council;

Noting with concern that smoking is still permitted in workplaces and public areas in buildings owned, operated or controlled by organizations of the United Nations system,

1. CALLS ON the Director-General as a matter of importance to approach the Secretary-General of the United Nations, urging him:
    (1) to take the necessary steps to ban the sale and use of all kinds of tobacco products in all buildings owned, operated or controlled by

organizations and specialized agencies of the United Nations sys-
tem and that are used to carry out its business;

(2) to ensure that the progressive implementation of this ban takes a
maximum of two years from the date of this Health Assembly;

(3) to encourage and assist employees who are smokers, but who wish
to cease smoking, to take part in smoking cessation programmes,
and provide sheltered open-air areas for those who wish to con-
tinue smoking;

2. REQUESTS the Director-General to report to the Forty-eighth World
Health Assembly on progress in the implementation of this resolution.

May 1993

WHA48.11

The Forty-eighth World Health Assembly,

Recalling and reaffirming resolutions WHA33.35, WHA39.14, WHA
43.16 and WHA45.20, all calling for comprehensive multisectoral, long-term
tobacco strategies and outlining the most important aspects of national,
regional and international policies and strategies in this field;

Recognizing the work carried out by the Organization in the field of
tobacco or health, and noting that the plan of action of the "tobacco or health"
programme for 1988–1995 comes to an end this year;

Noting that the Director-General and the Secretariat contributed to the
success of the Ninth World Conference on Tobacco and Health (Paris, Octo-
ber 1994) at which an international strategy for tobacco control was adopted
covering the essential aspects of WHO policy in this field: curbing of the
promotion of tobacco products, demand reduction particularly among women
and young people, smoking cessation programmes, economic policies, health
warnings, regulation of tar and nicotine content of tobacco products, smoke-
free environments, and marketing and monitoring,

1. COMMENDS the International Civil Aviation Organization response to
ban smoking on all international flights as of 1 July 1996;

2. URGES those Member States that have already successfully imple-
mented all or most of a comprehensive strategy for tobacco control to
provide assistance to WHO, working with the United Nations system
focal point on Tobacco or Health (located in United Nations Confer-
ence on Trade and Development), so that these bodies can effectively
coordinate the provision of timely and effective advice and support to
Member States seeking to improve their tobacco control strategies,
including health warnings on exported tobacco products;

3. REQUESTS the Director-General:

(1) to report to the Forty-ninth World Health Assembly on the feasi-
bility of developing an international instrument such as guidelines,

a declaration, or an International Convention on Tobacco Control to be adopted by the United Nations, taking into account existing trade and other conventions and treaties;

(2) to inform the Economic and Social Council of the United Nations of this resolution;

(3) to strengthen WHO's advocacy role and capacity in the field of "tobacco or health" and submit to the Forty-ninth World Health Assembly a plan of action for the tobacco or health programme for the period 1996–2000.

May 1995

A model of a tobacco products control law[1]

An Act to prohibit the advertising and promotion and respecting the composition, labelling and monitoring of tobacco products, to control smoking in public places, workplaces and transit vehicles, to regulate the tobacco industry and to regulate the sale of tobacco products to young people.

    1. This Act may be cited as the Tobacco Products Control Act.

Interpretation

    2. In this Act:

"advertise" means any commercial effort to promote, including through the use of sponsorship activities, the use, image or awareness of a product, its trade marks, brand name or manufacturer;

"analyst" means a person designated as a tobacco product analyst;

"designated smoking area" means an area other than an enclosed room, that is designated for smoking under subsection 12(2);

"designated smoking room" means an enclosed room that is designated for smoking under subsection 12(2);

"distributor" means a person engaged in the selling of tobacco products otherwise than at retail only, and includes a manufacturer or importer thereof;

"employee" means a person who is employed by an employer;

"employer" means a person who employs one or more persons and includes the person who is ultimately in charge of any place;

"inspector" means a person designated as a tobacco product inspector;

"manufacturer" includes any corporation that is associated with a manufacturer;

"Minister" means the Minister assigned responsibility for the administration of this law and any related regulations;

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[1] Slama K. *Tobacco control and prevention. A guide for low-income countries.* Paris, International Union against Tuberculosis and Lung Disease, 1998. Reproduced by permission of the publisher.

"package" means any pack, carton, wrapping or other container in which tobacco products are customarily sold at retail;

"prescribed" means required by regulations;

"retailer" means a person engaged in any business that includes the sale of tobacco products at retail;

"smoking" includes the carrying of any lighted tobacco product;

"tobacco product" means any product manufactured from tobacco and intended for use by smoking, inhalation, mastication, oral or percutaneous administration, and includes nasal and oral snuff;

"trade mark" includes any trade mark whether or not it is registered or registrable as such and any recognizable variation thereof;

"work space" means any indoor or other enclosed space in which employees perform the duties of their employment, and includes any adjacent corridor, lobby, stairwell, elevator, cafeteria, washroom or other common area frequented by such employees during the course of their employment.

Purpose

3. The purpose of this Act is to provide a legislative response to a national public health problem of substantial and pressing concern and, in particular,

(a) to protect the health of the people in the light of conclusive evidence implicating exposure to tobacco smoke in the incidence of numerous debilitating and fatal diseases;

(b) to protect young persons and others, to the extent that is reasonable, from inducements to use tobacco products and consequent dependence on them;

(c) to enhance public awareness of the hazards of tobacco use by ensuring the effective communication of pertinent information to consumers of tobacco products;

(d) to protect people to the extent that is reasonable and possible from the hazards of involuntary exposure to tobacco smoke; and

(e) to regulate tobacco products and the distribution of these products in a way that is consistent with public health goals.

Advertising

4. (1) No person shall advertise any tobacco product.

(2) No person shall, for consideration, publish, broadcast or otherwise disseminate, on behalf of another person, an advertisement for any tobacco product.

5. Notwithstanding section 4, a retailer, other than those prohibited from selling tobacco products, may

    (a) expose tobacco products for sale at the retailer's place of business provided these displays are permitted by law and meet such conditions as may be prescribed; and

    (b) post in that place signs that indicate that tobacco products are offered for sale, provided these signs display such health information as may be prescribed and meet such other conditions as may be prescribed.

6. No person shall use the brand name or trade mark of a tobacco product, or other commercial associations of tobacco products, in a representation to the public

    (a) that promotes a person or persons, an institution, a building, a location, an educational, cultural or sporting organization, activity or event; or

    (b) that acknowledges financial or other contributions made by the manufacturer or importer of the tobacco product toward such person or persons, institution, building, location, organization, activity or event.

7. (1) No distributor shall engage in free distribution of tobacco products, or furnish tobacco products to any person for the purpose of their subsequent distribution without fair market value payment.

    (2) No person shall offer any gift, merchandise, discount or cash rebate or the right to participate in any contest, lottery or game to the purchaser of a tobacco product in consideration of the purchase thereof, or to any person in consideration of the furnishing of evidence of such a purchase.

8. (1) No manufacturer or importer of tobacco products who is entitled to use any trade mark in association with those products, and no person acting with the concurrence or acquiescence of such a manufacturer or importer, shall

    (a) apply the trade mark of a tobacco product on any article other than a tobacco product or a package or container in which a tobacco product is sold or shipped; or

    (b) use the trade mark in any such form for the purpose of advertising any organization, service, activity or event.

    (2) No person shall distribute, sell, offer for sale or expose for sale any article that bears a trade mark of a tobacco product, other than a tobacco product or a package or container in which a tobacco product is sold or shipped.

Tobacco products

9. No person shall manufacture or import a tobacco product that does not conform with the standards established by the regulations.

10. (1) No distributor shall sell or offer for sale a tobacco product unless the package containing the product displays, in accordance with the regulations, messages concerning the health effects of the product, any other prescribed information, and a prescribed list of toxic constituents of the product and, where applicable, of the smoke produced from its combustion indicating the quantities of those constituents present therein, such quantities being measured and presented in the prescribed form and manner.

(2) No distributor shall sell or offer for sale a tobacco product if the package in which it is contained displays any writing, pictures or graphics other than the name, brand name of the tobacco product, the messages and list referred to in subsection (1), and other information that may be prescribed or required by other laws and regulations.

(3) Notwithstanding subsection (2), a distributor may display writing, pictures and graphics on packages of tobacco products that, while not required, may be authorized by the regulations.

(4) No distributor shall sell or offer for sale cigarettes unless the unit of sale is a package that contains a prescribed number of cigarettes.

11. (1) Every manufacturer or importer of tobacco products of a class prescribed for the purposes of this subsection shall provide to the Minister, in the prescribed form and manner and at the prescribed intervals, reports identifying the constituents of those products and, where applicable, of the smoke produced from their combustion and indicating the quantities of those constituents present therein.

(2) Every manufacturer or importer of tobacco products of a class prescribed for the purposes of this subsection shall provide to the Minister, in the prescribed form and manner and at the prescribed intervals, reports indicating the quantity of those tobacco products manufactured or imported by that manufacturer or importer and the quantity thereof sold by that manufacturer or importer.

(3) Every manufacturer or importer of tobacco products of a class prescribed for purposes of this subsection shall provide to the Minister, in the prescribed form and manner and at the prescribed intervals, reports on the importing, exporting, manufacturing and marketing of tobacco products. These prescribed reports shall also contain any other information that may be prescribed for purposes of this subsection.

(4) All information prescribed by this section shall be made available to the public.

(5) No distributor shall sell or offer for sale manufactured cigarettes unless

    (a) the product yield per cigarette of tar, the anhydrous nicotine-free condensate of cigarette smoke, as measured by the methods prescribed in subsection (1), is lower than

        (i) 15 mg per cigarette on or after 1 January, 2000, and

        (ii) 12 mg per cigarette on or after 1 January, 2004; and

    (b) the product complies with such further or other regulation as may be prescribed.

Protection from involuntary exposure to tobacco smoke

12. (1) Every employer, and any person acting on behalf of an employer, shall ensure that persons refrain from smoking in any work space or public area under the control of the employer.

    (2) An employer may designate for smoking enclosed rooms under the control of the employer other than rooms normally occupied by non-smokers provided employees are not required to enter these rooms as part of their duties and provided these rooms minimize the exposure of others to tobacco smoke and meet such further requirements as may be prescribed.

13. (1) No person shall smoke in any work space or public place under the control of an employer except in a designated smoking room or designated smoking area.

    (2) An employer shall clearly inform employees and members of the public of the prohibition imposed by subsection (1) and of the location, if any, of designated smoking rooms and designated smoking areas under the control of the employer by posting clearly visible signs, as appropriate, or as may be prescribed.

14. (1) An employer may not designate an area for smoking under subsection 12(2) in an aircraft or a motor vehicle carrying passengers for hire or reward.

    (2) An employee who becomes aware that a passenger is smoking in contravention of section 13 on an aircraft, train, motor vehicle or ship operated by the employer shall request the passenger to refrain from smoking.

    (3) Where a passenger fails to comply with a request made under subsection (2), the employer shall require the passenger to disembark at the next scheduled stop following the passenger's failure to comply.

15. Nothing in section 13 or 14 affects the operation of any other law or regulation thereunder or any rule of law in relation to the further protection of persons from exposure to tobacco smoke.

Tobacco sales

16. Tobacco products may not be sold in
    (a) hospitals, health clinics, pharmacies or other health care establishments;
    (b) schools, colleges, universities;
    (c) sports or athletic facilities; or
    (d) such other places as may be prescribed.
17. Tobacco products may not be sold
    (a) through automated vending machines;
    (b) using self-service displays;
    (c) by mail order; or
    (d) by such other method as may be prescribed.
18. Any tobacco product distributor or retailer must obtain a licence, following the prescribed procedure, in order to distribute or sell tobacco products, and must comply with such conditions as are prescribed in that licence.
19. (1) Everyone who gives or in any way furnishes any tobacco product to a person under the age of eighteen is guilty of an offence.
    (2) Where an accused is charged with an offence under subsection (1), it is not a defence that the accused believed that the person to whom the tobacco product was sold, given or otherwise furnished was eighteen years of age or more at the time the offence is alleged to have been committed, unless the accused took all reasonable steps to ascertain the age of the person to whom the tobacco product was sold, given or otherwise furnished.

Enforcement, offences, punishments and administration

20. The Minister may designate as a tobacco product inspector or as a tobacco product analyst any person who, in the opinion of the Minister, is qualified to be so designated. For purposes of enforcement of section 19, the Minister may designate persons under the age of 18 as inspectors. Any inspectors so designated shall be required to work under the supervision of designated tobacco inspectors who are 18 years of age or over.

[Additional sections to be inserted here that are in keeping with the laws of the country.]

[Some countries have specified in law the creation of Health Promotion Foundations or Health Sponsorship Councils to administer funds for health sponsorship of events that were previously sponsored by tobacco companies.

The creation of such foundations or councils is recommended by the International Nongovernmental Coalition against Tobacco (INGCAT) and WHO, and it may be desirable to specify their structure and operation in law. If so, interested readers may wish to consult the New Zealand Smoke-Free Environments Act of 1990 for an excellent and successful example of how to specify the structure and operation of a Health Sponsorship Council. The relevant sections could be inserted here.]

Regulations

[Detailed requirements to be prescribed under sections 5, 9, 10, 11, 12, 13, 16, 17 and 18 could be specified here.]

Selections from WHO's World No-Tobacco Day advisory kit, 1995: "Tobacco costs more than you think"

Changing the equation

The costs of tobacco need to be transferred to the producers of the products. Measures are needed which reduce the extraordinary profitability of the tobacco industry, and the ability of this industry to promote an epidemic. Among things which can be done are the following:

- **Raise the price of tobacco products through tobacco tax changes**
  The possibilities for such interventions are wide, and are dealt with in great detail elsewhere in the advisory kit. Such taxation changes are likely to be the single most significant weapon that public health advocates can use to change the economics of tobacco in a way that will reduce health problems.
- **Provide funds to replace tobacco sponsorships**
  The ability to replace tobacco company sponsorships will reduce the economic clout of the companies and allow these activities to promote useful messages. Higher taxes can fund this. An outstanding example of this is found in several Australian states that fund health promotion foundations from dedicated tobacco taxes.
- **Stop tobacco promotion**
  As part of an overall strategy to reduce tobacco consumption, thereby reducing the negative health and economic consequences, the elimination of tobacco advertising and promotion is essential. In fact, a recent survey found that half the population in the United Kingdom agreed with the statement that "smoking can't really be dangerous, or the government would ban cigarette advertising".
- **End government subsidies to tobacco**
  These subsidies can take many forms: support for farmers, investment incentives, regional assistance programmes, export credits and assistance in the development of new markets. All of these reduce the costs of the tobacco industry and some directly assist the expansion of the industry by transferring risk from the industry to government.

Measuring the impact of economic disincentives

In order to estimate the links between consumption and price, it is necessary to employ economic techniques. Many studies have done this, and consistently show that for every 10% increase in the real "inflation adjusted" price, there will be a drop in consumption ranging from 2% to 8%. Young people and low-income people have been found to be more price-sensitive than others. The relationship between price and consumption is evident in Figs 1 and 2, which show the real price of cigarettes compared to per capita consumption in New Zealand and Canada, respectively.

Producing this sort of information can show strong associations that can lead to changes in the perceptions of various tobacco control tools. These associations can also be powerful persuaders of governments. Some may argue that tobacco tax increases will reduce consumption so much as to reduce overall revenue, but mere presentation of past data in graphical form will show the opposite to be the case (see Fig. 3).

To produce such graphs, a measurement of how much tobacco is consumed each year is needed. This can be estimated from prevalence studies or figures on total sales found in government tax records or even tobacco company publications. Often such numbers can be found at the Ministry of Revenue or Ministry of Finance, where annual accounts for tobacco tax revenue will be available. In Papua New Guinea, for instance, it was possible to determine the amounts for total annual revenue and tax per pack of cigarettes simply by contacting the government revenue officials and going to look at their records.

The figures produced will be best when accurate and consistent measures

Fig. 1. Cigarette consumption and pack price, New Zealand
1973–1991

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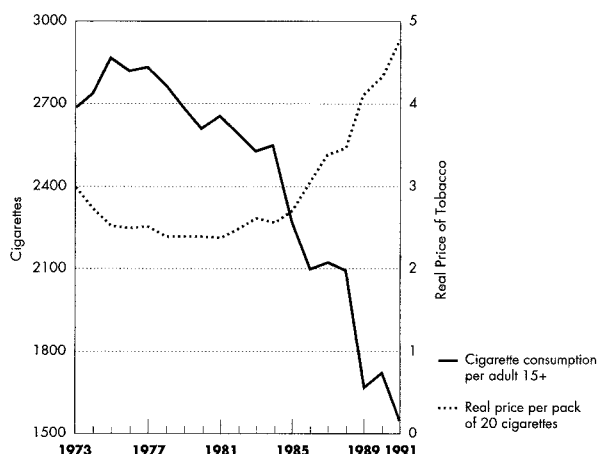
Fig. 2. Daily consumption of cigarettes per capita 15+ and real price of tobacco, Canada 1949–1993
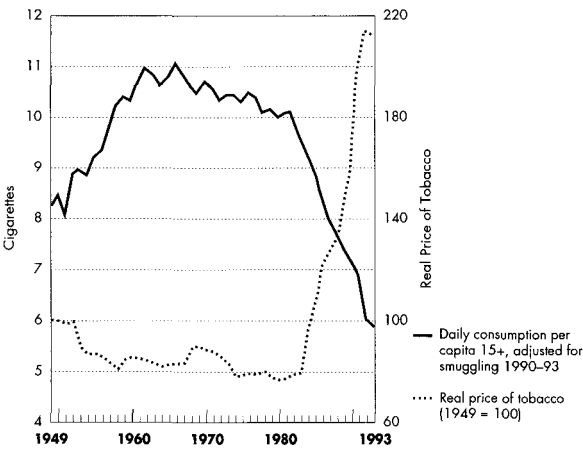
Fig. 3. Domestic sale of cigarettes and fine-cut equivalents and domestic tobacco tax revenues, Canada 1981–1993
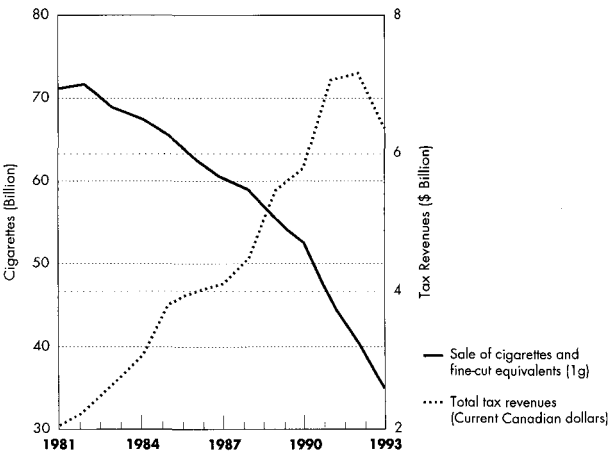
of the prices of tobacco products over time, adjusted for inflation, can be obtained. The inflation data are usually available from governments, and tobacco price data can be obtained either from government sources or from such sources as the published lists of manufacturers' suggested retail prices which can be obtained through tobacco retailers.

Similar graphs can illustrate such things as the relationship between changes in disposable income and changes in tobacco consumption or between price and the amount consumed per smoker. The only limits to such

methodology are the limits of available information or the limits imposed by the realm of economic disincentives for tobacco which are under consideration.

How to use tobacco tax policy to promote public health

The key objective of health-oriented tobacco tax policy is to reduce the harm from tobacco consumption. There are many ways that this can be done. These include:

- Putting a "floor" on the price of tobacco products, to keep price-sensitive consumers out of the market. This may be particularly effective in preventing non-smokers (such as children and poorer adults) from ever starting to smoke.
- Causing prices to rise regularly to cover normal inflation; to ensure that tobacco products do not become more affordable as incomes rise; and to give existing smokers increasing incentive to quit.
- Ensuring that the price-differential between different tobacco products more adequately reflects the health risks involved (there are, for instance, no health grounds for the tax-free status given to chewing tobacco and snuff in certain places) and prevents mere substitution of one product for another (such as what happened when some countries allowed much lower taxes on "roll-your-own" tobacco than on manufactured cigarettes).

There are two basic methods of tobacco taxation:

- *Nominal or specific taxes,* which are based on a set amount of tax per cigarette or gram of tobacco. These taxes will be particularly effective at putting a floor on the price of tobacco products. But, unless they are automatically linked to inflation, the government will have to increase them each year in order to ensure that the effect of the tax is not eroded by inflation. While this form of taxation can prevent inexpensive manufactured tobacco products from being on the market, it can also give advantages to the brands of the big multinationals which prefer to compete on brand image rather than price.
- *Ad valorem taxes,* which are levied as a percentage mark-up on the price of tobacco products. This method of taxation has the advantage of providing a mechanism for automatic tax increases in line with price changes. A disadvantage is that price differences between high and low price brands of cigarettes are accentuated.

For health purposes, specific taxes are likely to be more effective, as long as they are increased regularly to compensate for rising prices and incomes, and provided other methods can prevent marketing inroads by the multinationals. Linking the tax automatically to the index of consumer prices will ensure that

the tax is not eroded by inflation. Better still is for the tax to rise annually by more than the rise in incomes, to reduce affordability. The British Government, as part of its *Health of the Nation* target to reduce tobacco consumption by 40% between 1990 and 2000, has committed itself to raise tobacco taxes every year by at least 3% more than the annual rise in prices.

For some countries, a combination of specific and *ad valorem* taxes would be most appropriate. Each country must decide which method of tobacco taxation would be most appropriate for it, but the end result of making tobacco products less affordable is really what is most important.

The tobacco industry, as any industry, can be expected to try to minimize the impact of taxes and react to the structure of taxation — and so will consumers, for instance, as follows:

- Where taxes are levied on a per cigarette basis, the industry will promote longer "king size" cigarettes.
- Where taxes are levied on the basis of weight, the industry will promote lighter weight cigarettes.
- Where there is a big difference in the tax rate between manufactured cigarettes and hand-rolling tobacco or *bidis*, manufacturers are more likely to promote, and smokers more likely to choose, hand-rolled cigarettes or *bidis*.

This means that it is necessary to monitor the market at all times to ensure that the tax structure is not causing negative effects which reduce the effectiveness of tax policy in promoting health.

But there is also an opportunity. Because the industry will react to the tax structure, taxes can be used to change the tobacco market. One possibility is higher taxes on hand-rolling tobacco, *bidis*, paan or other substitute products.

In some rural areas it will be difficult to tax products produced locally (e.g. *bidis*, paan and others in India, and hand-rolled raw leaf in many parts of the world). This should not be an argument for failing to tax any tobacco product. Rather tax policies have to be adjusted to meet the needs of each country.

Answering the opposition to higher tobacco taxes

Tobacco taxes can be a powerful weapon in reducing tobacco consumption. A wide range of arguments are, however, used to try and dissuade governments from increasing such taxes.

1. "Changes to tobacco taxes raise inflation"

Tobacco contributes a small amount to the "basket of goods" used to measure changes in consumer prices (consumer price index, or CPI).

Government officials' reluctance to add to the rate of inflation has been one of the main reasons that some countries have allowed the real value of tobacco taxes to erode or at least not increase in real terms. Yet, former Australian Treasurer Paul Keating said, "The inclusion of tobacco products in the CPI does not constitute a significant deterrent to the use of punitive measures discouraging smoking . . . A 10% increase in the Commonwealth excise on an average packet of cigarettes would increase the CPI by less than one-tenth of one percentage point." Many financial experts also advocate removing tobacco from the CPI. France did this in 1992, and the average price of tobacco products rose 50% in two years.

2. "Tobacco taxes are regressive"

The concern that tobacco taxes place an undue burden on the poor is a poor excuse not to increase tobacco taxes. The current rates of smoking and the resulting morbidity and mortality are also very regressive. And since when is it considered *progressive* to perpetuate early death? Since there is evidence that the "poor" quit smoking in larger numbers in response to price increases, they will therefore benefit to a greater extent than more affluent socioeconomic groups. It is also possible to save large numbers of another generation of smokers from tobacco addiction, since the number of children who start to smoke is clearly inversely related to price.

3. "Tobacco industry jobs are jeopardized"

Tobacco tax increases are *not* a significant cause of lost jobs. Tobacco tax increases would simply slow the growth in tobacco manufacturing employment.

Those who favour the "job loss" argument are essentially saying that tobacco consumption, and the death and disease which follow directly from this consumption, should be maintained in order to support jobs. That is akin to arguing that wars should be kept going in order to keep arms manufacturers in business.

The "job" argument also implies that money currently spent on tobacco products will somehow mysteriously "disappear" from the economy. Instead, it may be expected that it will be used to buy other, less harmful goods and services, which in turn need people to provide them. At the same time, revenue raised by governments from tobacco taxes will be spent on activities which create or maintain other jobs.

In countries where most cigarettes are exported, employment in the tobacco factories is less affected by policies which reduce domestic demand for tobacco products. In countries where most tobacco products are imported, the concern over tobacco industry jobs is even more tenuous. Efforts to protect tobacco in these countries compromises local health and the strength of

local industries which would otherwise receive the money going to tobacco products.

The concern about tobacco industry jobs should also be seen in perspective. One way to do this is to look at the total direct employment related to domestic cigarette consumption in the tobacco industry. This information is usually available from government sources or from tobacco companies. This can then be used to calculate how many jobs are likely to be lost due to the anticipated tobacco tax increase, and to compare these potential job losses to anticipated tax revenue gains from the tax increase. In most cases, the foregone revenue necessary to maintain jobs will work out to an astronomical sum, clearly showing that decisions to keep tobacco taxes low to aid tobacco industry employment is untenable from an economic standpoint as it is from a health perspective.

4. "The government might lose revenue"

This argument is based on the possibility that tobacco consumption will fall so much that the government will actually end up with less tobacco tax revenue after the increase is implemented. However, a reasonable time frame (several months, for example) must be examined, to account for the fact that retailers and consumers stockpile tobacco just prior to tax increases. According to this type of analysis, no government has ever shown such a decline in revenues attributed to reduced demand following a tax increase.

From a health standpoint, it would be ideal if a tobacco tax increase could actually reduce tobacco use substantially. But the relationship between price and demand, and the fact that taxes constitute only a portion of the total price, means that there would have to be heretofore unseen market changes to reduce consumption enough to erode revenues.

5. "It will cause smuggling"

There is no doubt that the smuggling of tobacco products is a serious issue. A review of international trade figures shows that there are about 170 billion more cigarettes being exported than ever appear recorded anywhere as legitimate imports. This difference can largely be explained by cigarettes which leave a country legally but return to that country, or enter some other country, by illegal means.

Some countries also have particular concerns about smuggling given their individual situation. These can include:

- the absence of enforceable borders;
- existence of organized smuggling rings;
- the presence of very low tobacco taxes in neighbouring jurisdictions;
- an existing informal and unmonitored tobacco distribution system.

The existence of such conditions does not mean that tobacco taxes cannot reflect health objectives. Rather, the policies must simply take into account the potential problems. Governments are not powerless against smuggling. A range of measures can be taken against the smugglers and those who seek to supply them.

While some smuggling or "cross-border shopping" will almost certainly go on between low-tax and high-tax jurisdictions, this can effectively be dealt with through various enforcement mechanisms. Cross-border traffic can and does occur, but there is seldom the level of illegal activity that tobacco interests claim will transpire. The answer certainly is *not* to keep local tax rates low. The following are some other ways that smuggling can be addressed:

- *Ensure that all tobacco products prominently display an indication of the applicable taxes having been paid.* This has been done in various ways in different countries. The key thing is to distinguish clearly between legal and illegal goods. This makes the contraband product much easier to detect and the laws, therefore, easier to enforce. Many European countries require "tax-paid" stamps to be affixed to each cigarette package, under the cellophane wrapping.

  An interesting twist to the prominent marking of tobacco products to aid the detection of smuggled goods is also to require the use of prominent and unique local health warnings. In a few countries, such warnings now occupy 25% or more of the front panel of cigarette packages. These can be in addition to "tax paid" markings on all tobacco products to be sold in a specific country or state. Prominent and distinctive warnings in strongly contrasting colours on a significant proportion of the main panels of all tobacco packages would also contribute to immediate identification of the dissimilar contraband goods. This approach would allow a government to conduct a health education campaign at no expense to the public treasury while simultaneously countering illegal activity. One of the benefits is that a public education initiative could receive strong support from the finance, revenue, and law enforcement sectors of government. This might give the necessary additional political support to overcome the problem of the virtually invisible, or still non-existent, health messages on packages currently found in many parts of the world.
- *Revise the penalties for tobacco smuggling.* Many of the penalties for tobacco smuggling are long out of date and the applicable reporting requirements for revenue purposes may be full of loopholes. The penalties and reporting requirements can be improved as part of a revision of the applicable law on tobacco taxation. The key to such revisions is to ensure that the penalties for smuggling, when combined with the probability of getting caught, render tobacco smuggling unappealing.

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- *Officials from high tobacco tax jurisdictions could lobby their counterparts in neighbouring low tobacco tax areas to increase their rates.* This makes good fiscal sense for them (and for the neighbouring jurisdiction) and will greatly aid efforts at tax reform in the low tobacco tax region. This need not be strong-armed pressure. Simply providing information on tobacco tax policy, as the United Kingdom has to fellow members of the European Union, can be very effective.

6. "Tax should not be used as an instrument of social policy"

Any tax policy affects behaviour and as such tax policy and social policy are inextricably interrelated. For example, higher income taxes will discourage working and higher investment taxes will discourage saving. The failure to raise tobacco prices in line with disposable income has had a major impact on social policy by creating greater demand for tobacco products. Allowing tobacco products to become increasingly affordable is, in effect, social engineering by default. It will virtually guarantee an increased toll of death, disease and economic losses. Raising tobacco taxes is productive and constructive social policy. It is necessary even for the minimal social policy objective of preventing tobacco consumption from increasing.

7. "Smokers already pay their way"

There is some indication that tobacco taxes, in some countries, do offset the cost of treating tobacco-caused illnesses. Such "benefits" are shown even more clearly when the much greater death rates among smokers are taken into account. Sometimes, these high death rates have been seen as a means of decreasing the strain on the various government schemes to give financial assistance to the elderly. The absurdity of this argument is obvious.

In contrast, there are strong arguments in support of higher taxes from a pure economic fairness perspective. One is that the costs of tobacco use go well beyond immediate medical care to include long-term health care costs and lost productivity due to early mortality. When United States researchers looked at the financial costs of smoking-related illness and death, they estimated health care costs to total US$ 52 billion for 1993. When the lost productivity from smoking-related illness and premature deaths was taken into account, the total economic burden due to smoking in the United States amounted to more than US$ 100 billion in 1993.

The costs of tobacco industry products cannot fairly be assigned as the private costs of smokers or passive smokers. Until tobacco manufacturers and merchants are in a position of no longer selling addictive products to children, fully informing all users of the risks, and helping users to break their addiction, continuing to allow tobacco manufacturers and merchants to retain the profits

of the trade and benefit from the increased market created by low prices can be called into question. It is even more questionable that tobacco manufacturers and merchants should continue not to be held responsible for the damage their products do to non-smokers. No one should be obliged to absorb the costs associated with tobacco products that one did not personally use, thus allowing the product to be sold more cheaply — and more plentifully — which in turn means more harm to the non-smoker.

In the final analysis, the *pretium doloris* is incalculable. How does one assign a value to the suffering caused by disease or to human life lost to direct or involuntary smoking? As long as tobacco consumption continues there will be tremendous losses to society. Common sense indicates that we should lessen these losses, and tax policy is one of the most effective ways of doing so.

8. "Tobacco tax rises will put local tobacco growers out of business"

Where tobacco is grown by local farmers, the tobacco industry — and the farmers — will argue that tobacco taxes will damage their livelihood. Again, this is the argument that no public health gains are worth any economic inconvenience to vested interests. Fortunately, there are strong counter-arguments to consider when reviewing the concerns of local tobacco growers:

Only local production for domestic consumption will be affected. In countries with large-scale tobacco production, at least some is likely to be for export. The impact of measures which will reduce tobacco use — or at least slow its growth — will, therefore, have a smaller effect on total production than on total consumption. For example, one of the world's leading tobacco producers exports 98% of its tobacco crop, mainly to Europe.

Farmers retain very little of the total amount spent on tobacco products. In fact, the proportion of tobacco product sales which goes to tobacco farmers can be likened to the proportion of the price of an automobile which goes to iron ore miners. Because the tobacco farmers' share in the final price is so small, any decision to forego tax increases to assist the farmers is as inefficient in terms of cost per job in an economic sense as it is in terms of health.

It can be much more cost-effective in terms of government revenue and public health simply to compensate displaced tobacco growers. Positive gains would also be achieved by assisting these farmers in the pursuit of alternative livelihoods.

9. "Tobacco companies will deter inward investment and threaten foreign exchange earnings"

Worldwide, the tobacco industry is an important investor in newly independent and newly industrializing countries. The transnational tobacco giants have shown particular interest in buying into former state enterprises and

offering to build new factories in countries which might find it difficult to attract capital from elsewhere. Since markets have opened in central and eastern Europe, multinational tobacco companies have invested about US$ 2 billion in buying and equipping tobacco factories in the region.

In the short term, such investments may appear attractive to governments. But the tobacco companies' drive to invest is a reflection of their need to find new markets for their products. In the long run, it is clear that tobacco companies need these markets much more than these markets need multinational tobacco companies.

In the long term, the ultimate result of this investment is not better economic performance, but a switch in local spending to products which add to the health and economic problems of the country.

10. "Tobacco taxes damage the economy"

The tobacco companies sometimes argue that tobacco taxes damage economic performance by distorting people's choices. Pro-health changes in tobacco taxation *do* distort choice. That is the intention. Such changes make it less likely that people will smoke, and can reduce consumption levels among current smokers. Such changes are overwhelmingly beneficial. This reduces the misery caused to smokers, their families, and those involuntarily exposed to tobacco smoke. At the same time, it reduces the economic costs of tobacco use. It is better to raise revenue through tobacco taxes which deter tobacco consumption than through other taxes which reduce incentives for positive economic activity.

11. "Tobacco taxes make governments too dependent on the tobacco industry"

One of the often discussed questions about tobacco taxes is whether, particularly in poor countries, this tax revenue makes governments so dependent on the revenue that there is a reluctance to take other anti-tobacco measures. In some cases, this is of particular concern, including countries where tobacco taxes are one of the very few reliable sources of revenue and where these taxes comprise a large proportion of total government revenue. In some countries, the tobacco companies are particularly adept at trying to create this dependency by such things as the presentation of tax money to coincide with particular objectives. For instance, the tobacco monopoly in a particular country once made a very public payment of tobacco taxes just prior to the World No-Tobacco Day.

While dependencies can be formed, there is no reason that this should happen. If higher tobacco taxes really were good for tobacco companies, one would expect these companies to be leading the charge for higher taxes rather than opposing them. There are important ways in which tobacco tax policy can be pro-health, including:

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- From the standpoint of a government interested in revenue maximization, the most sensible course is to have significantly higher tobacco taxes. While total tobacco sales will decline, the much larger tax per package will guarantee much higher overall revenue. As a result, even governments feeling dependent on tobacco taxes are better off with tax policies which reduce overall demand.
- The reduction in tobacco use due to higher taxes means other tobacco control measures are more likely. For example, policies on such things as smoke-free spaces can be implemented more easily because there are fewer smokers.
- The effective enforcement of higher tobacco taxes to ensure this needed revenue is raised can support other efforts. There may, for instance be prominent product markings which can also reduce the allure of tobacco packaging. There may be rigorous enforcement of tax rules among retailers, which can also be used to enforce rules on tobacco sales to children.
- To justify the higher taxes on tobacco products, the government, even if primarily motivated by dependence on the tax revenue, may feel obliged to show health motivations. Otherwise there may not be the public support sufficient to allow the tax increases. This could mean a percentage of the revenue going to tobacco control efforts. Or it could mean other tobacco control policies could be enacted simultaneously. In either case, raising tobacco taxes can encourage further improvements in tobacco control policies — and further reductions in tobacco use.

Memo to the Finance Ministry: nine reasons for taxing tobacco

Unlike other elements of a tobacco control strategy, taxes are controlled by the Ministry of Finance, not the Ministry of Health. This means that arguments need to be presented in terms that make sense to the people making decisions in the Ministry of Finance. Among the points to be made are the following:

1. Tobacco use is a leading cause of preventable death. Tobacco products have no safe level of consumption and are a known source of ill-health and premature death when used exactly as intended. Tobacco products already account for three million deaths per year worldwide (6% of all deaths), and this total is expected to reach 10 million annual deaths by the decade of the 2020s or early 2030s if current trends in tobacco use persist. One-third of current tobacco-caused deaths now take place in developing countries. In 30 to 40 years, it is expected that the annual death toll in currently developing countries will be about 7 million, a seven-fold increase.

2. The human tragedy from tobacco use is compounded by the economic cost. Half of all tobacco-caused deaths in developed countries now occur in middle age, depriving society of some of its most productive citizens. The preventable deaths of so many people places a huge toll on all nations and has been estimated as resulting in a global net loss of US$ 200 billion annually, half of which is now occurring in developing countries. Tobacco use damages both health and wealth, and is depriving many countries of exactly the resources needed to develop effectively.

3. In the absence of government intervention, tobacco use can be expected to rise as incomes rise. This phenomenon is particularly significant for the many low- and middle-income countries which are experiencing very high growth rates. While high-income countries (with a long history of tobacco use) see tobacco sales increase less rapidly than economic growth, middle-income countries can see tobacco sales rise along with economic growth. This is because the shift to increased disposable incomes can make regular tobacco use affordable to a much larger portion of the population.

    Government action can counter that trend, by reducing tobacco's affordability. As prices increase, tobacco consumption is restrained. Depending on the country and the level of price increase, this could mean a decrease in overall tobacco consumption, or at least a reduction in the rate of increase. This means that governments can, through taxation decisions, affect the demand for tobacco products. As a result, government finance departments can play a crucial role in reducing the death, disease, and economic losses caused through tobacco use.

4. High tobacco taxes bring not only health, but also financial benefits to governments. These taxes can raise substantial amounts of revenue. Because the tax is only a portion of the price, and because consumption falls proportionately less than the price increase, higher taxes will yield higher revenue. Figure 3 (page 72) illustrates this relationship for Canada. The slight decrease in government revenue near the end of the period is due to the fact that other factors did not remain equal. Widespread smuggling from another country reduced government revenue. Taxation strategies need to be accompanied by other measures to prevent or reduce widespread smuggling.

5. Higher tobacco taxes allow reductions in other taxes. All taxes distort economic behaviour. Income taxes can reduce the incentive to work, or to declare income from work. Taxes on savings reduce savings rates and thus capacity for investment. But tobacco taxes reduce tobacco consumption. This produces significant benefits:
    • It reduces the productivity losses caused by tobacco use.
    • It reduces the health care burden of dealing with those made ill by tobacco products.

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- But most importantly, it reduces the human misery associated with unnecessary death and illness caused by tobacco consumption.

6. Tobacco taxes can also help capture some of the economic "rent" from the sale of tobacco products, which could otherwise be transferred to the (often foreign-controlled) tobacco companies. The world over, tobacco manufacturers and merchants put their own financial interests before the health and lives of the thousand million consumers to whom they sell their products. These tobacco products all contain nicotine. And in global terms, nicotine is unquestionably the substance responsible for the most persistent and most widespread drug dependence, even ahead of alcohol, marijuana, heroin and cocaine. Tobacco companies can raise their profits by raising prices. At the same time, they can produce other cheaper products to attract and retain those who might not otherwise be users of tobacco products. Health-oriented tobacco tax policies can prevent low prices in parts of the market, and mean some of the money that would otherwise leave the country as repatriated profit can be used to benefit local citizens. This additional revenue could, for example:
   - fund health care or health promotion;
   - fund alternative economic activity for tobacco farmers;
   - fund other, non-tobacco related, government programmes;
   - reduce other taxes.

7. Tobacco taxes are relatively easy to administer. In most countries, the supply of tobacco products is controlled by only a few companies. The point at which taxes are collected can be established as the products leave those companies. This needs very few people to administer and means only a small part of the revenue raised needs to be spent on collection. In countries which already have a tobacco tax collection system in place, there is little, if any, additional collection cost associated with an increase in the rate of taxation.

8. Tobacco tax increases have also been shown to be relatively popular. This is reflected in the comments of a former Chancellor of the Exchequer in the United Kingdom, who said: "Such is the success of the anti-smoking lobby that the tobacco duty is the one tax where an increase commands more friends than enemies in the House of Commons . . . The tobacco duty is the one tax a Chancellor can increase and receive at least as much praise as execration for so doing."

9. Tobacco tax policy can allow a nation to raise more money, and to do so even while the number of tobacco users decreases. This will provide much needed revenue to help countries, particularly developing countries, to finance social and economic development. A generation later, these benefits are compounded by having fewer productive people lost to premature mortality from tobacco use and less tobacco-related burden on the health delivery system.

Categories of the WHO Tobacco or Health database

1. Sociodemographic characteristics
1.1 Population (in 000s): total, male, female, adult (15+), urban, rural
1.2 Population age-sex structure
1.3 Infant mortality rate per 1000 live births
1.4 Percentage change in infant mortality rate
1.5 Life expectancy at age 15, at birth: total, male, female
1.6 Real gross domestic product per capita (parity purchasing power US$)
1.7 Gross national product (GNP) per capita (US$)
1.8 Average annual rate of growth of GNP (%)
1.9 Percentage distribution of labour force by sector: agriculture, industry, services
1.10 Adult literacy rate (%): total, male, female
1.11 Secondary education enrolment ratio

2. Tobacco production, trade and industry
2.1 Arable land devoted to tobacco growing
Total arable land area (hectares):
Hectares harvested for tobacco:
% *used for tobacco*:
2.2 Export earnings from tobacco (in 000 US$)
Tobacco leaf:
Cigarettes:
Other tobacco products:
Tobacco as % of all export earnings:
2.3 Import costs of tobacco (in 000 US$)
Tobacco leaf:
Cigarettes:
Other tobacco products:
Tobacco as % of all import costs:
2.4 Other import costs for tobacco
Machines and equipment (US$):
Goods and services (US$):

Tobacco and related equipment and services as a percentage of all import costs (US$):

Value of tobacco imports, tobacco products and tobacco equipment as a percentage of foreign currency reserves:

2.5 Workforce (full-time equivalents) employed by tobacco industry: tobacco manufacturing, tobacco growing (number, % of labour force)

2.6 Production, imports, exports, apparent consumption of *unmanufactured* tobacco (farm weight, metric tonnes) (tonnes and % of world total)

2.7 Production, imports, exports, apparent consumption of *manufactured* cigarettes (in millions of pieces) (tonnes and % of world total)

2.8 Production, imports, exports, apparent consumption of *all other tobacco products* (dry weight, metric tonnes) (tonnes and % of world total)

2.9 Production, imports, exports, apparent consumption of *cigars* (dry weight, metric tonnes) (tonnes and % of world total)

2.10 Production, imports, exports, apparent consumption of *all manufactured* tobacco (dry weight, metric tonnes) (tonnes and % of world total)

2.11 Revenue derived from tobacco (US$, as % of GNP)

Total tobacco sales:

Tobacco taxes:

Tobacco leaf:

Tobacco advertising:

3. Tobacco consumption

3.1 Minutes of labour at average earnings (per adult) necessary to purchase 20 cigarettes

3.2 Tar and nicotine content of cigarettes (in mg)

Tar: highest, lowest, most popular brand

Nicotine: highest, lowest, most popular brand

3.3 Percentage of manufactured cigarettes which are filter-tipped

3.4 Per adult (15 years and over) consumption of cigarettes (pieces), tobacco (all forms) (in g)

3.5 Average number of cigarettes smoked per day, per smoker (male, female)

3.6 Percentage of smokers who smoke 20 or more cigarettes/day (male, female)

4. Prevalence

4.1 Smoking/tobacco use according to socioeconomic status/occupation (in %) (total, male, female)

4.2 Smoking/tobacco use (in %) for population subgroups (e.g. urban/rural, religion, ethnicity)

4.3 Smoking/tobacco use (in %) among physicians, nurses, other health workers, teachers

4.4 Regular cigarette (daily) smokers (in %), by sex and age (10–14, 15–19, 20–24, 25–29, 25–34, 30–34, 35–44, 40–44, 45–49, 45–54, 50–54, 55–59, 55–64, 60–64, 65+, 65–69, 70+, total (all ages))

4.5 Occasional cigarette (less than daily) smokers (in %), by sex and age (10–14, 15–19, 20–24, 25–29, 25–34, 30–34, 35–44, 40–44, 45–49, 45–54, 50–54, 55–59, 55–64, 60–64, 65+, 65–69, 70+, total (all ages))

4.6 Current cigarette (daily + occasional) smokers (in %), by sex and age (10–14, 15–19, 20–24, 25–29, 25–34, 30–34, 35–44, 40–44, 45–49, 45–54, 50–54, 55–59, 55–64, 60–64, 65+, 65–69, 70+, total (all ages))

4.7 Prevalence of use of all tobacco products (in %), by sex and age (10–14, 15–19, 20–24, 25–29, 25–34, 30–34, 35–44, 40–44, 45–49, 45–54, 50–54, 55–59, 55–64, 60–64, 65+, 65–69, 70+, total (all ages))

4.8 Regular (daily) smokers among adults (15 years and over) (in %) (total, male, female)

4.9 Percentage of population who are ex-smokers (total, male, female)

4.10 Quit index (*former smokers as a proportion of ever-smokers*) (in %) (total, male, female)

4.11 Percentage distribution of daily smokers by age at which they began daily smoking (male, female, total)

<10 years:
10–14 years:
15–19 years:
20+ years:

5. **Mortality and morbidity** (male, female)

5.1 *Age-standardized death rate per 100 000 from:*

    5.1.1 All causes

    5.1.2 Lung cancer

    5.1.3 Laryngeal cancer

    5.1.4 Cancer of mouth, lip and pharynx

    5.1.5 Cancer of oesophagus

    5.1.6 All cancers

    5.1.7 Chronic obstructive lung disease

    5.1.8 Ischaemic heart disease

    5.1.9 Cerebrovascular disease

    5.1.10 All cardiovascular diseases

5.2 *Estimated total tobacco-attributable mortality:* (number of deaths, percentage of all deaths) (all ages, 35–69 years, 70+ years) (male, female, total)

Lung cancer
All cancer
Cardiovascular diseases
Chronic obstructive pulmonary diseases
All causes

6. Tobacco control measures, organizations and institutions

6.1 Legislation
    6.1.1 Prices, taxes and distribution restrictions
    6.1.2 Age restrictions
    6.1.3 Protection from involuntary tobacco smoke in:
        health care institutions:
        public places:
        public transport:
        workplaces:
        elsewhere (specify):
    6.1.4 Advertising bans
    6.1.5 Tar/nicotine limits
    6.1.6 Health warnings
    6.1.7 Reporting requirements
6.2 Health education and public information campaigns
6.3 Tobacco agriculture
6.4 Research promotion
6.5 Other measures
6.6 Organizations and Institutions
    6.6.1 Governmental
    6.6.2 Nongovernmental
6.7 Synopsis

Country profile sample: Indonesia[1]

Sociodemographic characteristics

Population	1990	1995	2025
Total	182812000	197588000	275598000
Adult (15+)	117578000	132398000	212324000
% Urban	30.6	35.4	60.7
% Rural	69.4	64.6	39.3

Health status

Life expectancy at birth, 1990–1995: 61.0 (males), 64.5 (females)
Infant mortality rate in 1990–1995: 58 per 1000 live births

Socioeconomic situation

GNP per capita (US$), 1991: 610, real GDP per capita (PPP$): 2730
Average distribution of labour force by sector, 1990–1992: agriculture 56%; industry 14%; services 30%
Adult literacy rate (%), 1992: total 84; males 91; females 77

Tobacco production, trade, and industry

Agriculture

In 1990, 183785 hectares were harvested for tobacco, down from 288000 hectares in 1985. Between 1 and 2% of all arable land is used for growing tobacco.

Production and trade

Between 1990 and 1992, Indonesia produced approximately 2.0% of all unmanufactured tobacco in the world. In 1994, Indonesia produced about 180000 million cigarettes (accounting for about 3.3% of world production), up

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[1] Source: *Tobacco or health: a global status report.* Geneva, World Health Organization, 1997.

from 83 900 in 1980. This growth in cigarette production largely reflects the dramatic increase in machine-made *kretek* (clove/tobacco mix) cigarettes.

In 1992, Indonesia imported 21 650 tonnes of unmanufactured tobacco (about 1.4% of all global imports), while exporting 18 900 tonnes (about 1.1% of global exports). Indonesia imported 15 million cigarettes and exported 15 000 million cigarettes, or 2.2% of global exports.

In 1990, import costs of tobacco leaf and cigarettes amounted to US$ 42.1 million (0.1% of all import costs), compared with US$ 17 million in 1985. In 1990, Indonesia earned an estimated US$ 124.6 million from tobacco exports (0.4% of all export earnings), up from approximately US$ 48.2 million in 1985.

Industry

About 214 300 workers were engaged full-time in the tobacco manufacturing industry in 1989. The Indonesian *kretek* industry ranks as the second largest employer after the Government.

Tobacco consumption

Most tobacco consumed in Indonesia is in the form of cigarettes. Between 85 and 90% of all cigarettes smoked in Indonesia are *kreteks*. The cigarette market share of *kreteks* increased from about 30% in 1974 to about 90% in the 1990s. Since 1970–1972, per adult consumption of cigarettes (all forms) has more than doubled, from 500 to 1180 per adult. A survey carried out in Jakarta in 1981 estimated that each smoker consumed 12 cigarettes a day, on average. About 5% of all smokers are estimated to smoke more than 20 cigarettes a day.

Consumption of manufactured cigarettes

Annual average per adult (15+)	
1970–1972	500
1980–1982	950
1990–1992	1180

Per adult consumption of cigarettes (age 15+)
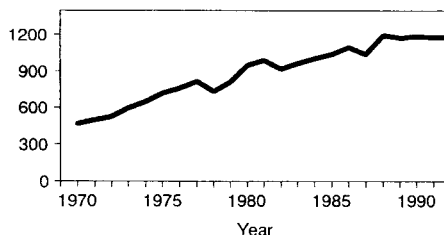
Tar/nicotine/filters

Tar levels are high. In 1983, the average tar content of 18 brands of *kretek* cigarettes was 58.0 mg (range 41–71), while the average nicotine content was 2.4 mg (range 1.2–3.2). These are substantially higher than levels permitted in industrialized countries. About 73% of manufactured cigarettes are filter-tipped.

Prevalence

A 1980 national household survey found that about 54% of males 10 years of age and older, and about 3% of females, were regular (daily) smokers. A similar survey carried out in 1986 reported similar prevalence rates (53% of males, 4% of females). Other surveys carried out during the 1980s in Lombok, Jakarta, and Yogyakarta have reported male prevalence levels of 75%, 65%, and 61%, respectively, and female prevalence levels less than 5% (except for Jakarta: 9.8%). Nationally, prevalence is approximately 60% for men and 5% for women.

Tobacco use among population subgroups

According to a 1985 survey in Semarang, 36% of doctors smoked, as did 79% of paramedical personnel. Almost all (96%) tricycle drivers in the survey smoked, as did over half (52%) of Government civil servants. A 1992 survey of medical students revealed that 8% of males and 1% of females were daily smokers, while 39% of males and 15% of females were occasional smokers.

Age patterns

A 1985 survey of primary schoolchildren in Jakarta found that 49% of boys and 9% of girls aged 10–14 were daily smokers. However, a study in Jakarta in 1990 reported that only 1% of 11–14-year-olds, 9% of 15-year-olds, and 6% of 16-year-olds were daily smokers, although the figures for occasional smokers were 15%, 22%, and 44%, respectively. The study also revealed that 9% started smoking when under 10 years old, 8% at the age of 11, 18% at age 12, 23% at age 13, and 40% at age 14–16. The vast majority (95%) smoked *kreteks*, and 72% reported that their parents did not know that they smoked.

Mortality from tobacco use

Reliable national mortality and morbidity data are not available. However, whenever comparable data are available, they point to an increase in the major chronic diseases associated with smoking. Estimates suggest that tobacco-attributable mortality has risen from 2–3% of all deaths in 1980 to 3–4% in 1986. This would suggest that about 57 000 deaths a year (primarily males) are already attributable to tobacco use, and this number can be expected to increase dramatically within the next few decades.

Tobacco control measures

Most tobacco control measures have been organized by nongovernmental organizations.

Controls on tobacco products

The only restrictions on tobacco advertising on television are that no person can be shown smoking and no cigarette can be shown. There are no restrictions on tobacco promotion on radio, billboards, point of sale, print media, or sponsorship. Health warnings on cigarette packets were introduced in 1991. There are no bans on vending machine sales or on sales to minors. Tax changes in 1991 increased the price of cigarettes by an average of 30%. In 1992, there was a 37.5% tax on local brands and a 70% tax on imports. Tobacco tax accounts for 10% of total tax revenue.

Protection for non-smokers

Three Government ministries are officially smoke-free, but this is often not enforced. By regulation, all health facilities are smoke-free, although some doctors even smoke in front of their patients. Schools up to the university level are smoke-free. Most air-conditioned cinemas have regulations prohibiting smoking, and some restaurants have voluntary bans. Flights of less than two hours are smoke-free, but there are no laws or regulations regarding smoking on trains, buses, or in taxis.

Health education

Nongovernmental organizations, such as the Indonesian Cancer Foundation and the Indonesia Heart Foundation, have produced posters, pamphlets, and leaflets, and some offer smoking-cessation classes. The nongovernmental organizations also organize many community events, and World No-Tobacco Day is regularly celebrated in Indonesia. However, tobacco control activities appear to be limited, and there is no comprehensive national tobacco strategy.

Case studies of prevalence surveys

Case study 1: TIFR studies

The Tata Institute of Fundamental Research has conducted studies in several rural populations of India to obtain a reliable estimate of the prevalence of tobacco use and oral pre-cancerous lesions. A district was chosen as the basic geographical unit, and five districts (each with a population ranging from over a million to 4 million) were selected. A list of villages was prepared from the district census handbook, published by the census department. Villages that had a population of over 2500 or less than 500 were excluded from the list. The number of villages that would approximately provide the sample size of at least 10 000 individuals aged 15 years and over was calculated utilizing information on the population distribution of the villages and age distribution of the population. These villages were selected by the method of simple random sampling.

A team consisting of a dentist and interviewers went house-to-house in the selected villages and interviewed every individual over the age of 15 years. They visited each household at least twice in an attempt to minimize the non-response rate. After completing all villages they made one more round of every village in an effort to interview the remaining persons.

This procedure provided reliable estimates of tobacco-use prevalence in parts of rural India. For example, it established for the first time that chewing generally meant chewing tobacco; the number of chewers who chewed betel-quid or areca nut without tobacco was negligible.

The limitation of this approach was that it was expensive and time-consuming, particularly because the random sampling selected a large number of villages in areas that were not easily accessible. It was possible, however, to carry out the survey because the main objective was to investigate the epidemiology of oral pre-cancerous lesions in this population.

Case study 2: prevalence in Malaysia

The Dental Public Health Division of the Ministry of Health in Malaysia carries out sample surveys routinely to estimate the extent of dental problems in the country. Following a suggestion from the Dental Faculty of the

University of Malaya, this division decided to undertake a survey of oral mucosal lesions in Malaysia. To obtain a representative sample of the entire country, they adopted a stratified two-stage sampling procedure.

The smallest unit available from the census office was an "enumeration block" consisting of 80–120 households. This was used as the sampling unit. The country was divided in four strata: general metropolitan areas, large urban areas, small urban areas, and rural areas. Within each stratum, enumeration blocks were selected by random sampling, and within each enumeration block a systematic sample (such as every tenth house) of living quarters was selected (with a random start). With a target sample size of 11 000–12 000, all adults aged 25 years and above in selected living quarters were interviewed and examined. Institutions such as hostels, hospitals, prisons, boarding houses and military barracks were excluded.

It would have been quite difficult for an individual investigator to undertake such a survey because of the resources and expense involved, but this was less problematic for the Ministry of Health. With technical expertise from a local university, it was possible to modify a routine survey project in order to obtain reliable estimates of tobacco use prevalence.

Case study 3: hospital patients

A Danish professor, teaching dental students in India, wanted to have some idea of the prevalence of oral lesions and their association with various forms of tobacco use in the country. With the help of local faculty, he interviewed and examined consecutively the first 10 000 dental outpatients treated at the dental college in each of the cities of Lucknow, Bombay and Bangalore, and 5000 in Trivandrum.

Although the authors were aware that the sample was biased, particularly with regard to age and gender, they maintained that since private dental care is rare and costly, the socioeconomic status of the patient group was probably representative of all but the very wealthiest.

The survey revealed a great variety of tobacco use. There were seven different tobacco practices (smoking cigarettes, *bidis*, chilum and hookah, chewing tobacco, and chewing paan with and without tobacco). A total of 38 combinations of these various forms of tobacco use were listed. It became obvious that in any survey of tobacco use in India one must be careful about how tobacco use is defined and also enumerate combinations of different kinds of tobacco use.

Case study 4: Bombay police study

As part of a study on leukoplakia, a survey on tobacco use among the police in Bombay was conducted in 1959. Policemen were selected because they formed a fairly homogeneous group — almost all of them were originally from the same district.

Because of his position as honorary dental surgeon to the police, the principal investigator was able to obtain the cooperation of the high-level officers for this study. The policemen were ordered to report to the police hospital at appointed dates and times in convenient batches. In this way, the investigator was able to interview and examine (for oral pre-cancerous lesions) 4734 policemen in a relatively short period of time.

Despite the fact that the results could not be generalized to other populations, the surprising extent of tobacco use (over 85% aged 26 years or over chewed or smoked tobacco) was of interest. The group was followed up after five and 10 years. This was the first long-term follow-up study of tobacco use in a cohort in India. These results were later corroborated in population-based follow-up studies of large cohorts in rural areas in India.

Sampling for a national prevalence survey

Sampling for two national (one urban, one rural) surveys

1. Obtain a list of districts. Suppose that about 80% of the districts are rural and 20% urban.
2. Separate into:
   (a) rural districts — rural stratum;
   (b) urban districts — urban stratum.
3. For each stratum, select randomly 20 districts:
   (a) rural: select 20 districts;
   (b) urban: select 20 districts.
   It is better to select districts on the basis of the principle that the probability of being selected is proportional to size (number of persons in the district).
4. For each rural district, randomly select 10 communes.
   For each urban district, randomly select 12 precincts.
5. For each selected commune, work out the number of families (households), as shown below.
   For each precinct, randomly select 4–5 wards.
6. Assume three persons aged 15+ in each household.
7. Total number of persons to be interviewed:
   (a) rural 4000;
   (b) urban 4000.

   This means $\dfrac{4000}{3} = 1400$ households in each of the rural and urban areas.

8. For rural areas: $\dfrac{1400 \text{ households}}{20 \text{ districts}} = 70$ households per district or about 7 households per commune.
9. For urban areas: for 70 households per district or 6 households per precinct, select randomly 1–2 households per ward.
10. Visit the household selected and interview all persons living there aged 15 or above.

Sample questions for public opinion surveys, Canada, 1979–1987[1]

	Percentage in favour		
	Total %	Non-smokers %	Smokers %
1979			
Is there a need for control by federal government legislation of:			
— reporting of constituents on the package (for example, tar, nicotine, carbon monoxide)?	80	82	79
— health warnings on cigarette packages and/or advertising?	80	83	77
— tar and nicotine levels of cigarettes?	72	74	71
— levels of other substances in cigarettes?	66	68	65
— advertising of cigarettes?	65	69	62
— promotion of cigarettes?	63	68	59
1981			
Would you support:			
— legislation to control the tar and nicotine contents of cigarettes?	84	86	82
— legislation to control the sales of cigarettes or the number of cigarettes sold yearly?	41	51	31
1982			
1. Do you think there should be non-smoking areas on buses, trains and airplanes?	93	95	90

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[1] Compiled from unpublished Canadian data.

	Percentage in favour		
	Total %	Non-smokers %	Smokers %
2. Do you think the amount of advertising of cigarettes should be reduced to a lower level or eliminated altogether?	64	69	56
3. Would you agree that:			
— the government should ban all advertising for cigarettes?	42	—	—
— the government should ban cigarettes in any public place?	54	—	—

1985
Is the measure in the federal budget to increase the price of a 25-pack of cigarettes by 25 cents immediately good for the country?

	75	—	—

1986
Would you agree that:

	Total	Non-smokers	Smokers
— the government should ban all advertising for cigarettes?	63	—	—
— the government should ban cigarettes in any public place?	60	—	—

Do you think smoking in the workplace should be:

— generally allowed?	18	9	31
— allowed in designated areas?	57	58	54
— not allowed?	22	30	12

Do you think smoking on airplanes should be

— generally allowed?	6	3	10
— allowed in designated areas?	51	43	63
— not allowed?	41	52	24

1987
Would you say that you favour or oppose a law banning smoking in the workplace except in private offices and smoking rooms?

	70	—	—

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	Percentage in favour		
	Total %	Non-smokers %	Smokers %
Do you approve or disapprove of the proposed law to ban advertising of cigarettes and all other tobacco products?* May	68	74	56
November	67	74	54
Would you support or oppose a total ban by the government on the sale of tobacco products?	38	46	24

* (persons with no opinion excluded)

Smoke-free workplace: sample questionnaire

1. Which of these phrases best describes your own view about smoking at your place of work? (Tick one).
   Smoking should not be allowed   —
   There should be separate areas where smoking is
       permitted   —
   Smoking should be allowed in all areas   —
   Don't know   —

2. What do you prefer in the areas where people work together? (Tick first and second preference).

	1st	2nd
No restrictions on smoking	—	—
Separate smoking and non-smoking working areas	—	—
No smoking except at break times and designated areas	—	—
Total ban on smoking in working areas	—	—

   Other (please specify)...........................
   ....

3. What do you prefer in the following areas? (Tick one in each line).

	Total ban	Separate areas	Smoking at certain time	No restriction
Toilet	—	—	—	—
Canteen	—	—	—	—
Tea lounge	—	—	—	—
Sports area	—	—	—	—
Lifts	—	—	—	—
Corridors	—	—	—	—
Other	—	—	—	—

4. At meetings, which do you prefer? (Tick one).
   Total ban   —
   Smoking breaks   —
   Majority vote   —
   No smoking unless all agree   —
   No restriction   —

5. Which of the following describes your working area best? (Tick one).

Private office   —
Shared office   —
Open-plan office   —
Shop floor   —
Other (please specify)

6. Which of the following describes you best? (Tick one).

I am a smoker who wants to give up   —
I am a smoker who doesn't want to give up   —
I am an ex-smoker   —
I am a non-smoker   —

7. Is smoking permitted in your work area?
Yes   —   No   —

8. Are you bothered by tobacco smoke at work?
Yes   —   No   —

9. If you are bothered by smoke at work how does it affect you? (Tick any that apply).

Worries about long-term effect on health   —
Eye irritation   —
Headache   —
Coughing   —
Stuffy or runny nose   —
Breathing difficulty   —
Loss of concentration   —
Clothes and hair smell   —
Other (please specify)

10. Have you ever had to move away from where you were working because of other people's smoke?

Frequently   —
Occasionally   —
Never   —

FOR SMOKERS ONLY: NON-SMOKERS PLEASE GO TO END OF QUESTIONNAIRE

11. Do you smoke in your work area?
Yes   —
No   —

12. If you could not smoke in your work area, would you smoke less, or stop?
Smoke less   —
Stop   —
No change   —

13. If you could not smoke at all in your working area, what would it be like for you? (Tick one).
    Very easy —
    Easy —
    Difficult —
    Very difficult —
14. Would you use help to give up smoking if it were offered at work?
    Yes —
    No —

Thank you for completing the questionnaire.

Please add any comments here:

Please return it to:

By (date):

Using epidemiological data to assess the health damage caused by smoking

Calculating age-standardized incidence (or mortality) rates

Commonly used standard populations
(world and European)

Age group	World	European
0	2400	1600
1–4	9600	6400
5–9	10000	7000
10–14	9000	7000
15–19	9000	7000
20–24	8000	7000
25–29	8000	7000
30–34	6000	7000
35–39	6000	7000
40–44	6000	7000
45–49	6000	7000
50–54	5000	7000
55–59	4000	6000
60–64	4000	5000
65–69	3000	4000
70–74	2000	3000
75–79	1000	2000
80–84	500	1000
85+	500	1000
Total	100000	100000

Formula for calculating the population attributable risk from smoking

Suppose the proportion (or percentage) of a given population who smoke (i.e. population smoking prevalence) is p. Furthermore, let us define the incidence (or death) rate from a specific smoking-related disease (e.g. lung cancer) as follows:

I_t = rate of disease (death or incidence) in the total population.
I_e = rate of disease among smokers (the exposed group).
I_u = rate of disease among non-smokers (unexposed group).

The overall rate of disease in the total population can be expressed as the sum of the rates in the exposed and unexposed groups, weighted by the size (relative) of the two groups. That is:

$$I_t = p \cdot I_e + \left(1 - p\right) \cdot I_u \tag{1}$$

Following the description given in Box 10, the relative risk (RR) (or rate ratio) is defined as:

$$RR = I_e / I_u \tag{2}$$

To compute the population attributable risk (PAR) from smoking for a specific disease, we firstly compute the excess risk (absolute) of smokers versus non-smokers by subtracting the risk among non-smokers (i.e. the background risk) from that among smokers. What remains is the absolute risk attributable to smoking. We then apply this risk to the fraction of the population who are exposed (i.e. smokers) to obtain the expected amount of disease contributed by smoking. This can be expressed algebraically as:

$$PAR = p\left(I_e - I_u\right) / I_t \tag{3}$$

It is then a matter of simple algebra to demonstrate that equation (3), for the population attributable risk, can be written as:

$$PAR = \frac{p\left(RR - 1\right)}{p\left(RR - 1\right) + 1}$$

as given in Box 10.

Calculating smoking-attributable mortality based on the observed lung cancer rate

The method proposed here uses the absolute lung cancer rate observed in a population to estimate the proportionate mortality from other diseases attributable to smoking (smoking-attributable mortality, or SAM). A high lung cancer rate, such as that for Hungarian males, thus implies that smoking is also a major cause of death from other diseases, whereas in a population where the lung cancer death rate is still low, such as Spanish females, by implication relatively few deaths from other diseases can yet be due to smoking.

To determine lung cancer deaths attributable to smoking in country "X", use the following formula:

$$SAM = \frac{f}{1 + f} D$$

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In this formula, D is the number of lung cancer deaths in country "X" and

$$f = \frac{L_x - L_{usns}}{L_{usns}}$$

where:

x = country "X"
L = the lung cancer death rate per 100 000 population
usns = the United States non-smoker lung cancer death rate, as determined by the American Cancer Society Prevention Study II (ACS CPS-II) (from Table 1).

This calculation should be made separately for males and females and for each age group for which data are available.

To estimate smoking-attributable mortality from diseases other than lung cancer, a more complicated procedure is required. It cannot be assumed that the absolute mortality rates among non-smokers will be comparable in different populations, as was assumed for lung cancer. There may well be important differences in other major risk factors for vascular disease (e.g. hypertension,

Table 1. Lung cancer: annual rates per 100 000 in 5-year and 10-year age groups among current cigarette smokers and lifelong non-smokers in the ACS CPS-II prospective survey

Age	Males				Females			
	Smokers (crude) (uss)		Non-smokers (smoothed) (usns)		Smokers (crude) (uss)		Non-smokers (smoothed) (usns)	
	5-year	10-year	5-year	10-year	5-year	10-year	5-year	10-year
35–39	*	12	2	2	*	10	2	2
40–44	*		3		*		3	
45–49	35	91	5	6	49	63	4	6
50–54	114		7		71		7	
55–59	227	296	10	12	136	164	10	12
60–64	375		14		195		14	
65–69	599	708	20	23	310	321	19	22
70–74	899		27		339		26	
75–79	1168	1174	35	46	429	420	34	39
80+	1191		46		400		44	
RR** s vs. ns	26				13			

* Inadequate data to estimate reliably at ages 35–44.
** Mantel-Haenszel analysis of all 10 age groups, without smoothing. For relative risk with smoothing, see Table 2.

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blood lipid levels) or for upper aerodigestive cancers (e.g. alcohol) among non-smokers in different countries.

Smokers may also be expected to be generally less health-conscious than non-smokers and more likely to adopt other deleterious health habits (e.g. poor diet, excessive alcohol consumption), with either factor inter-acting independently or synergistically with smoking to increase the risk of death. Thus, in the CPS-II cohort, part of the excess mortality of smokers from diseases other than lung cancer may well be due to factors other than smoking. In an attempt to control for this confounding, thereby ensuring that the risks of tobacco are not exaggerated, the estimated excess mortality of smokers is halved before calculating the attributable mortality due to smoking.

Thus, for all diseases "i", other than lung cancer, smoking-attributable mortality is calculated as:

$$SAM_i = \frac{f_i}{2 + f_i} D_i$$

Table 2. Cigarette smokers versus "non-smokers" (never smoked regularly): selected risk ratios* from years 3 to 6 inclusive (approximately 1984–88) of ACS CPS-II prospective study of 1 million United States adults

ICD-9	Male	Female
Lung cancer (ICD 162)	24.22	12.50
Upper aerodigestive cancer — mouth, pharynx, larynx or oesophagus (ICD 140–150 and 161)	7.87	6.95
Other cancer (rest of ICD 140–209)	1.69	1.20
Chronic obstructive pulmonary disease (ICD 490–2, 492–6)	13.82	14.21
Other medical causes (rest of ICD 000–799)**		
Age 35–59	3.05	2.69
60–64	2.31	2.68
65–69	2.09	2.52
70–74	2.00	2.00
75+	1.54	1.44

* Risk ratios are standardized by the method of Mantel and Haenszel for whichever are relevant of the five-year age groups from 30–34 to 75–79, and 80+. Female risk ratios may rise in future years in the United States, at least in the older age groups, as women who have smoked for only part of their lives are replaced by lifelong smokers.
** Except in extreme old age, the chief other medical causes were vascular disease, particularly coronary heart disease and stroke. For vascular diseases alone, the age-specific risk ratios for the same age groups as those shown in the table were, respectively, 3.45, 2.33, 2.01, 1.87 and 1.53 for males, and 2.96, 2.89, 2.53, 2.09 and 1.43 for females.
Note: For ICD-10 codes, see *International statistical classification of diseases and related health problems, tenth revision.* Geneva, World Health Organization, 1992.
Source: Mortality from tobacco in developed countries: indirect estimation from national vital statistics. *Lancet*, 1992, 339:1268–1278. Reproduced by permission of the publisher.

where D_i is the total number of deaths due to disease "i", and

$$f_i = (RR_i - 1)(SIR)$$

where RR_i is the known relative risk of smoking for disease "i', as determined by ACS CPS-II (from Table 2) and SIR is the smoking impact ratio as determined by the following formula:

$$SIR_x = \frac{L_x - L_{usns}}{L_{uss} - L_{usns}}$$

where:

    uss = the United States smoker lung cancer death rate as determined by ACS CPS-II (from Table 1).

This calculation should also be repeated for males and females separately, and for each age group.

SAM is then summed over all age–sex–cause groups for which it was calculated to obtain an estimate of total smoking-attributable mortality in country "X".

This procedure was developed by Peto and colleagues in the early 1990s. Further details of the method, and its application to the developed countries, can be found in Peto R. et al., *Mortality from smoking in developed countries, 1950–2000* (Oxford, Oxford University Press, 1994).

Method used for calculating smoking-attributable mortality in the Americas

1. Overall mortality estimates

For each country, vital registration was evaluated and the portion of the data that provides an accurate population-based mortality estimate was used.

For the 10 jurisdictions without mortality data, United Nations population schedules were used and mortality rates from countries with similar sociodemographic configurations were applied.

There was no correction for underreporting.

Ill-defined causes were excluded and there was no correction for them.

2. Cause-specific mortality estimates

The major smoking-associated disease groups (coronary heart disease; cerebrovascular disease; lung cancer; oral, laryngeal and oesophageal cancer; bladder cancer; chronic obstructive pulmonary disease) were identified.

Cause-specific mortality data were used for countries for which such data were available.

For the 10 jurisdictions without such data, data were used from four countries representative of the demographic and socioeconomic spectrum of the Americas (Argentina, Colombia, Guatemala, USA).

3. Relative risk and attributable risk estimates

United States estimates for relative risk were used since country-specific relative risk was generally not available.

The smoking-attributable fraction (SAF) for the USA was determined by using the attributable-risk calculation.

4. Adjustment of estimates by using an index related to lung cancer

An index of the maturity of the epidemic that relates the lung cancer rate for each country to that of the USA was used.

For each country, an adjusted SAF was determined for each disease by multiplying the index by the United States SAF for each disease.

For each country, the adjusted SAF for each disease was multiplied by the number of deaths from the disease to obtain smoking-attributable mortality (SAM) (approximately 375 000).

5. Further adjustment of the estimates

SAM for the USA alone was calculated by using this method and the result was compared with the official value reported for 1985 (US Department of Health and Human Services. *Reducing the health consequences of smoking: 25 years of progress. A report of the Surgeon General.* Rockville, MD, Centers for Disease Control, 1989).

For each cause, the difference between the result from this method and from the official method was calculated.

These upward adjustments were applied to the cause-specific SAMs: chronic obstructive pulmonary disease was increased by 230%, cancers were increased by 10.4% (using the difference in lung cancer estimates), and other diseases and causes were increased by 16.4%.

The adjusted estimate of SAM in the Americas was calculated (526 000).

SELECTED WHO PUBLICATIONS OF RELATED INTEREST

Price (Sw. fr.)*

Tobacco or health: a global status report.
1997 (495 pages)
155.–

Evaluating tobacco control activities: experiences and guiding principles.
C. Chollat-Traquet. 1996 (220 pages)
42.–

Legislative action to combat the world tobacco epidemic, 2nd ed.
R. Roemer. 1993 (310 pages)
59.–

Women and tobacco.
C. Chollat-Traquet. 1992 (139 pages)
26.–

Smokeless tobacco control. Report of a WHO Study Group.
WHO Technical Report Series, No. 773. 1988 (81 pages)
11.–

Smoking control strategies in developing countries.
Report of a WHO Expert Committee.
WHO Technical Report Series, No. 695. 1983 (92 pages)
10.–

Tobacco or health: status in the Americas.
A report of the Pan American Health Organization.
PAHO Scientific Publication, No. 536. 1992 (401 pages)
40.–

It can be done: a smoke-free Europe.
Report of the First European Conference on Tobacco Policy.
WHO Regional Publications, European Series, No. 30. 1990 (67 pages)
18.–

Prevention in childhood and youth of adult
cardiovascular diseases: time for action.
Report of a WHO Expert Committee.
WHO Technical Report Series, No. 792. 1990 (105 pages)
12.–

The health of young people: a challenge and a promise.
1993 (119 pages) 23.–

Tobacco use kills millions of people worldwide, causes immense suffering, and also has enormous economic and social costs. With one person dying every nine seconds from tobacco-related causes, the effects of tobacco have been likened to a global epidemic. This book gives practical guidelines for drawing up national action plans on tobacco control, for managing tobacco control programmes and for responding to tobacco interests that oppose them. The suggestions are not hard and fast rules but can be adapted to suit a variety of situations.

Effective tobacco control depends on up-to-date information about the nature of the problem. The book puts a great deal of emphasis on finding out just how serious the tobacco epidemic is in each country. It shows how to obtain reliable and timely data on the health effects of tobacco use and how to prepare country profiles on "tobacco or health" issues. Basic epidemiological methods are explained. Tobacco is the most important preventable cause of premature death in many countries, yet the health risks are often underestimated. This book leaves the reader in no doubt as to how grave the risks truly are and how urgent it is to take action against them.