Smoking and Health in the Americas

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A 1992 Report of the Surgeon General, in collaboration with the Pan American Health Organization

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Center for Chronic Disease Prevention and Health Promotion
Office on Smoking and Health

PAN AMERICAN HEALTH ORGANIZATION
Pan American Sanitary Bureau, Regional Office of the
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THE SECRETARY OF HEALTH AND HUMAN SERVICES
WASHINGTON, D.C. 20201

FEB 14 1992

The Honorable Thomas S. Foley
Speaker of the House of Representatives
Washington, D.C. 20515

Dear Mr. Speaker:

It is my privilege to transmit to the Congress the 1992 Surgeon General's report on the health consequences of smoking as mandated by Section 8(a) of the Public Health Cigarette Smoking Act of 1969 (Pub. L. 91-222). The report was prepared by the Centers for Disease Control's Office on Smoking and Health in conjunction with the Pan American Health Organization.

The topic of this report, Smoking in the Americas, reflects a concern for the broader problems posed by tobacco consumption. The report explores the historical, social, economic, and regulatory aspects of smoking in the Western Hemisphere. It defines the current extent of tobacco control activities in the countries of the Americas and stresses the need for regional coordination and cooperation in our efforts to create a smoke-free society.

The countries of North America--the United States and Canada--are in the midst of a major epidemic of smoking-related disease, including cancer, heart disease, chronic obstructive lung disease, and adverse outcomes of pregnancy. The countries of Latin America and the Caribbean now show evidence of a rising prevalence of smoking, particularly among young people, and in the absence of efforts to decrease tobacco use, are likely to be swept by a similar epidemic.

I believe that we in the United States must provide leadership through continued efforts to control tobacco consumption and prevent the uptake of smoking by young people. In addition, I believe that we must participate fully in regional efforts to develop effective smoking-control programs.

Sincerely,

Louis W. Sullivan

Louis W. Sullivan, M.D.

Enclosure

THE SECRETARY OF HEALTH AND HUMAN SERVICES
WASHINGTON, D.C. 20201

FEB 14 1992

The Honorable Dan Quayle
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

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Louis W. Sullivan

Louis W. Sullivan, M.D.

Enclosure

Foreword

By the mid-1980s, an estimated 526,000 people in the Americas were dying each year of diseases that are directly attributable to smoking. The number continues to increase. Most of these deaths occur in Canada and the United States, where smoking has been a widespread, entrenched habit for over 60 years. However, approximately 100,000 deaths occur annually in the countries of Latin America and the Caribbean. We are in the unfortunate position of watching an epidemic—like the one we are currently living with in the United States—begin to gather momentum among our neighbors.

The determinants of smoking are complex. Many forces are brought to bear on the young person who is deciding whether or not to smoke. The current overall prevalence of smoking in a population—a general measure of its social acceptability—plays a large role. The frequency with which peers or role models smoke may be even more important. The current laws and regulations that govern smoking may influence the decision, as do the price of cigarettes and the ease with which they can be purchased. The extent to which tobacco products are advertised and the forms and mechanisms for tobacco promotion are also likely to have a major influence on a young person's decision. All of these combine in an intricate way to create a social norm; the individual decision is hardly an isolated and independent event.

Considerable gains have been made against smoking in Canada and the United States in recent years. As documented in previous Surgeon General's reports, the prevalence of smoking in the United States has been falling at a rate of approximately 0.5 percentage points per year. But millions continue to smoke, and the current rate of decline will not reduce smoking prevalence to the goal of 15 percent set for the year 2000. It is clear that the efforts under way in the United States and Canada are important in maintaining the momentum of smoking abatement, but it is equally clear that they are insufficient. More sectors of society must be brought into the nonsmoking coalition, and the tools at our disposal must be further strengthened.

Other countries of the Americas face different circumstances. For some, still in the process of economic development, the prevalence of smoking is still low, and the problem may have a lower priority than more acute public health concerns. For others, further along in their development, diseases associated with smoking are already major causes of death, and the prevalence of smoking is high among young people in urban areas. Overall, the impact of smoking-related illness is not yet as evident in the other countries of the Americas as in Canada and the United States. However, the high prevalence among young people in many of these countries is ominous. Each country must deal with its problem in its own political, economic, and cultural context. Nonetheless, the countries of the Americas face a common threat, even though they may be in differing stages of its evolution. A common approach, characterized by agreement on goals, objectives, and means, can benefit the entire region.

The Pan American Health Organization (PAHO) has taken significant steps to establish a forum for the exchange of ideas and for the development of a joint plan of action. As a regional branch of the World Health Organization, PAHO in turn takes part in an international forum for coordinated action against tobacco. The individual decision to smoke—both now and in the future—will ultimately be influenced by these efforts of the global community.

This Surgeon General's report is the twenty-second in a series that was inaugurated in 1964 and mandated by law in 1969. The current report looks at the place of smoking in the societies of the Americas and at the current efforts to prevent and control tobacco use. It is perhaps best viewed as a planning document, a portrayal of the current situation in the Americas that will provide the basis for a concerted approach to future prevention strategies.

James O. Mason, M.D., Dr.P.H.
Assistant Secretary for Health
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Director
Centers for Disease Control

Preface

from the Surgeon General,
U.S. Department of Health and Human Services

This 1992 report of the Surgeon General, *Smoking and Health in the Americas*, is the second on smoking and health during my tenure as Surgeon General. Over the years, the reports have systematically examined the effect of smoking on human health: the biologic effects of substances in tobacco, the risks of disease, the susceptibility of target organs, the addictive nature of nicotine, and the evolving epidemiology of the problem. The reports summarize a massive amount of information that has accumulated on the untoward effects of tobacco use, now easily designated the single most important risk to human health in the United States. The 1990 report, *The Health Benefits of Smoking Cessation*, documented the positive impact of quitting and thus furthered the logical argument leading to a smoke-free society.

This report is a departure from its predecessors in that it treats the evidence against smoking as an underlying assumption. The issue for the future is how we will go about achieving a smoke-free society, and a consideration of smoking in the Americas is an early step in that direction. The report explores the historical, epidemiologic, economic, and social issues that surround tobacco use in the Americas. It focuses on cultural antecedents and trends, on social and economic structure, and on the local, national, and regional efforts that are currently under way to control tobacco use.

One of the striking inferences to be drawn from the report is that the countries of the Americas occupy a continuum of consequences related to smoking. This continuum appears to be related to overall economic development. Countries that are furthest along the path of industrialization have gone through a period of high smoking prevalence and are now experiencing the incongruous combination of declining prevalence and increasing morbidity and mortality from smoking. Other countries, substantially along the path, are entering a period of high prevalence and may also be experiencing some of the disease and disability associated with smoking. Still others, less developed industrially, have low prevalences of smoking and relatively lower estimates for smoking-attributable mortality, but must contend with numerous other public health issues.

Not all countries fit easily into such a simple classification. Within countries, there is considerable diversity in the pace of industrialization, urbanization, and general development as well as in the manifestation of the effects of tobacco use. But the classification is useful in defining the pathway that all countries are likely to take. In the absence of coordinated action, the epidemic of tobacco use is likely to proceed according to a well-defined script: gradual adoption of the smoking habit, long-term entrenchment of tobacco use, and a major loss of human life.

The forces that create this script are complex and often difficult to untangle. One of the major findings of the report is the crucial role of surveillance in understanding the intricate interrelationship of the factors that influence smoking.

The educational level of the population, for example, illustrates the complexity. Data from selected sources indicate that smoking is more prevalent among highly educated women than among less-educated women. One would think that increased education would be linked to a greater awareness of and concern about the health consequences of smoking, but this assumption appears incorrect. It may be that a higher educational level, especially in developing countries, imparts greater susceptibility to messages that promote positive associations with smoking. Only through systematic monitoring of smoking prevalence as well as of the knowledge, attitudes, and behaviors of the population can we appreciate the underlying reasons for the current epidemiologic configuration. Such appreciation, in turn, is the basis for a rational prevention and control program.

Another area in which surveillance is critical is in the monitoring of the tobacco sector of the economy. Such monitoring should include production, consumption, price structure, and taxation policy as well as advertising and promotion of tobacco products. The structure of the industry in any country will have important ramifications for the growth and "success" of the commodity. One of the fundamental paradoxes of market-oriented societies is that some entrepreneurs—even acting completely within the prescribed rules of business practice—will come into conflict with public health goals. The market structure of the tobacco industry constitutes a major threat to public health simply because the product is tobacco. In the tobacco industry, attempts to control a large market share, marketing to target groups, widespread use of innovative promotional techniques, and corporate growth, development, and consolidation—in short, the traditional elements of successful entrepreneurial activity—are ultimately inimical to the public health. Each country faces its own resolution of this paradox, but recognizing and monitoring it is fundamental to the prevention and control of tobacco use.

Most countries of the Americas have begun to face these complex issues. Several have taken major steps, others tentative ones, but all should recognize the crucial role of international coordination and cooperation. It is clear that although most countries can have significant impact on their own smoking-related problems, the international community can become smoke-free only by acting in concert. The process is an arduous one that begins with multifaceted efforts to change social norms regarding smoking and that moves ultimately to a disappearance of demand for tobacco products. I hope that the current report will serve as an impetus for continuing activity in the control of smoking and for mobilization of international resources toward the goal of a smoke-free society.

Antonia C. Novello, M.D., M.P.H.
Surgeon General

Preface

from the Director,
Pan American Health Organization

Diseases related to smoking are an important cause of premature deaths in the world, both in developed and developing countries. Eliminating smoking can do more to improve health and prolong life than any other measure in the field of preventive medicine.

Developing countries, including those of Latin America and the Caribbean, are not behind their neighbors in the north with regard to the tremendous growing problem of noncommunicable diseases related to tobacco consumption.

Over the last three decades, the countries of Latin America and the Caribbean have experienced important changes in their demographic, socioeconomic, and epidemiologic profiles. Increasing numbers of the older, more urban, and especially the poorer populations of the region, are dying of diseases related to lifestyle determinants. Consumption of tobacco is one of these harmful threats to the health and well-being of our populations.

Despite that, in most of the developing countries of our region, not enough attention has been given to generate actions and the kind of information needed for policy and program formulation with regard to tobacco control. It is also unfortunate that while the transnational conglomerates in control of almost all tobacco production and marketing have directed their efforts toward penetrating developing economies, many governments, given the urgent needs created by other health problems, and in some cases due to financial or economic reasons, consider tobacco control a low priority.

The United States Government and the Pan American Health Organization (PAHO) have been working in a joint effort to generate the information included in the Surgeon General's report, and the PAHO country report, which hopefully will bring more awareness and promote action against smoking in the region of the Americas.

Our collaboration with the Office of the Surgeon General has been highly satisfactory, and it will encourage the development of a regional network for implementing research and exchange of successful experiences in the control of tobacco addiction.

Carlyle Guerra de Macedo, M.D., M.P.H.
Director

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Smoking and Health in the Americas

Countries of the Americas *3*

Notes on the Text *5*

Chapter 1. Introduction, Summary, and Chapter Conclusions *7*

Chapter 2. The Historical Context *15*

Tobacco Use in Indigenous Societies *19*
The Emergence of the Cigarette, 1492–1900 *23*
The Emergence of the Tobacco Companies, 1900 to the Present *31*

Chapter 3. Prevalence and Mortality *57*

Prevalence of Smoking in Latin America and the Caribbean *61*
Smoking-Attributable Mortality in Latin America and the Caribbean *81*

Chapter 4. Economics of Tobacco Consumption in the Americas *101*

Economic Costs of the Health Effects of Smoking *105*
Economics of the Tobacco Industry *114*

Chapter 5. Legislation to Control the Use of Tobacco in the Americas *143*

Legislation to Control Production, Manufacture, Promotion, and Sales *148*
Legislation to Change Smoking Behavior *153*
The Impact of Antitobacco Legislation *161*

Chapter 6. Status of Tobacco Prevention and Control Programs in the Americas *179*

National Programs for Tobacco Control *183*
Regional Activities for Tobacco Control in Latin America and the Caribbean *185*
Elements of Prevention and Control Programs *186*

List of Tables and Figures *207*

Index *209*

Countries of the Americas

Latin America
- Andean Area
  - Bolivia
  - Colombia
  - Ecuador
  - Peru
  - Venezuela
- Southern Cone
  - Argentina
  - Chile
  - Paraguay
  - Uruguay
- Brazil
- Central America
  - Belize
  - Costa Rica
  - El Salvador
  - Guatemala
  - Honduras
  - Nicaragua
  - Panama
- Mexico
- Latin Caribbean
  - Cuba
  - Dominican Republic
  - Haiti
  - Puerto Rico

Caribbean
- Anguilla
- Antigua and Barbuda
- Bahamas
- Barbados
- Bermuda
- British Virgin Islands
- Cayman Islands
- Dominica
- French Guiana
- Grenada
- Guadeloupe
- Guyana
- Jamaica
- Martinique
- Montserrat
- Netherlands Antilles and Aruba
- Saint Kitts and Nevis
- Saint Lucia
- Saint Vincent and the Grenadines
- Suriname
- Trinidad and Tobago
- Turks and Caicos Islands
- Virgin Islands

North America
- Canada
- United States of America

Data in this report are almost exclusively presented by the above regions. In some instances, however, information is presented separately for the French overseas departments in the Americas (French Guiana, Guadeloupe, and Martinique) and the French territory Saint Pierre and Miquelon, which is in North America. Such instances are noted in the text.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the Pan American Health Organization or the U.S. Department of Health and Human Services concerning the legal status of any country, territory, city, or area of its authorities, or concerning the delimitation of its frontiers or boundaries.

Notes on the Text

Trade Names

Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Company Names

Current names are used to identify companies throughout the report. In some instances, exact names could not be verified from current sources, and the best available information was used. On tables reproduced from other sources, the nomenclature used in the original source was retained.

Sources used to verify company names included Tobacco International's *57th Annual Directory and Buyer's Guide, 1991* (Vol. 192, No. 21, New York: Lockwood Trade Journal Co., Inc., 1990) and the following online databases: D&B—Dun's Market Identifiers, ICC British Company Directory, and ICC British Company Financial Datasheets.

The complete name is used for the first mention of a company, after which an abbreviated form is generally used.

Organizations, Campaigns, and Slogans

Names of organizations, coalitions, committees, government agencies, and other groups, as well as names of public information campaigns and health campaigns and their slogans were verified in online sources (Encyclopedia of Associations, MEDLINE, and several news services) and in the files of the Pan American Health Organization (PAHO). Not all such information was verifiable, and translations made into English sometimes varied. Every reasonable effort was made to obtain the official name and/or standard translation; we regret any inaccuracies that may have occurred.

Legislation and Health Warnings

The legal and the popular names of legislation and the wording of health warnings required on advertisements and packaging of tobacco products were verified in several sources. These included the United States Code Service (online database), PAHO's LEYES database (see Chapter 5, Appendix 2), the *International Digest of Health Legislation*, copies of legislation, and the files of the Centers for Disease Control's Office on Smoking and Health. We regret any errors that may have resulted from incomplete files or inaccurate translations.

Botanic Substances

Names of substances discussed in Chapter 2 are treated as non-English words unless they appear in *Webster's Third New International Dictionary of the English Language*, unabridged, Springfield, Massachusetts: G. & C. Merriam Company, 1981. The spelling of non-English words was verified in foreign language dictionaries or used as cited in original sources.

Chapter 1
Introduction, Summary, and Chapter Conclusions

Introduction *9*

Development of the Report *9*
Major Conclusions *10*

Summary *10*

Chapter Conclusions *12*

Chapter 2. The Historical Context *12*
Chapter 3. Prevalence and Mortality *12*
Chapter 4. Economics of Tobacco Consumption in the Americas *12*
Chapter 5. Legislation to Control the Use of Tobacco in the Americas *13*
Chapter 6. Status of Tobacco Prevention and Control Programs in the Americas *13*

References *14*

Introduction

Recognition that the problems posed by personal risks are amenable to social solutions is an important contribution of modern public health. Each person makes choices, but such choices are shaped by social, economic, and environmental circumstances. On an even broader scale, national choices are made in a complex regional or global setting. This report attempts to place the personal risk of smoking in the Americas in the larger context and to underline both the heterogeneity and the interrelationship of nations.

Previous Surgeon General's reports have focused primarily, although not exclusively, on the epidemiologic, clinical, biologic, and pharmacologic aspects of smoking. With the twenty-fifth anniversary report (U.S. Department of Health and Human Services 1989), in which considerable attention was devoted to the social, economic, and legislative aspects of tobacco consumption, the need to place tobacco in a larger context was made apparent. Accordingly, this report now examines the broad issues that surround the production and consumption of tobacco in the Americas.

Development of the Report

The 1992 Surgeon General's report was prepared by the Office on Smoking and Health (OSH), National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control, Public Health Service, U.S. Department of Health and Human Services, as part of the department's responsibility, under Public Law 91-222, to report current information on smoking and health to the U.S. Congress.

OSH, a World Health Organization Collaborating Center for Smoking and Health, works closely with the Pan American Health Organization (PAHO). In the Regional Plan of Action for the Prevention and Control of Tobacco Use, PAHO responded to the thirty-third meeting (1988) of its Directing Council, which recommended that PAHO (1) collaborate with the countries of the Americas in the development of national programs for the prevention and control of smoking and (2) cooperate with member states and government and nongovernment centers and groups in identifying and mobilizing resources to contribute to this plan of action (PAHO 1989).

In February 1988, the Surgeon General, then C. Everett Koop, M.D., Sc.D., and the PAHO Director, Carlyle Guerra de Macedo, M.D., M.P.H., agreed to the development of a Surgeon General's report that focuses on smoking in the Americas. OSH and the Health of Adults Program of PAHO began work on this project.

OSH and PAHO presented the concept of a collaborative effort to attendees of the Fourth PAHO Subregional Workshop on the Control of Tobacco (Central America) in November 1988. Meetings of the Latin American Coordinating Committee on Smoking Control were also attended by OSH and PAHO staff in Santa Cruz, Bolivia (January 1989), and in Port of Spain, Trinidad and Tobago (March 1989).

Four experts on tobacco and health (from Brazil, Canada, Colombia, and Costa Rica) served on the Senior Editorial Board, and a collaborator was identified in each of the participating member states. In September 1989, work began on the current report and on a country-by-country summary of the current status of tobacco prevention and control in the Americas, which PAHO is issuing as a companion document to this report (PAHO 1992).

The current report has been prepared from reviews written by experts in the historical, sociodemographic, epidemiologic, economic, legal, and public health aspects of smoking in the Americas. In addition to standard bibliographic sources, the report uses data supplied by the U.S. Department of Agriculture, the Centers for Disease Control, The World Bank, the World Health Organization, the Economic Commission for Latin America and the Caribbean, the Caribbean Community Secretariat, the Latin American Center on Demography, the International Union Against Cancer, the International Organization of Consumers Unions, the American Cancer Society, and the Latin American Coordinating Committee on Smoking Control.

In addition, this report uses information derived from a data collection instrument developed by PAHO (with technical assistance from OSH) for the companion report on the current status of tobacco prevention and control in PAHO's member states. The data collection instrument requested current information on tobacco cultivation, cigarette consumption, legislation, taxation, government and nongovernment programs to control tobacco, tobacco-use surveys, and tobacco-related disease impact. Detailed information from this data collection instrument was reviewed at meetings in Caracas, Venezuela (February 1990), and Port of Spain, Trinidad and Tobago (March 1990), before incorporation into PAHO's country-by-country status report.

Major Conclusions

Five major conclusions have emerged from review of the complex factors affecting smoking in the Americas. The first two relate to the current size of the problem; the latter three, to current conditions that have an important influence on the prevention and control of tobacco use.

1. The prevalence of smoking in Latin America and the Caribbean is variable but reaches 50 percent or more among young people in some urban areas. Significant numbers of women have taken up smoking in recent years.
2. By 1985, an estimated minimum of 526,000 smoking-attributable deaths were occurring yearly in the Americas; 100,000 of these deaths occurred in Latin America and the Caribbean.
3. In Latin America and the Caribbean, the current structure of the tobacco industry, which is dominated by transnational corporations, presents a formidable obstacle to smoking-control efforts.
4. The economic arguments for support of tobacco production are offset by the long-term economic effects of smoking-related disease.
5. Commitment to surveillance of tobacco-related factors—such as prevalence of smoking; morbidity and mortality; knowledge, attitudes, and practices; tobacco consumption and production; and taxation and legislation—is crucial to the development of a systematic program for prevention and control of tobacco use.

Summary

The use of tobacco in the Americas long predates the European voyages of discovery. Among indigenous populations, tobacco was used primarily for the pharmacologic effects of high doses of nicotine, and it played an important role in shamanistic and other spiritual practices. Its growth as a cash crop began only after the European market was opened to tobacco in the early and mid-seventeenth century. During early colonial times, the focus for tobacco cultivation shifted from Latin America and the Caribbean to North America, where a light, mellow brand of tobacco was grown. Despite antitobacco movements, the popularity of tobacco increased dramatically after the U.S. Civil War, and by the early part of the twentieth century, the cigarette had emerged as the tobacco product of choice in the United States.

The first half of the twentieth century witnessed a spectacular increase in the popularity of cigarettes and in the growth of several major cigarette manufacturing companies in the United States. Interest in international expansion was minimal until after World War II. In the early 1950s, preliminary reports of the health effects of tobacco first appeared; these were followed in 1964 by the first report of the Surgeon General on the health effects of smoking (Public Health Service 1964). These events, which were accompanied by a downturn in U.S. tobacco consumption, ushered in a period of rapid international expansion by the tobacco companies. Their expansion into Latin America and the Caribbean was typified by a process of denationalization—that is, the abandonment of local government tobacco monopolies and the creation of subsidiaries by U.S. and British transnational tobacco corporations. The transnational companies were particularly successful in altering local demand by influencing consumer preferences. Local taste for dark tobacco in a variety of forms was largely replaced by demand for the long, filtered, light-tobacco cigarettes produced by the transnational companies.

During the 1980s, several divergent forces influenced the consumption of tobacco in Latin America and the Caribbean. Changing demographics (primarily declining birth and death rates and an overall growth in the population), increasing urbanization, improving education, and the growing entry of women into the labor force—all expanded the potential market for tobacco. Although systematic surveillance evidence is lacking, an increased prevalence of smoking among young people, particularly women in urban areas, appears to have occurred during this period. A countervailing force, however, was the major economic downturn experienced by most countries of Latin America and the Caribbean during the 1980s. The result was that despite the increasing prevalence of smoking in some sectors of the population, overall consumption of tobacco declined. Unlike the decline in North America, however, the decline in Latin America and the Caribbean seems to have been

based on income elasticity rather than on health concerns.

The health burden imposed by smoking in Latin America and the Caribbean is currently smaller than that in North America. A conservative estimate is that, by the mid-1980s, at least 526,000 deaths from smoking-related diseases were occurring annually in the Americas and that approximately 100,000 of these deaths occurred in Latin America and the Caribbean. Since the smoking epidemic is more recent, less widespread, and less entrenched in Latin America and the Caribbean than in North America, it may be thought of as less "mature"—that is, sufficient time has not yet elapsed for the cumulative effects of tobacco use to become manifest. Because health data from Latin American and Caribbean countries vary in consistency and comprehensiveness, establishing overall trends for morbidity and mortality is difficult. Nonetheless, the available evidence suggests an important contrast between North America on the one hand, and Latin America and the Caribbean on the other. In the United States and Canada, smoking-associated mortality is high and increasing because of high consumption levels in the past, but prevalence of smoking is declining. In Latin America and the Caribbean, prevalence of smoking is high in some sectors, but smoking-attributable mortality is still low compared with that for North America. This contrast augurs poorly for public health in Latin America and the Caribbean, unless action is taken.

The health costs of smoking are considerable. The U.S. population of civilian, noninstitutionalized persons aged 25 years or older who ever smoked cigarettes will incur lifetime excess medical care costs of $501 billion. The estimated average lifetime medical costs for a smoker exceed those for a nonsmoker by over $6,000. This excess is a weighted average of the costs incurred by all smokers, whether or not they develop smoking-related illness. For smokers who do develop such illnesses, the personal financial impact is much higher.

Available data do not permit a firm estimate for Latin America and the Caribbean. The estimate will probably vary with the health care structure of the country, but the burden is likely to increase with increasing development and industrialization. Nonetheless, early evidence suggests that smoking-prevention programs can be cost-effective under current economic circumstances.

The economics of the tobacco industry in the Americas are complex. Although tobacco had long been thought to be an inelastic commodity, it has been demonstrated to be both price and income elastic. Such elasticity renders tobacco use susceptible to control through taxation and other disincentives. Revenues from tobacco have been an important, though variable, source of funds for governments, but the case for promoting tobacco production on economic grounds is weak. Currently, only a few countries of Latin America and the Caribbean have economies that are largely dependent on tobacco production. The current economic picture, coupled with consumer responsiveness to income and price and the potential health hazards, has created a significant opportunity for tobacco control in Latin America and the Caribbean.

This opportunity is reflected, to some extent, in the fact that most countries of the Americas have legislation that controls tobacco use. Restrictions on advertising, the requirement of health warnings on tobacco products, limits on access to tobacco, and restrictions on public smoking have all been invoked. The legislative approach is not systematic, however, and in many countries, the programs have gaps. Furthermore, the extent to which such legislation is enforced is not fully known. Nonetheless, the pace of enactment suggests a growing awareness of the potential efficacy of the legislative approach.

Overall, the public health approach to tobacco control in Latin America and the Caribbean is variable. Many countries have adopted some elements of comprehensive control, including (in addition to legislation and taxation) the development of national coalitions, the promotion of education and media-based activities, and the development and refinement of surveillance systems. Few countries, however, have adopted the unified approach that characterizes, for example, the program in Canada.

The potential exists in the Americas for a strong, coordinated effort in smoking control at the local, national, and regional levels. The high prevalence of smoking that is emerging in many areas is a clear indicator of an approaching epidemic of smoking-related disease. The potential for decreasing consumption in Latin America and the Caribbean has been well demonstrated, albeit by the unfortunate mechanism of an economic downturn. The potential for a decline in smoking prevalence motivated by health concerns has been well demonstrated in North America. Furthermore, the importance of tobacco manufacturing and production to local economies is undergoing considerable scrutiny. Regional and international plans for tobacco control have been developed and are being implemented. For persons in the Americas in the coming years, the individual decision to smoke may well be made in an environment that is increasingly cognizant of the costs and hazards of smoking.

Chapter Conclusions

Following are the specific conclusions from each chapter in this report:

Chapter 2. The Historical Context

1. Tobacco has long played a role, chiefly as a feature of shamanistic practices, in the cultural and spiritual life of the indigenous populations of the Americas. This usage by a small group of initiates contrasts sharply with the widespread tobacco addiction of contemporary American societies.
2. During the latter half of the nineteenth century, amalgamation of major U.S. cigarette firms coincided with the emergence of the cigarette as the most popular tobacco product in the United States.
3. In Latin America and the Caribbean, through a process of denationalization and the formation of subsidiaries, a few transnational corporations now dominate the tobacco industry. The current structure of the industry presents a formidable obstacle to smoking-control efforts.
4. After rapid growth in per capita tobacco consumption in Latin America and the Caribbean during the 1960s and 1970s, a severe economic downturn during the 1980s led to a decline in tobacco consumption. In the absence of countermeasures, an economic recovery is likely to instigate a resurgence of tobacco consumption.

Chapter 3. Prevalence and Mortality

1. Certain sociodemographic phenomena—such as change in population structure, increasing urbanization, increased availability of education, and entry of women into the labor force—have increased the susceptibility of the population of Latin America and the Caribbean to smoking.
2. The lack of systematic surveillance information about the prevalence of smoking in most areas of Latin America and the Caribbean hinders comprehensive control efforts. Available information reflects a variety of survey methods, analytic schemes, and reporting formats.
3. Available data indicate that the median prevalence of smoking in Latin America and the Caribbean is 37 percent for men and 20 percent for women. Variation among countries is considerable, however, and smoking prevalence is 50 percent or more in some populations but less than 10 percent in others. In general, prevalence is highest in the urban areas of the more-developed countries and is higher among men than among women.
4. The initiation of smoking (as measured by the prevalence of smoking among persons 20 to 24 years of age) exceeds 30 percent in selected urban areas. Although systematic time series are not available, the data suggest that more recent cohorts (especially of women) in the urban areas of more-developed countries are adopting tobacco use at a higher rate than did their predecessors.
5. The smoking epidemic in Latin America and the Caribbean is not yet of long duration or high intensity, and the mortality burden imposed by smoking is smaller than that for North America. By 1985, an estimated minimum of 526,000 smoking-attributable deaths were occurring each year in all the countries of the Americas; 100,000 of these deaths occurred in Latin American and Caribbean countries.
6. The estimate of 526,000 deaths annually is conservative and is best viewed as the first point on a continuum of such estimates. However, it provides an order of magnitude for the number of smoking-attributable deaths in the Americas.
7. The time lag between the onset of smoking and the onset of smoking-attributable disease is foreboding. In North America, a high prevalence of smoking, now declining, has been followed by an increasing burden of smoking-attributable morbidity and mortality. In Latin America and the Caribbean, rising prevalence portends a major burden of smoking-attributable disease.

Chapter 4. Economics of Tobacco Consumption in the Americas

1. Because the health costs of tobacco consumption result from cumulative exposure, they are most pronounced in the economically developed countries of North America, which have had major long-term exposure. Since many countries of Latin America and the Caribbean are experiencing an epidemiologic transition, the economic impact of smoking is increasing.

2. The economic costs of smoking are a function of the economic, social, and demographic context of a given country. In the United States, estimated total lifetime excess medical care costs for smokers exceed those for nonsmokers by $501 billion—an average of over $6,000 per current or former smoker. Similar formal estimates for many Latin American and Caribbean countries are not available.
3. Evidence of the cost-effectiveness of smoking control and prevention programs has increased. In Brazil, for example, the cost of public information and personal smoking-cessation services is estimated at 0.2 to 2.0 percent of per capita gross national product (GNP) for each year of life gained; treatment for lung cancer costs 200 percent of per capita GNP per year of life gained.
4. In Latin America and the Caribbean, as GNP increases, cigarette consumption increases, particularly at lower income levels. This effect is attenuated at higher income levels.
5. Advertising tends to increase cigarette consumption, although the relationship is difficult to quantify precisely. Advertising restrictions are generally associated with declines in consumption and, hence, are an important component of tobacco-control programs.
6. The case for promoting increased tobacco production on economic grounds should be reconsidered. Although tobacco is typically a very profitable crop, much of the advantage of producing tobacco stems from the various subsidies, tariffs, and supply restrictions that support the high price of tobacco and provide economic rents for tobacco producers. Although the tobacco industry is a significant source of employment, production of alternative goods would generate similar levels of employment.
7. Increases in the price of cigarettes, which are a price-elastic commodity, cause decreases in smoking, particularly among adolescents. Excise taxes may thus be viewed as a public health measure to diminish morbidity and mortality, although the precise impact of taxes on smoking will be influenced by local economic factors.

Chapter 5. Legislation to Control the Use of Tobacco in the Americas

1. Legislation that affects the supply of and demand for tobacco is an effective mechanism for promoting public health goals for the control of tobacco use.
2. Although the direct effects of legislation are often difficult to specify because of interaction with a variety of other factors, there are numerous examples of an immediate change in tobacco consumption subsequent to the enactment of new laws and regulations.
3. Most countries of the Americas have legislation that restricts cigarette advertising and promotion, requires health warnings on cigarette packages, restricts smoking in public places, and attempts to control smoking by young people. These laws and regulations, however, vary in their specific features. In many areas, the current level of enforcement is unknown.

Chapter 6. Status of Tobacco Prevention and Control Programs in the Americas

1. A basic governmental and nongovernmental infrastructure for the prevention and control of tobacco use is present in most countries of the Americas, although programs vary considerably in their degree of development.
2. The need is now recognized, and work is under way, for developing a comprehensive, systematic approach to the surveillance of tobacco-related factors in the Americas, including the prevalence of smoking; smoking-associated morbidity and mortality; knowledge, attitudes, and practices with regard to tobacco use; tobacco production and consumption; and taxation and legislation.
3. School-based educational programs about tobacco use are not yet a major feature of control activities in Latin America and the Caribbean. The few evaluation studies reported indicate that such programs can be effective in preventing the initiation of tobacco use.
4. Cessation services in most countries of the Americas are often available through church and community organizations. Private and government-sponsored cessation programs are uncommon.
5. Media and public information activities for tobacco control are conducted in most countries of the Americas, but the extent of these activities and their effect on behavior are unknown.

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Chapter 2
The Historical Context

Preface *17*

Tobacco Use in Indigenous Societies *19*

Introduction *19*
Old World Discovery of Leaf Tobacco *19*
Methods of Tobacco Ingestion *20*
  Tobacco Chewing *20*
  Tobacco Drinking *20*
  Tobacco Licking *21*
  Tobacco Enema *21*
  Tobacco Snuffing *21*
  Tobacco Smoking *21*
  Inhaling Airborne Smoke *22*
  Percutaneous Tobacco Use *22*
Transcendental Purpose of Native Tobacco Use *22*

The Emergence of the Cigarette, 1492–1900 *23*

Tobacco as a Cash Crop *23*
Tobacco Manufacturing and Trade *24*
  North America *24*
  Latin America and the Caribbean *25*
The Expansion of Tobacco Manufacturing *26*
The Manufacturing of Cigarettes *28*
The Popularity of Cigarettes *29*

The Emergence of the Tobacco Companies, 1900 to the Present *31*

Early Growth and Consolidation *31*
  The 1903 Cartel *32*
  The Antitrust Case of 1911 *32*
  Stagnation Domestically and Growth Abroad *33*
  Diversification *34*
  International Competition *35*
The Current Structure of the Industry *35*
  Barriers to Entry *40*
  Profitability *41*
The Current Status in Latin America and the Caribbean *42*
The Future of Tobacco Control *48*

Conclusions *49*

References *50*

Preface

Since prehistoric times, tobacco has been part of the life and culture of the people of the Americas and has been a prominent feature of the religious and healing practices of the region's indigenous societies. During the eras of discovery, exploration, and national independence, tobacco was a major commodity in the growth of trade and the development of an economic base. In more recent times, tobacco use has become intimately entwined with social mores, economic patterns, and, perhaps most importantly, the health of populations in the Americas—as it has in the world at large. The recognition of health effects is a recent phenomenon in the history of tobacco use. Two main reasons for this recognition have been proposed. First, only in this century has life expectancy increased to the point at which smoking-related diseases begin to have a significant impact. Second, only in this century has an efficient method of tobacco ingestion—the manufactured cigarette—become available.

This chapter considers the historical development of tobacco use in the Americas—from the prehistoric cultivation of tobacco to the emergence of the manufactured cigarette and the growth of transnational tobacco corporations. Such an overview provides a background for understanding the current role of tobacco in the Americas.

Tobacco Use in Indigenous Societies

Introduction

In modern times, tobacco is ingested primarily by burning the tobacco leaf and inhaling the smoke. Tobacco is also chewed or placed, in the form of snuff, in contact with the mucous membranes of the mouth. The predominance of these methods is a fairly recent phenomenon, and the most common delivery system—the manufactured cigarette—has been available for only a little over a century. In the Americas, however, tobacco has been used for millennia, through various routes of administration and for a broad range of social and cultural purposes. The following discussion reviews but does not attempt to trace the history of tobacco use in the region's indigenous societies. Some of the practices discussed are rare or extinct; others are in current use, but all contribute to defining the role of tobacco in the cultural and religious life of these societies.

Nicotiana is an ancient genus, of which two major species in South America—*N. rustica* and *N. tabacum*—produce high yields of the principal alkaloid, nicotine. Many species were present in the Southern Cone of South America in ancient times, but they were largely ignored until about 8,000 years ago, when the changing food supply forced a major shift from hunting and gathering to land cultivation. At that time, populations migrated from the open savannas of southern South America, which were largely unsuited for agriculture, to the tropical rain forest of the Amazon and areas further north, including the Caribbean. Tobacco became one of the standard crops cultivated by these early farmers.

Old World Discovery of Leaf Tobacco

European explorers were introduced to tobacco in the West Indies in 1492, when natives offered tobacco leaves to Christopher Columbus and his men as a token of friendship. After a subsequent exploratory excursion through coastal Cuba, two of Columbus's crew reported having witnessed the custom of cigar smoking (Brooks 1937–1952). The explorers who followed also recorded tobacco use among the Indians, and these accounts, along with the observations of missionaries, soldiers, travelers, and scholars, are integral to our understanding of the role of tobacco in indigenous cultures.

Many explorers learned that tobacco use was addictive and multipurpose, but most of them did not understand why Indians considered tobacco sacred. The plant, it was soon recognized, was used in two main ways. In small doses, it acted as a stimulant, as a hunger and thirst suppressant, and as an analgesic. In such quantities, tobacco was used for social purposes, such as sealing friendships; augmenting palavers, war councils, and dances; and strengthening warriors. Small amounts of tobacco were also used during ceremonies to ensure fertility; to forecast propitious weather; to predict successful fishing, lumbering, and planting; and to ensure congenial courtship. In large doses, tobacco altered states of consciousness and was reported to facilitate spiritual objectives, such as spirit consultations, trance states, and psychic curing. In these excessive quantities, the substance acquired its sacred status.

The earliest printed reference to tobacco and the first mention of tobacco smoking is found in the first volume of Gonzalo Fernández de Oviedo y Valdés's ([1535] 1851–1855) monumental account of the discovery of the Americas and the first decades of conquest. He commented on the practice of divinatory tobacco smoking by shamans and the methods of tobacco cultivation among the Caquetío Indians of northern Venezuela. He also reported in 1549 that the Nicoya Indians of Nicaragua used ceremonial cigars and that Spanish soldiers had been offered reed cigarettes by Maya Indians off the coast of Yucatán (Robicsek 1978).

During his travels in 1541 to 1555, Girolamo Benzoni reported that the shamans of Hispaniola and certain Central American provinces poisoned themselves with tobacco smoke during a curing seance. In the process, some men fell to the ground as if dead and remained "stupefied for the greater part of the day or night" (Benzoni [1565] 1967, p. 97). After becoming coherent, these shamans would tell of their visions and encounters with the gods.

Other explorers witnessed cigar smoking on the coast of Brazil. In 1555, the Franciscan friar André Thevet ([1557] 1928) made contact with the Tupinamba Indians in Brazil. He reported their use of cigars to suppress hunger and thirst and during council deliberations.

Thevet's report and similar information by Hans Staden ([1557] 1928) were confirmed by Jean de Léry (1592) who reported smoking and another mode of tobacco use—ritual tobacco blowing—among the Tupinamba. Using long canes, chiefs blew tobacco smoke on the heads and faces of participants

circumambulating during war dances—purportedly to impart the spirit and fortitude required to overcome enemies. Canes may also have been used by the Tupinamba as tubular pipes. A few years earlier, Jacques Cartier (1545) had found L-shaped pipes in use among the Iroquois of Hochelaga (Montreal).

Another method of tobacco consumption was reported among the Taino Indians of the Greater Antilles. This tribe reportedly used a forked tube to inhale tobacco smoke (Fernández de Oviedo y Valdés [1535] 1851–1855). The Catalonian friar Ramón Pané ([1511] 1974) referred to a similar tube used by the Indians; however, it was used to inhale psychotropic snuff (cohoba) (D'Anghiera 1912). The tube may have been used by the Taino for both purposes.

Amerigo Vespucci reported the custom of leaf chewing among Indians (de Navarrete 1880). Vespucci might have observed tobacco chewing with lime, but he did not identify the type of plant material. The custom of chewing whole coca (*Erythroxylon*) leaves with powdered lime was widespread along the Caribbean coast of South America at the arrival of the Europeans, and it persists today (Plowman 1979). At the time of European discovery, chewing tobacco powder with ashes or pulverized shell was also common among the Carib Indians of the Lesser Antilles and the northeastern mainland of South America.

Methods of Tobacco Ingestion

The discussion of traditional tobacco use that follows is based on sources that span several hundred years. Some methods are still practiced and some are not. To avoid the confusion of shifting between past and present, the present tense is used (the ethnographic present) to allow a cross-sectional view of tobacco use by indigenous societies. Although this approach conveys a sense of immutability, some methods of tobacco use have undergone considerable change. Some mention is made of tobacco use among North American indigenous societies, but the discussion focuses on South American practices. The information presented is based on Wilbert (1987),[1] except where other references are cited.

Gastrointestinal, respiratory, and percutaneous routes of ingestion have been documented among South American Indians. Intravenous administration has not been reported. The reported methods of ingestion comprise chewing tobacco quids, drinking tobacco juice and syrup, licking tobacco paste, administering tobacco suppositories and enemas, using snuff, smoking, inhaling airborne tobacco smoke, and applying tobacco products to the skin and the eyes.

Tobacco Chewing

The chewing or, more precisely, sucking of tobacco quids is widely practiced in South America and the West Indies. The widespread distribution of tobacco chewing is considered indicative of the antiquity of this method (Zerries 1964). The practice has been observed in the Lesser Antilles and eastern Venezuela and from northwestern Colombia and the upper Amazon to the Montaña-to-Gran Chaco region (an area encompassing parts of Bolivia, Paraguay, and Argentina) as well as in eastern Brazil. In North America, tobacco chewing was practiced by Indians of the Pacific Northwest. With periodic fluctuations, tobacco chewing has found wide acceptance in non-Indian societies as well (U.S. Department of Health and Human Services [USDHHS] 1986; National Cancer Institute 1989; Connolly et al. 1986).

Indians in South America prepare wads or rolls for chewing from green tobacco and sometimes dust the wet leaves with ashes or salt and mix them with certain kinds of soils or honey. They also use tobacco pellets prepared by kneading finely chopped green tobacco leaves mixed with nitrous earth into a dough or by mixing finely crushed tobacco leaves with ashes and wetting the powder with water to produce a smooth paste. Guianese Indians bake a cake of fresh tobacco leaves that is sprinkled with salt or a surrogate obtained from *oulin (Mourera fluviatilis)*. Strips of the cake are stored in gourds, and *caraña* (resin; *Protium heptaphyllum*), pepper (*Capsicum* sp.), medicinal herbs, or lime from sea shells may be used as additives.

Tobacco quids, rolls, or pellets are carried by the user in the cheek or between the gum and the lower lip for protracted periods (Hammilton 1957). Tobacco chewing frequently occurs in conjunction with other methods of administration, such as smoking and snuffing, and tobacco is sometimes chewed with coca. Indians generally swallow the trickling juices rather than expectorate them (Bray and Dollery 1983).

Tobacco Drinking

Along with chewing, ingesting tobacco in liquid form may be the oldest method of tobacco use (Sauer 1969). The ethnographic distribution of tobacco

[1] For a broader discussion of the general topic and for more extensive documentation, consult Wilbert, J., Tobacco and Shamanism in South America, In: Schultes, R.E., Raffauf, R.F. (eds.) *Psychoactive Plants of the World*. New Haven, Connecticut: Yale University Press, 1987. See also the papers in the *Journal of Ethnopharmacology* (Elsevier Scientific Publishers) (Wilbert 1990) and in the proceedings published by Birkhäuser Verlag (Wilbert 1991).

drinking is similar to that of tobacco chewing, although it is not reported in the Gran Chaco. Most of the tribes in greater Guiana and many societies of the upper Amazon and the Montaña of Ecuador and Peru drink tobacco juice. Tobacco drinking has also been reported in northwestern coastal Venezuela, northwestern Colombia, and a few scattered places in Bolivia and Brazil. Tobacco drinking has found little acceptance as a method of tobacco use outside South America.

The Indians in these regions prepare tobacco juice in various ways. In greater Guiana, tobacco juice is usually an infusion of whole or pounded green leaves in water. The steeped or boiled leaves are strained and pressed by hand. Some tribes add salt or oulin ashes to the mixture (see "Tobacco Chewing"). Other botanical materials used as ingredients by Guianese tribes include the tree barks *ayug* and cinchona. Upper Amazon and Montaña tribes similarly steep, press out, and stir tobacco leaves in water, although these tribes frequently mince or masticate the leaves and occasionally add pepper (*Capsicum* sp.). Boiling tobacco leaves in water for the preparation of juice more frequently occurs among the tribes of the upper Amazon and the Montaña than among Guianese tribes. Unlike *ambil* paste, a syrup extract or jelly from which the water is completely evaporated, the juice is left viscous enough to allow for drinking.

Tobacco juice is ingested by mouth or through the nose, using cupped hands or gourds. The concentrate may also be squirted directly from mouth to mouth. Tobacco drinking is often accompanied by the consumption of tobacco in other forms, alcoholic beverages, and certain hallucinogenic substances.

Tobacco Licking

Licking of ambil is limited to the tribes of the northernmost extension of the Andes in Colombia and Venezuela, parts of the northwest Amazon, and a few areas of the Montaña.

Ambil is prepared differently from region to region. Indians in the Sierra Nevada de Santa Marta of Colombia boil tobacco leaves for hours or days and thicken the black gelatin extract with manioc starch (*Manihot esculenta*) or arrowroot (*Maranta arundinacea*). Venezuelan tribes east of Lake Maracaibo mix *urao*, a sesquicarbonate of soda, into ambil (Kamen-Kaye 1971), whereas the Montaña tribes make ambil with salt or alkaline ashes. Pepper (*Capsicum* sp.), avocado seeds (*Persea americana*), crude sugar, tapioca (manioc juice), and manioc starch are also occasionally used as ingredients for ambil.

A small quantity of ambil is rubbed across the teeth, the gums, or the tongue. Ambil is sometimes ingested with other tobacco products, and some tribes of the Montaña consume ambil with coca, ayahuasco (*Banisteria caapi*), and possibly other hallucinogens.

Tobacco Enema

Use of tobacco enemas and suppositories, as a remedy for constipation and helminthic infestations, is reported among South American Indians. The Shipibo of Peru apply a mixture of tobacco juice and ginger as a vermifuge (Gebhart, unpublished). Ritual use of tobacco enemas among the Aguaruna Indians of the Peruvian Montaña has recently been reported (Davidson, unpublished). To promote intoxication, South American Indians apply enemas of ayahuasco, *paricá* (*Virola* sp.), *willka* (*Anadenanthera colubrina*), and tobacco (*Nicotiana* sp.) (Roth 1924; Von Nordenskiöld 1930). Use of medicinal or ritual tobacco enemas has not been reported among Caribbean, Central American, or North American Indian populations.

Tobacco Snuffing

The use of tobacco snuff, although secondary to the use of psychotropic snuff in South America, is documented in several regions. Ethnographic sources indicate that tobacco snuffing is customary in the middle and upper Orinoco River, the northwest Amazon, and the Montaña—the Purus, the Guaporé, and the Andean regions. The practice has also found wide acceptance in the non-Indian world, although interest has fluctuated.

To prepare tobacco snuff, Indians dry tobacco leaves and then crush, pulverize, and often sift them. Snuff may be inhaled directly from the hand or a leaf or, more commonly, through a snuffing tube made of cane or hollow bone. Snuffing powders are sometimes administered by a partner.

Tobacco Smoking

Smoking is the most prevalent form of tobacco consumption in native South America and is particularly common in greater Guiana, the upper Amazon, the Montaña, Las Yungas, Mato Grosso, and the Gran Chaco. Smoking has also been reported in many intervening and peripheral areas, such as central and northern Colombia, the middle and lower Amazon, the coast of Brazil, Patagonia, and southern Chile.

North American Indians, except for the Pueblo and certain tribes in California, were exclusively pipe smokers (Linton 1924; Robicsek 1978). In South America, pipe smoking has prehistoric origins and is still widely distributed throughout the continent. It is prevalent in two focal areas—the Marañon-Huallaga-Ucayali region and the Gran Chaco. The practice is scattered

along the north coast and the Guiana hinterlands, along the Amazon, and in coastal Brazil. Pipe smoking also occurs farther inland and north of the Gran Chaco focal area—in central and southern Bolivia and on the lower Araguaia. South of the Chaco, pipe smoking is found in middle and southern Chile and in Patagonia.

South American Indians smoke tobacco in the form of cigars, cigarillos, and cigarettes, and they use tubular or L-shaped pipes made of reed, bamboo, wood, fruit shells, bone, clay, or stone. They inhale deeply and hyperventilate; rarely do they retain a puff of smoke in the mouth before expelling or swallowing it. The process is described as taking the smoke into the lungs with "great sucking gasps" and "working the shoulders like bellows" (Huxley 1957, p. 195). The Warao Indians of the Orinoco and several other tribal societies, such as the Vaupés Indians, hyperventilate by smoking giant cigars that measure nearly one-meter long and two-centimeters wide (Wallace [1889] 1972).

Certain customs may be associated with smoking. For example, cigars are usually rolled by Indian men, but in some Indian communities, women are expected to roll the cigars. Women may then light the cigars and take a few puffs themselves before handing the cigars to the men. Smoking is often accompanied by the ingestion of hallucinogens and stimulant beverages, such as guarana (*Paullinia cupana* var. *sorbilis*) and cassiri.

Tobacco is prepared for smoking by sun- or air-drying the leaves and crushing them; some societies alter the product with additives. To give cigar or pipe tobacco a pungent odor similar to frankincense, Indians of Guiana and Amazonia add the resin of *Protium heptaphyllum*, a tree of the myrrh or Burseraceae family. Caraña powder or granules are mixed with tobacco to give it a balsamic savor (Schultes 1980). In Patagonia, *calafate* shavings (*Berberis* sp.) are mixed into the tobacco to add an acrid taste and to create a very blue smoke when the tobacco burns. To make cigars, cigarillos, and cigarettes, South American Indians use several types of wrappers. Although whole tobacco leaves or pieces may be used, various kinds of tree foliage, palm stipples, banana leaves, and maize husks are more common. The wrappers usually add flavor and odor to the tobacco, and in some instances, observers have noted that the cover leaves may enhance the narcotic effect (Weyer 1959).

Inhaling Airborne Smoke

The intentional inhalation of environmental tobacco smoke is a peculiarly South American method of respiratory absorption of nicotine. This practice occurs on the east coast of Brazil, where religious practitioners blow tobacco smoke from canes and funnel-shaped cigars onto the heads and into the faces of dancing warriors. Men of this region also inhale the smoke of tobacco leaves burning inside effigy rattles. Cuna elders of Panama have cigar smoke blown into their faces, and Jivaro men of Peru blow tobacco smoke through long tubes into the open mouth of a partner.

Percutaneous Tobacco Use

The administration of tobacco products to intact or abraded skin is widespread in native South America and includes the following practices: general and directed smoke blowing; spit blowing of tobacco juice, nicotine-laden saliva, or tobacco powder; and administration of saliva massages, juice ablutions, and snuff and leaf plasters or compresses. Some of these practices may serve therapeutic purposes. Tobacco smoke and juice may also be applied to the eyes for absorption of nicotine by the conjunctiva.

Transcendental Purpose of Native Tobacco Use

Tobacco is traditionally used as a vehicle for transcendental experience by South American indigenous societies. As such, it is central to the religious rites of these populations and is a primary tool of the shamans, or spiritual leaders of these societies. Tobacco features in the initiation rituals of the shamans and is used throughout their careers as a mechanism for exercising power and maintaining credibility.

A fundamental role of the shamans is to serve as spiritual protectors who defend their societies against a host of intangible adversaries. Thus, a society's perception of the shaman as being supernatural as well as human is integral to the shaman's position. This dual nature is conferred during initiation rituals in which the novice undergoes a tobacco-induced deathlike state associated with temporary respiratory depression (Dole 1964). Revival from this condition is equated with a rebirth that imparts otherworldly powers.

During initiation, the novice ingests increasing amounts of tobacco and achieves acute intoxication. The candidate manifests a state of illness through nicotine-mediated nausea, heavy breathing, vomiting, and prostration. Through tremors, convulsions, or seizures, the novice progresses to acute narcosis and apparent death. The physiologic stages through which the novice passes depend on the rate of biotransformation of nicotine in the body (Larson 1952; Larson, Haag, Silvette 1961). The induction master's ability to interpret physical signs is critical.

In Guiana, for example, shamans make initiates drink liters of tobacco juice, which bring them to the brink of death. Several cupfuls of tobacco pulp are ingested in rapid succession, and a large bowl of liquid tobacco is force-fed through a funnel into the mouth of a swooning candidate. Initiates who fail to vomit part of the brew may convulse, become ill over an extended period, or die.

Shamans must continually demonstrate their spiritual power to themselves and to the community to maintain effectiveness as religious practitioners and healers (Reichel-Dolmatoff 1975). The pharmacologic effects of nicotine help them accomplish that goal. South American shamans reportedly ingest giant cigars while simultaneously chewing tobacco during ceremonies. Participants in certain rituals and shamanic curing seances on the Guaporé River (Brazil) have been observed taking dozens of insufflations of tobacco powder and ingesting up to 60 doses of *rapé* (snuff). Aguaruna vision seekers of Ecuador use tobacco enemas to produce a deathlike state. Shamans blow tobacco smoke and spittle against atmospheric enemies, such as thunder and lightning, that threaten human existence.

In many societies, shamans exercise power in the form of aggressive "were-jaguars," another condition accomplished through tobacco ingestion. Nicotine is used to provoke several physical changes, including a deep raspy voice, a furred tongue, and a fusty body odor. Nicotine also activates cholinergic preganglionic fibers of the sympathetic nervous system to stimulate the adrenal medulla to release epinephrine and norepinephrine, which mobilize the shaman's body for emergency reaction (USDHHS 1988; Schievelbein and Werle 1967). This generalized arousal is interpreted by the properly initiated shaman as characteristic of jaguar-men, and this experience confirms his shamanic status and role.

The use of tobacco for transcendental purposes in indigenous societies contrasts with its subsequent use in other American societies. In modern Latin American and Caribbean societies, tobacco is increasingly consumed for the social enjoyment of the stimulant rather than for the toxic and organoleptic effects of nicotine sought by the Indians. Acute intoxication, and its attendant immediate threat to health, has given way to long-term addiction and chronic health consequences.

The Emergence of the Cigarette, 1492–1900

Tobacco as a Cash Crop

Europeans did not follow native tobacco practices but developed a tobacco culture of their own based on trade. One of the earliest references to tobacco trade appears in Diego Columbus' will (dated 1534), which mentions a Lisbon tobacco merchant. The French ambassador to Portugal presented tobacco purchased in Lisbon to Queen Catherine de Medici of France in 1561, and a Spanish physician may have introduced tobacco to the court of King Philip II of Spain around 1560 (Fairholt [1859] 1968). Tobacco was first brought to England by Sir John Hawkins about 1565, and England soon had a large and fast-growing market (Anonymous 1602).

Within 30 years of Columbus's voyages, a tobacco trade had been established by the Spaniards between the Caribbean and India, and trade later developed with Japan, China, and the Malay peninsula (Robert 1967). Spanish tobacco, grown mostly in the Caribbean, dominated the market in the early sixteenth century. Sales of tobacco products became so lucrative that, in 1557, the Havana (Cuba) city council forbade black women from engaging in the tobacco trade, thus retaining trade for Europeans (Ortiz 1947). Tobacco growing thrived in parts of Latin America as well, especially in areas of Venezuela (Caracas, Cumaná, and Margarita).

Although the Spaniards attempted to monopolize the tobacco trade, many growers smuggled the leaf to Dutch and English ships. To curtail the contraband trade, King Philip II banned tobacco planting in most of the Spanish Colonies in Latin America from 1606–1616, a policy that stimulated England's search for its own source of tobacco (Robert 1967).

Sir Walter Raleigh first smoked tobacco in the Virginia colony in 1585, and John Rolfe introduced *N. tabacum* to the colony about 1611. Tobacco, a much-needed cash crop for the struggling Jamestown settlement, was exchanged for imported manufactured goods, and the colony soon became economically viable. Tobacco was taken to the Maryland settlements, where the soil produced a yellow tobacco known as Bright (Tilley 1948). According to Rolfe, Bright was "as strong, sweet, and pleasant as any under the sun,"

and with additional "triall and expense," it could compete with leaf grown in the West Indies (Morton 1945, p. 119). Maryland emerged as an important tobacco producer, and attempts to cultivate the crop in North Carolina also proved successful.

The first shipment of tobacco from Virginia reached London in 1613. Within three years, tobacco became the most significant crop and chief export of the British Colonies in North America (Tilley 1948). Tobacco was sold for its weight in silver, which encouraged production, exportation, and taxation (Wagner 1971). Thus, tobacco production became centered in the North American colonies, and the purchase of tobacco became an expensive indulgence.

Tobacco cultivation in Virginia allowed England to begin freeing itself from the Spanish tobacco trade. By 1614, high-quality Virginia tobacco was considered comparable to that grown in Trinidad (Bruce [1895] 1935). During 1615 to 1616, the Virginia Colony exported 2,500 pounds of tobacco, all but 200 pounds of which were sent to England, but the English imported 58,300 pounds from Spain (Brooks 1937–1952). This importation greatly concerned the English government because it created both a trade imbalance and an outflow of currency (Jacobstein 1907). In 1621, as the supply of Virginia tobacco increased, Parliament terminated importation of Spanish tobacco, which by then cost England £60,000 (Jacobstein 1907).

But not all Europeans were in favor of tobacco use. Some Europeans used tobacco for medicinal purposes, perhaps in imitation of South American Indians, but other Europeans believed that the use of tobacco was a heathen practice to be strongly discouraged. Many people claimed that smoking and chewing tobacco were harmful to health. The most famous attack on tobacco appeared in 1604, when King James I anonymously issued *A Counter-Blaste to Tobacco*, in which he disclaimed any medicinal value of tobacco and described smoking as a loathsome practice (James I [1604] 1954).

The King imposed a 400 percent tariff (McCusker 1988), but the tax had little impact on tobacco use, perhaps because demand was greatest among the upper classes. By the early seventeenth century, smoking and chewing tobacco were prevalent throughout most of Europe. In London in 1614, tobacco could be purchased at 7,000 establishments (Lehman Brothers 1955), and because of its presumed medicinal value, tobacco was commonly prescribed by physicians and made available at apothecaries.

In the New World, a sixpence fine was set for smoking in public in New Haven, Connecticut, in 1646, but in the following year, the Connecticut general court ruled that citizens could smoke or chew if they had a license from the court, unless they already had a doctor's prescription (Heimann 1960).

Concerns about tobacco faded, and attempts were made to grow tobacco in Europe. But climate and soil contributed to an unsatisfactory leaf. In the seventeenth century, attempts to produce tobacco were also made in Russia, Persia, India, Japan, and parts of Africa (Morton 1945); however, during this period, Europeans could obtain a sufficient supply of tobacco through importation from the New World only.

Tobacco Manufacturing and Trade

North America

In the Navigation Acts (1651 to 1673), the English parliament stipulated that all tobacco products from the colonies had to be shipped to England before being shipped elsewhere. The Acts were difficult to enforce, however, and resulted in a policy of benign neglect. But the passage of the Acts caused prices to rise sharply. Since tobacco production in the Virginia Colony was low, increased prices encouraged a proliferation of small farms in North America and, eventually, large tobacco plantations. The shortage of workers for these plantations spurred the slave trade, which increased the labor supply.

Annual tobacco shipments from the colonies increased significantly—from approximately 65,000 pounds in the early 1620s, to 1 million pounds by the late 1630s, to 20 million pounds in the late 1670s (Kulikoff 1986). By 1699, of the 30,757,000 pounds of tobacco exported to England from its North American colonies, all but 113,000 pounds were produced in Virginia and Maryland; 496,000 pounds were imported by England from other areas, including Europe, Turkey, Africa, and the Caribbean. During the next 75 years, imports from other areas declined, despite several sharp increases (Table 1). Reexportation of tobacco increased steadily during the first half of the eighteenth century and then peaked at 74,000 pounds in 1775 (U.S. Department of Commerce [USDOC] 1975).

Tobacco became the most important cash crop of the British Colonies. Labor for tobacco production was worth six times that used for wheat production (Jacobstein 1907), and in 1770, the total value of tobacco legally exported from the colonies (£906,638) was significantly greater than that of flour or rice (£504,553 and £340,693, respectively). Fifty percent of all British colonists obtained their living from tobacco production (Jacobstein 1907). In Maryland, wages

Table 1. Tobacco trade* in England, 1700–1775

Year	Imported from: North American colonies	Imported from: Other countries	Reexported†
1700	37,607	233	—
1705	15,629	32	—
1710	23,472	26	16,000
1715	17,801	8	15,000
1720	34,516	10	—
1725	21,034	12	16,000
1730	34,949	131	33,000
1735	40,068	1	—
1740	35,896	106	42,000
1745	41,063	10	43,000
1750	51,278	61	—
1755	48,867	217	45,000
1760	52,288	59	64,000
1765	48,317	3	68,000
1770	39,184	4	73,000
1775	55,458	510	74,000

Source: U.S. Department of Commerce (1975).
*In thousands of pounds.
†Reexportation exceeded importation in the later years because of tobacco grown in the British Isles.

were often paid in tobacco, which also functioned as a currency (USDOC 1975). In England, all companies involved in the tobacco industry also profited enormously, including those that provided banking and related services to planters.

During shipping, tobacco lost much of its moisture, and it had to be moistened before handling. To prepare tobacco leaves for smoking, the stems and ribs were removed and additives, such as sugar, glycerine, gum, and starch, caused the leaves to ferment. The leaves were either granulated for smoking or snuffing or pressed into plug for chewing. The different additives provided tobacco with distinct flavors. These flavors and the various shapes of plugs (including thick coil, pigtail, black twist, and Irish) offered the customer a wide selection in tobacco. Generally, the moister the plugs, the less expensive. Up to 120 pounds of plug could be manufactured from 100 pounds of tobacco, and carotte, an extremely moist variety, could yield 150 pounds of plug (Alford 1973).

But even before the American Revolution, the colonies had problems maintaining a steady level of tobacco production. Tobacco depleted the soil, which resulted in lower yields per acre over time. Tobacco growers faced a dilemma: maintaining their level of income required expanded planting, but a larger crop would also depress prices. Average price per pound for Maryland tobacco was already fluctuating sharply: one pence in 1713, 0.71 pence in 1714, 1.19 pence in 1720, and 0.65 pence in 1731. A general slump was followed by a steadily rising price per pound: 1.48 pence in 1752 and 2.23 pence in 1769. However, prices again declined in 1773 to 1.13 pence per pound (USDOC 1975). Some Virginia planters seriously contemplated abandoning tobacco in favor of wheat, and some did stop cultivating tobacco (Breen 1985).

Because of their increasing indebtedness to British merchants, most tobacco growers in the Bright Belt supported the American Revolution (Breen 1985). Thomas Jefferson wrote that these debts "had become hereditary from father to son, for many generations, so that the planters were a species of property, annexed to certain merchants in London" (Heimann 1960, p. 76). The American Revolution terminated the Navigation Acts but did not alter the adverse circumstances that many planters still faced.

Latin America and the Caribbean

In the 1580s, the Spaniards developed and expanded the plantation system in the Caribbean but emphasized sugar production (Brooks 1952). Foreigners began to enter the sugar industry, which required extensive capital, but tobacco production was dominated by local businesses. By 1606, 95 farms in Cuba specialized in tobacco (Andrews 1978). Little is known, however, about the industry in Cuba during this period, perhaps because Cuban farms grew the expensive and delicate tobaccos used in cigars and were quite small compared with the Virginia plantations (Ortiz 1947). The competitive advantage for the Cuban growers may have been that the leaf used for Cuban cigars produced a richer flavor with less nicotine than did the Bright leaf grown in the Chesapeake Bay area.

In the Chesapeake Bay area, the choice was between cotton and tobacco, and tobacco became more important. In Cuba, the choice was between sugar and tobacco, and tobacco became the less important crop (Ortiz 1947). Nevertheless, by 1711, a processing center was established in Havana to prepare tobacco leaf for shipment. In 1734, the center processed 3 million pounds of tobacco, one-third of which was of the best quality and was used to make snuff (Bray and Harding 1974).

In 1717, a tobacco monopoly was granted to Martin Arostegui by royal edict. Tobacco manufacturing was forbidden in Cuba, and raw leaf had to be sent to Spain (Stubbes 1985). As a result, tobacco farmers revolted in 1717, 1718, and 1723. The monopoly lasted for a century, however, and despite its adverse

effect on business, the tobacco trade continued to prosper (Ortiz 1947). From 1789 to 1794, Cuba produced about 6.25 million pounds of tobacco per year. A decline followed, due to imperial interference, the increasing cost of land, and the preference given to sugar and coffee production. By 1804, Cuba was obligated to import 1 million pounds of tobacco from the United States to meet the requirements of the Havana retail trade. Not until the Spanish government relented did the industry revive enough for Cuba to dominate the market for tobacco leaf and fine cigars in the 1830s (Turnbull [1840] 1973; Humboldt [1856] 1969).

Tobacco cultivation also flourished in Brazil, despite condemnation by the Roman Catholic Church and early Portuguese demands to use the land to grow food. However, these obstacles were overcome because the sale of tobacco could provide ready funds for purchasing slaves to work in the sugar cane fields. Tobacco sales became a state monopoly in Brazil in 1624, but sales were so profitable that the government yielded to private interests and abolished the monopoly in 1642. In 1659, the government reestablished the monopoly, which by 1716 earned 1.4 million crusados a year. Tobacco exports from Bahia averaged 375,000 pounds per year, and annual sales of Brazilian tobacco in London in the early eighteenth century were estimated at 1.9 million crusados (Randall 1977).

The Expansion of Tobacco Manufacturing

During the American Revolution, tobacco exported from the British Colonies declined sharply—to approximately 15 million pounds per year. Subsequent wars also contributed to the loss of foreign markets. Sales declined significantly during the Napoleonic Wars and the War of 1812 due to English blockade of American ports. In addition, revenues to cover the cost of these wars were raised by increasing excise taxes. In 1794, a tax was levied on manufactured tobacco to help cover the cost of the national government, but the tax was discontinued two years later. It was reintroduced to help defray the costs of the War of 1812 and remained in effect until 1816. England increased the tax on tobacco imports in 1815 from 28 cents to 75 cents per pound, which resulted in decreased consumption—from 22 million to 15 million pounds (Jacobstein 1907).

During the American Revolution, Europeans accelerated importation of tobacco from Latin America and the Caribbean and attempted to increase tobacco production elsewhere. Cuba, Colombia, Austria, Germany, and Italy were among the more active participants, but Sumatra also became a significant source of tobacco for Europe. By 1841, European production was estimated at 137 million pounds, compared with 219 million pounds in the United States. Europeans continued to purchase American tobacco, and in 1860, half of the total U.S. production of approximately 400 million pounds was shipped to Europe (Jacobstein 1907).

But taxation and the loss of some foreign markets contributed to a lower price for tobacco, which made cotton production more attractive to U.S. farmers. The United States was the world's leading cotton producer, with no competition from Europe. Yet, several factors contributed to the perpetuation and evolution of tobacco cultivation, curing, and trade. By law, before the American Revolution, only England could manufacture plug, snuff, cigars, and pipe tobacco. After gaining independence, Americans were free to manufacture these more profitable tobacco products, especially pipe and chewing tobaccos, which in addition to capturing the domestic market, became increasingly popular in Europe.

In North Carolina, tobacco became even more attractive because of an accident that changed the product. In 1839, a slave fell asleep while curing Bright tobacco. He awoke in time to see the embers dying and threw more charcoal on the fire to revive it, not realizing that the sudden heat would alter the process. What emerged was a brilliant yellow tobacco with a sweet, pleasant taste. This new curing method produced a slightly acidic tobacco unlike the more alkaline old Bright. The new tobacco was quickly adapted for use as a wrapper for many kinds of plug, which increased the popularity of this form of tobacco. The Bureau of the Census called this alteration "one of the most abnormal developments in agriculture that the world has ever known" (Sobel 1978, p. 16).

Cigar leaf was grown throughout the Caribbean, the first significant center for export of cigars to America and Europe. Cigars were first introduced in the United States in the late eighteenth century, and in 1804, more than 4 million Cuban cigars were imported (Brooks 1952). Cigars were first smoked in the southern colonies, and the practice soon moved north.

During the American Revolution, cigar manufacturing facilities were established in Philadelphia, Trenton, and New York, which became the centers for American cigar manufacturing. In 1800, cigar factories were also built in New Orleans; these factories produced cigars that resembled Cuban products. In 1810, a Suffield, Connecticut, cigar manufacturer employed a Cuban cigar roller to teach his craft to the American workers, and soon small cigar factories became widespread throughout the Northeast

(Heimann 1960). In 1831, 50 Cuban cigar rollers relocated to Key West, Florida, where they successfully transplanted the business (Ortiz 1947). During this period, trade was primarily local; most towns had at least one cigar factory (Heimann 1960).

Many kinds and shapes of cigars were smoked during the early nineteenth century. The most expensive were the Havanas, made either in Cuba or in American factories that imported Cuban leaf. La Corona was made exclusively with Havana leaf. The most popular shape of La Corona was the Perfecto, a large cigar that tapered from the middle. The Panatella was a long, straight cigar, open at the end that was to be lit. The Parejo was similar, but open at both ends. Cigars other than La Corona included the Oscuro, which was made from a much darker leaf; Maduro, made from a brown-black leaf; Maduro Colorado, made from a dark brown leaf; Colorado Claro, made from a light brown leaf; and several others (Cabrera Infante 1985).

In the early nineteenth century, Connecticut-grown tobacco was used to make cheap cigars (Akehurst 1968). Cigars manufactured with domestic leaf often used flavored Bright and Virginia tobacco with wrappers from Connecticut-grown tobacco. These cigars were called Conestogas, after a type of covered wagon, or "stogies" for short. Long Nines were 9 inches (3.5 cm) long and pencil-thin. Short Sixes were 6 inches (2.4 cm) long and less expensive. Prices varied from two cigars for a penny to as much as a 10 cents per cigar (Heimann 1960). Pipe and chewing tobaccos were inexpensive compared with the finer, more costly tobacco used for snuff and cigars, and pipe smoking was the most popular form of tobacco smoking during the first half of the nineteenth century. Persons of low-income groups used pipes and plug, while persons of high-income groups used snuff and cigars (Robert 1967).

After the Louisiana Purchase was made in 1803, settlers brought the tobacco culture to the West. By 1830, the western United States produced approximately one-third of the nation's tobacco used for plug and pipes (Wagner 1971). The southern states also produced tobacco for plug and pipe smoking and continued to produce most of the tobacco for snuff. Virginia, North Carolina, and Ohio led production (57 million, 12 million, and 10.5 million pounds, respectively). However, the cultivation of tobacco for cigars remained concentrated in the Northeast. By 1849, Connecticut, Pennsylvania, and Massachusetts were producing large amounts of cigar leaf (1,267,624; 912,651; and 138,246 pounds, respectively) (Jacobstein 1907). Just before the Civil War, $1.4 million worth of cigars was produced in Philadelphia and $1.1 million in New York City. Before the war, the total value of manufactured cigars was $9 million; the value of tobaccos for chewing and pipe smoking was $21 million (Heimann 1960).

The popularity of tobacco, combined with increasing urbanization, encouraged some merchants to enlarge their manufacturing activities and aggressively market their products. The first center of activity for pipe and plug tobacco was Richmond, Virginia. In 1830, James Thomas, Jr., one of the earliest manufacturer-merchants of Richmond, opened his factory and distributed plug tobacco to many parts of the country. Thomas relocated in California during the gold rush of the 1840s and soon established an almost total monopoly on plug sales in the territory by shipping the manufactured product from his eastern factories. By 1860, approximately 50 factories in Richmond manufactured tobacco; these firms employed 3,400 workers and produced goods valued at almost $5 million per year (Robert 1967).

Lorillard was perhaps the largest tobacco manufacturing facility during the first half of the nineteenth century. Pierre Lorillard had opened a snuff factory in Manhattan in 1760 and owned one of the two mills that survived British opposition to colonial production. After the American Revolution, he constructed a new mill on the Bronx River, which expanded into warehouses, a facility for packing snuff and smoking tobacco, workers' quarters, and his own home. The company outgrew this complex, and Lorillard opened a new facility across the Hudson River in Jersey City (Heimann 1960).

Tobacco products were not highly differentiated until the mid-1800s. Lorillard was one of the first to appreciate the significance of marketing. After the Civil War, his company began to affix tin tags to its plugs, which distinguished a Lorillard product from others; one Lorillard brand was called Tin Tag. Other manufacturers followed suit, and soon the tin tags were collected as novelties, just like cigarette cards in later years (Heimann 1960). The use of brand names for plug products became common in the 1840s and were used to differentiate products by additives, flavorings, and varieties of tobacco (Robert 1967).

Because financial centers were located in the North, tobacco financing was easier to obtain by manufacturing firms concentrated in that part of the country. By the 1850s, much of Virginia's crop was sent to New York firms on consignment; these firms then sold the crop to wholesale jobbers. These firms were so well established that southern manufacturers and retailers were obliged to use the northern firms. This

dependence served as another irritant between the North and South before the Civil War. Indeed, the system of U.S. tobacco manufacturing in the 1850s strongly resembled that of the 1770s when colonial tobacco farmers chafed at Britain's stranglehold. The financial panic of 1857 did much to inflame relations further since many New York manufacturers defaulted on their financial obligations, which caused seven of the eight Richmond tobacco manufacturers to suspend operations (Wagner 1971).

The Civil War had far-reaching effects on the tobacco industry. In the South, the cotton farmers fully supported the Confederacy, but the tobacco farmers were divided in their loyalties. Virginia, North Carolina, and Tennessee seceded from the Union, but Maryland, Kentucky, and Missouri remained. During the war, tobacco production in Kentucky surpassed that in Virginia. Some southern tobacco was smuggled through the lines, but Confederate planters clearly suffered during this period.

Farmers in the Bright Belt continued to plant and harvest tobacco despite the war. Because of the Union blockade of Confederate ports and fear of invasion, tobacco supplies were moved from Richmond to Danville, Virginia, which became a major center of the tobacco industry. Durham, North Carolina, also grew in importance and, in time, outranked Richmond as the leading manufacturer of plug.

In 1862, to stimulate production of much-needed foodstuffs, the Confederate government prohibited cotton and tobacco cultivation, a moot policy, since neither cotton nor tobacco products could elude the Union blockade. In the same year, funds were needed to finance the Civil War, and tobacco products were among the commodities taxed (Jacobstein 1907). But tobacco production continued, perhaps because the price of tobacco increased as the fighting progressed (Robert 1967; Coulter 1926).

Invading Union armies looted tobacco warehouses and, during lulls in the fighting, traded their food and coffee for tobacco from the Confederate troops. Some Union soldiers looted a Durham warehouse owned by John Ruffin Green who, in 1858, had created a fine smoking and chewing tobacco known as Bull Durham. The soldiers tried the cured, granulated tobacco, and after the war, they purchased the tobacco and introduced it to others (Tilley 1948). Just as sixteenth-century sailors introduced tobacco to the rest of the world, the Union soldiers brought a demand back to the North for some of the sweeter, milder, southern tobaccos they had discovered.

Within the tobacco industry, attention was focused on the success of Bull Durham, which had transformed Durham from a small southern town to a thriving tobacco center. In 1875, not only was Bull Durham used for pipe smoking and chewing, but some smokers had started to roll cigarettes with it, thus taking business away from the small companies that manufactured pipe and loose chewing tobaccos. The success of Bull Durham also contributed to the growth of the North Carolina tobacco industry. In 1870, Virginia grew 15 times more tobacco than North Carolina, but 10 years later, Virginia produced five times less (Tilley 1948).

The Manufacturing of Cigarettes

Although demand for manufactured cigarettes had increased gradually from the 1850s to the 1870s, cigarettes were still an insignificant part of the tobacco industry. The Duke family were small tobacco farmers and dealers in the Durham area. The family's patriarch, Washington Duke, was a Confederate veteran who returned to a gutted farm after the Civil War. He found a small cache of Bright, which he sold under the name Pro Bono Publico. Duke and his sons planted Pro Bono Publico and peddled their crop from town to town. The Dukes did a prosperous business, and in 1873 moved to Durham to be closer to the railroads that transported their product to market (Tilley 1948).

By the end of the 1870s, growth in the Duke business had leveled off. James Duke traveled throughout the country selling Pro Bono Publico, but like all the other manufacturers, Duke found it difficult to compete with Bull Durham (Robert 1967; Sobel 1978). In 1881, James, then the acknowledged head of the firm, started to manufacture cigarettes called Duke of Durham.

Duke was successful from the start. A combination of shrewd merchandising and aggressive price-cutting led to the increased popularity of Duke of Durham and other Duke brands. With the assistance of Edward Featherston Small, one of the first cigarette promoters, Duke merchandised his product effectively. At the time, manufacturers used cigarette cards to stiffen the soft packs; Duke cigarette cards were the most imaginative and sought after (Wagner 1971). Within a few years, cigarettes manufactured by Duke sold in many cities in the South and Midwest. In 1883, when the federal government reduced the tobacco tax from $1.75 to 50 cents per pound, most manufacturers passed part of the savings to customers through lower prices. Duke not only lowered his prices, he advertised his policy: "The Dukes are ambitious for a very large cigarette business, and to obtain such are *dividing their profits* with the dealers and consumers"

(Tilley 1948, p. 557). Cigarettes manufactured by Duke sold for five cents for a package of 10. They were now the least expensive on the market, and sales increased dramatically (Wagner 1971).

Even before Duke turned his attention to the manufacturing process, several inventors had been working to produce a cigarette-manufacturing machine that would replace the workers who rolled cigarettes by hand. But most manufacturers believed that the future of cigarettes was doubtful; they questioned whether a machine capable of producing tens of thousands of cigarettes was truly needed.

In 1881, James Bonsack, announced the invention of his cigarette-making machine, which was rejected by several firms. Duke, however, was interested and, with his engineer, helped Bonsack perfect the machine. By 1884, the Bonsack model could produce more than 200 cigarettes per minute—46.8 million cigarettes per year. Twenty of these machines could have satisfied the entire national demand for cigarettes for 1885.

Bonsack signed a long-term contract with Duke, giving Duke rights to the machine. Although Bonsack was free to license his machine to others, his contract provided Duke with rebates, thus reducing Bonsack's net royalties. Later, Bonsack agreed that Duke's payments would be at least 25 percent less than those paid by other firms (Sobel 1978). The Duke firm then had the lowest production costs in the tobacco industry, which gave it victory in price wars and a very high profit margin. Before the Bonsack machine was incorporated into the process, most cigarettes sold for 10 cents for a pack of 10 cigarettes; after incorporation, for five cents.

In 1880, Duke's total monthly payroll was $500; five years later, it was $15,000. From 1885 to 1886, production increased significantly—from 9 million to 30 million cigarettes. In August 1887, the Duke firm produced 60 million cigarettes (Tilley 1948). The firm realized high profits, which allowed Duke to accelerate his advertising and promotion campaigns.

Most other tobacco manufacturers continued to believe that great profits were based in the production of smoking tobacco, chewing tobacco, and cigars. At the time, Duke gave no indication of entering those market areas. Duke was the only large firm in the tobacco industry that concentrated on manufacturing cigarettes (Sobel 1974).

Duke believed that cigarettes would be most popular in urban areas. The firm relocated to New York where it soon became the largest cigarette manufacturer in the city. Allen & Ginter, located in Richmond, was the only serious competitor of Duke's in the late 1880s. Tobacco manufacturers competed fiercely for the purchase of tobacco, and dealer and smoker loyalty and price wars were frequent (Robert 1967). But cigarettes became increasingly popular, and consumer changeover was dramatic. In 1884, four cigars were sold for every cigarette. Three years later, the ratio was less than two to one—largely owing to the impact of the Bonsack machine.

The Popularity of Cigarettes

In 1890, Duke became The American Tobacco Company (ATC), the foremost tobacco manufacturer. Between 1895 and 1905, it was the second largest U.S. industrial firm in capitalization (behind U.S. Steel) and was more than three times the size of General Electric Company, Inc., the third largest enterprise (Nelson 1959). Expansion continued with the organization of American Snuff in 1900 (Sobel 1978). Reorganized as a holding company in 1901, ATC dominated the cigarette, snuff, smoking tobacco, and plug markets and soon purchased a controlling interest in United Cigar Stores. The firm did not enter into cigar production, primarily because cigars were rolled manually, which made competitive pricing difficult. However, cigars still accounted for 60 percent of the value of manufactured tobacco, and in order to enter this lucrative market, Duke established the American Cigar Company in 1901 with an investment of $10 million. The firm controlled several significant factories, including Havana Tobacco, American Stogie, and Havana Commercial, but did not dominate the cigar industry. ATC had only a small market share of the cigar business (14 percent) but a large market share of cigarettes (86 percent), smoking tobacco (76 percent), and snuff (96 percent) (Lehman Brothers 1955). The dominance of ATC in cigarette production was significant because cigarettes were rapidly dominating the tobacco market (Jacobstein 1907).

The cigarette's success can be measured by the excise taxes collected on tobacco varieties after the Civil War. In 1878, revenues from excise taxes on cigars and cheroots and on manufactured tobacco were considerably higher than those on cigarettes ($11.4 million, $25.3 million, and $300,000, respectively). When taxes were reduced by 50 percent in 1879, consumption of tobacco increased. Although taxes were reduced further in 1889, consumption did not increase enough to compensate for the lower tax rate. By 1890, tax revenues were $1.1 million for cigars and cheroots, $18.3 million for manufactured tobaccos, and $1.1 million for cigarettes. When funds were needed for the Spanish-American War, taxes were temporarily increased (Arnold 1897; Jacobstein 1907).

U.S. government revenue from tobacco sales from 1865 to 1890 is shown in Table 2.

In the 1880s and early 1890s, excise taxes on tobacco products accounted for approximately one-fourth of total federal government tax revenues, exclusive of tariffs. From 1863 to 1906, tobacco accounted for about 20 percent of government internal revenue (Jacobstein 1907), and an increasing proportion was derived from cigarette tax.

An antismoking movement that had begun in the 1860s was revived 10 years later. The increased popularity of cigarettes may have been at least partially responsible for the effort, which concentrated on eliminating that particular form of tobacco use. Advertisements of "cures" for smoking appeared in newspapers, and in 1880, the General Conference of the Methodist Episcopal Church resolved that its ministers would abstain from tobacco (Robert 1967).

In 1899, Lucy Page Gaston, who had been active in the Temperance Movement, established the Chicago Anti-Cigarette League and formed branches in other cities. The League and similar organizations opened clinics for curing smokers. Dr. D.H. Kress, the League's general secretary, patented a mouthwash containing a weak solution of silver nitrate, which he believed would cure all craving for cigarettes. Other remedies were developed, which were supposed to end the desire for all forms of tobacco (Sobel 1978).

By the early twentieth century, several antismoking laws were enacted. New York State prohibited public smoking by persons less than 16 years of age. In 1897, under the Dingley Tariff, the federal government forbade the inclusion in tobacco packs of coupons, cards, and other inducements to smoking. The following year, the government doubled the cigarette tax (from 50 cents to one dollar per thousand). In 1901,

Table 2. Tax revenue from tobacco sales, United States, 1865–1890

Year	Total*	Percentage of government revenue†	Average rate of tax per pound
1865	11.4	5.4	.228
1870	31.4	16.9	.269
1875	37.3	33.8	.211
1880	38.9	31.2	.160
1885	26.4	23.5	.080
1890	34.0	23.8	.080

Source: Arnold (1897).
*In millions of dollars.
†Although Arnold does not specify, the percentage appears to be of internal revenue, not total revenue.

Table 3. Manufactured tobacco products,* United States, 1870–1905

Year	Pounds of manufactured tobacco and snuff	Number of cigars	Number of cigarettes
1870	102	1,183	16
1871	107	1,353	20
1872	112	1,578	24
1873	118	1,755	28
1874	124	1,835	35
1875	124	1,828	59
1876	124	1,776	113
1877	123	1,816	157
1878	125	1,923	210
1879	136	2,217	371
1880	146	2,510	433
1881	172	2,806	595
1882	159	3,118	599
1883	194	3,232	844
1884	172	3,373	920
1885	207	3,294	1,080
1886	210	3,462	1,607
1887	226	3,662	1,865
1888	209	3,668	2,212
1889	246	3,787	2,413
1890	253	4,229	2,505
1891	271	4,422	3,137
1892	274	4,675	3,282
1893	251	4,341	3,661
1894	269	4,164	3,621
1895	274	4,099	4,238
1896	261	4,048	4,967
1897	297	4,136	4,927
1898	275	4,459	4,843
1899	295	4,910	4,367
1900	301	5,566	3,870
1901	314	6,139	3,503
1902	348	6,232	3,647
1903	351	6,806	3,959
1904	354	6,640	4,170
1905	368	6,748	4,477

Source: U.S. Department of Commerce (1975).
*In millions.

New Hampshire enacted the strictest legislation, making it illegal to manufacture, sell, or smoke cigarettes, and in 1907, Illinois passed similar legislation. By 1909, 11 states (Iowa, North Dakota, Tennessee, Arkansas, Indiana, Kansas, Minnesota, Nebraska, Oklahoma, South Dakota, and Wisconsin) had enacted laws prohibiting or limiting the use of cigarettes, and many cities had similar statutes (Wagner 1971). A survey of the period indicates that some form of anticigarette legislation had been passed in every state

except Wyoming and Louisiana. In general, effort to control the use of cigarettes was stronger in the Midwest than in the West and weakest in the East (Wagner 1971; Sobel 1978). Most of the state laws were rescinded by the middle to late 1920s.

ATC and several other tobacco companies responded in the 14 states that banned cigarette smoking. One strategy was to sell "the makings" (i.e., smoking tobacco and cigarette paper) because cigarettes, not the materials themselves, were prohibited. In states where the sale of cigarettes was illegal but smoking was permitted, tobacco companies suggested that merchants provide free cigarettes and charge for matches. Cigarettes were also illegally transported to the states that banned cigarette sales (Sobel 1978).

It is difficult to assess whether antismoking efforts were effective. At the turn of the century, the price of plug tobacco declined drastically, and many cigarette smokers may have switched to plug. Conversely, the economic boom that began in 1897 may have motivated former cigar smokers, who had converted to cigarettes during a previous economic downturn, to return to cigars. The net effect was that cigarette sales peaked in 1896 at 4,967 million units and then declined to 3,503 million in 1901 before again turning upward (Table 3).

Although ATC was secure enough financially to survive the decline in cigarette consumption, most competitors were not, and many cigarette manufacturers went out of business, further increasing Duke's market share. ATC accounted for slightly more than 80 percent of cigarette sales in 1894 and more than 90 percent in 1900 (Sobel 1978). Thus, the temporary decline in cigarette consumption served to narrow competition, a portend of further developments in the twentieth century.

Urbanization in the second half of the nineteenth century contributed to the dominance of cigarettes in the tobacco market. The cigarette first gained popularity in cities, where the pace of life was faster than in small towns and rural areas. The desire for "a quick smoke" could be satisfied more easily with cigarettes than with cigars or pipes. Moreover, because cigarettes cost less than other tobacco products, smokers may have given little thought to lighting up a cigarette. Chewing tobacco, which posed few aesthetic problems outdoors, caused concern in offices and factories. Informal social contact was more prevalent in cities than in rural areas. Offering someone a cigarette had a certain social cachet; it was an inexpensive way of socializing. Urban women were unlikely to smoke cigars, use snuff or pipes, or chew tobacco. But in the early twentieth century, educated women in the higher socioeconomic groups had already begun smoking cigarettes.

The Emergence of the Tobacco Companies, 1900 to the Present

Early Growth and Consolidation

Once cigarette smoking became established as the chief form of tobacco ingestion in the United States, the history of tobacco was dominated by the growth of large transnational corporations (TNCs) in the United States and the United Kingdom. ATC was one of the earliest and largest TNC in the United States (Wilkins 1970). During the 1880s, in an attempt to expand demand for his products, Duke sent representatives on world tours to procure business, and by the 1890s, almost one-third of U.S. cigarette output was exported to the Far East. ATC had almost complete control of U.S. cigarette exports (Tennant 1950), and when tariff barriers prevented exports, Duke established local manufacturing plants (as in Canada, Japan, Germany, and Australia) (U.S. Bureau of Corporations [USBOC] 1909). Britain's cigarette industry also expanded rapidly during this period, although growth was mainly confined to British colonial preserves and spheres of influence and was not as rapid as in the U.S. industry (Alford 1973; Corina 1975). By the mid-1890s, agents for W.D. & H.O. Wills (by then the largest U.K. firm) and ATC were directly competing in India, Australia, Japan, and China (Alford 1973).

By 1901, Duke had consolidated ATC's control over all segments of the U.S. tobacco industry (except cigars), and he decided to enter the U.K. market (USBOC 1909). His decision was influenced by the wave of antismoking hostility in the United States, which resulted in prohibitions in 14 states and a depression in sales between 1896 and 1906 (Tate 1989). In addition, some shift in market preference toward

Turkish tobacco cigarettes led to new competition from small independents. To better compete with ATC, several English firms, under the leadership of Wills, merged into the Imperial Tobacco Company (ITC), and the two firms soon began to compete worldwide. ITC was about to enter the U.S. market when the two competitors came to terms (Corina 1975; Alford 1973).

The 1903 Cartel

The settlement created a classic cartel. Ogden's Imperial Tobacco Ltd., a small tobacco firm, was sold to ITC in exchange for 14 percent of its securities; ATC and ITC agreed not to encroach on each other's markets; and a new London-based company, British-American Tobacco Company Ltd. (BAT), was organized to control business outside the United Kingdom, the United States, Cuba, and Puerto Rico. Two-thirds of the initial £5.2 million capital was allocated to ATC and one-third to ITC in exchange for overseas operations and export trade. Agreements were also made to ensure consultation and inhibit cheating (USBOC 1909; Alford 1973; Corina 1975).

In 1903, BAT was a transnational corporation of impressive size, comparable to current TNCs in its number of overseas operations. By the end of World War I, it was the world's largest cigarette manufacturer. Although some Chinese boycotted the firm's products, BAT's expansion was particularly extensive in China, BAT's largest market for many years (Cochran 1975; Wang 1960). BAT entered the U.S. market by acquiring a small Kentucky firm (Brown & Williamson Tobacco Corporation) in the late 1920s (Shepherd 1983). BAT also expanded rapidly in Latin America and in other markets outside the United States and the United Kingdom.

The Antitrust Case of 1911

Meanwhile, the structure of the tobacco industry in the United States was undergoing profound change. The practices used by ATC in gaining and maintaining its market elicited opposition from tobacco growers, leaf traders, small manufacturers, wholesalers, retailers, and organized labor (Tilley 1948; USBOC 1909, 1911). These groups wanted better leaf prices for growers, more accessible market entry, increased price competition, and larger margins for retailers and jobbers (Tennant 1950; Cox 1933). The Supreme Court dissolved ATC in 1911 (*U.S. v. American Tobacco Co.* 221 U.S. 106 [1911]; Tennant 1950; Cox 1933; Corina 1975) and ordered that the conglomerate be split into several successor companies: Liggett & Myers Tobacco Company, Lorillard, a new ATC, and R.J. Reynolds Tobacco Company. Distribution of ATC stockholdings was required, and several permanent and temporary injunctions against recombination were issued. Although this action probably did not accomplish the desired results, the case did have long-term effects on the international tobacco industry and upset the structure of the domestic industry enough to stimulate nonprice domestic competition (Cox 1933).

In 1913, R.J. Reynolds, which had not previously produced cigarettes, quickly launched a new type of cigarette, the American blend, with flavored Burley tobaccos. This cigarette, Camel, revolutionized the U.S. cigarette business and was quickly imitated by the new ATC's Lucky Strike and Liggett & Myers's Chesterfield. The advent of the American blend stimulated cigarette consumption and set off a long period (1913 to 1950) of extremely rapid, domestic growth known as the standard brand era (Sobel 1978). From 1911 to 1949, annual total U.S. cigarette output increased significantly (from 10 billion to 393 billion), while per capita consumption increased nearly twentyfold (Tennant 1950; Nicholls 1951). Sands (1961) concluded that the cigarette industry had the highest growth rate in physical output of all U.S. manufacturing industries for 1904 to 1947 and was second only to motor vehicles for 1904 to 1937. The average quinquennial growth rate for output was 88 percent for cigarettes versus only 15 percent for all U.S. manufacturing from 1904 to 1947 (Sands 1961). Growth in domestic consumption and output was so spectacular throughout that period that none of the firms showed any interest in developing foreign operations or exports (Shepherd 1983).

During this same period, the dilution of ATC's two-thirds holding in BAT meant that the concentrated one-third shareholding of ITC was eventually controlled by BAT. Thus, in the early 1920s, BAT became a British-controlled corporation. Because U.S. antitrust law had no jurisdiction over either BAT or ITC, except in their U.S. leaf-buying operations, the BAT/ITC market allocation agreements of 1903 were continued in Britain until the early 1970s. In the absence of British antitrust action, ITC continued to dominate the U.K. domestic market, while BAT controlled markets outside the United States. Even after the European Economic Community regulations forced the formal repudiation of the BAT/ITC market division in Europe in the 1970s, BAT/ITC relations remained close because the British Monopolies Commission did not take remedial action (Corina 1975).

As a result, brands developed by ATC became the property of BAT outside the United States and for export from the United States (Cox 1933). This severely

limited the new ATC from expanding overseas because many of its top-selling domestic brands (e.g., Pall Mall and Lucky Strike) had been ATC brands before the agreement. As the new ATC came to be one of the major U.S. firms, this constraint powerfully reinforced the domestic orientation of the industry. Finally, although the ruling declared the formal cartel illegal, the arrangements persisted exactly as before: U.S. firms marketed domestically; ITC dominated the British domestic market; and BAT remained the predominant international force outside the United States and United Kingdom well into the 1960s. Thus, U.S. cigarette firms enjoyed relative protection in expanding sales in the large, rapidly growing U.S. market.

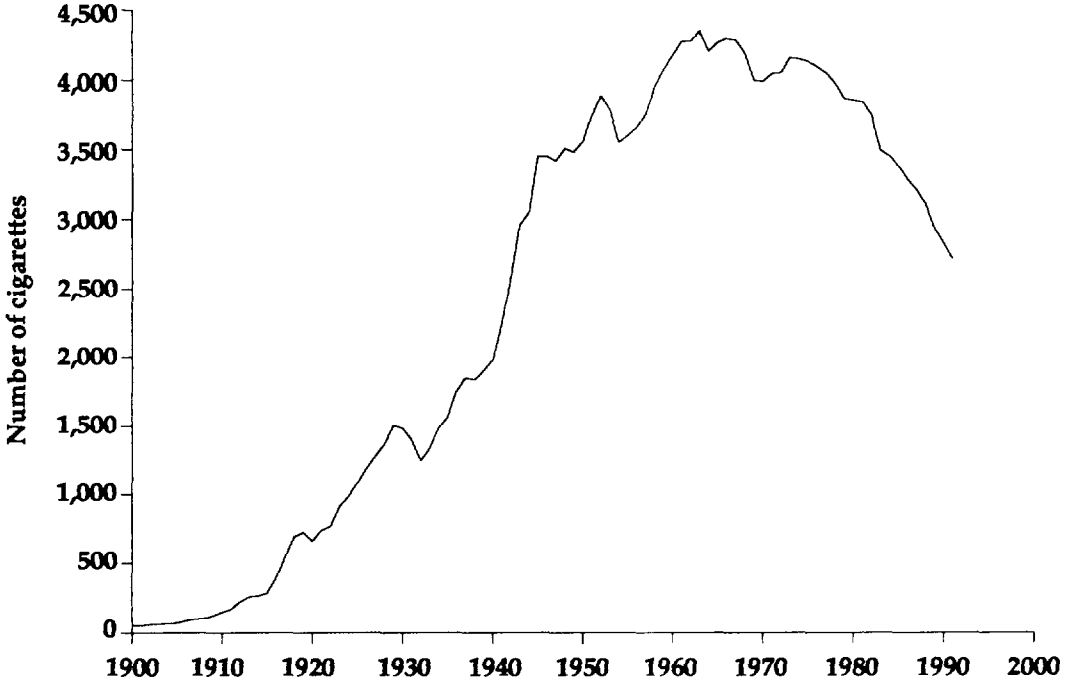
World War II provided the opportunity for significantly increased exports for U.S. firms. European production facilities had been destroyed, and American cigarettes became a coveted commodity due to the popularization of everything American. However, U.S. manufacturers did little to take advantage of this situation (Shepherd 1983). International markets were viewed as unstable and unlikely to provide future growth. The long period of expansive domestic growth made overseas markets pale in comparison. A near doubling of sales during the war and the reemergence of the overwhelming dominance of R.J. Reynolds, Liggett & Myers, and ATC made the struggle for domestic market shares more important than ever.

Stagnation Domestically and Growth Abroad

But changes in cigarette consumption had begun in the United States by the late 1940s (Kellner 1973). The growth rate of the domestic market began to shrink as it became saturated at a high level of consumption (see Figure 1). The market further declined when the health effects of smoking first surfaced as a major public concern in the early 1950s. In association with media publicity about the relationship between cigarette smoking and incidence of lung cancer, sales decreased 5 percent in 1954 (Kellner 1973).

The small firms were most affected by the decline in sales. The two smallest, Philip Morris Companies Inc. and Lorillard, began to explore the possibility of expansion into international markets and of increased exportation (Shepherd 1983). These firms were particularly concerned that domestic sales might fall below the minimum level required to finance the development and promotion of the new filtered cigarette. The first ventures abroad, including those in Latin America (Shepherd 1983), in the 1950s were tentative and coincided with increased tariffs in several small, though attractive, export markets, such as Australia, Panama, the Philippines, and Venezuela.

Figure 1. Per capita cigarette consumption, United States, 1900–1991*



Source: U.S. Department of Agriculture (unpublished historical data, 1965, 1991); Grise and Griffin (1988).
*1991, provisional data.

Philip Morris did establish a partly owned subsidiary in Australia, but most of the U.S. ventures consisted of licensing agreements with local firms. In general, domestic orientation remained strong, and U.S. producers did not take advantage of the potential international popularity of American blend cigarettes. The reluctance, particularly among the large companies, to pursue international markets may have been related to the success of filtered cigarettes, which revived high domestic growth rates in the late 1950s. Nonetheless, the smaller firms continued to acquire interests in foreign operations and were quite successful on a limited scale. In this way, Philip Morris positioned itself for a substantial advantage over the rest of the U.S. cigarette industry.

The business impact of filtered cigarettes was temporary (Kellner 1973). In 1962, the U.S. government initiated an inquiry into the health hazards of smoking (Fritschler 1975). In the resulting report of the Surgeon General, which received considerable attention, smoking was linked to several serious diseases (Public Health Service 1964). The publication of the report had immediate impact on U.S. cigarette sales (USDHHS 1989). The expression of public concern in the early 1950s, followed 10 years later by this formal statement of adverse health consequences, made it apparent that the health issue would probably continue to affect sales adversely in the future. During 1900 to 1950, U.S. aggregate cigarette sales failed to exceed those of the previous year only four times, but from 1950 to 1977, sales decreased seven times (Shepherd 1983). After 1964, every U.S. cigarette firm sought to acquire both foreign cigarette manufacturing operations and domestic nontobacco businesses (Taylor 1984). As sales continued to stagnate, pressure grew to diversify out of the U.S. cigarette market (Miles and Cameron 1982; Shepherd 1983, 1985).

Thus, the upsurge in direct foreign investment and licensing abroad by U.S. cigarette firms was probably attributable to the stagnation of the U.S. market that resulted from the smoking and health issue (Warner 1977). Health concerns provided the decisive push in the search for alternative markets for the smallest firms in the 1950s, and after 1964, for the larger firms as well. Some traditional economic motivations—such as defensive investment, maintenance of export markets, and protection of a technologically based oligopoly—probably played a less important role (Shepherd 1983).

Few patterns were discernible in the flow of investment and licensing abroad, and firms did not necessarily explore markets with high growth rates. Much activity targeted Europe, for example, where per capita consumption was already fairly high. Likewise, cigarette companies did not necessarily seek large markets nor penetrate high-income markets and then low-income markets; firms entered both markets simultaneously. Rates of growth, market size, levels of cigarette consumption, income, and other market characteristics appeared less important than the immediate concern of stagnation in the United States (Shepherd 1983).

Given the pressure to diversify quickly, most of the overseas subsidiaries established by U.S. firms were acquired rather than newly established. Of the traceable foreign subsidiary operations established during 1950 to 1976, 76 percent were acquisitions of foreign manufacturing firms by U.S. companies (Shepherd 1985). Thus, U.S. firms began foreign operations by using established national brands and working through existing distribution networks. Completely new subsidiaries emerged only where the local tobacco industry was so underdeveloped that no local firms were available for acquisition or where TNC competitors already owned the entire industry. As an illustration, 77 percent of the 22 subsidiaries established in Latin America were acquired rather than newly founded (Shepherd 1985).

Diversification

In their post-1964 efforts to diversify holdings, cigarette firms used the same strategy of acquiring existing companies that they had used earlier. In the first of three stages of diversification, cigarette firms focused on acquiring nontobacco businesses. By the late 1970s, TNCs derived a significant and growing share of their sales and income from nontobacco pursuits (35 to 50 percent of sales and 10 to 30 percent of earnings were the norm for the larger firms)(Miles and Cameron 1982). The proportions were somewhat higher for the smaller enterprises (Shepherd 1983). For a time, diversification seemed successful, and it appeared that some firms might become prototypes of a new form of conglomerate TNC. For example, during the 1980s, BAT spent US$7 billion on nontobacco acquisitions, the same amount as the company's market capitalization at the end of 1988 (Euromonitor Consultancy, Volume I, 1989).

However, the premise upon which this early diversification was based proved false. The continuing association of cigarette smoking with certain chronic diseases and the resulting decline in consumption could not be easily countered with nontobacco acquisitions. Diversification was not well received by investors—the newly acquired nontobacco companies earned less than the cigarette companies did (White 1988). Thus, mergers with nontobacco firms lowered

financial results dramatically. Furthermore, investors tended to judge stocks on the basis of future prospects rather than current earnings, and tobacco activity was deemed risky. Nontobacco acquisitions did not raise the market price of cigarette stocks; instead, the value of stocks in nontobacco firms were reduced when these firms were acquired by cigarette companies (Burrough and Helyar 1990; Euromonitor Consultancy, Volume I, 1989).

A second phase of takeovers began in the 1980s. Cigarette firms began to vary their diversification; some companies continued with new acquisitions, while others sold their nontobacco holdings (Anonymous 1983; Blum and Wroblewski 1985). However, all firms suffered from low price-earnings ratios, and their stocks were worth far less than their assets or real current earnings potential. Nearly all of these firms were viewed as takeover targets (Nordby 1989) because of the high cash flow from their core cigarette business. ITC was taken over by Hanson Trust Ltd. in 1986 (Euromonitor Consultancy, Volume I, 1989), Nabisco Inc. by R.J. Reynolds in 1988, and the two latter companies by Kohlberg Kravis Roberts & Company in 1989 (Burrough and Helyar 1990). BAT narrowly escaped a takeover of this sort in 1989 (Euromonitor Consultancy, Volume I, 1989; *Tobacco Reporter* 1989b).

By the late 1980s, diversification was entering its third stage, in which company strategies diverged markedly. Some firms, such as R.J. Reynolds, BAT, and Hanson Trust, focused more on cigarettes, while others, such as Philip Morris, ATC, and Loews Corporation (its tobacco holding is Lorillard), continued to grow through nontobacco acquisitions (Sherman 1989; Winters et al. 1988; Matlick 1990a,b). For all of these firms, however, diversification provided greater power and leverage to protect the cigarette business from further erosion (White 1988). Diversification aided in opposing smoking restrictions, product liability suits, and advertising and press coverage of health hazards (McGill 1988), and it broadened political coalitions against anticigarette legislation (White 1988).

International Competition

Entry of U.S. cigarette firms abroad after 1964 generated new competition within the industry, especially with BAT. Philip Morris and, to a much lesser extent, R.J. Reynolds were BAT's primary competitors. Liggett & Myers was almost wholly unsuccessful abroad, and Lorillard, which pursued a strategy of overseas licensing, eventually sold the rights to its brands abroad to BAT in 1978. ATC's brands in overseas markets were already largely owned by BAT. ATC concentrated almost all of its overseas manufacturing in the U.K. domestic market after acquiring Gallaher Tobacco Ltd. in the late 1960s (Corina 1975). Nevertheless, as U.S. firms continued to expand in the 1960s and 1970s, it became apparent that the Anglo-American understanding on separate development was over. ATC, through Gallaher, competed with ITC in the United Kingdom, while Philip Morris and R.J. Reynolds competed with BAT almost everywhere. In the early 1970s, Philip Morris became the world's second-largest tobacco company, and Marlboro became the world's largest-selling brand. Although it lagged slightly behind BAT in world cigarette volume in the 1980s, Philip Morris's sales value and growth were much higher, and it became the world's largest cigarette firm (Euromonitor Consultancy, Volume I, 1989).

Despite these developments, some de facto spheres of influence have remained. In all but the largest national markets, only a few TNCs are usually present. These historical spheres of influence and patterns of mutual forbearance are most obvious in Asia and Africa where European firms have dominated, except for U.S. licensing in the Philippines. Until the 1980s, U.S. firms tended to restrict their operations to more familiar terrain in Latin America and Western Europe. The larger markets of Western Europe, Canada, and Latin America have been areas of fairly competitive activity (Shepherd 1985). But on the whole, oligopolistic competition, market allocation, and restraint have characterized TNC operations.

In general, the normal pattern has not been aggressive, although several markets have been contested. For example, in Brazil and Argentina, after several years of advertising and new brand launchings, the parties tended to come to terms, expenses for demand creation were reduced, and new market shares and a more settled equilibrium evolved (Shepherd 1985).

The Current Structure of the Industry

By the late 1980s, a new transnational equilibrium appeared to have been established. The industry regrouped along a three-tiered stratification of firms. The first tier included four truly transnational firms: BAT, Philip Morris, R.J. Reynolds, and Rothmans International Tobacco Ltd. Second-tier firms, like American Brands, Inc., and Reemtsma GmbH & Company, were still international but not global in scope. These firms continued to retain important foreign markets but were largely confined to a specific region, such as Europe. Finally, smaller cigarette firms like Loews, ITC, and Liggett & Myers retired to their

respective national markets and became increasingly marginalized. After the late 1970s, the creation of new subsidiaries and licensing agreements slowed, a development which contributed to the period of consolidation in the 1980s and the subsequent equilibrium (Shepherd 1985).

Six of the dominant firms—BAT, Philip Morris, R.J. Reynolds, American Brands, ITC, and Rothmans International—recorded total sales in U.S. dollars, including taxes and nontobacco merchandise, of 97 billion in 1989 (Table 4). These TNCs are among the largest U.S. manufacturing firms and among the largest firms in the world; they exert considerable economic influence worldwide. The nontobacco operations of these firms are included in Table 4; however, the cigarette industry forms the basis of the economic activity of these TNCs (Miles and Cameron 1982; White 1988).

Complex equity and licensing patterns link the major firms in the transnational cigarette industry, and Anglo-American companies dominate the industry (Table 5). Of the seven major firms with extensive international operations, such as direct investments, licensing arrangements, and large-scale exports, only Reemtsma has neither U.S. nor British ownership. Rothmans International is a unique combination of South African, British, and Western European tobacco interests. For the past 20 years, Rothmans International has acquired economically troubled national tobacco firms—mostly in Western Europe. The latest Rothmans International acquisition is The Carroll Tobacco Company Ltd., an Irish cigarette manufacturer (Harman 1990). In 1981, Philip Morris acquired 29 percent of Rothmans International stock but recently sold it (Nordby 1990). R.J. Reynolds recently sold its Brazilian operations to Philip Morris (*Tobacco International* 1990), and Philip Morris merged its Canadian and U.K. businesses with Rothmans International (Harman 1988).

Four major TNCs (BAT, Philip Morris, R.J. Reynolds, and Rothmans International) account for 31 percent of total world production of cigarettes (5,245 billion in 1988) (Table 6). If socialist-planned economies of 1988 are excluded, these four firms account for 57 percent of manufactured cigarettes. If countries with socialist-planned economies or state monopolies in 1988 are excluded, these four companies account for almost 75 percent of cigarette sales in private enterprise markets worldwide. This percentage may actually be greater because, due to licensing, brand concentration of TNCs would be higher. In fact, each estimate may be subject to a substantial margin of error because of difficulty sorting out relationships among participants.

Since the several socialist-planned economies and state monopolies of 1988 account for approximately 60 percent of world cigarette sales (Table 6), the primary avenues of expansion for the major TNCs are now through entry into state monopolies, socialist-planned economies, the former Soviet Union, and

Table 4. Economic activity* and rankings of major transnational cigarette producers, 1989

	Activity†			*Fortune* 500 ranking‡		
Company	Sales§	Profits	Assets	U.S.	Global	International
Philip Morris	39,069	2,946	38,528	7	14	—
British American Tobacco	23,529	2,123	18,656	—	36	42
R.J. Reynolds/Nabisco	15,224	(1,149)‖	36,419	24	66	—
Imperial Tobacco/Hanson Trust	9,900	1,987	13,210	—	—	62
American Brands	7,265	631	11,394	64	178	—
Rothmans International	2,210	228	3,182	—	—	352
Total	97,197	7,915‖	121,389			

Source: *Fortune* (1989, 1990a,b).
*Includes tobacco and nontobacco activities.
†In U.S. dollars (millions).
‡Based on 1988 sales data.
§Includes excise taxes on tobacco and nontobacco products.
‖Loss due to restructuring of operations following 1989 takeover by Kohlberg Kravis Roberts. Losses are not included in total.

Table 5. Transnational cigarette industry: subsidiaries and affiliates (financial interest) or licensing agreements*

Subsidiaries and affiliates

Argentina
- B.A.T. Industries (Nobleza-Piccardo S.A.I.C.yF.)
- Philip Morris (Massalin Particulares S.A.)
- Reemtsma GmbH (Massalin Particulares S.A.)

Barbados
- B.A.T. Industries (B.A.T. Co. [Barbados] Ltd.)

Brazil
- B.A.T. Industries (Cia. Souza Cruz Industria e Commercio)
- Philip Morris (Philip Morris Marketing, S.A.)
- R.J. Reynolds (R.J. Reynolds Tabacos do Brasil, Ltd.)

Canada
- B.A.T. Industries (Imperial Tobacco Ltd.)
- Philip Morris (Rothmans, Benson & Hedges Inc.)
- R.J. Reynolds (RJR-Macdonald Inc.)
- Rothmans International (Rothmans, Benson & Hedges, Inc.)
- U.S. Tobacco (National Tobacco Company)

Chile
- B.A.T. Industries (Chiletabacos SA)

Costa Rica
- B.A.T. Industries (Republic Tobacco Company)
- Philip Morris (Tabacalera Costarricense, S.A.)

Dominican Republic
- Philip Morris (E. Leon Jimenes, C. por A.)

Ecuador
- Philip Morris (Tabacalera Andina S.A.)
- R.J. Reynolds (Fabrica de Cigarillos El Progreso S.A.)

El Salvador
- B.A.T. Industries (Cigarreria Morazan S.A. de CV)
- Philip Morris (Tabacalera de El Salvador, S.A. de C.V.)

Guatemala
- B.A.T. Industries (Tabacalera Nacional S.A.)
- Philip Morris (Tabacalera Centroamericana S.A.)

Guyana
- B.A.T. Industries (Demerara Tobacco Co. Ltd.)

Honduras
- B.A.T. Industries (Tabacalera Hondurena S.A.)
- U.S. Tobacco (Centro Americana Cigar, S.A.)

Jamaica
- Rothmans International (Carreras Group Ltd.)

Mexico
- Philip Morris (Cigarros La Tabacalera Mexicana, S.A. de C.V.)

Nicaragua
- B.A.T. Industries (Tabacalera Nicaraguense S.A.)

Panama
- B.A.T. Industries (Tabacalera Istmena S.A.)
- Philip Morris (Tabacalera Nacional S.A.)

Puerto Rico
- R.J. Reynolds (R.J. Reynolds Tobacco Company)

Suriname
- B.A.T. Industries (B.A.T. Co. Ltd. Suriname)

Trinidad
- B.A.T. Industries (The West Indian Tobacco Company Ltd.)

United States
- American Brands (The American Tobacco Company)
- B.A.T. Industries (Brown and Williamson Tobacco Corp.)
- Imperial Tobacco (Imperial Tobacco Leaf Services Inc.)
- Philip Morris (Philip Morris U.S.A.)
- Reemtsma GmbH (West Park Tobacco Inc.)
- R.J. Reynolds (R.J. Reynolds Tobacco Co.)
- Svenska Tobaks (The Pinkerton Tobacco Company)
- U.S. Tobacco (United States Tobacco Company; United Scandia International)

Uruguay
- Philip Morris (Abal Hermanos, S.A.)

Venezuela
- B.A.T. Industries (C.A. Cigarrera Bigott Sucs)
- Philip Morris (C.A. Tabacalera Nacional, S.A.)

Licensing agreements

Argentina
- Reemtsma GmbH (Massalin Particulares S.A.)
- R.J. Reynolds (Nobleza-Piccardo S.A.I.C.yF.)

Bolivia
- B.A.T. Industries (Tabacalera SRL)
- Philip Morris (Cia. Industrial de Tabacos S.A.)

Brazil
- Reemtsma GmbH (Philip Morris)

Chile
- Philip Morris (Fabrica de Cigarillos LTDA)

Costa Rica
- Reemtsma GmbH (Tabacalera Costarricense S.A.)

Curaçao
- Philip Morris (Superior Tobacco Co. of Curaçao N.V.)

Table 5. Continued

Ecuador
B.A.T. Industries (Tabacalera Ecuatoraria)
Haiti
B.A.T. Industries (Luckett Tobaccos)
Mexico
R.J. Reynolds (Cigarrera La Moderna S.A. de C.V.)
U.S. Tobacco (Philip Morris)
Netherlands Antilles
Philip Morris (Superior Tobacco Co. N.V.)
Panama
Reemtsma GmbH (Tabacalera Nacional S.A.)
Paraguay
B.A.T. Industries (La Vencedora S.A.)
Peru
Philip Morris (Tabacalera Nacional S.A.)
R.J. Reynolds (Tabacalera Nacional S.A.)
Suriname
B.A.T. Industries (Tobacco Company of Suriname N.V.)

Source: *Tobacco Reporter* (1990).
*Name of transnational corporation given first, followed by name of local company in parentheses.

Eastern European countries. During the 1980s, the major TNCs focused on gaining access to the expanding markets of Japan, South Korea, Taiwan, and Thailand, where state monopolies had long prevailed (Zimmerman 1990; Chadha 1989; Heise 1988; Connolly 1989; Wallace 1989; Doolittle 1990b; Mackay 1989; Chen and Winder 1990). The major TNCs are also opening the Western European monopolies with large-scale exporting (Stefani 1990a; Shelton 1988; *Tobacco Reporter* 1989a). During the 1980s, France lost nearly 50 percent of its market to cigarettes imported by TNCs (Manus 1988; Stefani 1990b). Despite considerable difficulty, U.S. and European TNCs are attempting to open the formerly closed markets of Eastern Europe, the former Soviet Union, and China (Zimmel 1990; Doolittle 1990a,b; Chadha and Sokohl 1990; American Cancer Society 1991).

Transnational cigarette companies dominate the markets in specific countries (Table 7). Nontransnational firms hold small market shares in most countries; in only a few countries do nationally owned, private cigarette firms account for more than 30 percent of the national market. In some countries, market concentration continues the trend toward increased TNC market control.

TNCs do not compete against each other in the world commodity market, except through exportation; only 10 percent of the total world cigarette production is traded internationally (USDA 1990d,e). Rather, TNCs compete in national markets in which the level of concentration of firms is much higher than in the world market. Direct competition is limited because in only a few of the largest markets do more than two or three TNCs compete (Shepherd 1985).

Table 6. Estimated cigarette output, by producing group, 1988

Group	Number*	Percent
Socialist-planned economies		
China	1,545	29.5
USSR	378	7.2
Eastern Europe	360	6.9
Cuba	30	0.6
Vietnam	25	0.5
North Korea	15	0.3
Subtotal	2,353	45.0
State monopolies		
Japan	268	5.1
South Korea	86	1.6
Spain	78	1.5
Italy	67	1.3
Turkey	60	1.1
France	53	1.0
Egypt	43	0.8
Maghreb countries	35	0.7
Thailand	35	0.7
Iran	15	0.3
Austria	14	0.3
Subtotal	754	14.4
Major transnational corporations		
British American Tobacco	575	11.0
Philip Morris	555	10.6
R.J. Reynolds	285	5.4
Rothmans International	220	4.2
Subtotal	1,635	31.2
Others producers†		
American Brands	90	1.7
Reemtsma	48	0.9
Loews (Lorillard)	46	0.9
Imperial Tobacco	43	0.8
Subtotal	503	9.6

Source: U.S. Department of Agriculture (1990d).
*In billions.
†Includes independent domestic cigarette firms and small state monopolies.

Table 7. Cigarette market share of major transnational firms and affiliates,* selected countries, 1988

Americas

Argentina
- British American Tobacco (Nobleza Piccardo, 57.2)
- Philip Morris (Massalin Particulares, 42.8)

Brazil
- British American Tobacco (Souza Cruz, 79.6)
- Philip Morris (Santa Cruz, 8.0)
- R.J. Reynolds (R.J. Reynolds Tobacos de Brasil, 9.5)
- Other (2.9)

Canada
- British American Tobacco (Imperial, 54.3)
- Rothmans (Rothmans, 30.8)
- R.J. Reynolds (Macdonald, 14.7)
- Other (0.2)

El Salvador
- British American Tobacco (Cigarreria Morazan, 78.4)
- Philip Morris (Tocasa/Tasasa, 21.6)

Guatemala
- British American Tobacco (Tabacalera Nacional, 48.9)
- Philip Morris (Tabacalera Centro-Americana, 51.1)

Jamaica
- Rothmans (Cigarette Company of Jamaica Ltd., 100.0)

Mexico
- British American Tobacco (La Moderna, 58.8)
- Philip Morris (Tabacalera Mexicana, 39.8)
- Other (1.4)

Nicaragua
- British American Tobacco (British American Tobacco, 99.9)
- Other (0.1)

Panama
- British American Tobacco (Tabacalera Istmena, S.A., 60.4)
- Philip Morris (Tabacalera Nacional, S.A., 39.6)

United States
- British American Tobacco (Brown & Williamson, 10.9)
- Philip Morris (Philip Morris, 39.3)
- R.J. Reynolds (R.J. Reynolds, 31.8)
- American Brands (American Brands, 7.0)
- Other† (11.0)

Venezuela
- British American Tobacco (Bigott Sucs, 79.6)
- Philip Morris (Tabacalera Nacional, 20.3)

Other countries

Australia
- British American Tobacco (Wills, 30.9)
- Philip Morris (Philip Morris, 33.2)
- Rothmans (Rothmans, 35.1)
- Other (0.8)

Belgium
- British American Tobacco (British American Tobacco, 12.1)
- Philip Morris (Weltab, 18.1)
- Rothmans (Tabacofina, 39.1)
- R.J. Reynolds (R.J. Reynolds, 7.3)
- Reemtsma (Cinta, 16.7)
- Other (6.7)

Denmark
- British American Tobacco (Skandinavisk Tobakskompagni, 98.2)
- Other (1.8)

Finland
- British American Tobacco (Suomen Tupakka, 19.8)
- R.J. Reynolds (Rettig, 15.4)
- Other† (64.8)

West Germany
- British American Tobacco (British American Tobacco, 22.3)
- Philip Morris (Philip Morris, 27.6)
- Rothmans (Brinkman, 10.7)
- R.J. Reynolds (H. Neuerbur, 9.2)
- Reemtsma (Reemtsma, 25.0)
- Other (5.2)

Ghana
- British American Tobacco (British American Tobacco, 89.0)
- Rothmans (Rothmans, 6.0)
- Other (5.0)

India
- British American Tobacco (India Tobacco Company/Vizar Sultan Tobacco Company, 68.0)
- Philip Morris (Godfrey Philips [India] Ltd., 15.0)
- Other (17.0)

Kenya
- British American Tobacco (British American Tobacco, 99.8)
- Other (0.2)

Malaysia
- Philip Morris (Philip Morris, 3.3)
- Rothmans (Rothmans, 46.3)
- R.J. Reynolds (R.J. Reynolds, 16.3)
- Other (34.1)

Table 7. Continued

Netherlands
- British American Tobacco (British American Tobacco, 23.0)
- Philip Morris (Philip Morris, 18.0)
- Rothmans (Rothmans, 40.0)
- Other (19.0)

Pakistan
- British American Tobacco (Pakistan Tobacco Company Ltd., 53.0)
- Other (47.0)

Sri Lanka
- British American Tobacco (British American Tobacco, 99.9)
- Other (0.1)

United Kingdom
- Philip Morris (Philip Morris, 5.1)
- Rothmans (Carreras Rothmans, 9.2)
- R.J. Reynolds (R.J. Reynolds, 3.4)
- American Brands (Gallaher, 39.4)
- Other[§] (42.9)

Zaire
- British American Tobacco (British American Tobacco, 42.0)
- Rothmans (Rothmans, 58.0)

Source: Maxwell (1989a,b, 1990a,b,c,d).
*Name of transnational corporation given first, followed by name of local company and market share (percentage) in parentheses.
†Lorillard/Loews, 8.2 percent; Liggett & Myers, 2.8 percent.
‡Extensive licensing of locally owned tobacco companies by transnational firms.
§Includes Imperial Tobacco/Hanson Trust, 34.6 percent.

The cigarette industry is also dominated by only a few top-selling brands (Table 8). The top two brands account for large shares of most of the world's large cigarette markets outside of countries with socialist-planned economies (in 1988 and 1989). The top 10 brands comprise most sales in these markets (from a low of 71 percent in Italy to 100 percent in Brazil and France). In 1987, the top 25 brands accounted for 25.5 percent of world sales by volume, or 46 percent of sales in countries that did not have socialist-planned economies at the time. Philip Morris's Marlboro was the best-selling brand (293 billion cigarettes). This volume was approximately equal to total cigarette sales in Japan, or the equivalent of total combined sales for the United Kingdom, Italy, and France. Outside of countries with socialist-planned economies (includes the former Soviet Union), more than one cigarette in 10 sold is a Marlboro (Euromonitor Consultancy, Volume II, 1989).

Barriers to Entry

Barriers to market entry affect the current structure of the international cigarette industry. Three major barriers are commonly cited (Bain 1956): (1) absolute cost advantages for existing firms, (2) economy of scale (or other advantages of large-scale production), and (3) consumer preference for the products of existing firms. The last factor is probably the most important.

Several factors ensure sustained consumer preference for the existing products: the location of plants or sales outlets, the provision of exceptionally good service by the firms, the technology to produce physical differences in the product, and the creation of a favorable image of the product (Scherer 1980). All four factors contribute to the creation of demand by the cigarette industry. The first two factors result from the manufacturer's investment in distribution networks, sales forces, and market research, but they are unlikely to be as decisive in most markets as are the second two factors.

The third factor, technology for producing differences in products or packaging, has permitted TNCs to gain a foothold in the foreign market. However, the advantages gained by firms on the frontier of product technology are usually short-term, mainly because the differences are easy to copy. Examples in which a competitor has copied a new product form

Table 8. Percentage of sales by top cigarette brands in selected countries, 1988–1989

Country	Top two	Top five	Top ten
Australia	41.3	63.3	77.6
Brazil	66.3	94.2	100.0
Canada	41.1	67.3	81.2
France	67.7	85.6	100.0
Italy	48.8	62.2	71.4
Mexico	42.1	71.7	87.7
United Kingdom	31.5	57.0	74.0
United States	35.6	53.3	71.8
West Germany	40.3	58.7	73.2

Source: Maxwell (1989a,b, 1990b,d).

and eventually became the market leader for that type of cigarette are common in the history of the cigarette industry (Kellner 1973). Consequently, although these innovations are a barrier to entry for potential competitors, they do not usually ensure the major TNCs a durable monopoly.

The fourth factor, the creation of favorable brand images through mass advertising and other types of promotion, reinforce differences in product form and packaging. Most industry analysts agree that established consumer preferences for existing products constitute the major obstacle to new entrants and that demand creation (i.e., marketing) has been the most important source of the high degree of concentration in the industry (Tennant 1950; Nicholls 1951; Kellner 1973; Cox 1933; United Nations Conference on Trade and Development [UNCTAD] 1978). The term marketing, however, is a misnomer; it implies some process of adaptation to a given, autonomous market when, in fact, the activities described above often control and change or, in effect, transcend the market.

The consumer loyalty that existing brands have gained from previous and current promotional activities is a powerful barrier. According to fragmentary market research from the 1970s, approximately 50 percent of U.S. cigarette smokers have never changed brands, and an additional 25 to 30 percent have smoked the same brand for three or more years (Key 1976). Profound product-form modifications, such as the introduction of filters in the 1950s or the change to low-tar brands in the 1970s and 1980s, tend to alter brand loyalties, but these modifications are infrequent (USDHHS 1989). Furthermore, since a new brand has to overcome not only current advertising of existing brands but also the effect of previous advertising, a high level of expenditure is required to introduce a new brand, even by existing firms. A potential competitor must spend more than the established firms do on advertising. Thus, cigarette advertising is an investment (although it is not treated as such by accounting conventions or tax laws) (Comanor and Wilson 1975), and the return on investment may continue for many years (Weiss 1969).

Profitability

The high barriers to entry and high levels of concentration in the industry have led to oligopolistic price-setting, a development which implies profits in excess of a competitive profit-rate equilibrium. Before cigarettes were proven to be harmful, this characteristic was the main complaint about the industry in the United States (Tennant 1950) and the main concern of the literature on the cigarette industry. Two major U.S. antitrust cases against the industry ensued in 1911 and 1946 (Tennant 1950; Nicholls 1951; Cox 1933; USBOC 1909, 1915; Kellner 1973). These same considerations led to an inquiry into concentration, pricing, and excess profit in Britain (U.K. Monopolies Commission 1961).

Despite official concern, and even after cigarette smoking was linked to certain chronic diseases in the post-World War II period, the industry's high levels of profitability continued. The U.S. tobacco industry led all U.S. industries in profitability, return to investors, and minimization of import penetration (Miles and Cameron 1982). Throughout the 1960s and 1970s, profitability of the post-World War II TNCs continued to be well above the average for all manufacturing firms (Kellner 1973; Shepherd 1983, 1985).

Available measures of profitability for the U.S. tobacco industry are conservative because they include the small tobacco firms that do not make cigarettes, for which profitability is presumed to be lower, as well as the nontobacco operations of tobacco firms (Table 9). Nonetheless, the more profitable firms have done very well. Philip Morris averaged a 33 percent return on domestic sales in 1984 through 1988 and 9.5 percent internationally, for a weighted average of 16 percent (Euromonitor Consultancy, Volume 1, 1989). Despite its recognition as a cigarette company, Philip Morris was a popular stock in the 1980s because of its performance (Sherman 1989). To the extent that the figures can be compared, profitability in the 1980s appears similar to that enjoyed by U.S. firms during the height of the American cigarette industry—from 1911 to 1950. This level of profitability has been characterized as "far above competitive levels and [it] bespeaks a high degree of market control vigorously exercised" (Tennant 1950, p. 342).

In the United States, increased profitability in the 1980s has been related to both decreased overall sales and a diminished regulatory environment for business. Because of the long history of antitrust concerns, tobacco companies avoided for decades any obvious price-setting patterns, even as they continued to regularly raise prices. In the deregulated business climate of the 1980s (Burrough and Helyar 1990), however, the cigarette firms started raising prices regularly, beginning with four increases in 1982 and continuing to the present with semiannual (June and December) increases (USDA 1987, 1990a). The price of tobacco products has outpaced the consumer price index since 1983 by an ever wider margin (USDA 1990a,c), although some of this increase is attributable to taxation. This pattern has resulted because, in an unregulated oligopoly, dwindling sales are balanced by higher prices and thus higher profit margins from sales to the remaining, presumably less price-elastic, "hard-core" smokers.

The distribution of returns from cigarette sales highlights the increased profitability of the industry in the 1980s (Table 10). By 1985, the federal excise tax and leaf growers' shares had declined substantially. Total excise taxes decreased from almost 50 percent of the consumer dollar spent on cigarettes to less than a third, and the U.S. farm value fell to only 5 percent. Although cigarette producers' 22 percent share in 1980 was not significantly different from their 21 percent share in 1950, it increased to 34 percent in 1985 (Table 10). More efficient manufacturing (better equipment and increased use of tobacco stems and reconstituted tobacco sheets), greater use of cheaper imported tobacco (about one-third of U.S. cigarettes in the mid-1980s), and product form changes (filter tips and slim cigarettes) all contributed to the increase in profitability (USDA 1987, 1990a,d), as did the decisive use of market power in the 1980s.

The high and increasing profitability of the industry in the United States is of concern because the richer the industry becomes, the more powerful it becomes and the more difficult it is to control (White 1988). The public health community faces the political, legislative, and economic strength of the tobacco industry, built up over time by the phenomenal cash flow and profitability of the cigarette business.

The Current Status in Latin America and the Caribbean

As described, a striking feature of the world cigarette industry in the last several decades has been the displacement in many countries of the nationally owned tobacco company by a TNC subsidiary. This phenomenon is perhaps most evident in Latin America and the Caribbean, where it has major implications for the future social and health-related outcomes of smoking (Connolly 1989). An overview of the history and current aspects of the cigarette industry in the region follows.

Tobacco often figured in the economic and political struggles of the colonial era in Latin America and the Caribbean. The *Comunero* Rebellion in Socorro,

Table 9. Income and profitability of tobacco manufacturing corporations,* United States, 1970–1985

		Net income (in millions of dollars)		Profit			
				Per dollar of sales (in cents)		Percentage of stockholders' equity (annual basis)	
Year	Net sales	Before income tax	After income tax	Before federal tax	After federal tax	Before federal tax	After federal tax
1970	9,839	1,098	569	11.2	5.8	30.3	15.7
1971	10,551	1,217	643	11.5	6.1	29.8	15.7
1972	11,308	1,246	676	11.1	6.0	28.4	15.4
1973	12,205	1,254	704	10.3	5.8	26.4	14.8
1974	14,267	1,354	770	9.5	5.4	26.4†	15.0†
1974‡	8,933	1,053	801	11.8	9.0	26.4†	20.0†
1975	9,987	1,396	919	14.0	9.2	26.6	16.6
1976	11,964	1,638	1,011	14.3	7.8	28.8	15.9
1977	13,969	1,938	1,239	14.2	9.1	32.0	17.5
1978	15,493	2,591	1,461	16.7	9.4	32.4	18.3
1979	15,331§	2,740	1,752	17.9	11.4	30.9	19.2
1980	17,471§	3,027	2,044	17.3	11.7	31.0	19.8
1981	20,228§	3,560	2,221	17.6	11.0	30.8	19.2
1982	20,126§	3,558	2,354	18.6	11.8	31.4	19.8
1983	21,185§	3,440	2,589	16.2	12.2	29.8	18.5
1984	24,138§	4,291	3,015	18.3	12.4	34.5	20.8
1985	25,096§	3,596	3,447	22.6	13.8	34.8	21.2

Source: U.S. Department of Agriculture (1980b, 1987).
*Includes nontobacco enterprises.
†Estimated on the basis of an equity increase of 8 percent.
‡Industry classification changed, and foreign subsidiary results were omitted beginning with 1974. For 1974, the new classification resulted in net sales reduced by 37 percent and profits before taxes reduced by 22 percent. Profits after taxes increased 4 percent.
§Excludes excise taxes.

Table 10. Expenditures, farm value, marketing bill, and taxes for cigarettes, United States, selected years

Year	Consumer expenditures*	Farm value*†	Marketing bill*			Excise taxes*		
			Manufacturing‡	Wholesaling/ retailing§	Total	Federal	State and local	Total
1950	3,586	482 (13)‖	757 (21)	681 (19)	1,438 (40)	1,243 (35)	423 (12)	1,666 (47)
1960	6,244	651 (10)	1,537 (25)	1,240 (20)	2,777 (45)	1,864 (30)	953 (15)	2,816 (45)
1970	10,438	718 (7)	2,574 (24)	2,680 (27)	5,254 (51)	2,036 (19)	2,430 (23)	4,466 (43)
1980	19,400	1,445 (7)	4,332 (22)	7,105 (37)	11,437 (59)	2,564 (13)	3,954 (21)	6,518 (34)
1984	28,750	1,478 (5)	8,973 (31)	9,137 (32)	18,110 (63)¶	4,749 (17)	4,413 (15)	9,162 (32)
1985	30,250	1,565 (5)	10,349 (34)	9,383 (31)	19,732 (65)¶	4,443 (15)	4,510 (15)	8,953 (30)

Source: U.S. Department of Agriculture (1987).
*In millions of dollars.
†Estimated by multiplying quantity of domestic tobaccos used in cigarettes consumed domestically by growers' prices from previous year.
‡Difference between farm value and manufacturers' gross receipts from cigarettes, less federal tax.
§Difference between manufacturers' gross receipts and consumer expenditures, less tax.
‖Percentage of consumer expenditures given in parentheses.
¶Source data recalculated to correct arithmetic error.

Colombia, in 1781, for example, began as a protest against policies affecting the cultivation and marketing of tobacco under the Crown monopoly (Leonard 1951). Eventually, the deep-seated hatred of the colonial monopoly led to the dismantling of most tobacco monopolies (Stein and Stein 1970; Harrison 1952). By the mid-nineteenth century, most tobacco industries in the region had become at least formally private.

As Latin American and Caribbean countries became increasingly linked to the international system of trade, they experimented with various commodities in which they might enjoy some advantage. Leaf tobacco was one of these products, and several countries experienced sporadic surges in tobacco exportation. Tobacco production was crucial to government revenue in almost all Latin American and Caribbean countries before and after independence from colonial powers (Stein and Stein 1970).

The tobacco industry in the region was based on locally grown, dark tobacco, which was used for cigars, snuff, and chewing tobacco in the precigarette era. Dark, air-cured tobaccos of this type were favored in regions with a history of Latin cultural influence. In the late nineteenth century, when cigarettes were first introduced, dark-leaf production for cigars was already well established. Thus, Latin American and Caribbean cigarette manufacturers would naturally produce cigarettes from these dark cigar leaf-cuttings (Brooks 1952).

Tobacco manufacturing played a key role in the early economic development of Latin America because tobacco products were logical commodities for local industrialization. Tobacco products were a luxury to import, domestic raw materials were readily available, scale requirements were not large, technology was not unduly difficult to acquire or adapt to local conditions, and leaf production was labor intensive. Because tobacco manufacturing provided tax revenue for the state and reduced nonessential imports, the industry frequently received considerable tariff protection. However, once the cigarette became the chief form of tobacco use, the evolution of the domestic tobacco industry was soon altered by the sudden appearance of TNCs.

In the largest markets of Latin America and the Caribbean, such as Argentina, Brazil, and Mexico, BAT entered the industry fairly early—just before and after World War I—usually by acquiring a local firm (Shepherd 1983). As it aggressively strived to carve out large market shares, BAT often met with opposition from owners of national firms, economic nationalists, and other groups that feared foreign control of the local economy. In some countries, such as Colombia, BAT was unable to gain a permanent foothold in the market despite four attempts from 1919 to 1959 (Shepherd 1983). However, BAT's strategy for dealing with economic nationalism was usually accommodating, and in some countries, local firms often prospered along with BAT subsidiaries. The takeover of these firms by other, mostly U.S., firms in the 1960s led to the "denationalization" of the region's tobacco industry.

The entry of U.S. TNCs into the Latin American market in the 1960s had a strong temporal relationship with contraband trafficking in cigarettes, as measured

by the disparity between recorded world exports and imports (Table 11). USDA acknowledged that the difference was "largely a result of contraband trade, since cigarettes that are shipped and recorded as official exports by the country of origin are not always reflected in the trade data of the recipient countries" (USDA 1976). The discrepancy is illustrated by the Netherlands Antilles, which imported 4,126 million cigarettes from the United States in 1976. If none of these cigarettes were exported, per capita consumption of cigarettes would have been seven times that of the United States at the time (USDA 1977).

Table 11. Recorded exportation and importation of cigarettes worldwide, selected years, 1951–1960* and 1967–1990†

Year	Exports	Imports	Percent difference
1951	126,735	106,508	16.0
1952	115,324	95,732	17.0
1953	114,869	90,708	21.0
1954	108,317	91,939	15.1
1955	108,420	92,179	15.0
1956	109,717	85,379	22.2
1957	110,129	92,334	16.2
1958	110,484	93,208	15.6
1959	108,609	86,425	20.4
1960	110,428	84,162	23.8
1967–1971‡	136,356	92,058	32.5
1972	178,415	126,016	29.4
1973	191,938	133,306	30.5
1974	203,888	153,615	24.7
1975	222,659	170,778	23.2
1976	235,370	192,076	18.4
1977	257,039	200,406	22.0
1978	279,089	213,558	23.5
1979	301,866	254,855	15.6
1980	322,820	254,250	21.2
1981	340,200	256,810	24.5
1982	331,961	259,737	21.8
1983	319,667	274,318	14.2
1984	331,444	292,323	11.8
1985	355,857	313,253	12.0
1986	363,074	324,805	10.5
1987	405,779	364,530	10.2
1988	460,238	389,888	15.3
1989	508,336	401,490	21.0
1990	543,148	417,951	23.0

Source: U.S. Department of Agriculture (USDA) (1958, 1960, 1962, 1976, 1977, 1980a, 1982, 1986, 1990d).
*In thousands of pounds of cigarettes.
†In millions of cigarettes.
‡USDA stopped publishing data on world trade in cigarettes after 1962 and did not resume until 1976 when it provided the average for 1967–1971.

In Latin America and the Caribbean, two examples with different outcomes illustrate the possible effects of contraband. Based on estimates provided by the Colombian government, the proportion of total cigarette consumption attributable to contraband rose from less than 4 percent before 1970 to nearly 18 percent in 1976 (Shepherd 1983). During these years a complex series of events took place, including two licensing agreements for the local manufacture of several popular TNC brands. The local firms, which constituted one of the last nationally owned, private cigarette industries, tried to preserve the market for dark-tobacco cigarettes, and continued to resist entry of the TNCs.

Based on estimates by the Argentine government, apparent contraband rose precipitously—from 2 percent to 12 percent of total consumption in the early 1960s (Shepherd 1979). In 1962, low-duty legal importation was briefly permitted, and contraband, as expected, declined. Several national firms established themselves as exclusive importers of TNC brands. When legal importation was again enjoined, these importers developed licensing arrangements for local manufacture of the same brands. However, contraband increased, to 15 percent, in 1966; all the nationally owned firms were then acquired by TNCs. In the early 1970s, after local versions of TNC brands had been established, contraband declined to 2 percent of total consumption.

Nearly 80 percent of the documented, U.S.-owned, TNC subsidiaries in Latin America and the Caribbean were acquired through takeover (Shepherd 1983). Although some European TNCs also entered the Latin American and Caribbean industry in the 1960s, most BAT subsidiaries were established much earlier and, therefore, BAT remains the major European TNC in the region. Denationalization has been pursued more aggressively in Argentina, Brazil, Mexico, Venezuela, and other markets with considerable potential for growth. In many of the smaller markets, such as those in Peru, Bolivia, and Paraguay, TNCs have settled for licensing arrangements or minority equity positions.

TNCs have been established in every national market in Latin America (except in Belize and Cuba) and in several Caribbean countries (Table 12). Because TNC market shares are very large, these firms control almost the entire cigarette industry in the region. Nationally owned tobacco industries survive in only a few countries, such as Bolivia, Paraguay, Peru, and Colombia. These firms are often involved with the TNCs through licensing agreements, and TNC influence continues to increase.

After TNCs entered Latin American and Caribbean cigarette markets, the industry underwent radical

transformation, especially in Brazil, Argentina, and Mexico. Intense nonprice oligopolistic competition for larger market shares began almost immediately. A five-year period of intense, somewhat evenly divided, competition for market shares was followed by a period of considerable market fluctuation, during which firms with initially large market shares weakened, while firms with small market shares prospered. This period of instability was followed by renewed concentration and consolidation (Shepherd 1983, 1985).

Several factors have contributed to high levels of market concentration in the Latin American and Caribbean cigarette industry. Not all of these factors are directly attributable to TNCs; however, the entry of TNCs accentuated and further concentrated market structure. The history of TNCs in Argentina may serve as an example. Before TNC entry in 1966, seven major tobacco firms operated in Argentina. Sixty-five percent of the total market was evenly divided among locally owned firms, and 35 percent was controlled by a subsidiary of BAT. After a short period of intense oligopolistic rivalry following TNC takeovers, successive mergers reduced the industry to only two firms—a duopoly controlled by BAT and Philip Morris. Thus, the transition in the Argentinean tobacco industry was from loose oligopoly to workable competition and then to renewed concentration and consolidation (Fidel, Lucángeli, Shepherd 1977).

Table 12. Subsidiaries, licensing arrangements, and market shares* of transnational cigarette firms, selected countries of Latin America and the Caribbean, c.1989

Country	British American Tobacco	Philip Morris	R.J. Reynolds	Rothmans International	Total output†	Market share‡
Argentina	S–57	S–43			33,700	100
Barbados	S–98				133	98
Bolivia	L–16	L–84			1,200	95
Brazil	S–80	S–8	S–9		162,700	97
Colombia		L–1			18,300§	43‖
Costa Rica	S–72	S–27			2,050	99
Chile	S–98	L–2			9,930	100
Dominican Republic		S–70			4,473	70
Ecuador		S–80	S–20		4,600	100
El Salvador	S–74	S–26			1,970	100
Guatemala	S–50	S–50			1,997	100
Guyana	S–100				266	100
Haiti	L–NR	L–NR			870	NR
Honduras	S–99				2,582	99
Jamaica				S–100	1,273	100
Mexico	S–58	S–40			49,510	98
Netherlands Antilles		L–NR			NR	NR
Nicaragua	S–100				2,400	100
Panama	S–64	S–36			1,150	100
Paraguay	L–NR	L–NR			2,730	NR
Peru	L–NR	L–NR	L–NR		4,200	20
Puerto Rico	S–3¶	S–15	S–82		3,200	100
Suriname	S–100				528	100
Trinidad and Tobago	S–100				1,250	100
Uruguay	S–77	S–23			3,900	100
Venezuela	S–73	S–27			18,035	100

Source: U.S. Department of Agriculture (1990b,d); Maxwell (1990b,c,d).

*S = Subsidiary with significant equity holdings. L = Licensing agreement with a local company (either locally owned or another transnational corporation) in which no equity is owned. Percentage of market share (by volume) follows dash. NR = Not reported.

†In millions of cigarettes.

‡Percentage; excludes export sales (either legal or illegal).

§Total consumption is estimated at approximately 27 billion cigarettes a year (Nares 1989).

‖Transnational corporation cigarette imports account for 43 percent of consumption, as estimated in 1989 (*Tobacco International* 1989).

¶These subsidiaries appear to be sales companies that do not manufacture tobacco products.

In Latin America and the Caribbean, as in the rest of the world, consumption patterns have converged toward TNC product forms. This convergence is partly the result of TNC demand creation and partly the result of the diffusion of industrialized nations' lifestyles—first to the elite in less-developed countries and then to broader portions of the population. Four major shifts have occurred in the consumption of tobacco products in the last 30 years: first, from all other tobacco products to cigarettes; second, from dark to light tobaccos; third, from unfiltered to filtered cigarettes; and, fourth, from short (70 mm) to long (85 mm, 100 mm, and 120 mm) cigarettes. The trend has been toward TNC product forms—that is, long, filtered, light-tobacco cigarettes—and away from the short, nonfiltered, dark-tobacco products of national producers. In particular, a decisive shift was made to American blend cigarettes, once specific to the United States only. One measure of this shift is the growth in market share of Marlboro cigarettes in several countries throughout the world (Table 13) (Davis 1986). The example of the Dominican Republic demonstrates an extreme case: an increase in market share from 9.3 percent in 1975 to 51.1 percent in 1989. In contrast, because of consequences of the 1911 antitrust case (see comments earlier in this section), the Philip Morris product cannot be sold in Canada.

In Latin America and the Caribbean, the popularity of Marlboro cigarettes illustrates the shift in taste from dark-tobacco to light-tobacco cigarettes (Table 14). This shift testifies to the success of TNCs in guiding production and consumption patterns away from local idiosyncrasies (which give local firms an advantage) and toward international patterns.

Another consequence of the expansion of TNCs into Latin American and Caribbean markets and the creation of demand was the rapid growth in total output and per capita consumption of cigarettes in the 1960s and 1970s (Shepherd 1983). This increased growth was often in marked contrast to stagnant growth rates reported by nationally owned firms. In Argentina, for example, during 1950 to 1966, sales of domestic cigarettes increased 38 percent, or an average of 2.4 percent per year. After TNC entry in 1966 and 1967, sales increased 58 percent during 1966 to 1975, an average of 6.4 percent per year. From 1950 to 1966, per capita sales increased 5 percent, or 0.3 percent per year; during 1966 to 1975, they increased 37 percent, or 4.1 percent per year (Shepherd 1983).

The rapid growth resulted from increased demand creation, primarily through advertising and distribution, larger sales forces, and other promotional techniques. Figured on the basis of constant 1960 prices in Argentina, the average annual cigarette advertising expenditure (per 1,000 packs) was 71.6 pesos from 1961 to 1966 but 266.8 pesos from 1967 to 1971—almost a fourfold increase. For the Philip Morris subsidiary, reported advertising expenditures were actually larger than reported earnings in 1967, and high levels of advertising resulted in reported losses

Table 13. Market share (%) of Marlboro cigarettes, selected countries, 1975–1989

	Year														
Country	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**
Latin America															
Dominican Republic	—	9.3	11.3	15.0	18.7	22.1	26.0	31.4	35.0	36.4	38.7	43.4	45.1	49.3	51.1
Mexico	—	1.2	1.8	2.7	3.9	5.1	6.5	8.2	8.8	10.1	13.1	14.7	14.3	15.5	20.1
Argentina	0.5	1.2	0.7	1.0	3.2	6.7	6.6	4.0	3.6	4.9	7.0	9.6	10.7	8.9	10.2
Asia															
Hong Kong	—	1.2	2.0	4.3	7.9	12.7	16.9	19.9	20.1	25.9	25.3	27.7	29.4	38.0	36.8
Singapore	1.5	1.6	1.4	4.7	7.5	13.4	15.1	16.7	18.8	19.3	16.9	15.8	20.8	20.3	20.7
Europe															
Greece	0.3	0.5	1.0	2.4	11.8	10.3	13.9	15.6	16.2	15.2	14.9	16.9	16.8	13.4	14.0
Federal Republic of Germany	—	—	6.8	8.5	11.0	13.0	14.1	13.8	11.4	14.7	18.5	21.6	23.5	25.4	27.8
Spain	—	0.3	0.6	0.5	0.4	0.6	0.6	1.2	1.6	2.2	2.8	3.5	5.0	7.1	8.7
France	—	1.1	1.8	2.7	4.2	6.7	8.7	10.6	—	13.8	14.7	15.4	16.2	16.8	18.2
Italy	—	7.6	8.8	11.7	11.9	15.6	14.1	11.5	11.1	12.3	14.5	15.2	15.2	15.7	15.5

Source: Maxwell (1990b,c,d).

Table 14. Percentage of cigarette sales by type of tobacco blend, selected Latin American countries, 1950–1989

	Argentina		Colombia		Peru		Mexico	
Year	Light	Dark	Light	Dark	Light	Dark	Light	Dark
1950	36	64	—	—	—	—	—	—
1955	50	50	—	—	5	95	—	—
1960	46	54	—	—	13	87	—	—
1965	52	48	—	—	19	81	—	—
1966	55	45	—	—	33	67	—	—
1967	60	40	—	—	50	50	—	—
1968	67	33	10	90	52	48	—	—
1969	71	29	11	89	55	45	—	—
1970	72	28	12	88	57	43	—	—
1971	72	28	16	84	56	44	—	—
1972	72	28	23	77	64	36	—	—
1973	72	28	24	76	67	33	—	—
1974	72	28	25	75	77	23	—	—
1975	75	25	—	—	—	—	—	—
1976	78	22	—	—	—	—	63	37
1977	77	23	—	—	—	—	65	35
1978	74	26	—	—	—	—	69	31
1979	75	25	—	—	—	—	73	27
1980	75	25	—	—	—	—	76	24
1981	74	26	50	50	—	—	78	22
1982	75	25	57	43	—	—	79	21
1983	75	25	61	39	—	—	77	23
1984	75	25	69	31	—	—	76	24
1985	77	23	69	31	—	—	79	21
1986	79	21	71	29	—	—	76	24
1987	80	20	76	24	—	—	70	30
1988	83	17	76	24	—	—	70	30
1989	—	—	77	23	—	—	75	25

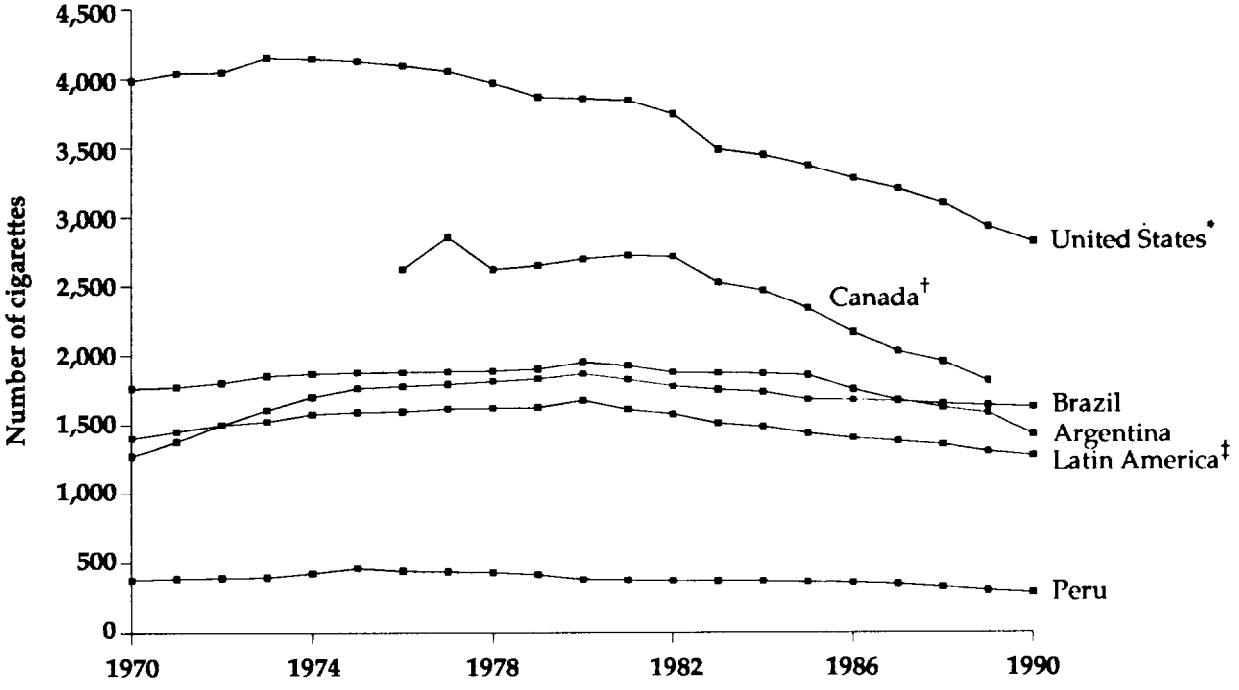
Source: Republica del Argentina, Departamento de Tabaco, Secretaria de Estado de Agricultura y Ganadería (1978); Maxwell (1989a,b, 1990b,c,d).

for three of the five TNCs during 1967 to 1970. After this initial period of intense competition—marked by introduction of new brands and the repositioning or elimination of old brands—advertising and other promotional expenditures declined (Shepherd 1983).

Despite this rapid growth over a decade or more, the economic results for the TNCs in Latin America and the Caribbean were disappointing in the 1980s because of severe macroeconomic problems and the impoverishment of broad sectors of the population. Toward the end of the decade, the region's per capita gross domestic product declined by nearly 10 percent from the 1980 figure, while per capita income decreased by nearly 15 percent (Economic Commission for Latin America and the Caribbean 1989; Inter-American Development Bank 1991). Since cigarette consumption has long been recognized as income-elastic, especially at lower levels of income, the decline in per capita income in Latin America and the Caribbean had a depressing effect on cigarette consumption in the region (Figure 2).

Per capita cigarette consumption declined somewhat uniformly throughout the Americas during the 1980s, but the reasons differ by region. In the United States and Canada, decreased consumption may well have been related to enactment of tobacco-control policies and mounting public awareness of the harmful effects of smoking (USDHHS 1989). In Latin America and the Caribbean, the widespread economic depression almost certainly reduced consumption, although growing antismoking efforts may have had a limited impact in some countries. The TNC policy of producing higher-priced, higher-margin products and raising prices to counter decreasing sales may also

Figure 2. Per capita cigarette consumption in the Americas, 1970–1990



Source: Centro Latinoamericano de Demografía (1990); U.S. Department of Agriculture (1990b); Maxwell (1990b).
*Persons aged 18 years or older.
†Persons aged 16 years or older.
‡Persons aged 15 years or older; excludes Belize and Puerto Rico.

have had some impact on decreasing consumption by volume (Shepherd 1985). Financially troubled governments throughout Latin America and the Caribbean raised cigarette taxes, which also led to decreased consumption.

After having increased in most markets of the region in the 1970s, adult per capita cigarette consumption was level or declined in 19 of 20 Latin American and Caribbean countries and declined overall in the region by 17 percent in the 1980s. (This reported decline, however, does not consider the potential effect of contraband; see Chapter 4.) In one exception, Colombia, adult consumption increased 14 percent during the 1980s. These data suggest why TNCs have now focused attention on other regional markets, especially those in Asia (Zimmerman 1990).

The Future of Tobacco Control

In developed, industrialized countries, the decline in cigarette consumption has been steep and fairly uniform (Figure 2) (USDHHS 1989). In the United States, adult per capita consumption has decreased to approximately that of the mid-1940s (Figure 1). A similar recent downward trend in consumption has also been documented for Canada (Figure 2). This decline has powerfully reinforced TNC pursuit of new cigarette markets, especially in the Third World (Muller 1978; UNCTAD 1978; Clairmonte 1979; Shepherd 1983; Taylor 1984; *Dollars & Sense* 1985; Nath 1986; Heise 1988; Food and Agriculture Organization of the United Nations [FAO] 1989; Wallace 1989; Connolly 1989; The World Bank 1989; Taylor 1989; Crofton 1990; *Dollars & Sense* 1990; Doolittle 1990a,b; Chapman and Wong 1990).

The basic system of leaf production, cigarette manufacturing, and leaf exporting in less-developed countries has long been established. For decades, BAT has been promoting these activities throughout the Third World, while also operating as a leaf dealer (Shepherd 1985). In Latin America and the Caribbean especially, and in less-developed countries generally, several factors are likely to make tobacco production and exportation and cigarette manufacturing more important in the near future.

First, various demographic trends, such as changing population structure and income elasticity, are likely to have a positive influence on cigarette consumption. Second, the emphasis placed on indirect taxes, such as excise taxes on cigarettes, is typical of economic austerity programs recommended by some international financial institutions. This emphasis might force governments of the region to rely even more on the tobacco industry for revenue, thus reinforcing an already high degree of reliance on cigarette taxation. Furthermore, these debt-related economic austerity programs promote exportation to earn the necessary foreign exchange to repay debts, finance importation, and correct chronic balance-of-payments deficits. This process may also lead to greater reliance on leaf-export sectors and even cigarette exportation.

In Latin America, the individual smoker—or the young person who considers taking up smoking—stands at the center of complex and changing economic forces. The TNCs have successfully established market dominance and created demand for their products. In recent years, the overall economic picture has been one of diminished consumption. However, if economic conditions improve in Latin America in the 1990s, growth in cigarette consumption may resume and even increase substantially by the year 2000, as some studies suggest (FAO 1990).

Conclusions

1. Tobacco has long played a role, chiefly as a feature of shamanistic practices, in the cultural and spiritual life of the indigenous populations of the Americas. This usage by a small group of initiates contrasts sharply with the widespread tobacco addiction of contemporary American societies.

2. During the latter half of the nineteenth century, amalgamation of major U.S. cigarette firms coincided with the emergence of the cigarette as the most popular tobacco product in the United States.

3. In Latin America and the Caribbean, through a process of denationalization and the formation of subsidiaries, a few transnational corporations now dominate the tobacco industry. The current structure of the industry presents a formidable obstacle to smoking-control efforts.

4. After rapid growth in per capita tobacco consumption in Latin America and the Caribbean during the 1960s and 1970s, a severe economic downturn during the 1980s led to a decline in tobacco consumption. In the absence of countermeasures, an economic recovery is likely to instigate a resurgence of tobacco consumption.

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Chapter 3
Prevalence and Mortality

Preface *59*

Prevalence of Smoking in Latin America and the Caribbean *61*

Introduction *61*
Demographic Characteristics *61*
  Population Configuration *61*
  Urbanization *62*
  Educational Opportunities *63*
  Income Distribution and the Labor Force *64*
Prevalence Estimates *65*
  Prevalence Reported by the Pan American Health Organization *66*
  Prevalence Reported by the Gallup Organization *67*
  Prevalence Reported by Reproductive Health Surveys *68*
  Additional Prevalence Estimates Reported Since 1980 *70*

Smoking-Attributable Mortality in Latin America and the Caribbean *81*

Introduction *81*
Mortality Data *81*
  Coverage *81*
  Data Quality *82*
  Coding *83*
Life Expectancy and Mortality *83*
  Trends in Life Expectancy and Overall Mortality *83*
  Estimates of Mortality *84*
  Total, Cause-Specific, and Age-Specific Mortality *85*
Mortality from Smoking-Related Diseases *86*
  Estimates of Cause-Specific Mortality *86*
  Estimates of Relative Risk Due to Smoking *87*
Smoking-Attributable Mortality *89*
  Estimates of Smoking-Attributable Mortality Worldwide *89*
  Lung Cancer Mortality as an Index of Prior Smoking in a Population *89*
  Estimates of Smoking-Attributable Mortality in the Americas *91*
    Unadjusted Estimates *91*
    Adjusted Estimates *92*
  A Comment on the Methodology *93*

Conclusions *97*

References *98*

Preface

In any population, the prevalence of smoking and the demonstrable health effects of tobacco consumption are out of phase. For some diseases, such as lung cancer, the lag may be 20 years or more; for heart disease or adverse outcomes of pregnancy, the lag may be considerably shorter. But the overall burden of disease reflects the cumulative long-term impact of tobacco use, or "maturity" of the smoking epidemic. This relationship between prevalence of smoking and smoking-related disease has been examined in detail for North America and will not be reiterated here. Rather, the focus is on the countries of the Americas in which tobacco use is an emerging problem.

This discussion juxtaposes estimates of the current prevalence of smoking in Latin America and the Caribbean with estimates of smoking-attributable mortality. Both estimates attempt to define the dimensions of the current and future health threat posed by tobacco use in the region.

Prevalence of Smoking in Latin America and the Caribbean

Introduction

The expansion of transnational corporations into international markets (described in Chapter 2) began in the early 1950s, accelerated in the 1960s, and was characterized by denationalization of local tobacco industries and development of consumer preference for the products of these corporations. In Latin America and the Caribbean, these events occurred along with complex social and demographic changes—often characterized as a demographic transition (Omran 1971; Jamison and Mosley 1991)—that made the area an attractive market for tobacco. These changes were not uniform throughout the region nor even, in some instances, uniform within a single country.

Nonetheless, four main sociodemographic factors have contributed to the potential of the population in Latin America and the Caribbean to initiate cigarette smoking. These factors are growth of groups likely to smoke, dissemination of an urban lifestyle, greater access to education, and the entry of women into the labor force. These factors are summarized below and related to available data on the prevalence of smoking.

Demographic Characteristics

Population Configuration

The population size and growth rate in Latin America and the Caribbean have been affected primarily by changes in the birthrate and death rate; with some regional exceptions, migration and emigration have been less important. Changes in fertility, natality, and mortality have been dramatic (Table 1).

In 1930, overall mortality was high in Latin America, and life expectancy was only 35 years, although in several countries, such as Argentina, Uruguay, and Cuba, life expectancy was greater because an export-driven economy (Merrick 1986) had encouraged environmental and sanitary improvements. Most Latin American countries, however, did not introduce widespread methods for control of endemic diseases until after World War II. Between 1950 and 1970, improved methods for the control of major infectious diseases of children and adults may have accounted for 30 percent of the increase in life expectancy (Palloni 1981). By the 1960s, life expectancy at birth for citizens of most Latin American and Caribbean

Table 1. Demographic indicators, Latin America and the Caribbean,* 1950–1990

Indicator	1950–55†	1955–60	1960–65	1965–70	1970–75	1975–80	1980–85	1985–90
Annual growth rate (%)‡	2.73	2.75	2.79	2.60	2.48	2.29	2.17	2.06
Crude birthrate§	42.5	41.7	41.1	38.0	35.4	32.4	30.6	28.7
Crude mortality rate‖	15.4	13.6	12.1	10.9	9.7	8.6	7.9	7.4
Total fertility rate¶	5.87	5.90	5.96	5.53	4.99	4.36	3.93	3.55
Life expectancy at birth**	51.9	54.8	57.3	59.2	61.3	63.3	65.2	66.7
Infant mortality rate††	126	112	100	91	81	70	61	54

Source: United Nations (1991).
*Excludes Belize and Puerto Rico.
†From July of the first year to July of the last year in each period.
‡Total increase in population during one year divided by mean population for the same period.
§Number of births during one year divided by mean population for the same period; per 1,000 persons.
‖Number of deaths during one year divided by mean population for the same period; per 1,000 persons.
¶Average number of children that would be born during the fertile period of each woman in a hypothetical cohort (in accordance with the fertility rate by age for the cohort) who was not at risk for mortality before the end of the fertile period.
**Average number of years that would be lived by a newborn in a hypothetical cohort subject to the mortality schedule in effect at the time.
††Number of deaths per year among children under one year of age divided by number of births during the same period; per 1,000 persons.

Table 2. Estimated population,* Latin America, the Caribbean, and the United States, 1950–1990

Region	1950	1960	1970	1980	1990
Latin America and the Caribbean					
Total	165.9	218.1	285.7	362.7	449.9
≥15 years of age	98.5 (59.4)†	125.4 (57.5)	164.3 (57.5)	220.2 (60.7)	287.5 (63.9)
United States					
Total	152.3	180.7	205.1	227.8	251.3
≥15 years of age	111.3 (73.1)	124.5 (68.9)	147.0 (71.7)	176.5 (77.5)	197.0 (78.4)

Source: United Nations (1991).
*In millions.
†Percentage of total population ≥15 years is given in parentheses.

countries was about 60 years. But since advances were not uniform, less industrially developed countries, such as Bolivia, Haiti, and the Central American countries (except for Costa Rica), reported a life expectancy at birth of less than 50 years. Nonetheless, for the region as a whole, overall crude mortality and infant mortality have declined by over 50 percent since 1950 (Table 1).

Through the first half of the twentieth century, the birthrate increased in Latin America, except for the urban populations of some countries (such as Argentina and Uruguay) that experienced early economic improvements. After 1965, the birthrate in larger countries, such as Brazil, Mexico, and Colombia, began to decrease, and the region as a whole experienced declining fertility. Total fertility has diminished by 40 percent since 1960 (Table 1).

As a result of these changes, the population growth rate for Latin America and the Caribbean increased between 1900 and 1940, peaked just after World War II, and leveled off at 2.8 percent per year from 1945 to 1965. Since then, the rate of growth has slowed; it is estimated at 2.1 percent from 1985 to 1990 (Table 1). In 1950, the total population of the region was only slightly greater than that of the United States, but by 1990, it was 1.8 times greater (Table 2). Although the proportion of the population in Latin America and the Caribbean under 15 years of age has remained high (from 41 percent in 1950 to 36 percent in 1990) compared with that of the United States (from 27 percent to 22 percent), the number of persons aged 15 or over (the main tobacco users) in Latin America and the Caribbean increased dramatically over that in the United States. In 1950, the population aged 15 or over in Latin America and the Caribbean was 13 percent smaller than that in the United States; in 1990, it was 32 percent larger.

These population shifts have created a large potential market of tobacco consumers in Latin America. Further, the trend in the birthrate ensures that a substantial number of young people will continue to enter the market for some time to come.

Urbanization

Although immigration and emigration have had local effects, they have not had a large effect on the demographic composition of the Latin American region as a whole. However, internal migration has. Large-scale internal migration began in Latin America in the 1930s; by the 1950s, approximately one-third of the population of the region resided in urban areas, and by 1980, two-thirds of the total population was urban (Table 3).[1] In countries where economic growth began early (Argentina, Brazil, Chile, Colombia, Cuba, Mexico, Uruguay, and Venezuela), approximately 70 percent of the population is concentrated in urban areas, but Haiti, Bolivia, and several Central American countries, such as Honduras, Guatemala, and El Salvador, remain primarily rural.

The urban lifestyle—which includes social differentiation, division of labor, greater availability of community services, and greater access to popular goods—has generally characterized Latin American life in the last several decades. Nationwide television networks and an upgraded network of roads link regions and consolidate markets for goods, services, and labor nationwide (Wilkie 1984). Features of urban life are now more available in rural areas as well.

[1] The definition of an urban area differs from country to country. When a uniform definition is used—population centers with more than 20,000 inhabitants—the proportion is considerably smaller, although the trend remains the same.

Table 3. Percentage of population living in urban centers, by country in Latin America,* 1950–1980

Country	Census definition of urban area†				20,000 or more inhabitants		
	1950	1960	1970	1980	1960	1970	1980
Argentina	62	74	78	83	59	66	70
Bolivia	35	24	38	45	23	27	34
Brazil	36	46	56	67	27	36	46
Chile	60	68	75	81	51	61	68
Colombia	39	53	57	64	34	44	54
Costa Rica	33	35	39	43	19	26	30
Cuba	51	55	60	68	39	43	48
Dominican Republic	24	30	39	50	19	30	41
Ecuador	28	36	40	47	27	33	40
El Salvador	36	39	39	43	18	21	25
Guatemala	25	34	34	37	15	16	19
Haiti	12	15	20	24	10	13	17
Honduras	18	23	28	35	11	18	24
Mexico	43	51	59	66	29	35	43
Nicaragua	35	41	47	51	20	31	37
Panama	36	42	47	50	33	39	41
Paraguay	35	36	37	42	22	27	32
Peru	41	47	58	64	27	39	47
Uruguay	57	72	82	85	60	63	66
Venezuela	35	63	72	79	47	59	67
Total	37	44	58	65	32	40	47

Source: Wilkie and Ochoa (1989); Centro Latinoamericano de Demografía (1990).
*Excludes Belize and Puerto Rico.
†Differs by country.

The trend toward urbanization in Latin America has concentrated and consolidated the market for tobacco products, as it has for most other consumer items. The techniques of demand creation (described in Chapter 2) largely depend on an easily reachable mass audience—an audience which in Latin America has demonstrated persistent relative and absolute growth.

Educational Opportunities

As a by-product of urbanization, access to education in Latin America has increased substantially in recent decades. Only 58 percent of the total population aged 6 to 11 years was enrolled in primary schools in 1960 (Table 4). By 1987, this enrollment had increased to 86 percent. Since 1970, enrollment in secondary

Table 4. Percentage of population in Latin America and the Caribbean enrolled in school, by age group and sex, 1960–1987

Year	6–11 years			12–17 years			18–23 years			6–23 years		
	Total	Males	Females	Total	Males	Females	Total	Males	Females	Total	Males	Females
1960	57.7	58.1	57.4	36.3	38.7	33.9	5.7	7.1	4.3	36.9	38.2	35.5
1970	71.0	70.7	71.3	49.8	52.1	47.5	11.6	13.6	9.7	48.3	49.5	47.1
1975	76.3	76.4	76.1	58.0	59.8	56.1	18.9	21.0	16.8	54.3	55.6	52.9
1980	82.4	82.8	81.9	62.6	63.6	61.6	23.6	25.1	22.0	58.8	59.8	57.7
1985	85.2	85.8	84.7	66.2	67.3	65.1	23.8	24.8	22.8	60.4	61.2	59.4
1986	85.9	86.6	85.3	66.7	67.8	65.6	24.2	24.9	23.5	60.8	61.7	60.0
1987	86.3	86.9	85.7	68.2	69.2	67.2	25.1	25.8	24.4	61.8	62.6	60.9

Source: United Nations Educational, Scientific, and Cultural Organization (1989).

schools has also increased significantly, and the number of university students has dramatically increased as well—from 500,000 in 1960 to 6 million in 1990 (Brunner 1990). Women continue to have somewhat less access to education than do men, but since 1960, gains in enrollment have been equivalent for both sexes (Table 4).

The gains in education have brought a more literate and more discriminating group of consumers to the marketplace. The net effect may be complex—although sophisticated consumers may be more exposed to tobacco marketing techniques and are more likely to have disposable income for tobacco products, they may also have better knowledge of the adverse health effects of tobacco use. Data on smoking prevalence and educational status are ambiguous (see "Prevalence Estimates" later in this chapter).

Income Distribution and the Labor Force

In Latin America between 1950 and 1980, the agricultural sector of the labor force declined, but both the trade sector and the manufacturing sector increased (4.5 percent and 3.3 percent per year, respectively) (Economic Commission for Latin America and the Caribbean [ECLAC] 1989). In urban areas, more than one-third of the total labor force is employed in these two sectors. A study of occupational stratification in six countries found a large increase in nonmanual employment (De Oliveira and Roberts 1989). But despite an apparent increase in the size of the middle class in Latin America, the unevenness of income distribution still exceeds that of the United States (Table 5). In 1975, high-income groups in Latin America accounted for a larger percentage of total income than did the corresponding groups in the United States. Conversely, the lowest income group accounted for a much smaller percentage of total income in Latin America than in the United States (7.7 vs. 17.2 percent, respectively). Perhaps more important, however, the average income of the lowest income group in Latin America was one-tenth that of the lowest income group in the United States. These income disparities have persisted into the mid-1980s. For selected Latin American and Caribbean countries for which data are available (Table 6), the concentration of income in the upper 20 percent of households is substantially greater than for North America.

A critical socioeconomic factor has been the increasing entry of women into the labor force. Among developing nations worldwide during the 1960s, the highest percentage of female nonagricultural wage earners was found in Latin America (Anker and Hein 1987). Between 1970 and 1980, the size of the female labor force increased at twice the rate of that of the male labor force (5.1 vs. 2.5 percent, respectively) (ECLAC 1989).

The main sociodemographic effect of changes in the labor force has been the creation of a group of middle-income wage earners with increased disposable income, a group in which women figure prominently. Such a consumer group is of interest to the tobacco industry because it may serve as a focus for creation of demand for tobacco (Ernster 1983).

Table 5. Income distribution in Latin America* and the United States, 1960 and 1975

	Percentage of total income		Annual income per family†	
Income bracket	**1960**	**1975**	**1960**	**1975**
Latin America				
10% richest	46.6	47.3	11,142	15,829
20% below the richest 10%	26.1	26.9	3,110	4,497
30% below the richest 10%	35.4	36.0	2,542	3,636
60% poorest	18.0	16.7	833	1,095
40% poorest	8.7	7.7	520	648
United States				
10% richest	28.6	28.3	15,538	21,488
20% below the richest 10%	26.7	26.9	13,490	17,807
30% below the richest 10%	36.7	36.9	11,577	15,891
60% poorest	34.8	34.8	6,099	8,276
40% poorest	17.0	17.2	4,976	6,635

Source: Portes (1984).
*Excludes Belize, Cuba, and Puerto Rico.
†In 1970 U.S. dollars.

Table 6. Income distribution in selected countries of the Americas

Country	Year	Percentage of household income (by percentile group)					
		Lowest quintile	Second quintile	Third quintile	Fourth quintile	Highest quintile	Highest 10%
Brazil	1983	2.4	5.7	10.7	22.8	62.6	46.2
Canada	1987	5.7	11.8	17.7	24.6	40.2	24.1
Colombia	1988*	4.0	8.7	13.5	20.8	53.0	37.1
Costa Rica	1986*	3.3	8.3	13.2	20.7	54.5	38.8
Jamaica	1988†	5.4	9.9	14.4	21.2	49.2	33.4
Peru	1985–1986†	4.4	8.5	13.7	21.5	51.9	35.8
United States	1985	4.7	11.0	17.4	25.0	41.9	25.0
Venezuela	1987*	4.7	9.2	14.0	21.5	50.6	34.2

Source: The World Bank (1991).
*Based on per capita income.
†Based on per capita expenditure.

The four main factors discussed here have all affected prevalence of smoking in Latin America, which is summarized below. The economic significance of these sociodemographic changes is discussed further in Chapter 4 (see "Economics of the Tobacco Industry").

Prevalence Estimates

Systematic surveillance of smoking prevalence has generally not been conducted for most regions of Latin America. Consistent time series and uniform methods of data collection are just now being developed (see Chapter 6). Available information on prevalence is primarily derived from the following sources: an eight-city survey conducted by the Pan American Health Organization (PAHO) in 1971 (Joly 1977); a set of surveys conducted by the Gallup Organization for the American Cancer Society in 1988 (Gallup Organization 1988); and a set of reproductive health surveys conducted by local public sector or private sector agencies, principally sponsored by the U.S. Agency for International Development, with technical assistance provided by the Centers for Disease Control (CDC). Prevalence data from additional surveys (Tables 16–19) have been compiled by PAHO and are available in a companion document to this report (PAHO 1992). Very few of the almost 150 surveys compiled have been formally published, and they differ widely by sampling strategy, target population, method of weighting and adjustment, and reporting format. Definitions of various categories of smokers also differ across studies (e.g., heavy vs. light,

Table 7. Prevalence of cigarette smoking (%) among persons aged 15–74 in eight cities* in Latin America, adjusted for age and sex,† 1971

City	Total		Men		Women	
	Current smoker	Former smoker	Current smoker	Former smoker	Current smoker	Former smoker
La Plata, Argentina	40	8	58	13	26	5
São Paulo, Brazil	37	4	54	10	26	3
Bogotá, Colombia	36	7	52	7	24	3
Caracas, Venezuela	36	8	49	5	21	2
Santiago, Chile	35	5	47	10	20	4
Mexico City, Mexico	30	5	45	8	17	3
Guatemala City, Guatemala	22	6	36	11	10	9
Lima, Peru	21	4	34	7	7	1

Source: Joly (1977).
*In order of prevalence of current smokers.
†Adjusted by the direct method, based on the age distribution of respondents.

regular vs. occasional, and current vs. former). Most surveys provide crude prevalence for the group examined (number of smokers divided by number of persons surveyed), and some surveys report results by age, sex, ethnic group, residence, and occupation. Comparison of prevalence by country or by group within countries is problematic, and the only summary statistics are ranges, distributions, and medians.

Prevalence Reported by the Pan American Health Organization

The 1971 PAHO survey reported prevalence of cigarette smoking for persons in eight major cities of Latin America (Table 7). Estimates were age-adjusted by using the combined total population of the eight cities as the standard. The age-adjusted prevalence of smoking ranged from 21 to 40 percent. For men, it ranged from 34 to 58 percent (median = 48 percent), and for women, from 7 to 26 percent (median = 21 percent). The prevalence for U.S. males and females at the time was 44 percent and 30 percent, respectively; however, the figures are not directly comparable to those of the PAHO survey because of methodologic differences (U.S. Department of Health and Human Services [USDHHS] 1989).

Most smokers (98 percent) reported that they smoked cigarettes rather than cigars or pipes (Joly 1977), and most of them (71 percent of men and 79

Table 8. Standardized ratio* of cigarette smoking among persons aged 15–74 in eight cities of Latin America, by sex and level of education, 1971

	Men				Women			
City	No schooling	Primary school	Secondary school	Post-secondary school	No schooling	Primary school	Secondary school	Post-secondary school
Bogotá, Colombia								
Current smoker	0.9	1.0	1.0	1.0	0.7	0.8	1.2	2.0
Former smoker	0.8	1.2	0.8	1.0	1.4	1.2	0.9	2.0
Caracas, Venezuela								
Current smoker	1.1	1.1	0.9	0.9	1.4	1.1	0.9	1.1
Former smoker	—	0.8	1.1	1.8	1.4	0.7	1.1	1.0
Guatemala City, Guatemala								
Current smoker	1.6	0.9	0.9	1.1	0.6	0.7	1.7	2.3
Former smoker	1.1	0.9	1.1	1.0	1.1	0.8	0.8	1.8
La Plata, Argentina								
Current smoker	0.8	1.1	1.0	1.0	0.7	0.7	1.2	1.4
Former smoker	1.6	1.1	0.9	1.2	—	0.6	1.2	1.9
Lima, Peru								
Current smoker	1.6	0.8	1.0	1.4	0.5	0.6	1.4	2.1
Former smoker	—	1.3	0.8	0.7	—	1.1	1.2	1.1
Mexico City, Mexico								
Current smoker	1.4	1.1	1.0	1.1	0.7	0.8	1.0	1.6
Former smoker	—	1.1	0.9	1.5	1.4	1.1	0.8	0.7
Santiago, Chile								
Current smoker	0.9	0.8	1.1	1.1	0.7	0.8	1.1	1.5
Former smoker	0.2	1.1	1.1	1.2	0.6	0.8	1.1	2.5
São Paulo, Brazil								
Current smoker	0.8	1.0	1.1	0.9	1.2	1.1	0.9	2.0
Former smoker	1.5	1.0	0.6	1.3	1.3	0.9	0.5	0.9
All eight cities								
Current smoker	1.1	1.1	1.0	1.1	0.8	0.8	1.2	1.6
Former smoker	0.7	1.0	0.9	1.2	0.9	0.8	1.1	1.6

Source: Joly (1977).
*Each entry represents the age-adjusted rate for the subgroup divided by that for the total sample. Educational categories are assumed to have the same age distributions within each sex group.

Table 9. Prevalence of smoking (%) in 12 Latin American countries, 1988

Country	Total		Men		Women	
	Current smoker	Former smoker	Current smoker	Former smoker	Current smoker	Former smoker
Chile	39	14	41	17	31	11
Uruguay	32	16	44	25	23	9
Colombia	28	16	37	21	18	11
Costa Rica	28	16	35	23	20	10
Peru	22	12	28	19	17	6
Brazil	38	12	40	18	36	6
Ecuador	27	7	39	10	16	5
Mexico	27	10	37	13	17	6
Argentina	35	17	43	25	27	9
Honduras	24	15	36	19	11	12
El Salvador	25	8	38	10	12	5
Venezuela	27	15	32	21	23	11

Source: Gallup Organization (1988).

percent of women) preferred light-tobacco cigarettes (Joly 1977). The percentage of smokers who smoked light-tobacco cigarettes was greater among persons with at least a high school education—from 54 to 77 percent for men and from 58 to 89 percent for women. Preference for dark tobacco was much greater among older (55 to 74 years) than among younger (15 to 24 years) persons (40 vs. 14 percent).

Although all cities reported a lower prevalence of smoking for women than for men, the difference was less for areas in which overall consumption was higher. For example, in La Plata, Argentina, and Caracas, Venezuela, the prevalence of smoking for women was approximately half that for men. However, in Lima, Peru, the prevalence of smoking for women was one-fifth that for men. Furthermore, in almost all sample populations, the age-adjusted prevalence of cigarette smoking increased with educational level for women but not for men (Table 8). In most areas, the prevalence of smoking for women with postsecondary school education was about two times higher than that for women with no schooling—evidence that education may have served demand creation rather than hazard recognition. However, the incidence of quitting was also greater among better-educated women than among better-educated men; thus, several factors may have been operating simultaneously.

In 1971, the proportion of heavy smokers (defined as persons who smoke 20 or more cigarettes per day) was greater for men (29 percent) than for women (15 percent). In addition, more men than women began smoking before age 16 (33 percent and 23 percent of those who smoke, respectively). Imitation of friends and companions was the reason adolescents most often gave for starting to smoke.

Prevalence Reported by the Gallup Organization

The only other multicountry survey was conducted by the Gallup Organization in 12 countries in 1988 (Tables 9, 16–18). Unfortunately, the methods of the 1988 Gallup survey and the 1971 PAHO survey differed substantially. The sampling frame and methodology were not reported in detail for the Gallup survey, although some weighting scheme was used, and prevalence was not age-adjusted. Only seven countries were in both surveys. The 1971 PAHO survey focused exclusively on urban areas; the 1988 Gallup survey concentrated on urban areas but included rural areas as well. The accuracy and precision of the Gallup survey are difficult to judge, and direct comparisons with the PAHO survey may be misleading. For example, data from the Gallup survey suggest that the overall prevalence of smoking decreased in the seven countries included in both surveys (Tables 7 and 9), but results from other surveys (Tables 16–18) are not consistent with these findings.

Comparisons within each survey may be legitimate, although they must still be interpreted with caution. In the 1988 Gallup survey, the overall prevalence of smoking was higher in countries that underwent early modernization, such as Chile (39 percent), Brazil (38 percent), Argentina (35 percent), and Uruguay (32 percent). Overall prevalence was lower in

Table 10. Male-to-female ratio of smoking prevalence in seven Latin American countries, 1971 and 1988

Country	1971	1988
Argentina	2.4	1.6
Brazil	2.7	1.1
Chile	1.8	1.3
Colombia	2.5	2.1
Mexico	2.7	2.2
Peru	5.3	1.6
Venezuela	1.8	1.4

Source: Joly (1977); Gallup Organization (1988).

less economically developed countries, such as Peru (22 percent), Honduras (24 percent), and El Salvador (25 percent). In both surveys, a higher proportion of men than women were heavy smokers, although the definition of heavy smoking appears to differ between the two surveys. The difference in prevalence by sex has decreased substantially (Table 10). In several countries (particularly Brazil and Chile), almost as many women as men are smokers.

Prevalence Reported by Reproductive Health Surveys

Since the late 1970s, CDC, in collaboration with national investigators, has surveyed reproductive health practices of women in Latin America. Most of these household surveys have asked questions about smoking. Additional household surveys of young adults (men and women aged 15 to 24 years) have also asked about smoking practices. These surveys produced weighted prevalence estimates representative of the area studied. The overall results have not been age-adjusted, but age-specific results are directly comparable. These surveys are discussed together because of the general uniformity of the methods used; other surveys of women of reproductive age are discussed later in this section.

Among women of childbearing age, the prevalence of smoking in the late 1980s varied from 6 to 33 percent in the areas studied (Table 11). Again, because of differences in data collection, direct comparisons cannot be made with earlier work, but the data at least suggest that the prevalence of smoking among women in São Paulo, Brazil, may have increased—the prevalence for women aged 15 to 44 was somewhat higher in 1986 (31 percent) than that for women aged 15 to 74 in 1971 (26 percent), although lack of methodologic detail prevents formal testing. In contrast, the prevalence of smoking for women in Guatemala may have declined during that period.

Surveys of young adults, conducted in selected Latin American countries in the late 1980s (Table 12), suggest that the smoking initiation rate (also referred to as the rate of smoking uptake) is high in at least some areas. Uptake of smoking is higher in the more-developed countries, although probably in urban areas only. In several countries surveyed (Guatemala, Jamaica, and Costa Rica), prevalence of smoking among young women is low. The increased tendency to smoke among women in urbanized areas is also evident in Brazil (Table 12), where women in the more urbanized southern areas have almost twice the prevalence of smoking as do women in the northeast.

Results from the 1988 survey of young adults in Chile (Valenzuela, Herold, Morris 1989) illustrate some important patterns (Table 13). In this survey, over 1,600 men and women aged 15 to 24 were sampled, although the sample size varied for specific questions. In Santiago, 53 percent of the young men and

Table 11. Prevalence of smoking among women of reproductive age (15–44 years*), selected areas of the Americas, 1979–1989

Area	Year	Sample size	Prevalence (%)
Brazil†	1986	5,892	30.6
Rio de Janeiro	1986	749	33.0
São Paulo	1986	769	30.8
South	1986	846	32.2
Northeast	1986	1,792	29.6
Guatemala‡	1983	3,670	6.6
Guatemala§	1987	5,160	4.0
Costa Rica‖	1986	3,277	12.4
Jamaica¶	1989	6,112	6.2
Puerto Rico‡	1982	2,861	15.6
U.S.–Mexico Border**			
Whites (non-Hispanic)	1979	798	31.6
Mexican–Americans	1979	1,235	18.5

*Age group 15–49 years for women in Costa Rica and Jamaica.
†All values for Brazil are from Centers for Disease Control (CDC) (1986).
‡Anderson (1985).
§CDC (1987a).
‖Asociación Demográfica Costarricense and CDC (1987).
¶McFarlane and Warren (1989).
**Smith, Warren, Garcia-Nuñez (1983).

Table 12. Prevalence of smoking among persons aged 15–24, selected countries of the Americas, 1986–1990

Country and city	Year	Men		Women	
		Sample size	Prevalence (%)	Sample size	Prevalence (%)
Brazil*	1986	—	—	2,479	27.3
Salvador†	1987	871	13.9	956	14.1
São Paulo‡	1988	750	33.7	804	26.2
Curitiba§	1989	950	24.4	913	22.0
Rio de Janeiro§	1989	848	22.5	831	22.0
Recife§	1989	1,154	23.9	989	12.0
Chile (Santiago)‖	1988	800	53.3	865	41.0
Costa Rica¶	1990	1,405	23.7	1,582	5.4
Guatemala**	1987	—	—	2,204	2.5
Jamaica††	1989	—	—	2,605	2.6

*Centers for Disease Control (CDC) (1986).
†Sakamoto, Freire, Morris (1991).
‡Universidade Federal da Bahia and CDC (1989).
§CDC (1990a).
‖Valenzuela, Herold, Morris (1989).
¶CDC (1990b).
**CDC (1987a).
††National Family Planning Board and CDC (1988).

41 percent of the young women were current smokers, and prevalence of smoking increased with age. For younger people (in these data, persons 15 to 17 years old), the prevalence of smoking approximates the rate of smoking initiation. In Santiago, the initiation rate was 46 percent for men and 34 percent for women. By ages 22 to 24, more than half of both sexes were current smokers, and 22 percent of both sexes stated that they were former smokers. The vast majority of both men and women were light smokers: 78 percent of men and 89 percent of women smoked less than 10 cigarettes per day. The proportion of heavy smokers increased with age.

With regard to educational attainment and smoking, the 1988 results from Santiago are consistent with those of the PAHO survey of 1971. A greater percentage of educated women were smokers (46 percent of women with superior education and 42 percent

Table 13. Prevalence of smoking and quantity smoked among persons aged 15–24, Santiago, Chile, 1988

Group	Total	15–17	18–19	20–21	22–24
Women					
Current smoker	41.0	33.9	44.0	36.0	52.1
Former smoker	22.7	24.1	20.7	23.8	21.6
Less than one-half pack per day	88.5	93.0	89.4	83.1	86.5
One-half pack or more per day	11.3	6.0	10.6	17.0	13.5
Men					
Current smoker	53.3	46.0	60.1	55.2	56.2
Former smoker	22.3	25.4	19.0	20.8	21.9
Less than one-half pack per day	78.2	85.6	75.5	76.5	73.7
One-half pack or more per day	21.8	14.4	24.5	23.5	26.3

Source: Valenzuela, Herold, Morris (1989).

Table 14. Prevalence of smoking and quantity smoked among persons aged 15–24, by educational level and sex, Santiago, Chile, 1988

Group	Educational level			
	Basic* or less	Middle† (incomplete)	Middle (complete)	Superior‡
Women				
Current smoker	41.5	38.4	42.3	46.4
Former smoker	24.6	22.4	22.6	20.6
Less than one-half pack per day	90.1	91.8	92.4	66.7
One-half pack or more per day	9.9	7.5	7.6	33.3
Men				
Current smoker	56.7	55.0	52.3	46.5
Former smoker	23.6	22.4	22.7	19.3
Less than one-half pack per day	79.8	81.4	77.9	66.0
One-half pack or more per day	20.2	18.6	22.1	34.0

Source: Valenzuela, Herold, Morris (1989).
*1–8 years.
†9–12 years.
‡>12 years.

of women with basic education or less), but the reverse was true for men (47 percent vs. 57 percent for the corresponding educational levels) (Table 14). Women with greater educational attainment also tended to smoke more (one-third smoked more than 10 cigarettes per day). The prevalence of smoking as a function of the educational level of the father of the respondent followed the pattern for the educational level of the respondent.

History of pregnancy appeared to have little effect on the prevalence of smoking among women in Santiago (Table 15). On the contrary, prevalence of smoking was slightly higher for women who had been pregnant (43 percent) or who had given birth (47 percent) than for women who had never been pregnant or had never given birth (around 40 percent for both groups). Since the data are not age-adjusted, this difference may result from the generally lower age distribution of women who have never been pregnant. The data suggest that pregnancy has little influence on the smoking habits of the population studied.

The data from Chile are not necessarily generalizable to Latin America as a whole, but they support the supposition that smoking is common among young people in some of the more-developed countries and that the quantity smoked is not great. Although the results do not permit the calculation of a single estimate of the prevalence of smoking among young people in Latin America, they do suggest that prevalence varies by level of socioeconomic development and that prevalence may be over 50 percent in some areas.

Additional Prevalence Estimates Reported Since 1980

PAHO has assembled prevalence data, as well as some information on knowledge and attitudes, from country-specific surveys (Tables 16–19). Most of these surveys report a crude prevalence for the population studied, and as noted, the methodologies of these surveys differ substantially.

The overall prevalence of current smoking varies widely in Latin America and the Caribbean—from 6

Table 15. Prevalence of smoking (%) among women aged 15–44, by reproductive history and smoking status, Santiago, Chile, 1988

Smoking status	Never pregnant	Pregnant at least once	No live births	At least one live birth
Current smoker	40.3	43.3	39.6	46.6
Former smoker	22.4	23.3	23.0	21.4
Never smoker	37.3	33.3	37.4	32.0

Source: Valenzuela, Herold, Morris (1989).

percent in rural La Paz, Bolivia, to 49 percent in Pôrto Alegre, Brazil. Prevalence of smoking is higher for men than for women. The distribution of results (Table 20) from the surveys of adults (Table 16)—displayed as a stem-and-leaf plot (Tukey 1977)—reveals that the prevalence for men is centered in the 30 to 49 percent range (median = 37 percent); 74 percent of observations were greater than 30 percent. For women, most results were in the 10 to 29 percent range (median = 20 percent); 24 percent of observations were greater than 30 percent. Most reports of low prevalence for women were from less-developed, predominantly rural areas. A similar rural–urban gradient was also found for men.

In general, crude prevalence was highest in the Andean region, the Southern Cone, and Brazil (Table 16). Prevalence tended to be intermediate in Central America, Mexico, and the Latin Caribbean and lowest in the other Caribbean countries (Table 16). Lifetime prevalence (51 percent) was reported for men in Jamaica. For Trinidad and Tobago, a 42 percent prevalence is given for men in a single urban area. The available information suggests that for male, urban dwellers in the more-developed countries of Latin America and the Caribbean, the prevalence of smoking exceeds 50 percent; for rural women in less-developed countries, the prevalence is less than 10 percent. The data do not permit calculation of a single estimate of the prevalence of smoking in the region, since no unified, planned prevalence survey of the region has been attempted.

Cigarette smoking was also common among physicians. The range for the 11 studies that reported prevalence among medical students, physicians in training (residents or house staff), and physicians was 17 to 49 percent (Table 16).

Prevalence of smoking for adolescents appears to follow a pattern similar to that for adults (Table 17). Prevalence is higher for young men than for young women and higher in urban areas of the more-developed countries. The regional pattern is also similar, except that smoking among young people appears to be more common in the non-Latin Caribbean than in Central America, Mexico, and the Latin Caribbean. The prevalence of smoking for adolescents is high in some areas—perhaps even higher than the prevalence for adults. A prevalence of greater than 30 percent is reported by almost half of the surveys for young men and almost one-third of the surveys for young women.

Surveys of women of childbearing age have been conducted in some Latin American and Caribbean countries (Table 18). The results generally confirm those cited earlier (also included, in part, in Table 18). The prevalence of smoking varies considerably; 25 percent of surveys reported a prevalence over 30 percent, and more than half reported a prevalence greater than 20 percent. Since women of reproductive age span the adolescent and adult years, younger women may disproportionately contribute to the high overall prevalence of smoking in some areas.

The few studies available about public knowledge and attitudes with regard to smoking suggest a high level of awareness of the general health hazards of tobacco use (Table 19). One study in Cuba indicated a high level of public approval for an indoor ban on smoking. In contrast, a survey among physicians in Paraguay showed that only 30 percent agreed with the statement that smoking is undesirable. Information on public awareness of the specific health risks of smoking and on the degree to which smokers perceive a personal risk is not available for Latin America and the Caribbean; data for the United States, however, have been considered in detail (USDHHS 1989). Collection of such information for Latin America and the Caribbean will be important to enhancing tobacco control in those regions (see Chapter 6).

Another aspect of the prevalence of smoking in the Americas is smoking patterns among Hispanic persons who reside in the United States. A large probability survey of Hispanic Americans (Hispanic Health and Nutrition Examination Survey [Hispanic HANES]), conducted in 1982 to 1984, revealed that, for both men and women, the pattern of smoking differs among persons of Mexican origin in the southwest United States, persons of Puerto Rican origin in the New York City area, and persons of Cuban origin in the Miami area. For all three groups, the weighted prevalence of cigarette smoking was higher for men than for women (Table 21). But persons of Puerto Rican or Cuban origin were more likely than persons of Mexican origin to be heavy smokers (Haynes et al. 1990). Compared with the prevalence of smoking for the general U.S. population (USDHHS 1989), the prevalence of smoking was higher for men of all three Hispanic groups and for women of one group (Puerto Rican origin).

The Hispanic HANES survey of 1982 to 1984 also showed that with decreasing income and educational attainment, the prevalence of smoking increases among Hispanic men (Haynes et al. 1990). In addition, for women of Puerto Rican origin residing in the New York City area, the prevalence of cigarette smoking is approximately twice that of women in Puerto Rico (Becerra and Smith 1988).

Approximately five years after the Hispanic HANES survey, the National Health Interview Survey

(NHIS) revealed that the prevalence of smoking for all these groups had declined substantially, parallel with the decline in prevalence in the general U.S. population (Table 21) (Schoenborn1989). Detailed analysis of prevalence of cigarette smoking among successive birth cohorts, however, shows little reduction for women of Mexican origin and an increase for women of Puerto Rican or Cuban origin (Escobedo, Remington, Anda 1989).

Direct comparison with data for populations in the areas of origin is not possible (Table 16) because of differences in sampling methods, but the data suggest that some trends for Hispanic persons residing in the United States may be the same as those for the general U.S. population (Escobedo, Remington, Anda 1989; Escobedo et al. 1990; Harris 1983). Although prevalence of smoking has declined among Hispanic men and women, uptake of smoking is increasing among young Hispanic women. In general, persons of Hispanic origin in the United States reflect a mixture of the cultural forces in Latin America and North America.

Table 16. Prevalence of tobacco use among adults reported by surveys in Latin America and the Caribbean, 1980s and 1990s

Region and Country	Survey					Prevalence* (%)		
	Year	Sample area	Number	Age	Sponsor	Men	Women	Total
Andean Area								
Bolivia	1983	La Paz	945	≥15	Bolivian Cancer Foundation	41/37	32/33	36/35
	1986	Sucre	1,028	≥15	Department of Mental Health	35	18	28/41
	1986	Rural La Paz	1,060	≥15	Department of Mental Health	6	3	6/48
	1986	Urban La Paz	1,058	≥15	Department of Mental Health	46/38	29/33	38/36
	1987	Physicians in La Paz	72		Osorovic and Ríos-Dalenz			35/17
Colombia	1980	Nationwide	6,277	≥15	National Institute of Health	52	26	39
	1985	Medellín (excludes persons of low socioeconomic status)	2,432	≥16	University of Antioquia			30†
	1987	Urban areas	2,400	≥16	Public Health School Drug Survey	43	25	34†
	1988	Nationwide	1,512	18–60+	American Cancer Society/Gallup Organization	37	18	28
Ecuador	1988	Quito, Guayaquil, and three rural capitals	3,657	20–65	Ministry of Public Health, Our Youth Foundation	27/27	11/20	22/24
	1988	Urban areas	1,323	13–60+	American Cancer Society/Gallup Organization	39	16	27
	1990	Quito	1,805	≥10	Ministry of Public Health			23/27
Peru	1980	Households in Lima/Callao	2,167	12–45	Police Force, Antidrug Unit	49/14	23/11	36/13
	1985	Male firearm licensees in Lima	359	18–70	Police Force, Antidrug Unit	36/23		

Source: Pan American Health Organization (1992).
*Given for current daily smokers/occasional smokers, or for the former only.
†Smoked during the previous year.

Table 16. Continued

Region and Country	Survey					Prevalence* (%)		
	Year	Sample area	Number	Age	Sponsor	Men	Women	Total
Peru (contd.)	1987	Lima	1,800	15–50	Peruvian Public Opinion	68	40	
	1988	Urban areas	400	18–35+	American Cancer Society/Gallup Organization	28	17	22
	1989	Towns >2,500 population	6,761	12–50	Information Center, Education for the Prevention of Drug Abuse	42	13	26‡
Venezuela	1984	Nationwide			Ministry of Health			38
	1986	Caracas			Ministry of Health			42
	1988	Urban areas	852	18–64	American Cancer Society/Gallup Organization	32	23	27
	1989	Caracas	400		Ministry of Health			36
Southern Cone								
Argentina	1981	Buenos Aires	306	15–74	Alvarez	39	27	33
	1988	Buenos Aires pediatric hospital staff	128	20–55	Pediatric Hospital	48	49	
	1988	Urban areas	826	18–50+	American Cancer Society/Gallup Organization	43	27	35
Chile	1984	Santiago	1,050	>15	Public Health School	34/10	28/11	30/11
	1985	Twelve cities	2,700	>15	Gallup Chile			31
	1987	Three communities near Santiago	1,800	>15	Catholic University Department of Public Health	35/16	32/11	33/13
Paraguay	1988	Medical students and doctors at Catholic University Medical School	375		Estigarribia	25	24	25
	1989	Less than one-half of all medical students	394	16–36	Martinez	18	14	17
	1989	Physicians nationwide	837	20–80	Chaparro	35	24	32
Uruguay	1984	Montevideo	396	≥18	Prevention Volunteers	49/9	31/14	40/12
	1985	Ministry of Public Health employees	525	≥18	Epidemiology Division, Ministry of Health	45	45	45
	1988	Urban areas	799	18–50+	American Cancer Society/Gallup Organization	44	23	32
	1989	Fourth-year medical students in Montevideo		22–26	Ruocco			24

*Given for current daily smokers/occasional smokers, or for the former only.
‡Smoked during the previous month.

Table 16. Continued

Region and Country	Survey					Prevalence* (%)		
	Year	Sample area	Number	Age	Sponsor	Men	Women	Total
Brazil	1981	Physicians in Pôrto Alegre			Saltz et al.	26	40	
	1982	Medical association				32	27	
	1987	Pôrto Alegre		20–64	Achutti	52	34	49
	1987	São Paulo		15–59	Ramos	45	31	38
	1988	Two state capitals	1,297	18–50+	Gallup Organization	40	36	38
	1988	Twelve state capitals		18–55	Ministry of Health	45	33	39
	1989	Physicians in Rio de Janeiro			Campos	28	23	
Central America[§]								
Costa Rica	1986	Households nationwide	35,000	≥15	Office of Statistics	35	14	30
	1987	Nationwide	2,700	14–60	Alcohol and Drug Dependency Institute	33	11	22
	1988	Nationwide	1,213	18–40+	American Cancer Society/ Gallup Organization	35	20	28
El Salvador	1988	Nationwide, urban	1,300	18–40+	American Cancer Society/ Gallup Organization	38	12	25
Guatemala	1982	Guatemala City	2,403	≥10	Drug Institute	53	30	47
	1987	University of San Carlos students and teachers	170		San Carlos Medical School	34	36	34
	1989	Urban areas	7,372	≥15	Health Department	38	18	27
	1989	Finance Office employees	350		Health Department	48	38	44
Honduras	1987	Ministry of Health employees	293		Ministry of Health			22
	1988	Urban areas	1,200	18–40+	American Cancer Society/ Gallup Organization	36	11	24
Nicaragua	1988	Employed persons	520	≥18	Mount Sinai Medical Center	51	6	41
Panama	1983	Nationwide	1,631	≥18	National Cancer Association	56	20	38
	1986	Health Department employees	11,385		National Cancer Association	10	4	7
	1989	Health Department pensioners	100	≥55	National Cancer Association	48	13	33
Mexico	1983	Physicians	495					33
	1986	Households	14,528	≥12	National Health Survey	27	8	17
	1988	Urban areas	12,581	12–65	Secretary of Health	38	14	26
	1988	National Respiratory Institute employees				41	18	28
	1988	Urban areas	2,600	15–45+	American Cancer Society/ Gallup Organization	37	17	27

*Given for current daily smokers.
[§]Excludes Belize.

Table 16. Continued

Region and Country	Survey					Prevalence* (%)		
	Year	Sample area	Number	Age	Sponsor	Men	Women	Total
Mexico (contd.)	1989	Physicians in Mexico City (telephone)	818		Menese et al.			23
Latin Caribbean[‖]								
Cuba	1984	Nationwide	4,968	≥17	Cuban Institute for Research and Orientation of Internal Demand			42
	1988	Nationwide	5,933	≥14	Cuban Institute for Research and Orientation of Internal Demand	48	26	36
Dominican Republic	1989	Health Department employees	704		Ministry of Health	25	22	20
	1989	Nationwide	502	20–79	Ministry of Health	66	14	40[¶]
	1991	Households in Santo Domingo	1,392	15–55+	Vincent et al.	36	33	35
Puerto Rico	1989	Behaviorial Risk Factor Survey, San Juan (telephone)	772	≥18	School of Public Health	23	11	
Selected Caribbean countries								
Anguilla	1989	Islandwide	101	15–74	Health Department	10/9	2/10	7/9
Bahamas	1988	Areawide	933	≥15	Health Department	20	5	11
Bahamas	1989	Areawide	1,000	16–59	Health Department Drug Survey	19	4	10
Jamaica	1987	Household Council	6,007	≥12	National Council on Drug Abuse	51[**]	15[**]	
	1987	Household	1,000	≥10	Jamaican Medical Association	25	6	
Aruba and Netherlands Antilles	1989	Random sample of population (1%)	623		Ministry of Health	32	13	21
Trinidad and Tobago	1981	St. James (Port of Spain)	2,491	35–69	State government and Medical Research Council (United Kingdom)	42	8	27
U.S. Virgin Islands	1989	Household Behavioral Risk Factor Survey (telephone)	141	≥18	Health Department	15	9	12
	1989	2% population sample after hurricane	727					11

*Given for current daily smokers/occasional smokers, or for the former only.
‖Excludes Haiti.
¶Definition of smoking status unavailable.
**Smoked during lifetime.

Table 17. Prevalence of tobacco use among adolescents reported by surveys in Latin America and the Caribbean, 1980s and 1990s

Region and Country	Survey					Prevalence* (%)		
	Year	Sample area	Number	Age	Sponsor	Men	Women	Total
Andean Area								
Bolivia	1980	La Paz	18,956	14–22	Committee on Drugs			42
	1983	Tarija	120	18	Bolivian Cancer Foundation			63
	1983	La Paz	707	13–18	Bolivian Cancer Foundation	51	43	44
	1986	La Paz	1,359			72	61	
Colombia	1985	Medellín		10–15	Public Health School			30†
	1987	Urban areas	400	12–15		5	4	5†
	1985	Cali, private school	283	16–18	University of Valle drug survey			16†
	1985	Cali, public school	512		University of Valle drug survey			6†
	1989	National school	7,513	11–25	Education Ministry			10/22†
Ecuador	1988	Nationwide	2,599	10–19	Ministry of Public Health	15	15	15†
	1988	Nationwide	329	13–19	American Cancer Society/Gallup Organization			16
Peru	1980	Lima/Callao	419	12–19	Police Force, Antidrug Unit			44
	1982	Public school	1,311	<18	Cancer Institute	41		
		Private school	206	<18	Cancer Institute			64
	1985	University	1,379	15–22	University of Sacred Heart		90	
	1989	Nationwide		12–19	Drug Abuse Center			34
Venezuela	1984	Caracas	225	12–15	Ministry of Health			7‡
Southern Cone§								
Argentina	1981	Buenos Aires		15–21				14
	1986		1,007	12–15	Tobacco Industry			3
Chile	1981	Santiago	330	18–20	Department of Health	69	65	67
	1986	Rural areas	415	18–20	University of Concepción	37	28	34
	1986	Santiago	761	18–20	Department of Health			51
Uruguay	1975	Montevideo	10,496	12–16		33	32	
		Ten high schools		17–18		50	45	
Brazil	1980	Pôrto Alegre		10–19	Rosito et al.			13/15
	1984	Pôrto Alegre		10–19	Rosito et al.			11/11
	1987	Ten state capitals		10–18	Barbosa et al.			16†
				≥18				20‡
	1989	Ten state capitals	42,475	10–18	Corlini et al. (Psychotropic Drug Center)			16†
				≥18				27‡
	1989	Street boys in three cities			Corlini et al.	75‖		
	1989	São Paulo		6–18	Moraes et al.			6/27

Source: Pan American Health Organization (1992).
*Given for current daily smokers/occasional smokers, or for the former only.
†Smoked during the previous year.
‡Ever smoked.
§Excludes Paraguay.
‖Smoked during the previous month.

Table 17. Continued

Region and Country	Survey					Prevalence* (%)		
	Year	Sample area	Number	Age	Sponsor	Men	Women	Total
Central America[¶]								
Belize	1986	National Drug Use Survey	12,595	10–20	Pride Belize			12[‡]
Costa Rica	1984	San José	487	15–20	Calderon et al.	17	10	13
Honduras	1986	Preuniversity students	694	15–30	National University	29	4	17
Nicaragua	1988	High school students in Managua	468	15–18	University of Nicaragua	40	52	46
Panama	1984	Nationwide	11,385	11–18	National Cancer Association	10	4	7[**]
	1989	Private college	464	15–19	Department of Health	3	3	6
Mexico	1989	Secondary students	9,967					6
								42[‡]
	1988	First year university students	88,735		National University			9[†]
	1980	Mexico City secondary students	3,408		Mexican Insitute of Psychiatry			47[‡]
Latin Caribbean[††]								
Cuba	1988	Nationwide	1,067	13–17	Consumer Institute	8	3	6
Selected Caribbean countries								
Bahamas	1987	Areawide	4,838		United Nations Fund for Drug Abuse	20[‡]	10[‡]	
		Out-of-school youths	74					32[‡]
		In-school youths	4,767					15[‡]
Cayman Islands	1985	Areawide	2,077	10–17	Drug Advisory Committee			23[‡]
French Guiana	1986	Areawide		11–13		7[§§]	2[§§]	
Jamaica	1987	Secondary students		11–21	National Council on Drug Abuse	40	19	29[‡]
						7	3	5[‖]
Suriname	1988	Seven cities and rural areas				36	12	
Aruba and Netherlands Antilles	1988	Aruba		13–21		24	12	
Trinidad and Tobago	1985	All secondary students	2,192	11–19	Trinidad and Tobago Government Drug Survey	23	12	17[†]
U.S. Virgin Islands	1988	Household Behavioral Risk Factor Survey		12–17	U.S. Virgin Islands Government			1

*Given for current daily smokers.
†Smoked during the previous year.
‡Ever smoked.
‖Smoked during the previous month.
¶Excludes El Salvador and Guatemala.
**Smoked during the previous week.
††Excludes Dominican Republic, Haiti, and Puerto Rico.
§§Occasional smoker.

Table 18. Prevalence of smoking among women of childbearing age, selected Latin American and Caribbean countries, 1979–1987

Country	Survey				Prevalence (%)
	Year	Sample area	Number	Sponsor	
Argentina	1987	Nationwide	4,605	CLAP*	38[†]
Brazil	1981	Southern Brazil		CDC[‡]	25
	1982	Piauí State		CDC	27
	1982	Amazonas State		CDC	22
	1987	Nationwide		CLAP	36
Chile	1983	Santiago			58/26[§]
Colombia	1987	Nationwide	1,480	CLAP	21
Costa Rica	1986	Nationwide			12
Ecuador	1987	Nationwide	2,009	CLAP	8
Guatemala	1983	Nationwide		CDC	7
	1987	Nationwide	4,187	CLAP	3
Mexico	1979	U.S. border		CDC	19
Panama	1987	Nationwide	986	CLAP	4
Paraguay	1987	Nationwide	1,935	CLAP	7
Puerto Rico	1982	Entire territory			16
Suriname	1985	Urban areas			26
Uruguay	1987	Nationwide	5,169	CLAP	44[†]
Venezuela	1987	Nationwide	980	CLAP	34

Source: Pan American Health Organization (1992).
*Centro Latinoamericano de Perinatologia y Desarrollo Humano de la Organización Panamericana de Salud.
†Six months before pregnancy.
‡Centers for Disease Control.
§Before pregnancy/during pregnancy.

Table 19. Public knowledge and attitudes on smoking and health in Latin America and the Caribbean, 1982–1990

Country	Year	Sample	Question	Response (%)
Bolivia	1983	344 daily smokers	Is smoking dangerous? (yes)	83
	1983	120 adolescents	Is smoking harmful to health? (somewhat or very)	96
	1987	72 physicians	Is smoking harmful to health? (somewhat or very)	94
Brazil	1988	Pôrto Alegre	Is the life expectancy of smokers decreased by smoking? (yes)	48
	1988	Pôrto Alegre	Is environmental tobacco smoke harmful to children? (yes)	100

Table 19. Continued

Country	Year	Sample	Question	Response (%)
Costa Rica	1984	Urban students	Are health risks associated with smoking? (adequate knowledge of such risks)	81
Cuba	1988	Nationwide	Do you approve of a ban on indoor smoking? (yes)	98
Guatemala	1989	Treasury employees	Are health risks associated with smoking? (low level of knowledge)	64/56*
Honduras	1986	Preuniversity students aged 15–30	Does smoking cause lung cancer and other diseases? (yes)	50
	1987	Ministry of Health employees in Tegucigalpa	Do you favor a worksite smoking regulation? (yes)	70
			Are you bothered by smoking at your worksite? (yes)	77
Mexico	1988	Nationwide	Is smoking harmful to health? (yes)	90
	1988	Nationwide	Is smoking less harmful than use of other drugs? (yes)	65
Panama	1989	Students	Are you bothered when other people smoke? (yes)	60
Paraguay	1990	Physicians	Is smoking undesirable? (yes)	30
Peru	1982	Adolescents	Is smoking harmful? (yes)	95
	1989	Adult smokers	What is the most important reason to stop smoking? (health)	66
Puerto Rico	1989	San Juan	Do you believe that smoking is harmful to the health of smokers? (yes)	89
Uruguay	1984	Montevideo	Does smoking affect health negatively? (yes)	81
Venezuela	1984	Nationwide	Is smoking harmful to health? (yes)	94
	1984	Caracas	Should smoking be restricted in public places? (yes)	83
	1984	Nationwide	Should all forms of tobacco advertising be banned? (yes)	72
	1986	Caracas	Is smoking harmful to others? (yes)	75/81*
	1986	Caracas	Are some cigarettes less harmful than others? (yes)	53
	1986	Caracas	Should smoking be restricted in public places? (yes)	89
	1989	Caracas	Should radio and television advertising of tobacco be banned—including indirect advertising? (yes)	60

Source: Pan American Health Organization (1992).
*Smokers/nonsmokers.

Table 20. Modified stem-and-leaf display of prevalence of smoking (%) among adults, selected countries of Latin America and the Caribbean, 1980s and 1990s*

Men

0–9	6																				
10–19	10	10	15	18	19																
20–29	20	23	25	25	25	26	27	27	28	28											
30–39	32	32	32	33	34	34	35	35	35	35	35	36	36	36	37	37	38	38	38	39	39
40–49	40	41	41	42	42	43	43	44	45	45	45	46	48	48	48	48	49	49			
50–59	51	52	52	53	56																
60–69	66	68																			

Median = 37

Women

0–9	2	3	4	4	5	6	6	8	8	9										
10–19	11	11	11	11	12	13	13	13	14	14	14	14	15	16	17	17	18	18	18	18
20–29	20	20	22	23	23	23	23	24	24	25	26	26	27	27	27	28	29			
30–39	30	31	31	32	32	33	33	34	36	36	38									
40–49	40	40	45	49																

Median = 20

*Prevalence data from Table 16 are grouped by decile (stem) and listed in ascending order (leaf). The data are from different sources and derive from various methodologies. This display provides a visual overview of the range of measured values.

Table 21. Prevalence of smoking (%) among Hispanic persons in the United States, aged 20–74, by ethnic group and sex, selected years

Ethnic group and sex	1982–1984*	1987†
Mexican origin (southwest United States)		
Men	43.6	31.8
Women	24.5	17.4
Cuban origin (Miami area)		
Men	41.8	23.3
Women	23.1	20.4
Puerto Rican origin (New York City area)		
Men	41.3	38.6
Women	32.6	24.1

*Hispanic Health and Nutrition Examination Survey, 1982–1984 (Escobedo, Remington, Anda [1989]).
†Schoenborn (1989).

Smoking-Attributable Mortality in Latin America and the Caribbean

Introduction

Births and deaths are the most widely collected and reported health events, and mortality is a standard measure of the health status of a population. Mortality has traditionally been used as an indicator of socioeconomic status and standard of living, especially in countries for which measures of economic productivity are inappropriate.

Mortality is a useful measure when setting health priorities, communicating health-related information, and marshalling political support for a health initiative. It is a measure easily understood by the public, and it can affect the public's perception of risk. For example, the following statement about the United States has a powerful simplicity: "cigarette smoking, alone, causes more premature deaths than do all the following together: acquired immunodeficiency syndrome, cocaine, heroin, alcohol, fire, automobile accidents, homicide, and suicide" (Warner 1987, p. 2081). Yet the data that allow such a statement are difficult to assemble, and the methodologies used to determine the number of deaths attributable to smoking are complex (USDHHS 1989).

Although useful, mortality data do not indicate the full effect of a disease or set of diseases on a community. They do not describe the pain, morbidity, disability, economic costs, and decreased quality of life of persons who live with an illness, nor do they describe the secondary effects on family members who lose a close relative.

However, other measures of the effect of a disease have limitations as well. For example, life expectancy, which can express the health status of a population, may be misleading. For developing countries, life expectancy is strongly influenced by infant and childhood mortality and much less so by disease prevention or therapeutic advances that affect adult health. People who have died from a smoking-related disease would have lived approximately 15 years longer if they had not been smokers (Warner 1987). This powerful effect is diluted if the improvement in smokers' life expectancy is averaged over the whole population.

In the following discussion, an attempt is made to specify the number of deaths in Latin America and the Caribbean attributable to smoking, while keeping in mind the limitations of common disease measures. The result is an approximation, an early step in an iterative process for determining the health impact of tobacco use in the Americas. The methodology, which applies the concept of attributable mortality, is complicated by the need to estimate and adjust data to compensate for missing or insufficient data. A step-by-step description of the methodology is provided in Table 22. The effects of the empirical decisions made are discussed at the end of the chapter (see "A Comment on the Methodology").

Mortality Data

The data in this section are from the PAHO Technical Information System, a data base that includes mortality information. PAHO collects mortality data (by age, sex, and cause of death) from source jurisdictions by using questionnaires, national publications, and other methods. Most of the data are from civil registries, which rely on death certificates completed by health personnel in the field. These mortality data have several problems: the coverage of the population is incomplete, the quality of some data is questionable, and the cause-of-death groupings of the World Health Organization (WHO)/PAHO data collection questionnaire limit comparability with other data.

Coverage

PAHO has estimated that the underregistration of mortality is more than 20 percent in Brazil, Colombia, Dominican Republic, Ecuador, El Salvador, Honduras, Panama, and Peru (PAHO 1990b). The diverse reporting standards from various countries necessitated several country-specific decisions. In Brazil, for example, the most populous country in Latin America and the Caribbean, the estimated underregistration is approximately 25 percent. The level of underreporting differs between areas, although it tends to be worse in the poorer, northern part of the country. The number of reported deaths was used for the whole country, although it is an underestimate. In Paraguay, mortality information is published for only a portion of the country, and the information may not be representative of the remainder of the country. However, the areas not covered by the mortality registry are geographically defined and include about 40 percent of the population. Thus, reasonably reliable disease rates can be determined for a portion of Paraguay but not for the country as a whole. For this country, data from the well-defined reporting areas only were used; for other countries, similar decision rules were used.

Table 22. Method used for calculating smoking-attributable mortality in the Americas

Estimate overall mortality

For each country, evaluate vital registration and use the portion of the data that provides an accurate population-based mortality estimate.

For the 10 jurisdictions without mortality data, use United Nations population schedules and apply mortality rates from countries with similar socio-demographic configurations.

Do not correct for underreporting.

Exclude and do not correct for ill-defined causes.

(Resultant population and mortality estimates are reported in Table 25.)

Estimate cause-specific mortality

Identify the major smoking-associated disease groups (coronary heart disease; cerebrovascular disease; lung cancer; oral, laryngeal, and esophageal cancer; bladder cancer; and chronic obstructive pulmonary disease [COPD]).

Use cause-specific mortality data for countries for which such data are available.

For the 10 jurisdictions without such data, use data from four countries representative of the demographic and socioeconomic spectrum of the Americas (Guatemala, Colombia, Argentina, and the United States).

(Resultant cause-specific mortality estimates are in Table 26.)

Estimate relative risk and attributable risk

Use U.S. estimates for relative risk since country-specific relative risk is generally not available.

Determine the smoking-attributable fraction (SAF) for the United States by using the attributable-risk calculation.

Adjust estimates by using an index related to lung cancer

Use an index of the maturity of the epidemic that relates the lung cancer rate for each country to that of the United States.

For each country, determine an adjusted SAF for each disease by multiplying the index by the U.S. SAF for each disease (Table 32).

For each country, multiply the adjusted SAF for each disease by the number of deaths from the disease to obtain smoking-attributable mortality (SAM) (approximately 375,000).

Adjust the estimate further

Calculate SAM for the United States alone by using this method and compare the result with the official value reported for 1985 (U.S. Department of Health and Human Services 1989).

For each cause, calculate the difference between the result from this method and from the official method.

Apply these upward adjustments to the cause-specific SAMs: increase COPD by 230%, increase cancers by 10.4% (using the difference in lung cancer estimates), and increase other diseases and causes by 16.4% (see footnotes to Table 33).

Calculate the adjusted estimate of SAM in the Americas (526,000).

Data Quality

One measure of the quality of mortality information is the proportion of deaths assigned to the rubric "symptoms, signs, and ill-defined conditions" (*Manual of International Statistical Classification of Diseases, Injuries, and Causes of Death,* Ninth Revision *[ICD-9]*). Currently, the percentage of mortality ascribed to ill-defined causes is greater than 10 percent for 16 of the 39 jurisdictions submitting mortality information (PAHO 1990a). In this analysis, ill-defined causes were excluded from calculations of proportions or rates.

Because a decedent may not have received health care or the certifying physician may not have been the physician who treated the decedent, diagnostic

imprecision may occur. More serious distortion may result because the certifying physician did not have the diagnostic tools necessary for accurately determining the cause of death.[2] Furthermore, managers of health services may not be willing or able to ensure accurate recording or conduct the diagnostic tests that would yield an accurate diagnosis, especially for the elderly. As a result, assessments of mortality levels and trends are often made by considering disease-specific rates for middle-aged rather than elderly populations (Doll and Peto 1981).

Coding

Since 1979, PAHO's participating member states have classified cause of death by using the *ICD–9* coding scheme. To store these data, PAHO developed a grouping of causes of death based on, but not identical to, the Basic Tabulation List of the *ICD–9*. The PAHO grouping is also similar, but not identical, to the groupings used by WHO and CDC. The difference in grouping, which has a variable effect on disease classification, does not affect deaths categorized as due to the following conditions:

Condition	*ICD–9 code*
Coronary heart disease	410–414
Cerebrovascular disease	430–438
Lung cancer	162
Cancers of the lip, oral cavity, or pharynx	140–149
Cancer of the esophagus	150
Cancer of the larynx	161
Cancer of the bladder	188

However, PAHO grouped cancers of the pancreas (*ICD–9* 157) and kidney (*ICD–9* 189) with other cancers. Chronic obstructive pulmonary disease (COPD), when coded as *ICD–9* 490–492 and 496, cannot be isolated in the PAHO grouping. The relevant PAHO categories are "bronchitis (chronic and unspecified), emphysema, and asthma" (*ICD–9* 490–493). Thus, unlike the grouping for COPD used in the calculation of smoking-attributable mortality (SAM) in the United States (CDC 1991), the PAHO grouping includes *ICD–9* 493 (asthma) and excludes *ICD–9* 496.

Life Expectancy and Mortality

Trends in Life Expectancy and Overall Mortality

For all countries and subregions of the Americas, the overall trend is an increase in life expectancy at birth (Table 23). Over the last 35 years in Latin America and the Caribbean, the average life expectancy at birth has increased by about 15 years—from 51.8 to 66.6 years. In North America, the increase was seven years—from 69.1 to 76.1 years, reflecting a slower increase as life expectancy at birth reaches age 75 to 80.

Among Latin American and Caribbean countries, the current differences in life expectancy at birth are great—ranging from 53.1 and 54.7 years in Bolivia and Haiti, respectively, to 75.2 years in Cuba. Over the last 35 years, the range has diminished somewhat.

Table 23. Life expectancy* at birth for persons born during selected periods, by region and country

Region and country	Year of birth			
	1950–55	1970–75	1985–90	2000
Latin America	51.8	61.2	66.6	69.7
Bolivia	40.4	46.7	53.1	60.5
Haiti	37.6	48.5	54.7	59.4
Peru	43.9	55.5	61.4	67.9
Guatemala	42.1	54.0	62.0	68.1
El Salvador	45.3	58.8	62.2	68.8
Nicaragua	42.3	54.7	63.3	69.3
Honduras	42.3	54.0	64.0	68.2
Brazil	51.0	59.8	64.9	68.0
Ecuador	48.4	58.9	65.4	68.2
Dominican Republic	46.0	59.9	65.9	69.7
Paraguay	62.6	65.6	66.9	67.9
Colombia	50.6	61.6	68.2	70.7
Mexico	50.8	62.6	68.9	72.1
Venezuela	55.2	66.2	69.7	71.3
Argentina	62.7	67.3	70.6	72.3
Chile	53.8	63.6	71.5	72.7
Uruguay	66.3	68.8	72.0	73.0
Costa Rica	57.3	68.1	74.7	75.8
Cuba	59.5	71.0	75.2	76.3
Caribbean	56.4	67.1	72.4	74.7
North America	69.1	72.2	76.1	78.1
United States	69.0	71.3	75.4	77.6
Canada	69.1	73.1	76.7	78.5

Source: Centro Latinoamericano de Demografía (1990); Pan American Health Organization (1990a).
*Estimates through 1985 are based on actual data. After 1985, estimates are projections based on trends and on comparisons with data from similar countries.

[2] Historically, the lack of appropriate diagnostic tools had a major impact on the number of deaths assigned to lung cancer. When diagnostic radiology was introduced in England in the 1920s, the rate of certified lung cancer deaths increased threefold (Peto 1986).

During 1950 to 1955, the range was 28.7 years; today it is 22.1 years, and by the year 2000, it is expected to decrease to 16.9 years. Few Latin American and Caribbean countries are at the low end of the range. Currently, only about 3 percent of the population of Latin America and the Caribbean lives in countries with a life expectancy at birth lower than 55 years, while 86 percent lives in countries with a life expectancy at birth of 65 years or more. All countries except Bolivia and Haiti are expected to achieve a life expectancy at birth of 65 years or more by the year 2000 (PAHO 1990a).

Differences in the rate of increase are also evident among countries. For example, although life expectancy at birth in Chile and Uruguay is now similar, it increased three times more in Chile than in Uruguay over the last 35 years. In general, the increase in life expectancy at birth was slower in the 1970s and 1980s than in the 1950s.

The current life expectancy at birth in Latin America and the Caribbean is equivalent to that in the United States around 1945 to 1950—before many major advances in chronic disease prevention and treatment occurred (PAHO 1990a). Based on the current rate of improvement, the life expectancy at birth in Latin America and the Caribbean should reach that currently found in the United States by about the first quarter of the next century (Centro Latinoamericano de Demografía 1990).

The range of population and mortality parameters is illustrated by data for four countries (Guatemala, Colombia, Argentina, and the United States) that represent the broad spectrum of variation within the Americas (Table 24). This variation highlights the diverse potential effects of smoking on a population. For example, for all deaths in women (excluding deaths from ill-defined causes), the fraction of deaths in women aged 35 or older ranges from 34 percent in Guatemala to 95 percent in the United States. Since most SAM occurs among persons 35 years old or older, it is this group whose health is most affected by a tobacco habit.

Estimates of Mortality

The PAHO Technical Information System contains national mortality data suitable for this analysis for all but 10 jurisdictions in the Americas: Antigua and Barbuda, Bermuda, Bolivia, Guadaloupe, Grenada, Haiti, Montserrat, Netherlands Antilles, Nicaragua, and Saint Pierre and Miquelon.

To determine the number of deaths in the Americas attributable to smoking, the number of deaths for these 10 jurisdictions had to be estimated. The United Nations (1989) population estimates for these jurisdictions were used for this calculation. Crude population mortality rates and other major mortality parameters were applied by using data for countries in the PAHO Technical Information System believed to be similar with respect to life expectancy, geographic region, per capita gross national product, tobacco consumption rates, and other factors. These estimates were used along with others obtained by standard means (Table 25).

These nonstandard estimates are sensitive to the choice of country used to model the mortality structure. In general, these are underestimates of actual mortality because of underreporting and because

Table 24. Mortality from defined causes,* selected countries, c. 1985

Country	Sex	Population†	Total Mortality†	Persons aged ≥35 years	
				Mortality†	Percentage of total mortality
Guatemala	M	3,914	32	11	34
	F	3,826	27	9	34
Colombia	M	14,103	74	45	61
	F	14,007	55	39	70
Argentina	M	15,049	129	110	85
	F	15,283	103	89	86
United States	M	116,160	1,080	987	91
	F	122,571	975	930	95

Source: Pan American Health Organization (1990b).
*Excludes ill-defined causes; see text.
†Number, in thousands.

Table 25. Mortality from defined causes,* regions of the Americas, c. 1985

Region	Sex	Population†	Total Mortality†	Persons aged ≥35 years	
				Mortality†	Percentage of total mortality
Latin America	M	197,023	1,168	736	63
	F	196,887	892	592	66
Andean Area	M	40,177	207	109	53
	F	39,705	166	95	57
Southern Cone‡	M	24,377	190	159	84
	F	24,785	153	131	86
Brazil	M	67,601	367	239	65
	F	67,963	254	177	70
Central America§	M	12,190	78	32	41
	F	12,002	62	26	42
Mexico	M	39,744	224	134	60
	F	39,631	171	112	66
Latin Caribbean	M	12,934	101	63	62
	F	12,801	87	52	60
Caribbean	M	3,510	21	17	78
	F	3,571	18	15	82
North America‖	M	128,768	1,179	1,078	92
	F	135,410	1,055	1,006	95
All regions of the Americas	M	329,301	2,368	1,831	77
	F	335,868	1,965	1,614	82
Total		665,169	4,333	3,444	80

Source: Pan American Health Organization (1990b).
*Excludes ill-defined causes; see text.
†Number, in thousands.
‡Includes Falkland Islands.
§Excludes Belize.
‖Includes Bermuda and St. Pierre and Miquelon.

mortality from ill-defined causes has been excluded (as discussed earlier). The resultant estimates of smoking-related mortality are conservative.

Total, Cause-Specific, and Age-Specific Mortality

The composite of reported and estimated mortality indicates that approximately 4,300,000 deaths occur in the Americas each year; about half of these deaths (2,060,000) occur in Latin America (Table 25). In the Americas overall, about 80 percent of deaths occur among persons aged 35 or older; in Latin America, the fraction is about 64 percent. The fraction of deaths occurring among persons aged 35 or older varies from a low of about 41 percent in Central America to a high of 92 to 95 percent in North America. Most of the population of Latin America lives in countries where this fraction is between 60 and 70 percent.

The greatest absolute increase in life expectancy at birth is generally associated with improvements in mortality rates for children. In Latin America, a gradient of economic development is associated with increased life expectancy. In general, the death rate for children is lower in more highly developed countries, but the death rate for older persons is similar in various economic settings. For example, in Argentina, the mortality rate per 1,000 persons under five years of age is 7.9, and for persons aged 65 or older, it is 65.8. In Guatemala, the rate for persons under five years of

age is 21.4, but for persons aged 65 or older, it is 67.5 (PAHO 1990a).

The gradient of economic development is also reflected in the cause-of-death mortality structure. Among men aged 45 to 64, mortality from heart disease, expressed as a percentage of total mortality, is 11 percent in Guatemala, 27 percent in Colombia, and 37 percent in the United States. But some similarities are emerging. For both the 45 to 64 and the 65 or older age groups, the three leading causes of death for each sex are the same in both Colombia and the United States. For the oldest age group, the leading cause of death—diseases of the heart—is also the same in Guatemala (PAHO 1990a).

This pattern—increasing similarity of causes of death—is likely to intensify. As life expectancy improves, the epidemiologic profile of a country changes. Countries with a lower life expectancy tend to have a younger population, and the greatest mortality is in the younger age groups. In these countries, deaths are primarily due to infections (such as acute respiratory infections and diarrhea), malnutrition, and conditions originating in the perinatal period. As these diseases are controlled and life expectancy increases, deaths from chronic diseases—in particular, cardiovascular diseases and cancer—become the dominant health problem (PAHO 1990a).

Mortality from Smoking-Related Diseases

Estimates of Cause-Specific Mortality

The major diseases associated with tobacco smoking include coronary heart disease, cerebrovascular disease, COPD, and cancers of the lung, lip, oral cavity, pharynx, larynx, esophagus, pancreas, bladder, and kidney. In the United States, each of these causes (considering cancers of the lip, oral cavity, and pharynx as a single group) contributes at least 2,000 deaths to the total number of deaths attributable to smoking (USDHHS 1989).

The four countries for which population data were assessed (Table 24) and the six smoking-related conditions (Table 26) were the focus of this analysis of the effect of smoking on countries of the Americas. Cancers of the lip, oral cavity, pharynx, larynx, and esophagus were grouped because of the similar smoking-attributable risk for these conditions (USDHHS 1989). Cancers of the kidney and pancreas were excluded because they cannot be specifically identified in the PAHO Technical Information System. The four countries

Table 26. Deaths from six major causes as a percentage of all deaths from defined causes,* for persons aged 35 or older, selected countries, c. 1985

Country and sex‡	Coronary heart disease (aged 35–64)	Coronary heart disease (aged ≥65)	Cerebrovascular disease (aged 35–64)	Cerebrovascular disease (aged ≥65)	Lung cancer	Oral,† laryngeal, and esophageal cancer	Bladder cancer	Chronic obstructive pulmonary disease§	All categories
Guatemala									
Men	2.2	3.6	1.2	2.5	0.1	0.3	0.1	1.2	11.2
Women	1.6	3.2	1.8	3.8	0.4	0.1	0.0	1.1	12.0
Colombia									
Men	6.3	10.1	3.4	6.8	2.1	1.6	0.3	1.9	32.5
Women	4.7	10.2	4.7	9.5	1.3	1.0	0.2	1.8	33.4
Argentina									
Men	4.8	8.1	3.6	7.0	5.6	2.5	0.9	1.2	33.7
Women	1.6	8.6	2.7	9.9	1.1	0.8	0.2	0.9	25.8
United States									
Men	7.6	21.3	1.0	5.0	8.5	1.5	0.7	1.3	46.9
Women	2.8	24.1	1.0	8.9	4.2	0.6	0.3	0.9	42.8

Source: Pan American Health Organization (1990b).

*Codes from *Manual of International Statistical Classification of Diseases, Injuries, and Causes of Death,* Ninth Revision: coronary heart disease, 410–414; cerebrovascular disease,430–438; lung cancer, 162; cancers of lip, oral cavity, and pharynx, 140–149; cancer of the esophagus, 150; cancer of the larynx, 161; cancer of the bladder, 188.

†Cancer of the lip, oral cavity, and pharynx.

‡The denominator for each row is the total number of deaths from defined causes, by country and sex.

§See text for a description of this rubric.

chosen represented four different points on the spectrum of mortality rates. Guatemala was chosen, even though its lung cancer rate is low, because it reports nationwide mortality statistics and has one of the lowest levels of life expectancy in Latin America.

For persons aged 35 or older, the distribution of deaths from the six major causes was expressed as a percentage of all deaths from defined causes (Table 26). Because SAM from coronary heart disease and cerebrovascular disease differs significantly between persons aged 35 to 64 and persons aged 65 or over (USDHHS 1989), estimates for both these age groups are presented.

For all six smoking-related illnesses and age subcategories taken together (Table 26, last column), the proportion of deaths caused in persons aged 35 or older differed among the countries. In Guatemala, these diseases accounted for slightly over 10 percent of adult deaths. In Argentina and Colombia, they accounted for 25 to 33 percent of deaths, while in the United States, they contributed approximately 45 percent of deaths.

To estimate the number of deaths from smoking-related conditions for subregions of the Americas (Table 27), both the reported mortality data (Table 25) and synthetic mortality estimates for the 10 jurisdictions without data were used. For these jurisdictions, the mortality distribution patterns from the four selected countries (Table 24) were applied, as described.

Substantially more deaths in North America than in Latin America and the Caribbean were attributed to coronary heart disease, lung cancer, and bladder cancer. The number of deaths was similar in North America and in Latin America and the Caribbean for cerebrovascular disease, COPD, and oral cancer. Using these estimates, 81 percent of lung cancer deaths in the Americas occur in North America. When accounting for underreporting, the proportion is probably closer to 75 percent. (Using a different approach, other researchers have estimated that North America accounts for 77 percent of lung cancer deaths [Parkin, Laara, Muir 1988]). Because lung cancer is a strong indicator of all smoking-attributable diseases, a rough approximation suggests that the number of deaths in Latin America and the Caribbean attributable to smoking will be about one-third to one-fourth of the number in North America.

Estimates of Relative Risk Due to Smoking

Relative risk is defined as $r = d(1)/d(0)$, where $d(1)$ and $d(0)$ are the incidence of a particular disease for exposed and unexposed cohorts, respectively. For current smokers, the relative risk for a disease estimates the increase in disease incidence associated with a history of smoking. This risk varies widely among population groups due to differences in smoking-related factors, such as person-years of smoking contributed by heavy smokers, age at initiation, and cigarette product smoked. For example, among current smokers in a population, the relative risk for lung cancer would be expected to be relatively low if a sizable proportion of the population recently began to smoke heavily. If, however, heavy smoking has been common since World War II, the risk would be relatively high. The main reason for this effect is that the exposure category defined by "current smokers" is based on current rather than past smoking habit, but lung cancer rates primarily depend on smoking patterns of 20 or more years ago.

For many of the smoking-related causes of death, few country-specific estimates of relative risk are available for Latin American and Caribbean populations, and most have focused on cancer. For current cigarette smokers in the United States, aged 35 or older, the estimated relative risk for lung cancer is 22.4 for men and 11.9 for women (USDHHS 1989). In Cuba, the relative risk is 14.1 for men and 7.3 for women. Dark tobacco is the variety of tobacco most commonly smoked in Cuba and many other areas of Latin America. In Cuba, dark tobacco is associated with a higher relative risk for lung cancer than light tobacco is: for men, 14.3 and 11.3, respectively, and for women, 8.6 and 4.6, respectively (Joly, Lubin, Caraballoso 1983). In Colombia, the relative risk for lung cancer among current smokers was 10.3 in one case-control study of 102 persons with lung cancer, 74 percent of whom were men (Restrepo et al. 1989).

The study in Colombia also reported relative risk for cancer of the bladder, larynx, and oral cavity/hypopharynx of 3.7, 37.9, and 11.2, respectively. In La Plata, Argentina, where the rate of bladder cancer is high, a relative risk of 7.2 for bladder cancer was found for men who were current smokers (Iscovich et al. 1987). In a study of 232 cases of cancer in Brazil (87 percent of patients were men), the relative risk for cancer of the tongue, gum, floor of the mouth, and other parts of the oral cavity was 9.3 for current smokers of manufactured cigarettes (Franco et al. 1989). In a 1966 case-control study of male cigarette smokers and nonsmokers in Puerto Rico, the relative risk was 1.5 for esophageal cancer, 1.1 for cancer of the oral cavity, and 2.7 for cancer of the pharynx (Martinez 1969). In Montevideo, Uruguay, the relative risk for laryngeal cancer was 35.4 for male smokers of dark tobacco and 14.7 for male smokers of light tobacco (De Stefani et al. 1987). For comparison, for U.S. men who

Table 27. Deaths (in thousands) from six major causes,* for persons aged 35 or older, selected regions of the Americas, c. 1985

Region and sex	Coronary heart disease (aged 35–64)	Coronary heart disease (aged ≥65)	Cerebro-vascular disease (aged 35–64)	Cerebro-vascular disease (aged ≥65)	Lung cancer	Oral,† laryngeal, and esopha-geal cancer	Bladder cancer	Chronic obstructive pulmonary disease‡
Latin America								
Men	38.1	59.7	28.5	49.8	22.4	14.1	3.0	15.6
Women	16.7	53.2	22.6	55.5	6.8	4.0	1.0	11.3
Andean Area								
Men	5.5	8.7	3.2	6.1	2.1	1.3	0.3	2.0
Women	3.1	7.6	3.3	7.2	1.0	0.6	0.1	1.8
Southern Cone§								
Men	7.3	13.8	5.5	11.9	8.2	3.9	1.2	2.9
Women	2.2	12.6	3.7	14.4	1.4	1.1	0.3	1.7
Brazil								
Men	16.6	19.3	15.7	21.0	6.1	6.2	0.9	4.8
Women	7.2	17.5	11.5	21.7	1.9	1.4	0.3	2.7
Central America‖								
Men	1.0	2.0	0.5	1.3	0.3	0.2	0.05	0.6
Women	0.5	1.6	0.6	1.5	0.2	0.01	0.02	0.5
Mexico								
Men	4.2	7.1	2.3	5.6	2.8	1.1	0.3	4.5
Women	1.9	6.3	2.2	6.8	1.3	0.4	0.1	3.8
Latin Caribbean								
Men	3.5	8.9	1.4	3.9	2.5	1.4	0.3	0.9
Women	1.8	7.5	1.3	3.9	0.9	0.4	0.1	0.7
Caribbean								
Men	0.8	1.2	0.7	1.9	0.4	0.3	0.1	0.3
Women	0.4	1.1	0.6	2.2	0.1	0.1	0.03	0.2
North America¶								
Men	82.2	230.3	11.2	54.7	92.0	16.4	7.5	14.2
Women	27.8	242.2	9.6	89.8	41.7	6.1	3.4	9.2
All regions of the Americas								
Men	121.0	291.2	40.4	106.3	114.4	30.8	10.6	30.1
Women	44.9	296.5	32.8	147.5	48.5	10.1	4.4	20.6
Total	165.9	587.7	73.2	253.8	162.9	40.9	15.0	50.7

Source: Pan American Health Organization (1990b).

*Codes from *Manual of International Statistical Classification of Diseases, Injuries, and Causes of Death,* Ninth Revision: coronary heart disease, 410–414; cerebrovascular disease, 430–438; lung cancer, 162; cancers of lip, oral cavity, and pharynx, 140–149; cancer of the esophagus, 150; cancer of the larynx, 161; cancer of the bladder, 188.

†Cancer of the lip, oral cavity, and pharynx.

‡See text for a description of this rubric.

§Includes Falkland Islands.

‖Excludes Belize.

¶Includes Bermuda and St. Pierre and Miquelon.

are current smokers, the relative risk for cancer of the bladder is 2.9, cancer of the esophagus 7.6, cancer of the larynx 10.5, and cancer of the lip, oral cavity, and pharynx 27.5 (USDHHS 1989).

Two case-control studies were conducted to investigate the factors associated with esophageal cancer in Uruguay, which has one of the highest rates of esophageal cancer in the world. In one study of 226 cases, the relative risk was 6.5 for ever smokers (82 percent were men) (Vassallo et al. 1985). In the other study of 199 cases, the relative risk was 5.7 for current male smokers (De Stefani et al. 1990). In bordering southern Brazil, which also has a high rate of esophageal cancer, the relative risk was 8.4 for male smokers (Victora et al. 1987).

For countries for which relative risk estimates were lacking, relative risks were derived from U.S. data and used in the following computations of SAM (USDHHS 1989, 1990). Small differences in relative risk estimates are unlikely to have a large overall effect on SAM because of the structure of the formula for calculating attributable risk (see below).

Smoking-Attributable Mortality

Estimates of Smoking-Attributable Mortality Worldwide

Interest in attempting to quantify the extent of the health hazard caused by tobacco led to development of smoking-attributable fractions (SAFs). These values estimate the proportion of cases of a specific disease in a population that can be attributed to smoking.

$$SAF = \frac{p\,(r-1)}{1 + p\,(r-1)}$$

in which p is the proportion of the population that has ever smoked and r is the risk for ever smokers relative to never smokers. The SAF calculated for each disease of interest is multiplied by the number of deaths for that disease, and the result is the SAM for that disease. The sum of SAM values for all diseases associated with tobacco use gives the total number of deaths attributable to smoking.

The SAF can be refined to account for differences in smoking status (never, current, or former smoker) and for age and sex subgroups. Smoking prevalence and relative risk can be estimated for each of these subgroups. SAFs have been calculated for 10 selected causes of death in the United States (Table 28).

Recent studies have estimated the number of deaths attributable to smoking in the United States (Table 29). The estimates by Rice and colleagues, CDC, and USDHHS all considered smoking status, age, and sex. The estimates vary for several reasons: the diseases included, the specific methodology used, the target year, and the source of the smoking prevalence data and the relative risk estimates. The most recent (1988) estimate for the United States (434,000 smoking-attributable deaths) is discussed in Chapter 4, "Economic Costs of the Health Effects of Smoking." The 1985 estimate is used here to maintain consistency with data available for Latin America and the Caribbean.

SAM has been estimated for many European countries (Table 30), and the current worldwide estimate is 3 million smoking-attributable deaths per year.

The methodology described earlier for calculating SAM can be used for countries for which reliable information is available on smoking prevalence and on the risk for major tobacco-associated diseases among ever smokers relative to never smokers. Unfortunately, few countries in Latin America have such data; an alternative methodology for calculating SAM is described below.

Table 28. Smoking-attributable fraction for 10 selected causes of death, United States, 1985

Cause of death	Men (%)	Women (%)
Coronary heart disease (aged 35–64)	45	41
Coronary heart disease (aged ≥65)	21	12
Cerebrovascular disease (aged 35–64)	51	55
Cerebrovascular disease (aged ≥65)	24	6
Cancer of the lung	90	79
Cancer of the lip, oral cavity, and pharynx	92	61
Cancer of the larynx	81	87
Cancer of the esophagus	78	75
Cancer of the pancreas	29	34
Cancer of the bladder	47	37
Cancer of the kidney	48	12
Chronic obstructive pulmonary disease	84	79

Source: U.S. Department of Health and Human Services (1989).

Lung Cancer Mortality as an Index of Prior Smoking in a Population

Numerous attempts have been made to describe the relationship between smoking habits and mortality

Table 29. Smoking-attributable mortality in the United States

Reference	Year	Estimate
Rice et al., 1986	1980	270,000
U.S. Office of Technology Assessment, 1985	1982	314,000
Centers for Disease Control, 1987b	1985	320,000
U.S. Department of Health and Human Services, 1989	1985*	390,000

*The 1985 estimate (rather than the 1988 estimate of 434,000 reported in Chapter 4, Table 1) is used here to maintain consistency with the demographic and vital data available for Latin America and the Caribbean.

from lung cancer in a population. Many of these attempts have not been entirely successful, primarily due to the lack of key information. Current lung cancer mortality rates reflect smoking habits of 20 to 40 years ago. Reliable data on lung cancer incidence and mortality are available for many industrialized countries, but only limited information is available on previous smoking habits. Furthermore, the relationship between smoking and lung cancer is affected by many factors. Duration of smoking is the factor most strongly correlated with risk for lung cancer. For example, when duration of regular tobacco use is doubled from 15 to 30 years, lung cancer incidence increases about 20-fold (Peto 1986). Other factors that affect lung cancer risk include number of cigarettes smoked per day, age at initiation, tar yield of tobacco products, use of filters, blend of tobaccos, and depth of inhalation. Many of these factors vary over time, not only for a national population but for individuals within a population. Only in recent years have surveys in a few industrialized countries collected data on these factors in some detail. Thus, data are unavailable for building an optimal model of smoking habits and lung cancer risk.

Nevertheless, tobacco consumption is highly correlated with lung cancer; the SAF has been calculated at over 90 percent for countries that have populations with a long history of high prevalence of heavy smokers (Table 31). This strong association suggests that lung cancer mortality can be used as a surrogate to measure the impact of smoking on a population.

The following index (I) uses lung cancer mortality rates for the population aged 55–64. This index, a measure of smoking maturity in a population, contains population risk factor information related to the smoking habits of the population, as expressed by the risk of dying from lung cancer.

$$I = \sqrt{\frac{R(C) - R(US,N-S)}{R(US) - R(US,N-S)}}$$

$$\text{for } R(US,N\text{-}S) < R(C) < R(US)$$

in which $R(C)$ is the lung cancer mortality rate for a country in the Americas, $R(US)$ is the lung cancer rate for the United States (Table 31), and $R(US,N\text{-}S)$ is the lung cancer rate for never smokers in the United States (12.7 for men and 11.1 for women). When $R(C)$ is greater than $R(US)$, the index is arbitrarily set to 1.

The index has the following properties:

- It equals 0 for the few countries in Latin America and the Caribbean with a lung cancer rate below that of never smokers in the United States.
- It equals 1 for countries that have a lung cancer rate higher than that of the United States (although there were none).
- It falls between 0 and 1 for countries with a lung cancer rate between the U.S. rate for never smokers and the overall U.S. rate, and the value increases as the country's rate approaches that of the United States.

This index can be used to develop estimates of SAM for countries in Latin America and the Caribbean. For a given country, the lung cancer rate and index are calculated, and this lung cancer index is used to adjust all diseases. The index is multiplied by the disease-specific SAF for the United States to obtain an adjusted disease-specific SAF for a specific country. The number of deaths from a specific cause is then multiplied by the adjusted SAF to obtain the SAM.

Thus, the index adjusts the SAF downward—to a level appropriate for the extent of lung cancer in the population. The index is nonlinear; large changes in the upper range of lung cancer rates have only a small effect on the SAF. But changes in the lower range, closer to the rate for never smokers, have a proportionately larger effect on the SAF. In Table 31, the SAF is given with and without the index adjustment. The index uniformly offers a more conservative estimate of SAF.

Because of the potential for diagnosis of lung cancer to be more inadequate in some elderly populations than in younger populations, and because of the need to choose a relatively stable measure of smoking habits, the lung cancer rate for persons aged 55 to 64 was used in creating the index. If older age groups are used, significant diagnostic misclassification occurs, and the relationship to smoking is more tenuous. The low rates for younger age groups render the rate estimates

Table 30. Estimated number of deaths due to tobacco use in 27 countries of the World Health Organization (WHO) European Region*

Country	Year	Male	Female	Total
Austria	1985	5,527	3,354	8,881
Belgium	1984	8,905	2,664	11,569
Bulgaria	1984	6,129	3,215	9,344
Czechoslovakia	1984	14,693	7,363	22,056
Denmark	1985	5,531	3,311	8,842
Finland	1984	4,094	1,900	5,994
France	1984	25,751	10,102	35,853
German Democratic Republic	1984	12,393	6,178	18,571
Germany, Federal Republic of	1985	49,572	26,433	76,005
Greece	1984	5,305	1,718	7,023
Hungary	1985	10,742	5,541	16,283
Iceland	1984	115	78	193
Ireland	1983	2,754	1,449	4,203
Israel	1984	1,416	859	2,275
Italy	1981	39,489	15,324	54,813
Luxembourg	1985	298	121	419
Malta	1985	115	54	169
Netherlands	1985	12,140	3,892	16,032
Norway	1984	3,046	1,553	4,599
Poland	1985	23,858	7,337	31,195
Portugal	1985	3,656	1,778	5,434
Romania	1984	12,178	7,907	20,085
Spain	1980	14,492	5,738	20,230
Sweden	1985	7,104	4,339	11,443
Switzerland	1985	4,299	1,610	5,909
United Kingdom	1984	60,764	33,916	94,680
Yugoslavia	1982	9,103	3,732	12,835
Total for region		343,469	161,466	504,935
Total worldwide	1991			3,000,000

Source: WHO (1988, 1991 [for worldwide estimate]).
*Represents about 60% of the regional population. Tobacco is held responsible for about 90% of all deaths from lung cancer, 75% of bronchitis/emphysema deaths, and 25% of all deaths from ischemic heart disease. The estimate for each country is based on the most current data provided to WHO by the countries themselves.

unstable. Further, the use of a single, well-defined group at risk has the virtue of simplicity—data directly available to a country are used, and adjustment that might be necessary for cross-country comparisons is avoided.

Estimates of Smoking-Attributable Mortality in the Americas

Unadjusted Estimates

Before adjustment, approximately 375,000 deaths in the Americas were attributable to smoking around 1985 (Table 32). These were distributed by disease as follows:

Disease	*Total SAM*
Coronary heart disease	144,200
Cerebrovascular disease	46,800
Lung cancer	128,600
Oral, laryngeal, and esophageal cancer	23,200
Bladder cancer	5,700
COPD	27,300

In Latin America and the Caribbean, an intermediate estimate of 64,000 smoking-attributable deaths was obtained, and most of these deaths were from coronary heart disease (about 18,500), cerebrovascular disease (about 17,000), and lung cancer (about 13,000). The largest contribution to SAM in Latin America was made by Brazil, followed closely by the Southern Cone subregion.

Table 31. Smoking-attributable fraction (SAF) and adjusted SAF for lung cancer mortality, selected industrialized countries, 1978–1981

Country	Sex	Crude lung cancer rate*	SAF	Index of smoking maturity	Adjusted SAF†	Difference between SAF and adjusted SAF
Canada	M	142.8	.90	.92	.85	.05
	F	34.0	.71	.77	.60	.11
England and Wales	M	228.5	.94	1.00	.92	.02
	F	63.3	.80	1.00	.78	.02
Japan	M	64.8	.83	.58	.53	.30
	F	21.0	.58	.50	.39	.19
Sweden	M	85.0	.83	.69	.63	.20
	F	28.0	.57	.66	.51	.06
United States‡	M	166.7	.92	1.00	.92	.00
	F	50.0	.78	1.00	.78	.00

Source: Adapted from International Agency for Research on Cancer (1986).
*For persons aged 35 or older. The calculation actually uses the rate for persons aged 55–64 years.
†Calculated by multiplying the SAF for the United States by the country-specific index of smoking maturity; see text.
‡Total population.

SAM was calculated as the percentage of deaths for persons aged 35 or older (last column of Table 32). For the Latin American subregions, the proportion was highest for men in the Southern Cone and lowest for men in Central America. In the Southern Cone, the difference in the rate for men and women reflects a large historical difference in the rate of tobacco consumption (see "Prevalence of Smoking" earlier in this chapter). The lung cancer mortality rate for women in Peru was less than that for U.S. women who were never smokers. The index was zero, and by this method, no deaths were attributable to smoking.

Adjusted Estimates

The estimates of SAM (Table 32) are underestimates for several reasons: (1) COPD was undercounted due to differences in cause-of-death groupings; (2) cancers of the kidney and pancreas were omitted; (3) the SAF for cancers of the oral cavity, esophagus, and larynx is an underestimate (the three cancers were grouped, and the smallest SAF for the three was used); (4) other categories of disease or death were omitted, including other types of cardiovascular and respiratory disease, cervical cancer, infant deaths due to maternal smoking during pregnancy and postnatal exposure to environmental tobacco smoke, lung cancer deaths due to passive smoking, and deaths from smoking-related fires; and (5) an undercount of deaths due to both underregistration of cases and the exclusion of deaths attributed to ill-defined causes. SAM was adjusted for the first four of these factors as follows. For the United States, the estimate of SAM was calculated and compared with that made for 1985 (USDHHS 1989). The latter estimate, which provided a benchmark, was 37.2 percent larger than the estimate computed in this analysis. The percent difference between these two estimates was used to alter upward the estimates for the other countries in the Americas. The adjustments were made by cause (Table 33, see footnotes), since the degree of underestimate varied with the condition.

After adjustment, an estimated 526,000 annual deaths in the Americas are attributable to tobacco use; about 100,000 of these are in Latin America and the Caribbean. About two-thirds of these deaths occur in Brazil and the Southern Cone. The estimated 36,000 deaths for Bermuda, Canada, and St. Pierre and Miquelon correspond closely with estimates derived by using several different methods and previously reported for Canada alone (Collishaw, Tostowaryk, Wigle 1988; PAHO 1992). As discussed below, the 100,000 annual deaths in Latin America and the Caribbean, estimated from data for the mid-1980s, is conservative. If the current U.S. SAF is applied and if Latin American and Caribbean countries follow a trajectory similar to that of North America, over 1 million smoking-attributable deaths per year will occur in Latin America and the Caribbean by the year 2030.

A Comment on the Methodology

The attribution of mortality requires an empirical approach. In the method used here, which varies somewhat in detail, but not in fundamental approach, from other methods (WHO 1989), at least five basic empirical decisions were made. First, the analysis excluded mortality data for which cause of death was inadequately specified, and no attempt was made to adjust for the underreporting of deaths. Second, synthetic estimates of mortality structure were used for countries with little or no data. Third, a proration was used to adjust for causes of death that could not be analyzed by using PAHO data. Fourth, an empirical index was developed to adjust for the many factors that influence the risk that smoking imposes on a population. Fifth, the SAM calculation made for the United States (USDHHS 1989) was used as a benchmark for adjusting the estimates derived in this analysis. Each of these decisions influenced the final estimate; in addition, some specific features of the index and factors related to attributable risk in general also had an influence.

The net effect of the empirical decisions is difficult to assess, but the first decision—no correction for underreporting and no proration for ill-defined causes—probably dominates and results in a sizable underestimate. The order of magnitude of the underestimate can be approximated by comparing the estimate of total mortality in Latin America derived for this analysis (2,060,000 [Table 25]) with an estimate, derived by using regression methods, that attempted to account for underreporting (3,197,000 [Hakulinen et al. 1986]). Based on this difference in overall mortality of about 55 percent, the number of smoking-attributable deaths might be as high as 155,000. The more conservative estimate of 100,000 smoking-attributable deaths was deemed more appropriate because it directly relates to the data with which ministries of health in Latin American and Caribbean countries actually work. In addition, the conservative method allows a simple, uniform decision rule to be used by all countries of the region in making their own computations. Finally, this approach allows for increasingly credible estimates of SAM to be made as better mortality data become available and the estimates are gradually refined.

The index of smoking maturation is based on a comparison of lung cancer rates. Although accurate information is more readily available for lung cancer than for other conditions, it may not be the optimal condition for use in calculating the index. Although tar levels affect the risk for lung cancer, they apparently do not affect the risk for cardiovascular disease and COPD (USDHHS 1981). Further, the lag between increased consumption of tobacco and a rise in lung cancer mortality may not be representative of the lag for other diseases. In addition, use of the 55 to 64 age group for calculating the index underestimates the population's exposure to smoking in most Latin American and Caribbean countries because peak tobacco-consumption rates have not yet been reached.

Because the index is empirical, there is no clear methodologic justification for the square root transformation. Many transformations are available; the square root was used because of properties appropriate to the analysis. Specifically, taking the square root of numbers less than one produces a nonlinear effect: it increases all numbers that are less than one, but it has a greater effect on numbers close to zero than on numbers close to one. Thus, upward revision is proportionately greater for countries with low rates than for countries with high rates. This choice modulates, to some extent, the conservative nature of the index. On the other hand, no deaths were attributed to smoking in countries with lung cancer rates less than those for U.S. never smokers. Since smoking is not uniformly distributed in such countries, rates may be higher for some subgroups, and at least some deaths should have been attributed to smoking.

Finally, this methodology is weakened by a lack of information on multiple risk factors. The SAF may be higher or lower when risks other than smoking play a significant role in disease causation. Because smoking is the dominant risk factor for lung cancer, this effect is probably negligible. In cardiovascular disease, however, smoking interacts with hypertension, hypercholesterolemia, physical inactivity, obesity, diabetes, and possibly other risk factors as well, and this effect may be considerable.

Thus, the empirical choices and the specifics of the analysis may have differing effects, but the final estimate of 526,000 annual deaths attributable to smoking in the Americas is almost certainly conservative. This estimate—perhaps best viewed as the first point on a continuum of such estimates—provides an order of magnitude for the number of smoking-related deaths in the Americas.

If, as suggested in the first half of this chapter, the prevalence of cigarette smoking is increasing in some areas, accurate assessment of SAM is of considerable importance. As noted, the lack of some critical data diminishes the precision of the estimates and fosters a greater reliance on empirical decisions. As data systems develop, individual countries will be better able to apply these methods for calculating SAM for their own populations.

Table 32. Smoking-attributable mortality* for men and women in the Americas, c. 1985

Region and country	Lung cancer mortality rate†	Index of smoking maturity	Coronary heart disease (aged <65)		Coronary heart disease (aged ≥65)		Cerebrovascular disease (aged <65)	
			SAF§	SAM‖	SAF	SAM	SAF	SAM
Men								
Latin America	—	—	—	8,426	—	6,432	—	7,090
Andean Area	—	—	—	785	—	557	—	462
Colombia	34.1	.302	.136	386	.063	287	.154	237
Peru	19.5	.140	.063	24	.029	25	.072	24
Venezuela	55.6	.444	.200	354	.093	228	.226	167
Southern Cone¶	—	—	—	2,583	—	2,245	—	2,151
Argentina	155.5	.829	.373	1,983	.174	1,156	.423	1,659
Chile	80.6	.566	.255	290	.119	344	.288	261
Brazil	57.8	.456	.205	3,411	.096	1,844	.233	3,652
Central America**	—	—	—	71	—	89	—	36
Mexico	44.3	.376	.169	708	.079	559	.192	435
Latin Caribbean	—	—	—	867	—	1,138	—	355
Cuba	119.8	.716	.322	711	.150	974	.365	298
Caribbean	—	—	—	128	—	108	—	129
North America††	—	—	—	36,907	—	48,251	—	5,696
Canada	209.0	.975	.439	3,376	.205	4,044	.497	449
United States	219.0	1.000	.450	33,526	.210	44,204	.510	5,243
All regions of the Americas	—	—	—	45,460	—	54,791	—	12,914
Women								
Latin America	—	—	—	1,848	—	1,837	—	857
Andean Area	—	—	—	346	—	234	—	101
Colombia	16.1	.267	.110	198	.032	126	.147	59
Peru	7.8	—	—	—	—	—	—	—
Venezuela	23.7	.409	.167	149	.049	108	.225	42
Southern Cone¶	—	—	—	236	—	403	—	223
Argentina	16.6	.279	.114	162	.033	259	.153	149
Chile	19.5	.338	.139	63	.041	119	.186	58
Brazil	15.0	.240	.098	706	.029	505	.132	313
Central America**	—	—	—	20	—	28	—	10
Mexico	16.4	.274	.112	209	.033	207	.151	113
Latin Caribbean	—	—	—	331	—	459	—	98
Cuba	42.2	.632	.259	299	.076	405	.347	85
Caribbean	—	—	—	30	—	27	—	29
North America††	—	—	—	11,315	—	28,854	—	5,343
Canada	75.1	.901	.369	768	.108	1,919	.496	386
United States	90.1	1.000	.410	10,547	.120	26,934	.550	4,957
All regions of the Americas	—	—	—	13,194	—	30,718	—	6,229

Source: Pan American Health Organization (1990b).
*Mortality from defined causes for persons aged 35 or older, in thousands.
†Cancer of the lip, oral cavity, and pharynx.
‡The lung cancer rate for U.S. never smokers used for the index calculation was 15.5 per 100,000 men aged 55–64 and 10.4 per 100,000 women aged 55–64.

Cerebrovascular disease (aged ≥65)		Lung cancer		Oral,† laryngeal, and esophageal cancer		Bladder cancer		Chronic obstructive pulmonary disease		Total SAM	Total SAM as proportion of total mortality
SAF	SAM	SAF	SAM	SAF	SAM	SAF	SAM	SAF	SAM		
—	5,959	—	11,549	—	5,946	—	845	—	5,819	52,066	.071
—	418	—	579	—	305	—	36	—	441	3,584	.033
.073	222	.272	258	.236	164	.142	17	.254	212	1,784	.040
.034	26	.126	33	.109	12	.066	2	.118	38	184	.009
.107	143	.400	263	.346	116	.209	15	.373	148	1,434	.063
—	2,182	—	5,952	—	2,446	—	468	—	1,727	19,754	.124
.199	1,527	.746	4,580	.647	1,782	.390	368	.697	916	14,370	.131
.136	315	.509	492	.441	260	.266	35	475	553	2,549	.083
.109	2,302	.410	2,522	.356	2,197	.214	191	.383	1,827	17,945	.075
—	56	—	75	—	33	—	5	—	67	431	.013
.090	503	.339	938	.293	322	.177	47	.316	1,409	4,920	.037
—	498	—	1,483	—	645	—	98	—	348	5,432	.086
.172	399	.644	1,334	.558	462	.336	86	.601	252	4,517	.146
—	198	—	214	—	131	—	18	—	105	1,030	.062
—	13,098	—	82,569	—	12,781	—	3,503	—	11,892	214,696	.199
.234	1,162	.878	7,249	.761	1,254	.458	367	.819	1,245	19,147	.211
.240	11,932	.900	75,310	.780	11,523	.470	3,135	.840	10,645	195,519	.198
—	19,255	—	94,331	—	18,859	—	4,366	—	17,817	267,792	.146
—	857	—	1,567	—	673	—	103	—	2,257	12,247	.021
—	101	—	210	—	97	—	11	—	289	1,716	.018
.016	59	.211	102	.163	64	.099	7	.211	151	977	.025
—	—	—	—	—	—	—	—	—	—	—	—
.025	42	.323	108	.249	33	.151	5	.323	138	739	.039
—	223	—	317	—	181	—	30	—	386	2,308	.018
.017	149	.220	220	.170	116	.103	22	.220	170	1,473	.016
.020	58	.267	87	.206	55	.125	6	.267	203	727	.029
.014	313	.190	360	.147	207	.089	30	.190	517	4,156	.023
—	10	—	16	—	10	—	1	—	35	140	.005
.016	113	.217	275	.167	74	.102	10	.217	827	2,052	.018
—	98	—	389	—	104	—	20	—	203	1,877	.036
.038	85	.499	352	.385	89	.234	17	.499	167	1,671	.069
—	29	—	26	—	11	—	3	—	33	218	.015
—	5,343	—	32,706	—	3,657	—	1,253	—	7,170	95,562	.095
.054	386	.712	2,242	.550	312	.333	105	.712	532	6,631	.088
.060	4,957	.790	30,463	.610	3,345	.370	1,148	.790	6,638	88,928	.096
—	6,229	—	34,299	—	4,342	—	1,359	—	9,460	108,027	.067

§Smoking-attributable fraction.
‖Smoking-attributable mortality.
¶Includes Falkland Islands.
**Excludes Belize.
††Includes Bermuda and St. Pierre and Miquelon.

Table 33. Adjusted estimates of smoking-attributable mortality (SAM) in the Americas, c. 1985

Region and country	Total SAM*	Chronic obstructive pulmonary disease†	Cancers‡	Other diseases§ and causes	Total adjusted SAM
Latin America	64,300	18,600	1,400	13,800	98,100
Andean Area	5,300	1,700	10	1,200	8,200
Southern Cone‖	22,100	4,900	700	4,500	32,100
Brazil	22,100	5,400	300	4,600	32,400
Central America¶	600	200	10	100	900
Mexico	7,000	5,100	100	2,000	14,200
Latin Caribbean	7,300	1,300	200	1,400	10,200
Caribbean	1,200	300	30	300	1,900
North America	310,300	43,800	12,000	60,000	426,100
United States	284,400	39,800	11,000	55,000	390,200
Other**	25,800	4,100	1,000	5,100	36,000
All regions of the Americas	375,800	62,700	13,400	74,100	526,000

Source: Pan American Health Organization (1990b). Adjustments were based on 1985 estimates for the United States; U.S. Department of Health and Human Services (1989). Percentages used for upward adjustment for chronic obstructive pulmonary disease and other diseases and causes were specific to those diagnostic rubrics. Upward adjustment for cancers was based on lung cancer.

*Total for men and women from Table 32.

†230% adjustment to compensate for undercounting.

‡10.4% increase added to adjust for omission of cancers of the kidney and pancreas and for underestimates of smoking-attributable fraction for cancers of oral cavity, esophagus, and larynx.

§16.4% increase added to adjust for exclusion of cervical cancer, other types of cardiovascular and respiratory diseases, deaths among newborns due to smoking by the mother, lung cancer deaths due to passive smoking, and deaths from smoking-related fires.

‖Includes Falkland Islands.

¶Excludes Belize.

**Includes Bermuda, Canada, and St. Pierre and Miquelon.

Conclusions

1. Certain sociodemographic phenomena—such as change in population structure, increasing urbanization, increased availability of education, and entry of women into the labor force—have increased the susceptibility of the population of Latin America and the Caribbean to smoking.
2. The lack of systematic surveillance information about the prevalence of smoking in most areas of Latin America and the Caribbean hinders comprehensive control efforts. Available information reflects a variety of survey methods, analytic schemes, and reporting formats.
3. Available data indicate that the median prevalence of smoking in Latin America and the Caribbean is 37 percent for men and 20 percent for women. Variation among countries is considerable, however, and smoking prevalence is 50 percent or more in some populations but less than 10 percent in others. In general, prevalence is highest in the urban areas of the more developed countries and is higher among men than among women.
4. The initiation of smoking (as measured by the prevalence of smoking among persons 20 to 24 years of age) exceeds 30 percent in selected urban areas. Although systematic time series are not available, the data suggest that more recent cohorts (especially of women) in the urban areas of more developed countries are adopting tobacco use at a higher rate than did their predecessors.
5. The smoking epidemic in Latin America and the Caribbean is not yet of long duration or high intensity, and the mortality burden imposed by smoking is smaller than that for North America. By 1985, an estimated minimum of 526,000 smoking-attributable deaths were occurring each year in all the countries of the Americas; 100,000 of these deaths occurred in Latin American and the Caribbean countries.
6. The estimate of 526,000 deaths annually is conservative and is best viewed as the first point on a continuum of such estimates. However, it provides an order of magnitude for the number of smoking-attributable deaths in the Americas.
7. The time lag between the onset of smoking and the onset of smoking-attributable disease is foreboding. In North America, a high prevalence of smoking, now declining, has been followed by an increasing burden of smoking-attributable morbidity and mortality. In Latin America and the Caribbean, rising prevalence portends a major burden of smoking-attributable disease.

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Chapter 4
Economics of Tobacco Consumption in the Americas

Preface *103*

Economic Costs of the Health Effects of Smoking *105*

Latency of the Health Consequences *105*
Estimating the Economic Costs *105*
  General Considerations and Limitations *105*
  Prevalence- and Incidence-Based Studies *110*
  Application to Developing Countries *112*
Financing of Health Care and Pension/Disability Funds *112*
Costs of Smoking-Control Policies and Programs *114*

Economics of the Tobacco Industry *114*

The Tobacco Sector *114*
  Overview *114*
  Demand for Tobacco *115*
  Advertising *118*
  Supply of Tobacco *119*
  Manufacturing *121*
  Distribution *121*
  Trade *122*
Subsidies to Tobacco Production *122*
Contribution of Tobacco to Economic Growth and Development *125*
  Externalities 125
  Price, Production, and Substitution *125*
Future of Tobacco Production *127*
Tobacco Taxation *127*
  Subnational Taxes *128*
  Effects of Excise Taxes on Smoking *129*
  Modeling Addiction 131
  Analysis of Recent Tax Increases *132*
  Health Consequences of Tax Changes *133*
  Equity, Incidence, and Distribution of the Tax Burden *134*
  Use of Tobacco Taxes *135*

Conclusions *136*

References *137*

Preface

Although the economic aspects of smoking in North America have been extensively examined, detailed data are not available for Latin America and the Caribbean. For the latter region, a definitive analysis of the health costs of smoking and the economic configuration of the tobacco industry await more systematic reporting and collection of data.

In the first part of this chapter, a generic approach to assessing the costs associated with the major adverse health effects of smoking is outlined. The background for this approach, which uses concepts introduced in Chapter 3, is described. Data and examples from the United States and Canada are provided, and the work done in these countries is summarized.

In the second part, an overview of the tobacco sector of the economy is offered. Again, more data are available from North America than from Latin America and the Caribbean, but the economic issues (supply and demand, advertising, subsidies, taxation, and others) are relevant to all countries of the Americas. This overview provides a framework for weighing the relative costs and benefits of tobacco production and consumption.

Economic Costs of the Health Effects of Smoking

Latency of the Health Consequences

Since 1964, when a report on the health consequences of smoking was released by the Surgeon General's Advisory Committee on Smoking and Health (Public Health Service 1964), extensive research has assessed the disability, morbidity, and premature mortality attributable to tobacco use. The many effects of smoking on health were documented in the Surgeon General's twenty-fifth anniversary report on smoking and health (U.S. Department of Health and Human Services [USDHHS] 1989). A detailed examination of smoking-attributable mortality (SAM) in the United States summarizes these associations (Table 1). (See Chapter 3 for an assessment of SAM in Latin American and Caribbean countries.)

As an epidemiologic transition occurs in Latin America and the Caribbean, noncommunicable diseases are expected to become increasingly prominent as causes of death. For example, although Brazil bears a burden from certain infectious diseases (such as Chagas' disease) and the growing incidence of human immunodeficiency virus infection, many other infectious and parasitic diseases have been brought under control. Many cases of lung cancer are now anticipated in Brazil (The World Bank 1989a). Cardiovascular disease is the leading cause of death in Brazil (The World Bank 1989a), and the number of deaths due to cardiovascular disease is likely to increase significantly. Among Latin American women, for whom prevalence of smoking appears to have increased (see Chapter 3), an increased incidence of lung cancer may soon become apparent (Crofton 1990).

Numerous studies have reported a 20- to 30-year latent period between the initiation of smoking on a regular basis and the development of lung cancer (USDHHS 1982), a phenomenon well documented in North America. In the United States, many men started to smoke as adolescents or young adults around World War I, and many women started as adolescents or young adults during or after World War II. The incidence of lung cancer in the United States began to increase for men around 1940 and for women around 1960 (USDHHS 1989). A similar lag occurred in Canada; from 1976 to 1986, the rate of lung cancer doubled (Millar 1988). An epidemiologic and economic result of latency is the continued rise in lung cancer deaths despite a decline in the prevalence of smoking. In the United States, the lung cancer mortality rate for men did not begin to level off until 1985 (USDHHS 1989). For women, deaths from lung cancer have not yet peaked, and lung cancer has become the most common cause of cancer mortality, surpassing breast cancer (USDHHS 1989).

The correlation between the level of cigarette consumption in a population cohort when it enters adulthood and the lung cancer rate for that cohort when it enters middle age provides further evidence of the 20- to 30-year latency (Figure 1). In Brazil, lung cancer mortality among adult males has increased as a lagged response to the increase in tobacco consumption (Figure 2) that began during World War II. Thus, the consequences of tobacco consumption—including economic consequences—are long in developing, and the full impact of disease, disability, and death is measured over decades.

Estimating the Economic Costs

Many estimates have been made of the costs of smoking in the United States and Canada. A similar body of work is not available for Latin America and the Caribbean—in part because the data required for such analyses are often not available. In addition, a single estimate would probably not serve adequately because of the heterogeneity among countries of the region. An approach to estimating the health costs of smoking is described below, along with some estimates that have been made.

General Considerations and Limitations

Estimates of the economic effects of the health consequences of smoking generally consist of three components (U.S. Office of Technology Assessment [USOTA] 1985):

- An attempt to identify an increased incidence of smoking-related illness in current or former smokers and attribution of that increase to smoking.
- An application of these attribution ratios to estimates of the direct (health care) costs of caring for persons with smoking-related illness—to obtain an estimate of the direct costs of smoking.
- An estimate of the indirect costs of smoking-related illness, which is made by measuring the increased rate of morbidity and mortality in current and former smokers and then valuing (1) time lost due to morbidity by their current wage rate and (2) excess mortality by discounted future earnings.

Table 1. Relative risks* (RR) for death attributed to smoking and smoking-attributable mortality (SAM) for current and former smokers, by disease category and sex , United States, 1988

Disease category (ICD-9-CM)†	Men RR Current smokers	Men RR Former smokers	Men SAM	Women RR Current smokers	Women RR Former smokers	Women SAM	Total SAM
Adult diseases (≥35 years of age)							
Neoplasms							
Lip, oral cavity, pharynx (140–149)	27.5	8.8	4,942	5.6	2.9	1,460	6,402
Esophagus (150)	7.6	5.8	5,478	10.3	3.2	1,609	7,087
Pancreas (157)	2.1	1.1	2,775	2.3	1.8	3,345	6,120
Larynx (161)	10.5	5.2	2,401	17.8	11.9	589	2,990
Trachea, lung, bronchus (162)	22.4	9.4	78,932	11.9	4.7	33,053	111,985
Cervix uteri (180)	NA	NA	0	2.1	1.9	1,246	1,246
Urinary bladder (188)	2.9	1.9	2,951	2.6	1.9	963	3,914
Kidney, other urinary (189)	3.0	2.0	2,729	1.4	1.2	363	3,092
Cardiovascular diseases							
Hypertension (401–404)	1.9	1.3	3,441	1.7	1.2	2,254	5,695
Ischemic heart disease (410–414)							
Persons aged 35–64 years	2.8	1.8	29,263	3.0	1.4	9,105	38,368
Persons aged ≥65 years	1.6	1.3	41,821	1.6	1.3	27,990	69,811
Other heart diseases (390–398, 415–417, 420–429)	1.9	1.3	27,503	1.7	1.2	14,638	42,141
Cerebrovascular disease (430–438)							
Persons aged 35–64 years	3.7	1.4	5,121	4.8	1.4	4,504	9,625
Persons aged ≥65 years	1.9	1.3	11,554	1.5	1.0	5,134	16,688
Atherosclerosis (440)	4.1	2.3	4,644	3.0	1.3	3,612	8,256
Aortic aneurysm (441)	4.1	2.3	5,798	3.0	1.3	1,435	7,233
Other arterial disease (442–448)	4.1	2.3	1,874	3.0	1.3	1,111	2,985
Respiratory diseases							
Pneumonia, influenza (480–487)	2.0	1.6	11,580	2.2	1.4	8,098	19,678
Bronchitis, emphysema (491–492)	9.7	8.8	9,670	10.5	7.0	5,269	14,939
Chronic airways obstruction (496)	9.7	8.8	29,838	10.5	7.0	16,884	46,722
Other respiratory diseases (010–012, 493)	2.0	1.6	828	2.2	1.4	690	1,518
Pediatric diseases (<1 year of age)							
Short gestation, low birthweight (765)		1.8	344		1.8	261	605
Respiratory distress syndrome (769)		1.8	351		1.8	233	584
Other respiratory conditions of newborn (770)		1.8	384		1.8	277	661
Sudden infant death syndrome (798)		1.5	422		1.5	280	702
Burn deaths‡			850			453	1,303
Passive smoking deaths§			1,330			2,495	3,825
Total			286,824			147,351	434,175

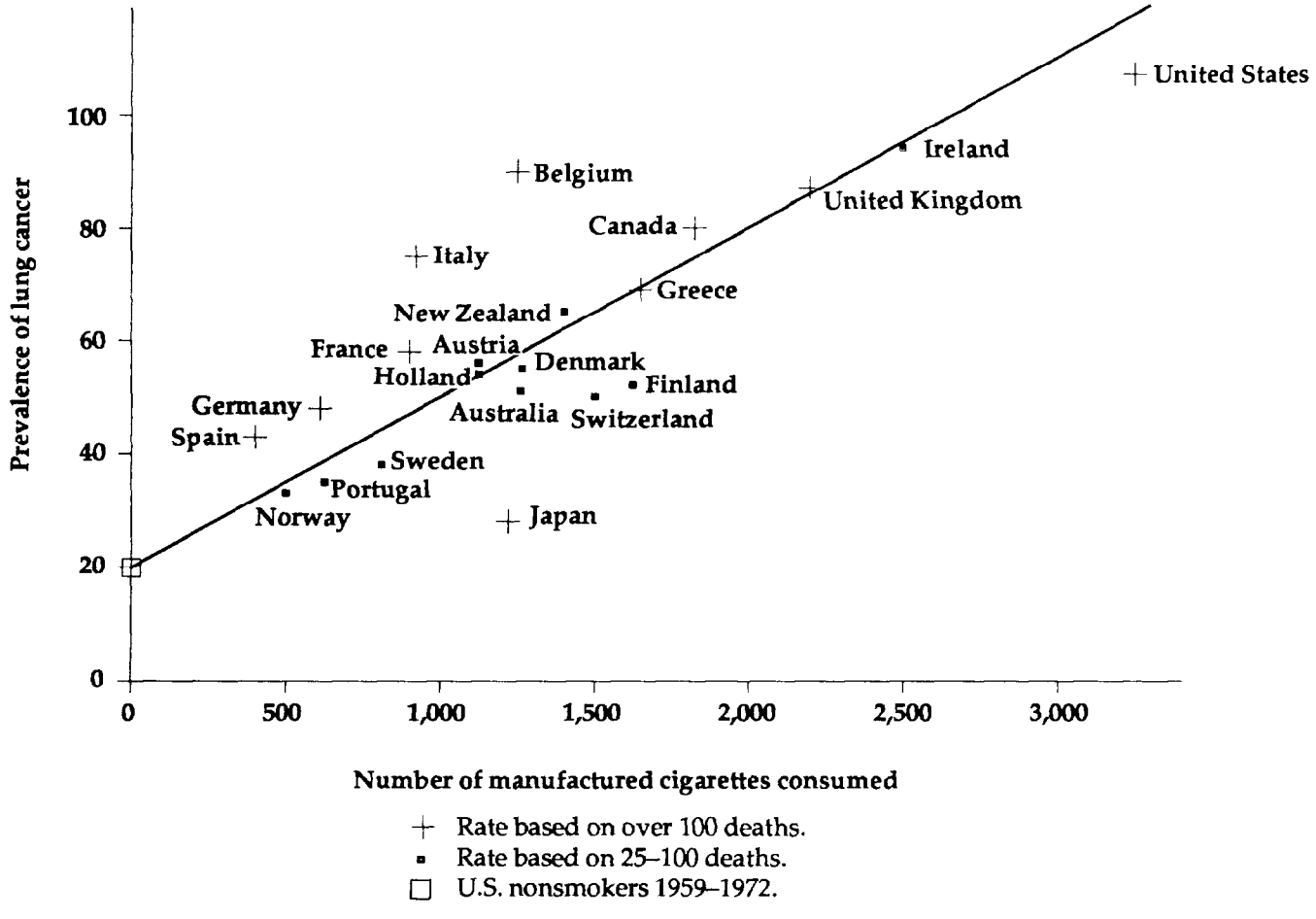
Source: Centers for Disease Control (1991).
*Relative to never smokers.
†*International Classification of Diseases, Ninth Revision, Clinical Modification.*
‡Data from the Federal Emergency Management Agency, 1990.
§Deaths among nonsmokers from lung cancer attributable to passive smoking; National Research Council (1986).

Several estimates have been made for the United States (Rice et al. 1986; Hodgson 1988), Canada (Collishaw and Myers 1984; Forbes and Thompson 1983a), the United Kingdom (Atkinson 1974), Sweden (Hjalte 1984), and Switzerland (Leu and Schaub 1984). Various factors should be included in a complete picture of the economic impact of smoking-related illness (Table 2), but few published studies have addressed all of these factors, and most studies have concentrated on factors for which data are available.

Most estimates of the costs of smoking-related illness calculate the direct costs of treating persons with smoking-related diseases, including the costs of hospital and nursing-home care, physicians' fees, and medications (Table 3). The specific items included in the estimates vary among studies, which also differ with regard to the medical conditions attributed to smoking. Some studies include lung cancer only, while others include heart disease and chronic obstructive pulmonary disease (COPD). Other studies compare differences in the overall use of health care by smokers and nonsmokers. However, these estimates do not include nonmedical components of direct costs, such as the costs of transportation to health care providers or of modifying an environment to accommodate a person with a severe chronic illness.

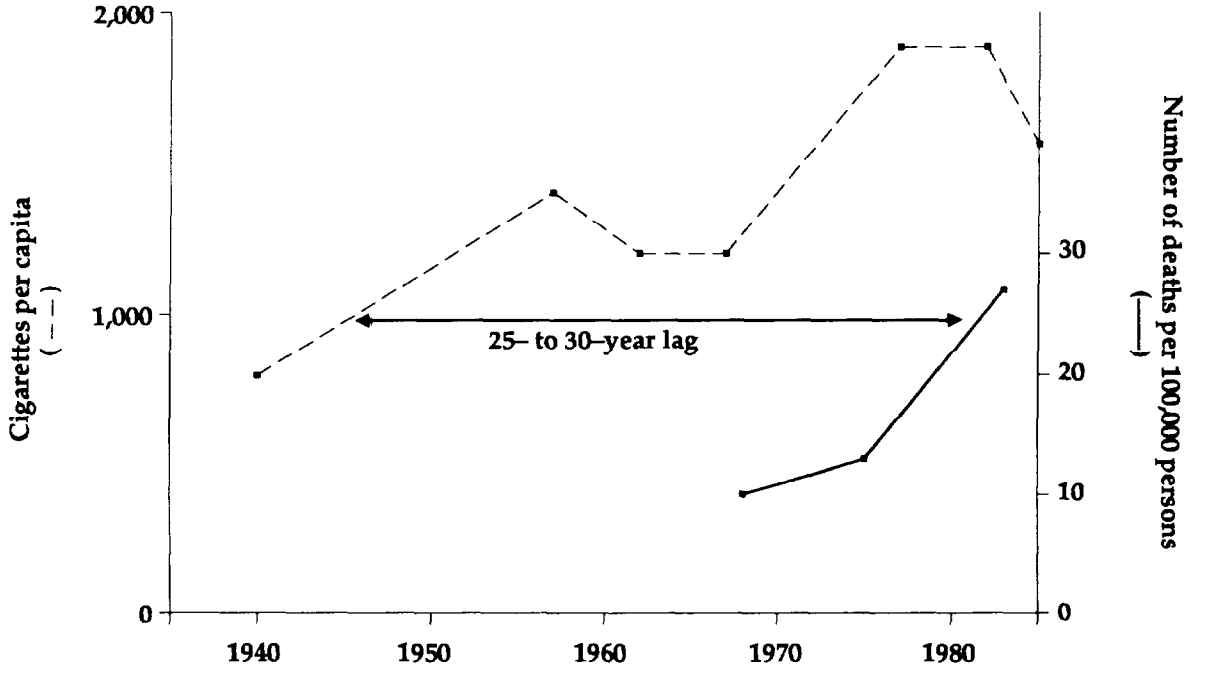
Estimates of the indirect costs of smoking-related illness attempt to measure the productivity lost or output forgone as a result of smoking-related illness or death (Table 4). This so-called human capital approach has been criticized for placing a high value on losses sustained by young adults, men, and more-

Figure 1. Correlation between cigarette consumption per person who entered adult life in 1950 and lung cancer rate for that generation as it entered middle age in mid–1970



Source: Doll and Peto (1981).

Figure 2. Per capita rate of cigarette consumption in Brazil and lung cancer deaths for men in Rio Grande do Sul, Brazil



Source: The World Bank (1989a).

educated persons (Markandya and Pearce 1989). In addition, earnings lost because of illness and mortality may have little relationship to the value people place on their life or health (Markandya and Pearce 1989). A more appropriate measure of that value may be the amount they are willing to pay to reduce the probability of death or disease. Although several attempts have been made to estimate willingness-to-pay for non-smoking-related illness (Viscusi 1990), this approach has not been applied to cost-of-smoking studies. In addition, no value has been assigned to intangible items, such as pain and suffering, premature death, and loss experienced by relatives; accordingly, these intangibles have not been included in any published estimates of the costs of smoking. Some estimates include costs associated with the harmful effects on the fetus and on newborns of maternal smoking during pregnancy and of postnatal exposure to environmental tobacco smoke (Forbes and Thompson 1983b); however, most published estimates do not incorporate measures of external costs (those borne by persons other than smokers).

The transfer payments (pension benefits and sick benefits) associated with smoking-related illness have been a source of confusion and controversy. Transfer payments reflect who pays for and who benefits from smoking-related illness; these transfers are not, strictly speaking, economic costs because they do not reflect resources consumed or lost due to smoking. However, discussions of smoking-control policies have frequently asked whether smokers in economically advanced societies (with well-developed public or private health care financing, disability, and pension systems) cover the costs of their own illness (Manning et al. 1989; Schelling 1986; Garner 1977).

Accurate estimation of the cost of smoking is influenced by the quality of data available, current demographic circumstances, and competing mortality risks. Cost estimates require reliable data on smoking behavior, the incidence of smoking-related illnesses, and the prevalence of such illnesses at death. In many developing countries, vital statistics are unreliable or incomplete (see Chapter 3, "Smoking-Attributable Mortality in Latin America and the Caribbean"), although several Latin American and Caribbean countries have well-established national statistical registries (World Health Organization [WHO] 1989) from which reliable estimates can be constructed.

Table 2. Components of the costs of the health effects of smoking

Component	Definition
Direct costs	
Medical care	Costs of treatment for smoking-related illness.
Other	Nonmedical costs of smoking-related illness.
Indirect costs	
Morbidity costs	Loss of earnings and/or housekeeping services due to smoking-related illness.
Mortality costs	Loss of earnings and/or housekeeping services due to premature death from smoking-related illness.
Intangible costs	
Pain and suffering	Cost to individual of pain and suffering from smoking-related illness.
Premature death	Cost to individual of premature death due to smoking.
Relatives' loss	Cost to smoker's relatives and friends because of concern for smoker's health, observation of sickness and suffering, and grief and suffering due to smoker's premature death.
Transfer payments	
Taxes	Reduced taxes paid by smokers due to illness-related reductions in earnings.
Pension benefits	Value of transfer payments such as pensions paid or forgone due to premature death.
Sick benefits	Health care costs paid by public or private insurance plans. Sick pay and disability benefits paid to smokers during illness.
External costs	Effects of smoking on nonsmokers, including deleterious health effects and the annoyance of exposure to environmental tobacco smoke. Includes the deleterious effects of maternal smoking on the fetus, on infants, and on children.

A country's demographic configuration influences the degree to which smoking-related illness becomes manifest. Since many smoking-related illnesses do not have an important impact on persons under age 50, such illnesses do not significantly contribute to mortality in countries where life expectancy after infancy is low; however, low life expectancy affects only a small proportion of the population in Latin America and the Caribbean (Chapter 3, "Life Expectancy and Mortality").

The manifestation of smoking-related illness is also a function of competing morbidity and mortality. Latin American and Caribbean countries are at different stages of epidemiologic transition, and the chronic conditions associated with smoking may be obscured by the continued presence of infectious diseases and other disorders. Countries also vary in the extent to which background conditions (nutritional, genetic, or environmental) interact with smoking.

Another limitation of cost-of-smoking studies is the method used to calculate attributable risk (AR).[1] Although quite useful, this calculation must be applied judiciously; it attributes all differences between ever smokers and never smokers to smoking, and it may overestimate the level of smoking-related illness. Smokers and never smokers differ in several characteristics, including diet and level of alcohol consumption, exercise, and education (USDHHS 1990), all of which may be associated with differences in health outcomes. Leu and Schaub (1983) developed the hypothetical construct of the "nonsmoking smoker-type," a person who is like a smoker in all ways except smoking, to serve as the standard of comparison in estimating costs of smoking. This construct was also used by Manning and associates (1989) to calculate the lifetime external costs of smoking in the United States. However, the concept may not be useful in many developing countries because of the variability of competing factors in different settings.

In attempting to estimate tobacco-related diseases in developing countries, some researchers have used a single measure of AR for each of the major smoking-related illnesses, such as lung cancer, heart

[1] A detailed discussion of the theory, limitations, and other methodologic issues concerning the calculation of AR and smoking-attributable disease and mortality is presented in the Surgeon General's 1989 report (USDHHS 1989).

Table 3. Medical care costs for smokers, by study type and author

Study type and author	Country	Year of estimate	Total cost (billions)*	Cost per smoker*
Annual costs (prevalence-based estimates)				
Collishaw and Myers (1984)†	Canada	1979	1.64	164
Luce and Schweitzer (1978)	United States	1976	52.02	868
Rice et al. (1986)	United States	1984	24.85	444‡
Stoddart et al. (1986)†§	Canada (Ontario)	1978	0.34	127
Thompson and Forbes (1983)†	Canada	1980	3.04	302
U.S. Office of Technology Assessment (1985)	United States	1985	12–35	214–870
Lifetime costs (incidence-based estimates)				
Manning et al. (1989)‖	United States	1983		6,113
Oster, Colditz, Kelly (1984)	United States	1980		2,474–6,576¶ 1,147–4,138**
Hodgson (1990)	United States	1985	501.0	6,239††
Hjalte (1984)†	Sweden	1980	0.18	73

*Converted to 1985 U.S. dollars by using U.S. Bureau of the Census (1988) Table 738 consumer price index.
†Markandya and Pearce (1989) report these estimates converted to 1980 U.S. dollars.
‡Total cost divided by 56 million smokers in the United States in 1985; U.S. Department of Health and Human Services (1989).
§Public expenditure only.
‖0.33 cost per pack x 16,300 packs = $5,379 (1983 U.S. dollars).
¶Men aged 40–44 light (1–14 cigarettes per day) to heavy (≥35 cigarettes per day) smokers.
**Women aged 40–44 light (1–14 cigarettes per day) to heavy (≥35 cigarettes per day) smokers.
††Lifetime cost for all smokers >25 years old.

disease, and COPD (90, 26, and 75 percent, respectively) (Pan American Health Organization [PAHO] 1989). Such use of AR can be misleading because the proportion of current and former smokers varies across countries and over time, and the relative risk is a function of smoking patterns (e.g., the number of cigarettes smoked daily and the duration of smoking), which also vary (USDHHS 1989). For example, Joly and colleagues (1983) reported that of all lung cancers for Cuba in 1984, 63 percent among women and 91 percent among men were caused by smoking; for U.S. women and men in the mid-1980s, the attribution proportions were 75 and 80 percent, respectively (Centers for Disease Control [CDC] 1987). Moreover, the relative risk for smoking is also determined by nontobacco causes of illness, and these differ among countries. Applying an exogenously determined set of AR proportions to any country's population may lead to unreliable estimates of the level and costs of smoking-related illness. However, for countries that lack endogenous data, this procedure is often the only alternative (see Chapter 3, "Smoking-Attributable Mortality in Latin America and the Caribbean").

Prevalence- and Incidence-Based Studies

The prevalence-based approach to measuring the economic costs of tobacco-related disease has frequently been used, largely because of its relatively simple methodology, the availability of the data needed for the calculations, and the consistency of carefully made estimates (Rice et al. 1986) (Table 3).

Several of these prevalence-based studies (Luce and Schweitzer 1978; USOTA 1985; Rice et al. 1986; Collishaw and Myers 1984) indicate that the costs of smoking in any one year are likely to be great and that the economic costs of smoking should be taken

Table 4. Value of productivity lost due to mortality and morbidity, by study type and author

Study type and author	Country	Year of estimate	Mortality		Morbidity	
			Total cost (billions)	Cost per smoker	Total cost (billions)	Cost per smoker
Annual costs (prevalence-based estimates)						
Collishaw and Myers (1984)	Canada	1979	4.04	405	0.75	74
U.S. Office of Technology Assessment (1985)	United States	1985	27–61	484–1,080[*†]		
Rice et al. (1986)	United States	1984	9.63	172[‡]	21.74	388[‡]
Lifetime costs (incidence-based estimates)						
Leu and Schaub[§] (1984)	Switzerland	1976	0.28–0.35	149–183	0.14–0.25	76–132
Oster, Colditz, Kelly (1984)	United States	1980		24,221–68,316[†‖] 5,894–21,765[†¶]		

[*]Total cost divided by 56 million smokers in the United States in 1985; U.S. Department of Health and Human Services (1989).
[†]Range includes both mortality and morbidity losses.
[‡]Converted to 1985 U.S. dollars by using U.S. Bureau of the Census (1988) Table 738 consumer price index.
[§]Markandya and Pearce (1989) report these estimates converted to 1980 U.S. dollars.
[‖]Men aged 40–44 light (1–14 cigarettes per day) to heavy (≥35 cigarettes per day) smokers.
[¶]Women aged 40–44 light (1–14 cigarettes per day) to heavy (≥35 cigarettes per day) smokers.

seriously. These studies estimate expenditures for medical care for tobacco-related diseases, workdays lost, and future productivity lost due to smoking-related deaths during the year. However, these studies do not address other issues that most concern policymakers, including the economic impact of decreased prevalence of cigarette smoking, the length of time before economic effects are realized, the economic benefits of not smoking, and a comparison of the lifetime illness costs of smokers with those of nonsmokers (Hodgson 1990). Health care expenditures tend to increase just before death, but smoking shortens life expectancy and changes the pattern of health care expenditures. The question arises whether the health care costs incurred by smokers, when adjusted for the altered temporal pattern, exceed costs incurred by never smokers.

Most cost-of-illness studies are based on estimates of the prevalence of illness in a particular year. Because many smoking-related illnesses are chronic and the latent period between initiation of smoking and onset of illness is long, prevalence-based cost estimates reflect the consequences of historical trends in smoking, which may differ among countries at different times. Accordingly, prevalence-based cost estimates cannot be used to predict the impact of smoking-control policies or to predict the impact of increases in smoking, except after long periods.

For policymakers, incidence-based, or lifetime, estimates of the costs of smoking-related illness may be more useful than prevalence-based estimates (Leu and Schaub 1983; Manning et al. 1989; Oster, Colditz, Kelly 1984). In the incidence-based model, the economic costs of smoking are estimated as the average additional costs per smoker, due to smoking-related illnesses, incurred over the smoker's lifetime. Estimates can be made of direct (medical care expenditures) and indirect (e.g., lost wages, salaries, and housekeeping services) costs of smoking and of the benefits of quitting. For lung cancer, coronary heart disease, and emphysema, the discounted value of anticipated lifetime costs has been estimated for smoking-related diseases in persons who smoked in 1980 and continued to smoke (Oster, Colditz, Kelly 1984). The costs of the benefits of quitting can be estimated as the difference between the cost-of-smoking estimate and the expected costs of former smokers, which reflect the gradual rate of decline in risk for smoking-related diseases.

Estimates of each smoker's lifetime cost of smoking differ by the person's age, sex, and quantity smoked (Oster, Colditz, Kelly 1984). For example, the

lifetime costs of smoking for a 45-year-old man who is a heavy smoker are significantly greater than those of a 65-year-old woman who is a light smoker ($46,334 vs. $2,462; in 1980 U.S. dollars). Oster and colleagues suggest that estimates of the costs of the benefits of quitting are less than the costs of smoking and that benefits vary according to the characteristics of individual smokers. The expected costs of both smoking and the benefits of quitting were sizable for all groups of smokers (Oster, Colditz, Kelly 1984).

Recently, Hodgson (1990) analyzed data on use and costs of medical care and on mortality for specific age groups in cross sections of the U.S. population to generate profiles of lifetime health care costs beginning at age 17. Because expenditures are higher for persons who die than for those who survive, the analysis distinguished between the two groups within a given age range. The profiles, estimated for men and women by age and amount smoked, include the costs of inpatient hospital care, physician services, and nursing-home care. However, the cost of drugs and dental care, as well as morbidity and mortality costs, are excluded. Hodgson concluded that, despite the higher death rate for smokers, the cumulative impact of the excess medical care used by smokers while alive outweighs their shorter life span and that smokers incur higher medical care costs during their lifetime. For all smokers, excess medical care costs increase with the amount smoked. Hodgson (1990) estimated that the U.S. population of civilian, noninstitutionalized persons aged 25 years or older who ever smoked cigarettes will incur lifetime excess medical care costs of $501 billion (1990 U.S. dollars discounted at 3 percent) or $6,239 per current or previous smoker (Table 3). This excess is a weighted average of the costs incurred by all smokers, whether or not they develop smoking-related illness. For smokers who do develop such illnesses, the personal financial impact is much higher.

Lifetime or incidence-based cost-of-illness estimates are preferred over prevalence-based estimates for measuring the costs of changes in, and trends affecting, the incidence of disease. However, lifetime cost estimates require knowledge of the natural history of disease, the pattern of medical care use, and the occurrence of co-morbidity. Lifetime costs are often estimated from current profiles for cross sections of populations at different ages and at different stages of disease. To measure the potential impact of changes in public policies and demographics on future health care costs, projections of cost estimates must be made. Changes in parameters, such as technologic change and its rate of diffusion, must be considered, or estimates may be biased and misleading (Hodgson 1988).

The incidence-based approach is better suited than the prevalence-based approach for estimating the costs of smoking because the former relates current changes in smoking behavior to future changes in the costs of smoking-related illness. The incidence-based approach, however, suffers from the limitations of transferability between countries (mentioned above); it does not directly address intangible costs and externalities; and it values mortality and morbidity by measuring forgone earnings rather than willingness-to-pay. Moreover, even for economically advanced countries, including the United States, the incidence-based approach is limited by the lack of adequate and comprehensive data; for less-developed countries, this limitation may be exacerbated.

Application to Developing Countries

The cost-of-illness studies conducted in the United States and other developed countries reflect health care rendered in technologically sophisticated, expensive health care systems. In many other parts of the world, health care delivery systems are less technologically advanced, and access to sophisticated therapy is frequently limited to residents of large metropolitan areas. Thus, the costs and benefits of health care services in one area may differ significantly from those found in other areas. Using the experience of North American and European countries to predict trends in health care for much of the rest of the world is speculative because both the future development of medical technology and the rate of its transference across national boundaries are largely unknown.

Few estimates are available on the costs of smoking-related illness in Latin American and Caribbean countries. In one report, an average of 19,000 deaths were attributable to smoking-related diseases in Venezuela during 1980 to 1984 (PAHO 1992). The costs of medical care and employee absenteeism associated with smoking-related illness in Venezuela increased significantly from 1978 to 1985 (from US$69 million to US$110 million). Because of the wide variation among countries in demographic structure, morbidity and mortality, health care systems, and prevalence of smoking, these results cannot be generalized to all of Latin America and the Caribbean.

Financing of Health Care and Pension/ Disability Funds

Considerable attention has been focused on not only the size of the economic burden of smoking-related illness but also on how societies will bear that burden. Miscalculations of economic burden have been derived by dividing prevalence-based estimates of the costs of smoking-related illness by the quantity of

cigarettes sold. The resultant quotient has been reported as the per cigarette cost of smoking borne by society. For example, in the United States, $2.17 is frequently quoted as the cost of smoking per pack of 20 cigarettes (USOTA 1985). This overall cost fails to distinguish between the costs of smoking borne by smokers (internal costs) and those borne by others (external costs). The discussion of taxation (later in this chapter) explains how the magnitude of the burden imposed on nonsmokers by smokers is as much a function of the institutional arrangements for financing health care, sick pay, disability, and retirement pensions as it is of the costs of smoking-related illness. Therefore, the incidence of the health costs of smoking varies among countries depending on the structure and scope of each country's social insurance system.

Different national systems finance health care, disability, and retirement within the Americas. In some countries, participation in benefit programs is financed by payroll taxes or job-related insurance premiums. These types of programs are limited to persons who participate in the formal economy. Although national health insurance systems are mandated in some countries, a low level of funding may limit the scope of public systems and lead to the creation of private markets for health services. Information on the formal health care system may be inadequate for measuring the external costs of smoking-related illness; data may be needed on the actual source and disposition of funds.

The U.S. health care system is financed by various government and private payment sources. In the United States in 1985, direct payments accounted for 24 percent and private insurance—principally provided by businesses for their employees—accounted for 33 percent of the total personal health care expenditures. The federal government paid for 30 percent, mostly through Medicare (a federal program for disabled persons and persons aged 65 or older) and Medicaid (a program that provides health care for the poor). State and local governments paid for 11 percent of health care expenditures, largely through contributions to the Medicaid program. Government health programs are financed by various mechanisms, including a payroll tax. The cost of employer-financed health insurance is included in total payroll costs and is reflected in prices, profits, and wage rates. Public old-age pensions and disability payments are financed through the federal Social Security Administration for most persons in the work force, but private plans account for a substantial proportion of benefits (Lazenby and Letsch 1990).

In Canada, health care is financed through a national system separately administered by each province, with some direction and funding from the federal government. The Canadian government finances a comprehensive set of medical benefits and restricts funding by private sources, but Canadian citizens can select their own health care providers. Physicians' fees and hospital budgets are negotiated by the government, and savings are achieved in part through the administrative simplicity of the insurance plans. In 1987, Canada spent US$1,483 per person for personal health services, and the United States spent US$2,031 (Igelhart 1989). In 1987, personal health services accounted for 8.6 percent of the total gross domestic product (GDP) in Canada and 11.2 percent in the United States (Igelhart 1989). These comparisons suggest that, on a per capita basis, Canada spends less on smoking-related illness than the United States does.

Brazil has a mixed public and private system for financing health care but is moving toward a new constitutionally mandated, unified, and decentralized health system (The World Bank 1989a). Brazil spends approximately 5 to 6 percent of its total GDP on health care, an amount divided almost equally between the private and public sectors. About half of all public financing for health care is channeled through the National Institute for Medical Assistance and Social Security and is tied to employment (The World Bank 1989a). Health services, primarily basic services for the urban and rural poor, are funded by the Ministry of Health through the general budget. State and local governments, which also finance health care, accounted for 27 percent of public expenditures on health in 1986. Private health care is financed by individual persons, who directly pay fees for services, and private insurance, largely financed by employers, which features various capitation and reimbursement-for-expenditures insurance plans. In a recent survey of the Brazilian health care system, The World Bank concluded that "resources have been poorly allocated; little is spent on prevention and much on curative care (70 percent on hospitals alone); little is spent on the poor, and much on the middle class" (The World Bank 1989a, p. 44).

In Venezuela, as in Brazil, access to health care is constitutionally guaranteed, but care is delivered both privately and through various government programs (Morgado 1989). The Ministry of Health is responsible for providing health care, and approximately two-thirds of the country's physicians are employed by the Ministry in some capacity. In addition, largely unregulated private insurance reimburses both physicians and private hospitals on a fee-for-service basis. The physician-to-population ratio is high; however, as in other Latin American countries, physicians are concentrated in the large urban centers.

The costs of smoking-related diseases may be substantial in Brazil, Venezuela, and other countries of the Americas with similar health care systems. The concentration of health care resources for curative care (mainly hospital and fee-for-service physicians' care) in urban, middle- and upper-class areas suggests that these groups consume a disproportionate share of the resources and that smoking-related diseases in these groups are treated aggressively. Smoking-related diseases may also be a more important source of illness in urban, high-income groups than in low-income groups because persons of high income are likely to have a longer, more intense exposure to tobacco use and a longer life span during which smoking-associated diseases may become manifest.

Costs of Smoking-Control Policies and Programs

Knowledge of the dangers of tobacco use and concern for public health have led to the development of smoking-control policies in several countries. (See Chapter 6 for a discussion of control efforts.) Many of these policies—such as restrictions on advertising, warning labels on tobacco packages and in advertisements, restrictions on smoking in public places, and increases in tobacco taxes—use few direct resources, but hidden or intangible costs may be associated with such policies. However, other smoking-control policies—such as public and school education programs, lobbying efforts of smoking-control advocates, and enforcement of restrictions on cigarette sales, advertising, and smoking in public places—use resources that can be considered part of the costs of smoking.

The 1989 report of the Surgeon General presents a detailed analysis of smoking-control activities in the United States (USDHHS 1989). Such activities have recently increased significantly in Canada, where the federal, provincial, and municipal governments have moved to increase tobacco taxes, restrict tobacco advertising, strengthen product warnings, restrict smoking in public places, and help tobacco growers diversify and produce other crops (Collishaw, Kaiserman, Rogers 1990). Except for the program to discourage tobacco cultivation, these policies and programs use few direct resources. These programs reflect, in part, the health advocacy of more than 30 voluntary agencies working individually and collectively (as the Canadian Council on Smoking and Health). Such advocacy activities, although rarely costed-out, consume resources that should be included in estimates of the costs of smoking-control activities.

Through the initiative of local medical leaders and health and education authorities, Brazil's first antismoking campaign began in Pôrto Alegre in 1976 (The World Bank 1989a), spread to other regions, and gained support. In 1985, the Ministry of Health began to develop a national program to control smoking. A recent evaluation by The World Bank (1989a) cited the Brazilian program as a success, although the effects of the program on smoking patterns have not been formally assessed. Health planners from The World Bank found that "public information and personal smoking-cessation services," which cost only 0.2 to 2 percent of per capita gross national product (GNP) for each year of life gained, were the most cost-effective of the preventive and therapeutic interventions reviewed. In contrast, treatment for lung cancer cost 200 percent of per capita GNP per year of life gained. This comparison suggests that public information programs designed to control smoking in Brazil are extremely cost-effective.

Economics of the Tobacco Industry

The Tobacco Sector

Overview

From an economic perspective, the existence of a market for tobacco indicates that tobacco produces some economic benefits, including (1) consumer satisfaction from smoking and other forms of tobacco use and (2) income to producers in excess of the cost of resources for tobacco production. Tobacco production also generates costs—principally the value of resources used to manufacture tobacco products. Confusion about the costs and benefits of tobacco production has been spawned by tobacco industry analysts who label the value of the land, labor, and capital used in tobacco production as a benefit of such production (Tobacco Growers' Information Committee, n.d.;

Agro-economic Services Ltd. and Tabacosmos Ltd. 1987). In fact, because the resources used in tobacco production are not being used for other products, the cost of these resources is the true resource cost of tobacco production. The value of the alternative goods that could be produced with the resources allocated to tobacco production is a measure of the opportunity costs of producing tobacco. A tobacco industry may also generate tax revenues, which are neither benefits nor costs to a society. Rather, taxes are transfers of resource claims from one segment of society to the government for redeployment. Subsidies, such as agricultural support programs, are also transfer payments.

The cultivation of tobacco is prima facie evidence of tobacco's net contribution to growers' incomes. Although tobacco production may be very profitable for the individual producer, it is not necessarily beneficial economically. Subsidies and externalities associated with the production of tobacco may lead to a divergence between what is best for producers and what is best for society as a whole.

Demand for Tobacco

Worldwide consumer demand for tobacco products drives the market for tobacco. In the economist's view, this demand originates from consumer efforts to satisfy exogenously determined wants, which are subject to constraints on consumer resources. Such constraints include limits on time and disposable income. By using information about products and prices, each consumer purchases a mix of goods to maximize consumer satisfaction.

One of tobacco's benefits is the avoidance of nicotine withdrawal symptoms by addicted smokers. This benefit and other pleasurable sensations, called "utility" by economists, may have many components, including status, enjoyment, relaxation, a sense of security, affiliation with other smokers, and perhaps in certain cultures, a sense of being modern or progressive. However difficult these attributes are to measure, economists posit that when consumers choose to spend some of their own limited resources on tobacco, they reveal their preference for purchasing tobacco than for engaging in other forms of consumption or savings.

Price is a measure of the amount of alternative goods forgone to purchase tobacco products. (The effects of variation in cigarette price on tobacco consumption are discussed later in this section.) Tobacco products, as well as most consumer goods, tend to obey the law of downward sloping demand—as price falls (rises), quantity demanded increases (decreases). Factors that increase the retail price of cigarettes, including taxes, tariffs, and import quotas decrease consumption. The cost of raw tobacco is generally not an important factor in the retail price of tobacco products. In addition, although the supply of cigarettes does not affect demand directly, supply influences consumption through the market price: as supply increases, price tends to decrease, which stimulates consumption until the additional sales clear the market. Factors other than price that influence the demand for cigarettes and other tobacco products are cited in Figure 3.

Income determines a consumer's command over resources and limits consumption options. In general, the consumption of most goods increases as income increases, but at a decreasing rate as consumers reach satiety for a particular good. The income elasticity of demand is defined as the percent change in the quantity demanded divided by the percent change in income that caused the demand change. The relation of consumption to income can be observed for individuals, groups, and countries, for which income and consumption fluctuate over time, and for variations in income and consumption among groups at a particular time.

For countries in the Americas, the correlation is positive between per capita cigarette consumption and per capita GNP (Figure 4 and Table 5). This relation is stronger in less-developed countries in

Figure 3. Factors, other than price, that affect the demand for tobacco products

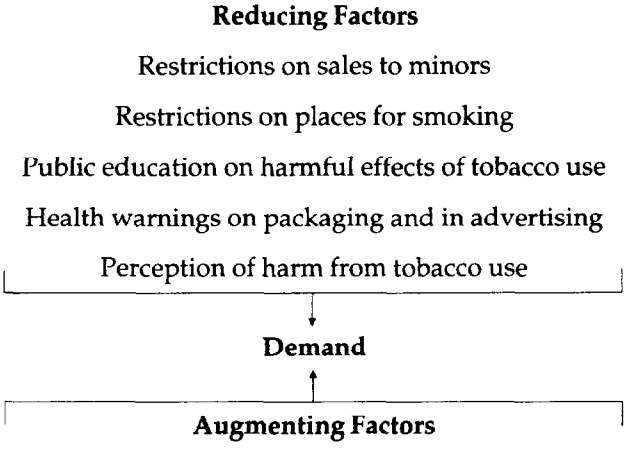
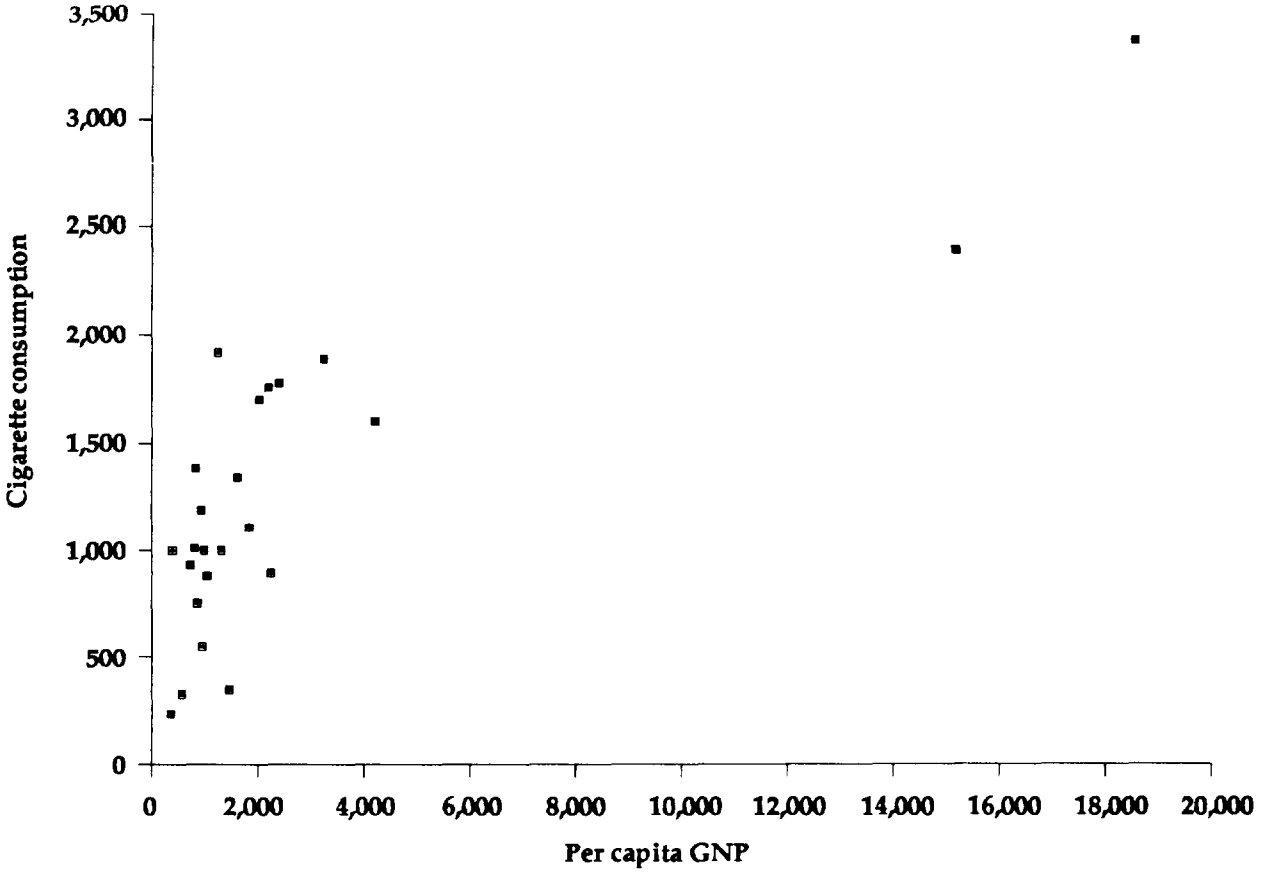


Figure 4. **Per capita cigarette consumption and annual per capita gross national product* (GNP) in 24 countries of the Americas,† 1985**



*Using a model that compares the annual per capita consumption of cigarettes to the log of the GNP, the relationship is expressed by the following linear regression equation: Consumption = -3241 + 616 ln(GNP per capita) (R^2 = .68). This equation was used to calculate the elasticities discussed in the text.
†See Table 5.

which rising incomes frequently lead to increased cigarette consumption due to an increase in the percentage of the population that smokes and in the amount each smoker smokes and to a shift from homemade and roll-your-own cigarettes to more-expensive, factory-made, higher-quality tobacco products.

Several studies indicate that income elasticity measured for multiple countries is higher than that measured for a single country (Table 6). The estimates reported by Chapman and Richardson (1990) and Townsend (1990), and the estimate based on the data in Figure 4, cluster around 0.50 (0.45 to 0.55). However, elasticity tends to fall as income rises, and near-zero estimates have been reported for developed countries (Table 6). In the model that compared consumption to the logarithm of GNP (Figure 4), estimated income elasticity of demand is approximately 2.0 at the lower end of GNP but falls to almost zero (0.04) at the upper end.

Restrictions on cigarette sales or on where smoking is permitted make smoking more difficult. These restrictions raise the total effective price of cigarettes for consumers and reduce cigarette consumption. Increased perception of the harm of cigarette smoking also depresses demand by increasing the total price of cigarettes (including health-associated costs) or by affecting taste.

Physical characteristics of cigarettes, such as filters, and aspects of taste, which include strength, flavor, and smoothness, augment demand. In many countries, the modern tobacco industry developed

Table 5. Per capita* cigarette consumption and income in the Americas

Country	Per capita cigarette consumption (1985)	GNP† per capita (US$) (1987)	Change in consumption (%) (1970–1985)	Average annual growth in GNP (%) (1965–1987)‡
North America				
United States	3,370	18,530	-15	1.5
Canada	2,392	15,160	-30	2.7
Latin America				
Argentina	1,780	2,390	3	0.1
Bolivia	330	580	10	-0.5
Brazil	1,700	2,020	30	4.1
Chile	1,000	1,310	-7	0.2
Colombia	1,920	1,240	15	2.7
Costa Rica	1,340	1,610	-20	1.5
Cuba	3,920		-2	
Dominican Republic	930	730	-11	2.3
Ecuador	880	1,040	26	3.2
El Salvador	750	860	-21	-0.4
Guatemala	550	950	-26	1.2
Haiti	240	360	-55	0.5
Honduras	1,010	810	7	0.7
Mexico	1,109	1,830		2.5
Nicaragua	1,380	830	10	-2.5
Panama	894	2,240		2.4
Paraguay	1,000	990	4	3.4
Peru	350	1,470	-10	0.2
Uruguay	1,760	2,190	14	1.4
Venezuela	1,890	3,230	-4	-0.9
Caribbean				
Barbados	1,380		20	
Guadeloupe	1,080		-1	
Guyana	1,000	390	-26	-4.4
Jamaica	1,190	940	-34	-1.5
Suriname	1,660		60	
Trinidad and Tobago	1,600	4,210	-16	1.3

Source: The World Bank (1989b); U.S. Department of Health and Human Services (1989); Chapman and Wong (1990).
*Aged 18 years or older.
†GNP = Gross national product.
‡1982–1988 data.

because of a shift in consumption from traditional forms of tobacco to modern, machine-made, quality-controlled, flavored cigarettes made from blends of tobacco, including *tabaco rubio*, a flue-cured tobacco. Some authorities have suggested that the development of filter-tipped cigarettes and long, slim cigarettes has increased smoking among women (see Chapter 2, "The Emergence of the Tobacco Companies"). The addictive nature of tobacco, another demand-augmenting factor, is discussed in a prior report (USDHHS 1988).

The degree of competitiveness or structure of the market for tobacco products can also affect the demand for cigarettes by operating on retail price, product differences, and product promotion. In many countries, the market for tobacco products may be reserved for a government-operated or sanctioned monopoly, but cigarette markets in the Americas are characterized by oligopoly—dominance of the market by several large firms (see Chapter 2, "The Emergence of the Tobacco Companies"). Prices tend to be lower and aggregate advertising and promotion expenditures

Table 6. Estimates of income elasticity of demand for cigarettes

Study	Data	Elasticity
Chapman and Wong (1990)	Worldwide, 1980	.45*
Chapman and Wong (1990)	Countries with gross national product <$5,000 per capita, 1980	.55*
Walsh (1980)	Ireland, 1953–1976	.33
Witt and Pass (1981)	United Kingdom, 1955–1975	.13
Lewit and Coate (1982)	United States, 1976	.08
Townsend (1990)	Europe, 1987–1988	.46
Data in Figure 4	24 countries of the Americas, 1985	.49

*Estimates calculated for this report from data provided in Chapman and Wong (1990).

tend to be higher in oligopoly markets than in monopoly markets, because of competition. In addition, oligopoly markets are characterized by greater variety as firms attempt to capture market niches for specific products.

Cigarette advertising and the sponsorship of entertainment, sporting, and cultural events are intended to increase the demand for particular cigarette brands. Measuring the effect, if any, of such advertising on aggregate demand is problematic. Accordingly, public policy toward cigarette advertising and promotional activities is controversial in many countries. Assessment of the impact of tobacco advertising and advertising restrictions was presented in the Surgeon General's 1989 report (USDHHS 1989) and is updated below.

Advertising

In the United States, cigarettes are one of the most heavily advertised products, and the mix of advertising and promotion has changed over time. Cigarette commercials have been prohibited from television and radio since 1971. In 1975, 75 percent of expenditures were directed toward traditional print advertising media (newspapers, magazines, billboards, and point-of-sale posters) and 25 percent toward promotional activities, such as coupons, free samples, public entertainment, and allowances to retailers (CDC 1990). By 1988, when total expenditures reached $3.27 billion, promotional activities accounted for more than two-thirds of all advertising and promotional expenditures. Despite the sizable decline in the use of traditional print media from 1975 to 1988, cigarettes were in 1988 the product most heavily advertised on outdoor media, the second most heavily advertised in magazines, and the sixth most heavily advertised in newspapers (CDC 1990).

In many other countries of the Americas, tobacco advertising expenditures are substantial (Table 7), despite restrictions on advertising activities (see Chapter 5). The Canadian Tobacco Products Control Act banned all tobacco advertising in the Canadian print media beginning January 1, 1989, and required that outdoor advertising on billboards and sponsorship of sporting and cultural events be phased out (Collishaw, Kaiserman, Rogers 1990). This advertising ban is currently being contested by Canadian tobacco companies in a protracted court case (Collishaw, Kaiserman, Rogers 1990).

Advertising aims to increase profit by increasing demand for a particular product (Scherer 1980). In oligopoly markets, advertising is used to differentiate

Table 7. Estimated advertising expenditures* of tobacco industry in selected countries of the Americas

Country	Cost
United States	$3,270.0
Canada	88.0†
Argentina	18.5
Brazil	68.0
Costa Rica	1.8
Dominican Republic	2.4
Ecuador	1.0
El Salvador	0.9
Guatemala	1.8
Mexico	19.8
Panama	1.8
Uruguay	0.7

Source: Philip Morris International Inc. (1988); ERC Statistics International Limited (1988); Centers for Disease Control (1990); Chapman and Wong (1990).

*Estimates are for 1986, 1987, or most current year available; in millions.

†A phased-in ban on tobacco advertising began in January 1989 and is scheduled for completion by January 1993. A court ruling declared the law unconstitutional, but it remains in effect pending appeal (RJR-Macdonald Inc. v. Attorney General of Canada 1990; Imperial Tobacco Limited v. Attorney General of Canada 1990).

among similar products and to build sales or to sustain the price of a particular product (Scherer 1980). Advertising attempts to associate smoking with attributes generally considered positive, such as high-style living, healthful activities, and economic, social, and political success; it fails to voluntarily provide information on the substantial hazards of cigarette consumption. In emphasizing the positive attributes of a product, advertising may increase demand for both a particular brand and a class of products. Much of the debate over tobacco advertising has focused on whether such advertising increases cigarette sales and, consequently, has a negative impact on public health, or whether advertising is strictly a competitive device tobacco companies use to determine relative market share in a stable or declining market, in which case such advertising would have little effect on public health (USDHHS 1989). The results of many analyses of the effects of advertising on cigarette consumption were reviewed in the Surgeon General's 1989 report, which cited the conclusion that it is "more likely than not that advertising and promotional activities do stimulate cigarette consumption" (Warner et al. 1986), although precisely quantifying the influence of these activities on the level of consumption may not be possible.

Evidence from the Canadian advertising ban and the continuing debate over increasing restrictions on advertising in the United States (Koop 1989) and other countries suggest that focus has shifted from the impact of advertising per se to the effects of advertising restrictions on consumption. An extensive study of this issue was performed by the New Zealand Toxic Substances Board (1989) in support of its recommendation for a total ban on tobacco promotion in that country. The relation between tobacco advertising bans and tobacco consumption was examined from 1976 to 1986 in 33 countries. The study demonstrated that "government tobacco advertising bans and controls are accompanied by enhanced rates of fall in tobacco consumption" (page xxiii) and that "the greater a government's degree of control over tobacco advertising and promotion, the greater the annual average fall in tobacco use in adults and young people" (page xxiv). As a follow-up to the New Zealand report, Laugesen and Meads (1990) examined the effects of tobacco advertising restrictions, price, and income on tobacco consumption between 1960 and 1986 in 22 economically developed countries. They found that a total ban on tobacco advertising would have lowered average consumption by 5.4 percent in 1986 in countries without a total ban at that time.

However, these studies have limitations—primarily a failure to account for the potential bias that antitobacco sentiment may be stronger in countries that ban advertising than in countries that do not. Accordingly, restrictions on tobacco advertising are, to some extent, markers of antitobacco sentiment, and a portion of the decline in consumption in countries with bans may be attributable to this sentiment rather than to advertising restrictions. In addition, both studies primarily included developed countries with a high but declining level of tobacco consumption. Extrapolation of these findings to less-developed countries with different patterns of tobacco consumption may be inappropriate.

Supply of Tobacco

Tobacco, which is grown in more than 120 countries, is the most widely grown nonfood crop. It is grown in most developing countries, and the share of tobacco production in developing countries has increased steadily from 50 percent of world production in 1961 to 1963 to 58 percent in 1972 to 1974 to 69 percent in 1987 (Stanley, in press) (also discussed in Chapter 2, "The Emergence of the Tobacco Companies"). In the past decade, most of the increase in worldwide tobacco production has been in China, which accounts for about 34 percent of total world production (Table 8). Major producers in the Americas include the United States (almost 10 percent of

Table 8. Share of world tobacco production, 1990

Country	Production*
Major producers	
China	33.5
United States	9.8
India	7.3
Brazil	6.3
USSR	5.4
Other producers in the Americas	
Canada	1.1
Argentina	1.0
Mexico	0.9
Cuba	0.6
Colombia	0.6
Dominican Republic	0.4
Paraguay	0.3
Venezuela	0.2
Chile	0.1

Source: Food and Agriculture Organization of the United Nations (1990).
*As percentage of world output; computed from weight of crop.

total world production) and Brazil (about 6 percent). Worldwide, about 22 percent of tobacco leaf by weight is grown in the Americas. Tobacco production is increasing more rapidly in developing than in developed countries and is expected to increase in developing countries to more than 72 percent of world production by the year 2000 (Food and Agriculture Organization of the United Nations [FAO] 1990). In the Americas, tobacco production is expected to decline from 23 percent of world production in 1984 to 1986 to 21 percent by the year 2000 (FAO 1990).

Considerable differences exist between the quality and, hence, the price of tobacco leaf produced in different countries. For example, tobacco grown in the Americas is worth almost four times as much as tobacco produced in China, although by weight, the American crop is only 65 percent of the Chinese crop (Agro-economic Services Ltd. and Tabacosmos Ltd. 1987).

Tobacco production is mainly concentrated on small farms in limited geographic areas. The value of the typical tobacco crop frequently makes tobacco an important source of income not only for growers but for local agricultural workers, even though tobacco is often grown in rotation with other crops. Compared with most other crops, tobacco uses little arable land (about 0.3 percent worldwide), but tobacco cultivation is labor intensive (Table 9) (Muller 1978). The tobacco industry's ability to create employment is valued in areas where labor is plentiful and production alternatives are few. Millions of persons are involved in or dependent on some stage of the tobacco-production process for a portion of their livelihood (Agro-economic Services Ltd. and Tabacosmos Ltd. 1987),

Table 9. Labor* and land use in tobacco growing, processing, and manufacturing in the Americas, 1983

Country	Growing		Processing and manufacturing	Distribution		Arable land used (%)
	No.	FTE†	FTE	No.	FTE	
North America						
United States		59.68‡	77.00	228.08	75.80	0.21‡
Canada	66.80	20.40	8.10	31.18	9.58	
Latin America						
Argentina	105.40	43.90	9.73	215.76	7.70	0.20
Bolivia						1.00
Brazil	600.00	288.90	43.87	352.00	120.20	0.50
Costa Rica						0.20
Chile	3.76	1.93	1.95	42.00	2.60	0.10
Colombia	302.00	100.50	9.35	108.00	30.30	0.40
Cuba	20.00	17.00	40.10	23.20	13.40	2.10
Dominican Republic						1.10
Ecuador						0.10
El Salvador						0.50
Guatemala	24.20	6.55	1.48	55.02	0.93	0.40
Haiti	1.23	1.23	0.44	12.20	1.52	0.10
Honduras						0.50
Mexico	351.00	117.00	4.81	197.50	25.90	0.10
Nicaragua						0.20
Panama						0.20
Paraguay						1.70
Peru	10.00	3.50	1.44	22.00	1.90	0.10
Uruguay						0.10
Venezuela	95.00	22.90	3.57	100.00	6.70	0.20
Caribbean						
Jamaica						0.40

Source: Agro-economic Services Ltd. and Tabacosmos Ltd. (1987); Chapman and Wong (1990).
*In thousands of workers.
†FTE = Full-time equivalent.
‡For 1989; U.S. Department of Agriculture unpublished estimates.

and persons in certain regions may substantially depend on tobacco.

Tobacco farming is also highly seasonal. If the work could be spread evenly throughout the year, the average-sized tobacco farm could be managed by one full-time farmer, with some time remaining (Stanley, in press). However, because many workers are needed for harvesting and planting, tobacco farming provides many countries with part-time, seasonal employment for many laborers (Table 9). The average number and full-time equivalent (FTE) number of workers employed in tobacco growing and other aspects of the tobacco industry vary widely in the Americas.

After tobacco is harvested, the crop is processed in various ways before being made into cigarettes and other consumer products. This processing includes sorting and grading, curing and drying, and destemming the raw tobacco leaves. In most countries, these activities occur in agricultural areas and are included in statistics for the agricultural sector. In other countries, some of these activities are associated with the initial stages of the manufacturing process and are included in statistics for that sector.

Many features of the tobacco market make tobacco particularly attractive to growers in many countries. First, and most important, when tobacco is grown extensively, it yields a higher net income per unit of land than most other cash crops and substantially more than most food crops. In addition, price does not fluctuate substantially for tobacco as it does for other cash crops. Moreover, in most countries, tobacco growers protect themselves from the unexpected price fluctuations that plague other crops by negotiating sales prices for crops before planting; growers are paid in cash immediately upon sale (Economist Intelligence Unit 1983). The combination of prenegotiated price and quick sale makes tobacco growing easy to finance. The extremely favorable conditions of sale offered to tobacco farmers are not usually offered to growers of other crops. Various combinations of government and transnational tobacco company activities, including controls on planting, production quotas (guaranteed prices, incentives, and subsidies), import duties, state tobacco monopolies, state trading in tobacco, foreign aid programs, and limitations on marketing, benefit tobacco growers in many countries. As a result, much of the risk of tobacco growing is shifted from the farmer to the purchaser.

Although tobacco provides most farmers with higher gross returns per hectare than many other crops do, considerable costs are associated with tobacco growing. In addition to being labor intensive, tobacco cultivation requires large amounts of fertilizers and pesticides, and in many areas, fuel (wood, gas, or oil) is needed for tobacco curing. The U.S. Department of Agriculture (USDA) estimated that, excluding land and quota cost, the cost of growing flue-cured tobacco in the United States in 1990 amounted to 70 percent of the value of the crop produced (Clauson and Grise 1990). In examining the opportunity costs of tobacco growing in Brazil in terms of alternative crops, Barrows (unpublished) found that the value that labor employed in tobacco growing would have in alternative activities is the most important factor in determining the profitability of tobacco. Barrows estimated that in 1986 in Rio Grande do Sul, total returns to land, labor, and management for tobacco were 130 percent of those for manioc and 118 percent for potatoes. However, cultivation of tobacco required 7.5 times as many man-hours of labor as manioc did and 5.3 times as many man-hours as potatoes did. Accordingly, all of the apparent additional returns to the tobacco grower were in fact returns to the additional labor invested, and the actual profitability and net social benefit of the tobacco crop depended on the wage rate and the potential alternative uses of the labor employed in tobacco growing.

Manufacturing

Most of the tobacco grown worldwide is flue-cured and processed on the farms. Tobacco is then manufactured into cigarettes, cigars, smokeless tobacco products, and loosely cut smoking tobacco. About 85 percent of worldwide tobacco production is used for cigarettes. Flue-cured tobacco accounts for almost 60 percent of the tobacco in American-style cigarettes and all of the tobacco in British-style cigarettes.

The manufacturing of cigarettes provides substantial employment in many countries, but the labor intensity of cigarette manufacturing varies considerably by country. In the United States, production is highly automated; seven factories produce enough cigarettes for the domestic market and for the large and growing export market. In Latin America, cigarette manufacturing is less automated and more labor intensive (Table 9). Cigar manufacturing is more labor intensive than cigarette manufacturing, which is reflected in the employment figures for countries that are important producers of cigars (e.g., Cuba and the Dominican Republic).

Distribution

Tobacco is distributed in many forms. Cigarettes are sold in cartons of 10 packs and in packs of 10, 15, 20, and 25 cigarettes. In many areas, street vendors

sell cigarettes individually from broken packs. In some countries, cigarettes are sold by tobacconists; however, cigarettes and other tobacco products are typically sold by retail merchants who also sell a variety of other consumer goods. Accordingly, in most countries, total employment in tobacco distribution is many times FTE employment because tobacco sales represent a small part of the employees' jobs (Table 9).

Distribution in the tobacco sector is a small component of larger distribution activities in most economies. Although attributing some proportion of employment to tobacco distribution activities is statistically appropriate, such attribution may be inappropriate for analytic reasons. In the absence of tobacco products, consumers would purchase alternative goods, and the production of these goods would result in employment—not only in the distribution sector but in the manufacturing and farming sectors as well. Although the level and type of employment generated by alternative consumption patterns may change with changes in the tobacco sector, total employment would not change significantly. Some persons, however, may be affected by shifts in consumption patterns; some persons may become unemployed, and some may change jobs or job activities.

The tobacco industry also creates output in other parts of the economy—both directly, by creating demand for products such as fertilizers, fuel, and paper used in the manufacture of tobacco products, and indirectly, when persons employed in the industry spend their earnings for their own consumption. Every economic activity, however, has both direct and indirect links to other economic activities. The exact nature of the links differs among industries and countries, but the net aggregate effect of shifts in demand into or out of specific industries is small, except perhaps for some transitional costs. Exceptions may occur, however, for factors that receive higher-than-normal returns (called "rents" by economists) from a specific activity. Such factors are particularly disadvantaged by a reduction in rent-producing activity; however, even their losses are balanced by gains to other factors of production or to consumers.

Trade

Most tobacco is consumed within the country of production; only 25 percent of world production is traded internationally, primarily as a raw commodity. Only the United States, the United Kingdom, and the Netherlands are important exporters of cigarettes, and the United States is the leading cigarette exporter—at 25 percent of the worldwide total. In addition, the United States exports much high-quality tobacco, which in several countries, is blended with tobacco from other sources to make the increasingly popular American-style cigarettes. The United States imports oriental tobacco and other less-expensive filler tobacco to blend with U.S.-produced tobacco to make cigarettes for domestic consumption and export. Brazil, another major tobacco exporter sells much of its crop in Europe. On the whole, countries in the Americas have a substantial balance-of-trade surplus in tobacco (Table 10).

Subsidies to Tobacco Production

Subsidization may be used in an attempt to develop or protect a domestic tobacco industry or to control the importation of cigarettes or tobacco to conserve foreign exchange. The growing and curing of tobacco is frequently controlled and directed by the main tobacco purchasers—either large, private companies or government agencies. In many areas, these organizations set the price of tobacco before planting and provide seeds or seedlings to tobacco farmers, who are thus guaranteed a minimum income for their crop at harvest time. These production controls are primarily designed to encourage the production of a limited amount of high-quality, marketable tobacco (Lewit 1988).

The situation in southern Brazil exemplifies an industry-sponsored support program for tobacco growers that has fostered the development of a tobacco-growing sector. The cigarette manufacturers provide the growers with all purchasable inputs—including seed, pesticides, and fertilizers—at wholesale prices, and maintain agricultural extension programs to develop tobacco plants and technology appropriate for the area. Farmers are visited regularly by technical advisers provided by the tobacco companies. The purchasers also control the chemicals used in growing tobacco so that the crop will conform to U.S. and European standards and be exportable (about 37 percent of the Brazilian crop is exported) (Economist Intelligence Unit 1983). The value of the extension services rendered to farmers is estimated at 30 to 35 percent of the prices paid to farmers for the tobacco (Economist Intelligence Unit 1983).

A similar relationship exists in Venezuela among the government, two tobacco processors, and several hundred tobacco farmers. The farmers receive financial and technical aid from the companies, along with guaranteed prices for crops. As a result, the companies have some control over the quality and quantity of the tobacco crop, but the companies can also set retail cigarette prices. The Venezuelan government

Table 10. International trade in tobacco, 1984 and 1985*

Country	Imports		Exports		Trade balance
	Total value	Percentage of all imports	Total value	Percentage of all exports	
North America					
Canada†	51,066	0.1	97,579	0.1	+46,513
United States†	734,082	0.3	2,658,053	1.3	+1,923,971
Subtotal	785,148		2,755,632		+1,970,484
Latin America					
Argentina	1,210	<0.1	46,310	0.6	+45,100
Brazil	140	<0.1	468,570	1.7	+468,170
Chile	800	<0.1	4,200	0.1	+3,400
Colombia	9,681	0.2	22,243	0.6	+12,562
Costa Rica	312	<0.1	521	<0.1	+209
Cuba	375	<0.1	64,866	1.0	+64,491
Dominican Republic	1,687	0.1	30,872	3.5	+29,185
Ecuador	1,900	0.1	993	<0.1	-907
El Salvador	1,041	0.1	510	<0.1	-531
Guatemala	1,000	<0.1	16,099	1.4	+16,753
Haiti	4,100	0.9	—	—	-4,100
Honduras	3,170	0.3	15,562	2.1	+12,392
Mexico	6,290	<0.1	30,420	1.3	+24,130
Nicaragua	137	<0.1	4,222	1.1	+4,085
Panama	1,458	0.1	1,873	0.7	+415
Paraguay	8,964	1.7	14,653	4.4	+5,689
Peru	3,173	0.1	292	<0.1	-2,881
Uruguay	4,842	0.6	1,136	0.1	-3,706
Venezuela	1,140	<0.1	14,380	0.1	+13,240
Subtotal	51,420		737,722		+686,302
Caribbean					
Guyana	695	0.1	—	—	-695
Jamaica	4,868	0.4	14,750	1.9	+9,882
Trinidad and Tobago	6,723	0.4	318	<0.1	-6,405
Subtotal	12,286		15,068		+2,782
Total	848,854		3,508,422		+2,659,568

Source: Agro-economic Services Ltd. and Tabacosmos Ltd. (1987); Chapman and Wong (1990).
*Unmanufactured tobacco only; in U.S. dollars.
†1983 data.

provides tobacco farmers with subsidized inputs and low-interest loans but receives a steady stream of tax revenues from a 50 percent tax on retail cigarette sales (*Tobacco International* 1989).

Canadian tobacco manufacturers offer subsidies to Canadian tobacco growers, which allow growers to competitively price Canadian leaf for export (Collishaw, Kaiserman, Rogers 1990). But in a unique turn of events, the Canadian government developed a subsidy program to downsize the Canadian tobacco industry (Collishaw, Kaiserman, Rogers 1990).

In Argentina, a levy on cigarette sales is used to finance a fund to support tobacco prices, but the fund is fairly static. Support prices have tended to fall as output increased, which has resulted in inadequate incentives to sufficiently increase crop quality for an export market (FAO 1990).

In other countries, such as the United States, tobacco production is encouraged by the establishment or support of high prices and the institution of production controls to avoid excess supplies. Since 1933, USDA has operated a tobacco price-support

program to increase the returns to tobacco cultivation (Warner 1988; Congressional Research Service 1989). Although the program was revised substantially in 1986, it still controls supply to reduce U.S. production and supports higher-than-free-market prices of U.S. tobacco for both domestic and foreign consumption. The current program also restricts the location of tobacco farms in the United States (Grise 1988), which probably makes U.S. tobacco production more costly than it might otherwise be.

Subsidization may introduce distortions into the tobacco market. By making tobacco growing more profitable to the farmer than it would be if prices were determined solely by market forces, subsidization encourages a shift of resources from other crops to tobacco. In competitive markets, such a resource shift would lead to an expansion in supply and an equilibrating fall in price. When supply is controlled and unable to expand, price does not fall, and farmers earn excess profits for their production. Many developing countries also attempt to discourage importation of foreign tobacco (either in raw form or as cigarettes) by setting bans, quotas, or high tariffs. Consequently, prices received by tobacco growers in these countries are likely to be above free-market prices; domestic production becomes stimulated; and tobacco farmers' incomes increase.

Excess profits, or rents, encourage producers to organize politically to protect themselves against increases in supply, falling prices, and government campaigns designed to discourage smoking. Such rent-seeking behavior has been observed in markets for many products around the world (Tollison 1982) and should be considered a consequence of most regulatory and subsidy policies. Furthermore, the net effect of programs that limit tobacco importation or production is beneficial to domestic producers but at the expense of consumers. These programs do not confer a net benefit on the country as a whole and only transfer income between groups. However, because such measures usually increase cigarette prices and may decrease cigarette quality, consumption may be reduced. But high tariffs and import restrictions can encourage the growth of an illegal market in smuggled cigarettes.

Although no official trade statistics estimate the size of the world market in illegally traded tobacco products, these statistics indicate that from 1984 through 1986, exports were 13 percent greater than imports (FAO 1990) (see also Chapter 2, "The Emergence of the Tobacco Companies"). Cigarettes smuggled from the United States have been a problem in several Latin American countries over the years, most recently in Colombia (Nares 1984). Cigarette smuggling also appears to be a problem in Uruguay and Paraguay, and the growing disparity in cigarette taxes between the United States and Canada has increased the incidence of border crossings to purchase cigarettes in conveniently located duty-free shops in the United States (USDA 1990). Illegal reimportation of Canadian cigarettes is also becoming increasingly common. Canadian cigarettes smuggled back into Canada from the United States accounted for an estimated 1 to 4 percent of total Canadian cigarette consumption in 1990 (Collishaw, personal communication 1991).

The United States is the world's second largest tobacco producer (after China) and the largest exporter of tobacco. U.S. tobacco exports accounted for 18 percent of all nonmanufactured tobacco traded internationally in 1984 to 1986, down substantially from the 35 percent market share held in 1955 to 1959 (FAO 1990). Spillover effects of the U.S. tobacco price-support program affect the development of tobacco-growing sectors in many developing countries. Higher-than-free-market prices, received by U.S. tobacco growers as a result of the U.S. tobacco program, benefit the growers and entitlement holders (those with permits to grow tobacco) at the expense of domestic and foreign consumers. These high prices also create opportunities for foreign producers to profitably produce tobacco for both domestic consumption and export (sometimes to the United States). U.S. tobacco, although very expensive, is perceived to be of high quality. Accordingly, a substantial fall in the price of U.S. tobacco could have a significant impact on the world market.

Sumner and Alston (1984) have estimated that elimination of the U.S. tobacco-support program would very conservatively result in a 50 percent increase in U.S. tobacco production and a 25 percent reduction in the price of U.S. tobacco. Very little of this increased production would be absorbed in the United States or abroad through increased consumption of cigarettes. Some of the tobacco (27 percent) would substitute for that currently imported by the United States, but most (73 percent) would be exported (Sumner and Alston 1984). The excess U.S. tobacco would be highly competitive with tobacco produced in other countries, and as a result, tobacco growing would become much less profitable in other countries. In fact, an increase in U.S. tobacco exported or substituted for imports could be devastating to developing countries that depend on tobacco export earnings for foreign exchange. Tobacco exported by developing countries amounts to over one-third of the current export market (Lewit 1988).

The various subsidies provided to many tobacco producers make the evaluation of tobacco-production policies complex, and each case should be examined individually to determine the true "benefits" of tobacco production. The vulnerability of tobacco exportation and prices to changes in U.S. farm policy is difficult to value, but tobacco-development projects should be evaluated in terms of potential changes to this policy. Tobacco production is profitable in many countries primarily because it allows participation in a subsidized market established by USDA. Thus, the subsidization of U.S. producers has created an opportunity for subsidization in other tobacco-producing countries as well.

Contribution of Tobacco to Economic Growth and Development

Tobacco production can contribute to economic growth and development directly by raising national income and investment and indirectly through various spillover effects. Heavily subsidized tobacco production enables transfer of resources from tobacco consumers to producers. When producers are concentrated in developing countries and consumers are concentrated in the developed world, this transfer tends to raise incomes and stimulate growth and investment in the developing countries. For example, Brazil, the second largest tobacco exporter in the world (after the United States), accounted for more than 14 percent of all tobacco exported in 1989. Most of Brazil's tobacco exports are sent to the United States and Western Europe (USDA 1985). Brazil obtains an above-market price for tobacco exports, due to subsidy programs in other countries, and profits from this exportation.

Because tobacco is readily marketable, investments in agricultural projects supporting tobacco production are usually self-liquidating, and in the past, such investments may have been thought attractive by international development agencies, which financed projects designed to enhance tobacco production in Latin America and the Caribbean (Chapman and Wong 1990). Such financing is currently under review by some international lenders because of concerns about the long-term health effects of encouraging tobacco-industry growth in developing countries.

Externalities

Several positive externalities, or technologic spillover effects, have been associated with both tobacco growing and manufacturing. Improvements in farming practices, for example, have increased yield from not only tobacco but other crops as well because many of the modern farming procedures introduced for tobacco growing can also be applied to other crops grown in rotation with tobacco (Sofranko, Fliegel, Sharma 1976; Economist Intelligence Unit 1983). Producing a tradable tobacco crop requires a high degree of quality control, and in many countries, tobacco purchasers provide the technical support and inputs necessary for a high-quality crop. Furthermore, manufacturing and marketing of tobacco products may require highly trained workers to maintain and support modern factories in developing countries (Philip Morris International Inc. 1988). The training, except for that specific to tobacco production, helps to increase the supply of sophisticated managers and technicians. These positive externalities, however, could probably be achieved for many other commodities as well.

One potentially negative externality is deforestation associated with curing tobacco. Several early reports indicate that curing with wood requires felling one tree per 300 cigarettes (Muller 1978). Stated in other terms, one hectare of woodland is required to cure either one hectare (Eckhold et al. 1984) or one-half hectare (International Agricultural Development 1984) of tobacco. The latter source also estimates that one in 12 trees cut worldwide is used for curing tobacco. These estimates correspond to a specific fuel consumption (SFC) of between 100 and 230 kg of wood per 1 kg of tobacco.

The only multicountry analysis of deforestation associated with the curing of tobacco was commissioned by the International Tobacco Information Centre (an industry-sponsored group) and was performed by the International Forest Science Consultancy (Fraser 1986). For the few countries examined, the researchers estimated that the SFC for individual farms ranged from 2.5 to 40 kg/kg (average of 7.8 kg/kg) and that the SFC for Brazil was 15 to 20 kg/kg. Overall, the report estimated that in tobacco-growing, developing countries, only 0.7 percent of trees cut for all purposes are cut for tobacco curing. Because no available data question these findings, deforestation associated with tobacco curing cannot currently be considered a significant negative externality, although deforestation in general is a major concern in many parts of Latin America.

Price, Production, and Substitution

A decline in the price of tobacco, which would discourage production, would occur if demand for tobacco were significantly reduced or if the subsidies and tariffs that support tobacco production were

reduced. Worldwide, a significant excess supply of tobacco would result if production controls were relaxed (FAO 1990). The substantial price reduction that would probably result from this excess supply would make tobacco growing less profitable than it currently is.

As described earlier, tobacco produced for export allows a country to participate in a subsidized international market and capture some of the economic transfers between consumers and producers that occur in such markets. Such participation may benefit a country's net income, provided that no serious externalities are associated with tobacco production. When tobacco is produced for domestic consumption, however, most subsidies enjoyed by domestic producers are financed by domestic consumers, and domestically financed subsidies are likely to encourage rent-seeking behavior. Such behavior may in turn lead to increased efforts to protect the domestic market from foreign competition. It may also result in attempts to encourage tobacco consumption and restrain policies designed to discourage consumption for health reasons. However, the higher prices that result from controls on supply may alone reduce consumption.

Tobacco production has also been encouraged to allow substitution for imported tobacco. Economic development through import substitution was a popular economic policy in South America in the 1950s (Fishlow 1990). For the tobacco sector, this policy may appear attractive in the short term because import substitution saves on foreign exchange, creates employment, and shifts the subsidy paid by consumers from foreign suppliers to domestic producers. The development of a domestic tobacco sector almost certainly results in increased tobacco use because of a decline in tobacco's real price. In addition, development of a domestic sector makes it more difficult for a country to mount successful antitobacco campaigns because domestic producers rather than foreign suppliers are affected. Because of these conflicting interests, the measurement of the net costs or benefits associated with developing a domestic sector is difficult and must reflect the idiosyncrasies of each country.

Increased support for the production of crops other than tobacco might effectively control tobacco production (Warner et al. 1986). For example, some farmers in the tobacco-growing area of southern Brazil choose not to grow tobacco because of the large labor input required (Economist Intelligence Unit 1983), which suggests that tobacco may be only marginally advantageous for many growers in that area. But a policy of support for other products must be carefully considered for each country. In some areas, alternatives to tobacco growing are feasible. For example, vegetables (such as tomatoes) have been suggested as alternatives in North Carolina. However, because of soil and climatic conditions, the cultivation of other crops in other areas may not be economically viable.

Market response to attempts to substitute other crops for tobacco may complicate this policy. Increased production of alternative crops may lead to a fall in their prices, which not only makes them less-attractive substitutes for tobacco, but also harms traditional producers of these crops. Similarly, a decline in tobacco production by established producers may merely produce opportunities for competitors to initiate or increase production. Given the potential excess supply of tobacco in many countries, programs that encourage production of alternative crops will probably require strict controls to successfully reduce tobacco production. The main attraction of such policies may be that they provide a politically acceptable way to "buy off" tobacco growers. By offering growers an acceptable, profitable alternative to tobacco, policies designed to reduce the demand for tobacco may be easier to implement.

In 1987, Canada instituted a C$30 million tobacco diversification plan, and by 1990, about C$80 million had been allocated to the plan. One component of the plan, the Alternative Enterprise Initiative Program, focuses on the development of alternative crops and production technologies to benefit tobacco-growing regions (predominantly Ontario). A second part of the program offers cash incentives to encourage tobacco farmers to retire from the industry (USDA 1987a,b). The Canadian government has only recently begun to evaluate this program; anecdotal evidence suggests, however, that most retired Canadian tobacco growers have found alternative employment and that the local economy in the tobacco-growing area of Ontario is flourishing (*Delhi News-Record* 1990). This trend in Canada is consistent with trends in the United States where, even without a program designed to underwrite downsizing, tobacco agricultural employment declined by 20 percent between 1977 and 1985 (U.S. Bureau of the Census 1988). From 1979 to 1989, U.S. tobacco acreage declined by 16 percent, but because of an increase in yield per acre, production fell by only 4 percent. To some extent, the shifts in U.S. tobacco production during the 1980s reflected changes in the USDA crop-support program, which reduced prices to make U.S. tobacco more competitive in international markets and bring supply and demand into better balance.

Future of Tobacco Production

Health considerations aside, the case is weak for promoting long-term, worldwide increased tobacco production for economic reasons. Although tobacco is often a very profitable crop, much of its advantage stems from the various subsidies, tariffs, and supply restrictions that support its high price and provide economic rents for its producers. If the U.S. tobacco price-support program, which is an important determinant of the price of tobacco in international markets, were abolished or radically altered, foreign tobacco producers might have to contend with a massive increase in the supply of U.S. tobacco and a fall in tobacco prices that would make tobacco production much less profitable.

Other changes in the world tobacco market may also make tobacco a much less attractive crop. At present, despite substantial growth in tobacco consumption in China, which has a self-sustaining market, worldwide per capita consumption of tobacco is projected to be similar in the year 2000 to that in 1974 to 1976 (FAO 1990). Demand for tobacco in the major, developed countries has been decreasing because of health concerns. Therefore, even without a major shift in U.S. tobacco policy, tobacco-exporting countries may find it increasingly difficult to market their crop to their traditional markets in economically developed countries. In closed markets or in developing countries, this difficulty may put pressure on prices and cause countries to look for domestic outlets for their tobacco crops.

The economic implications of shifts in international tobacco markets could be significant. When producers are concentrated in the less-developed countries, as they now are (except for the United States), and their customers are concentrated in the developed world (primarily Europe and Japan), the income transfer may benefit the developing countries. If developing countries begin trading tobacco among themselves, the transfers would benefit the recipients at the expense of other developing countries, and no net gain would result for less-developed countries as a group. This intercountry transfer would be similar to that which results when high tariffs and import restrictions benefit domestic producers at the expense of domestic consumers.

The U.S. tobacco industry recently opened markets for U.S.-manufactured cigarettes in Japan, South Korea, and Taiwan (Council on Scientific Affairs 1990). Previously, sales of U.S.-manufactured cigarettes and, to a lesser extent, U.S. tobacco were restricted by these countries to protect their domestic industries. The Canadian tobacco industry is also looking for foreign markets in which to develop or expand to compensate for the decline in the Canadian cigarette market (Ontario Flue-Cured Tobacco Growers' Marketing Board 1990). In China, if domestic demand slackens, domestic health concerns increase, or the desire to earn foreign exchange develops, Chinese tobacco producers may enter the international market and have a significant impact on supply, exert downward pressure on tobacco prices, and reduce returns for other countries.

Regardless of future tobacco policies in the United States and China, a significant, excess supply of tobacco is possible. Many policies have been instituted to constrain the supply of tobacco and support current prices. Increased demand for excess tobacco is likely to come from developing countries, but demand will depend on rates of growth in income and on government tobacco policies.

Tobacco Taxation

Almost all countries levy taxes directly on tobacco products, mostly on manufactured cigarettes and imported tobacco. In some countries, the right to manufacture, distribute, and import tobacco products is reserved for a government monopoly. In such countries, the excess profits of the monopoly are a form of indirect taxation on tobacco, in addition to the taxes nominally levied.

Taxes may be extracted during most stages of tobacco processing. Import tariffs and customs duties are frequently levied on both raw tobacco and manufactured tobacco products. In many countries, some brands of manufactured cigarettes are made from tobacco blends, which include imported tobaccos. As a result, an import duty is usually included in the price of these cigarettes. In addition, imported cigarettes, usually American or European brands, are available in many countries. Because of high tariffs, these imported cigarettes sell at a substantial premium—when compared with domestically produced cigarettes, including domestically produced versions of international brands licensed by the large multinational tobacco companies. In addition to import duties, many countries levy excise taxes on domestically produced tobacco products and levy value-added, general sales, and general business income taxes.

Tobacco taxes are popular primarily because of their low administrative cost relative to generated revenues. Tobacco taxes are easy to collect because most tobacco passes through only a few physical locations (cigarette factories and/or ports of entry) during manufacturing. In countries where tobacco production and distribution are government controlled, the

government may set the margins received by retailers, as well as the prices paid to the various factors of production. Because these prices are frequently set administratively, rather than by the market, judging the net profitability of the government tobacco monopoly or determining the extent of the subsidies paid to the various production factors is difficult.

While in some countries tobacco taxes account for a substantial amount of all central government tax revenues (Chapter 6, Table 2), in the United States and Canada, these taxes account for only about 2 percent. In 1985, income tax collections accounted for less than 1 percent of GDP in Argentina (Dornbusch and De Pablo 1990) but almost 10 percent in both the United States and Canada (The World Bank 1987). In Argentina, a country of more than 30 million residents, only 1.5 million residents were registered taxpayers, and only 29,000 persons actually paid any tax. Tobacco taxes accounted for 4 percent of GDP in Argentina in 1985 (Achutti, personal communication 1990).

Recently, taxes of all kinds have not been an important source of finance for government operations in some Latin American countries. In these countries, government operations are largely financed by printing money, which results in inflation. Then, the relative importance of tobacco taxes in public finance is reduced, and if tax rates are not adjusted to an increase in the cost of living, the real value of tobacco taxes and retail prices may fall substantially.

Tobacco taxes and tariffs may be either unit or ad valorem taxes. Unit taxes are denominated at a specific nominal rate per unit of a good (per cigarette, per pack of 20 cigarettes, per kilogram of tobacco) and are most susceptible to erosion in real terms as prices increase. Even in countries such as the United States and Canada, which have had a moderate rate of inflation, unit tobacco taxes may decline over time if the nominal tax rate is not increased enough to keep pace with increases in the overall price level (Lewit 1988; USDHHS 1989). To compensate for this tendency, the Canadian cigarette tax was indexed in the early 1980s to changes in the general price level. The Canadian national tax is no longer indexed, but it has been increased more rapidly than inflation in recent years. In many countries, tobacco tariffs are ad valorem levies, which are denominated as a percentage of price (e.g., a general sales tax). Ad valorem taxes tend to track with inflation since the tax rises as the cost of cigarettes increases. Although changes in the price of imported tobacco may be captured by this mechanism, little impact on cigarette prices may result because imported tobacco and tobacco products are a small part of the tobacco market in most countries of the Americas.

Subnational Taxes

Local and provincial governments may also tax tobacco products. In the United States, all states, the District of Columbia, and many municipalities levy taxes on tobacco products, and many also tax tobacco products via general sales taxes. In recent years, the amount of tobacco tax collected by all states combined has been almost equal to that collected by the federal government. In Canada, all provincial governments also levy taxes on tobacco products, and these taxes accounted for more than 50 percent of all tobacco taxes collected in Canada in 1989 (Canadian Council on Smoking and Health 1989). In Colombia, approximately 10 percent of the revenue of provincial governments is derived from levies on Colombian cigarette sales (Nares 1984).

Differences in cigarette tax rates among countries and subnational divisions can complicate the enforcement of tax laws. In particular, big differences in tax rates provide an incentive for smuggling—the purchasing of cigarettes in low-tax jurisdictions for consumption or resale in high-tax jurisdictions. Various tax-evasion activities have been identified: buying cigarettes in neighboring lower-tax areas for personal consumption; organized smuggling of cigarettes for commercial resale; purchasing cigarettes through tax-free outlets (international ports of entry, military stores, and Indian reservations); and illegal diversion of cigarettes within the traditional distribution system (forged tax stamps and underreporting) (Advisory Commission on Intergovernmental Relations 1977).

In the United States, as the differentials in state tax rates increased rapidly during the late 1960s and early 1970s, the level of cigarette tax evasion also increased substantially. In response, the Federal Cigarette Contraband Act was enacted. Law enforcement problems, stemming from organized interstate cigarette smuggling, contributed to the deceleration of state tax increases in high-tax states (Advisory Commission on Intergovernmental Relations 1985). Because the range of real prices has declined among states, interstate smuggling has become less profitable. This decline in profitability and increased federal enforcement have probably accounted for the subsequent decline in cigarette smuggling (Advisory Commission on Intergovernmental Relations 1985).

International cigarette smuggling can have an adverse impact on national tobacco companies and reduce revenue for governments. In Colombia, where

cigarettes are subject to indirect taxation of up to 120 percent of the wholesale price, contraband U.S. cigarettes have been smuggled into the country from the United States, Panama, Venezuela, and the Caribbean (Nares 1989; *Tobacco International* 1989). The president of Coltabaco (Cia. Colombiana de Tabaco S.A.), the Colombian tobacco company, estimates that smugglers now control 35 percent of the national cigarette market (Nares 1989). In Canada, citizens cross the U.S.-Canadian border to purchase Canadian cigarettes in U.S. duty-free shops. The increase in this activity may be linked to recent substantial increases in Canadian cigarette taxes (USDA 1990).

Effects of Excise Taxes on Smoking

One nearly universal economic concept is the law of downward-sloping demand—that is, the quantity of a commodity demanded declines as the price for that commodity increases. Numerous econometric studies have confirmed that this law holds for cigarettes, even though they are addictive, and the relation has also been demonstrated for various addictive drugs (Henningfield 1986). Because excise taxes increase the price of cigarettes, such increases should reduce the demand for cigarettes.

An analysis of the price elasticity of demand for cigarettes estimates the effect on consumption of a change in excise tax rates. Price elasticity of demand measures the degree of responsiveness of demand to changes in price; it is the percent change in the quantity of a good demanded, divided by the percent change in price that caused the demand change. Thus, an elasticity of -0.5 means that a 10 percent increase (decrease) in price would reduce (increase) by 5 percent the quantity of cigarettes demanded. To determine the effect of a tax change, the price elasticity of demand must be multiplied by the percent change in price that resulted from a tax change, since cigarette taxes account for only a part of the total retail price of cigarettes. The elasticity of demand with respect to a tax change is generally less than the price elasticity of demand.

Numerous attempts have been made to measure the price elasticity of demand for cigarettes (Table 11). The estimates are from econometric studies that attempt to explain differences in cigarette consumption as a function of price, income, and demographic variables. Different data sets, units of observation, and statistical techniques were used. Estimates were derived from (1) time series of per capita cigarette consumption for countries as a whole or for cross sections of states or countries and (2) survey data on the smoking behavior of cross sections of populations at a point in time and over time. Each of these procedures may result in problems of interpretation. In the time-series studies, the estimates of both price and income elasticity are sensitive to the construction of the different models. In addition, time-series estimates are frequently unstable because the independent variables tend to be highly correlated with each other. On the other hand, estimates based on cross sections of tax-paid sales may be biased upward because some cigarettes sold in low-tax areas are consumed by smokers in high-tax areas. As a result, the estimated price elasticity of sales exceeds the price elasticity of actual consumption.

Data for participants in two national U.S. surveys were used to evaluate the effects of price (tax) differences on individual smoking behavior (Lewit, Coate, Grossman 1981; Lewit and Coate 1982). For a sample of 19,288 persons aged 20 to 70 from the 1976 National Health Interview Survey, the overall price elasticity was estimated at -0.42 for cigarettes (Lewit and Coate 1982). A more detailed breakdown suggested that increased prices primarily reduced the number of smokers (measured as prevalence, or the participation rate) (Lewit and Coate 1982). The estimated effects on the number of cigarettes consumed per smoker were not statistically significant. Differences in the estimated price elasticity were also found among groups; reported elasticity was much higher for adult males than for adult females and much higher for persons aged 20 to 25 than for those in other age groups (Table 12).

In a methodologically similar study, smoking was analyzed for a national sample of 6,788 youths, aged 12 to 17, surveyed between March 1966 and March 1970 (Lewit, Coate, Grossman 1981). Because antismoking messages were broadcast during this period (under the Federal Communications Commission's Fairness Doctrine), these researchers were also able to investigate the effect of that policy on teenage smoking. They reported that elasticity of demand for cigarettes was greater in absolute value for teenagers than for adults (Table 12). In addition, smoking participation was more responsive to price than was quantity smoked. The estimated teenage smoking participation elasticity was -1.20, and the elasticity for quantity smoked, conditional on smoking, was -0.25.

These results suggest that increases in tobacco taxes can deter smoking. Since teenagers appear to be more responsive than adults to changes in the price of cigarettes, excise tax increases may be very effective in preventing the onset of smoking by teenagers. By preventing the onset of this addictive behavior,

Table 11. Recent estimates of the price elasticity of demand for cigarettes

Reference	Estimated aggregate price elasticity	Data, country, dates
Walsh (1980)*	-0.79, -0.38†	Ireland, 1953–1976
Lewit, Coate, Grossman (1981)	-1.44	HES III‡ 12- to 19-year olds United States, 1966–1970
Lewit and Coate (1982)	-0.42	NHIS§ Elasticities by age and sex 20- to 74-year olds United States ,1976
Peturinen (1984)*	-0.48‖ -0.96	Finland, 1960–1981 Tested, 1982–1983
Advisory Commission on Intergovernmental Relations (1985)	-0.45	Pooled time series of state cross sections United States, 1981–1983
Bishop and Yoo (1985)	-0.45	Time-series aggregate data United States, 1954–1980
Mullahy (1985)	-0.47	NHIS§ by sex United States, 1979
Radfar (1985)*	ST¶-0.23 LT -0.39	United Kingdom, 1965–1980 (quarterly)
Collishaw, Myers, Rogers (1985)	ST -0.42 LT -0.91	Canada, 1950–1982
Porter (1986)	-0.27	Time-series aggregate data United States, 1947–1982
Worgotter and Kunze (1986)*	-0.54	Austria, 1955–1983
Becker, Grossman, Murphy (1990)	LT -0.75	Pooled time series of state cross sections United States, 1956–1985
Chaloupka (1990)	-0.26	NHANES II** Full sample; also by age, sex, race, and education United States, 1976–1980
Townsend (1990)	-0.40	Europe, 1987–1988
Jacobson and Rodway (1990)	LT -0.6 to -0.8	Canada, 1973–1988

*Studies mentioned in Townsend (1990).
†The first estimate is pre-1961, and the second post-1961.
‡U.S. Health Examination Survey, Cycle III.
§National Health Interview Survey.
‖The first estimate is for a price increase, and the second for a decrease.
¶ST = Short term; LT = Long term.
**National Health and Nutrition Examination Survey.

Table 12. Estimates of the price elasticity of demand for cigarettes in the United States,* by age group

Age group (years)	Elasticity		
	Total	Participation	Quantity†
12–17	-1.40	-1.20	-0.25
20–25	-0.89	-0.74	-0.20
26–35	-0.47	-0.44	-0.04
36–74	-0.45	-0.15	-0.15
All adults (20–74)	-0.42	-0.26	-0.10
All ages (12–74)	-0.47	-0.31	-0.11

Source: Lewit and Coate (1982); Lewit, Coate, Grossman (1981); Lewit (1985).
*Calculated from source data.
†Elasticity for quantity smoked for persons who smoke.

prevalence of smoking and its associated detrimental health effects would decline gradually but substantially over several decades—rather than in the years immediately after a tax increase. In addition, since price elasticity affects prevalence of smoking far more than quantity smoked, attempts by smokers to compensate for fewer cigarettes (by inhaling more deeply and frequently, reducing idle burn and butt length, or even switching to higher tar and nicotine brands) appear to be relatively infrequent responses to price increases.

Formal estimates of the price elasticity of demand for cigarettes in Latin America and the Caribbean are not readily available, and few data have been gathered for other developing countries (Chapman and Richardson 1990). In many developing countries, the price elasticity of demand for all tobacco products may be difficult to measure and may be much lower than that for cigarettes. In response to a tax increase on cigarettes, smokers may substitute lower-priced tobacco products. In many Latin American and Caribbean countries, the price of cigarettes varies widely by brand, and smokers may respond to a tax (price) increase by switching to a lower-priced brand. This recently occurred in the Philippines; when cigarette taxes were increased more on high-priced than on low-priced brands, consumers switched to low-priced brands. Total cigarette tax collections declined even though the tax rate had been increased on all brands (Singh 1988a,b,c,d). Marginal consumers may respond to a tax increase by switching to "roll-your-own" or homemade cigarettes. In addition, as noted above, high taxes and tariffs encourage smuggling, which may provide cigarettes at less-than-fully taxed prices.

Modeling Addiction

Although the addictive nature of cigarette consumption has been recognized for some time (USDHHS 1988), most economic studies of the demand for cigarettes have not explicitly allowed for addiction. The consumption of addictive goods in general was not believed to conform to the rational, utility-maximizing model that is the paradigm of standard economic analysis. Recently however, Becker and Murphy (1988), among others, have developed models of rational addiction that distinguish between the consumption of addictive and nonaddictive goods and that allow for economic analysis. The Becker-Murphy models recognize that current consumption of addictive goods depends on the level of past and future consumption. The model accounts for tolerance, reinforcement, and withdrawal—factors that distinguish between use of addictive and nonaddictive substances (USDHHS 1988). With regard to the price elasticity of demand for cigarettes, the Becker-Murphy approach implies that lower past prices and lower future prices lead to greater current consumption and that the long-term response will exceed the short-term response to a permanent price change.

To test the rational addiction model, Becker and colleagues (1990) used a time series of cross-sectional samples of U.S. per capita state tax-paid cigarette sales, by state, for 1956 to 1985. The results demonstrated a linkage across time periods between price and cigarette demand. In particular, the authors found that a 10 percent permanent increase in the price of cigarettes would reduce current consumption by 5 percent initially and by 7.5 percent over the long term.

Using data for participants aged 18 to 74 in the second National Health and Nutrition Examination Survey, Chaloupka (1990) tested several implications of the rational addiction model. The resultant estimates of the price elasticity of demand were less than those reported by Becker and colleagues (1990) and by Lewit and Coate (1982); the latter analysis did not explicitly allow for the addictive component in cigarette demand.

The application of the rational addiction model to cigarette consumption is a recent development; further investigation and refinement are required before the contribution of the model to the understanding of

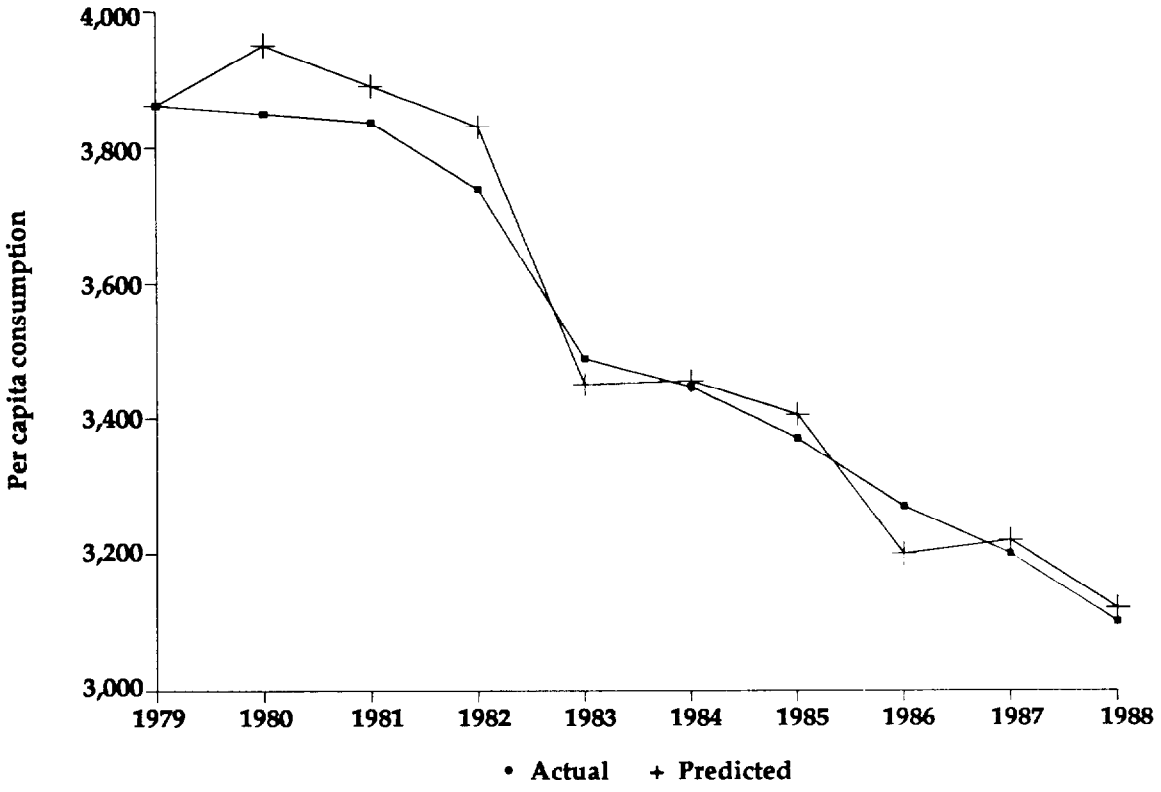
smoking behavior can be fully evaluated. The range of estimates of the long-term price elasticity of cigarette demand derived from the model are not inconsistent with previously published estimates; thus, analyses of the effect of doubling the U.S. cigarette tax in 1983 (discussed next) are not likely to be invalidated by further refinement of the model.

Analysis of Recent Tax Increases

After the federal excise tax on cigarettes was doubled in 1983, total U.S. cigarette consumption declined (Lewit 1988). Before 1982, retail cigarette prices had been increasing more slowly than the general rate of inflation, and as a result, the real price of cigarettes was declining. In anticipation of the January 1, 1983, tax increase, U.S. tobacco companies increased the wholesale price of cigarettes at regular intervals beginning in August 1982 (see also Chapter 2, "The Emergence of the Tobacco Companies"). From 1983 to 1991, the federal excise tax did not increase, but retail cigarette prices continued to increase more rapidly than the general rate of inflation—because of an aggressive pricing policy of the tobacco companies and increases in taxes in many states. Between 1981 and 1988, the price of cigarettes, adjusted for inflation, rose by 57 percent. Based on a price elasticity of -0.42, per capita consumption should have declined by about 23 percent over this period (Figure 5). Data from USDA indicate a decline of about 20 percent. U.S. per capita cigarette consumption had been declining slowly—about 1 percent per annum since the mid-1970s. The very rapid acceleration in the rate of decline—to about 3 percent annually after the excise tax and associated price increases—is consistent with Lewit and Coate's (1982) estimates and serves as further evidence that excise taxes may be a potent tool for reducing cigarette consumption.

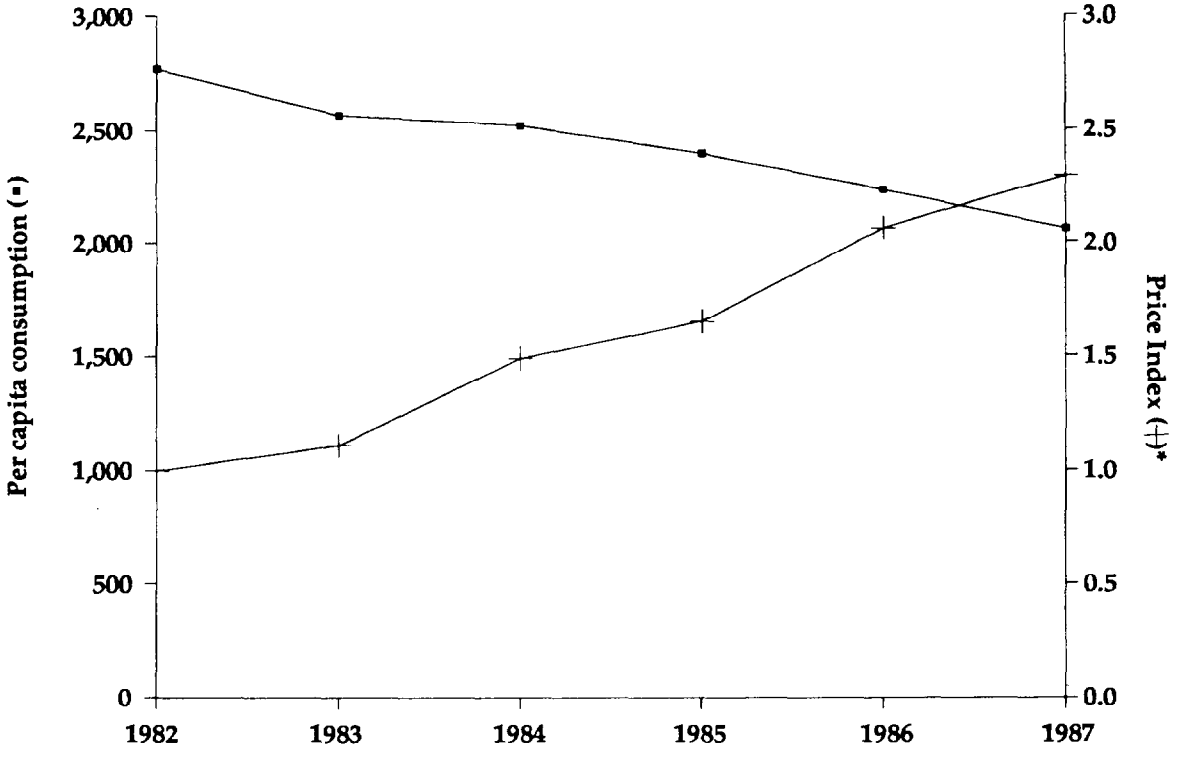
The Omnibus Budget Reconciliation Act of 1990 provides for two increases in U.S. federal excise taxes on cigarettes and other tobacco products (USDA 1990).

Figure 5. Predicted and actual per capita (≥18 years of age) consumption of cigarettes, United States, 1979–1988*



Source: Grise and Griffin (1988); U.S. Department of Agriculture (1991).
*Actual values from source; predicted values calculated by Lewit (unpublished data). Predicted values are based on a price elasticity of –0.42.

Figure 6. Per capita consumption and real price of cigarettes in Canada, 1982–1987



Source: ERC Statistics International Limited (1988).
*Relative cost per pack of cigarettes (1981 = 1.0).

The cigarette tax was increased four cents per pack beginning January 1, 1991, and will increase an additional four cents on January 1, 1993. The tax on snuff increased from 24 cents per pound to 30 cents per pound in 1991 and will increase to 36 cents in 1993. Chewing tobacco tax will increase by eight cents per pound (to ten cents) in 1991 and by 12 cents in 1993. Taxes on other tobacco products were also increased. Although it is still too early to judge the effect of these taxes on tobacco consumption, the impact may not be the same as that from the 1983 tax increase because of the substantial increase in retail tobacco prices since 1982 (also discussed in Chapter 2, "The Emergence of the Tobacco Companies"). The current tax increases will result in a smaller percent increase in retail prices than did the percent increase that accompanied the 1983 tax rise.

In Canada, in part due to a very aggressive antismoking campaign, both federal and provincial cigarette excise taxes have increased substantially since 1980 (Figure 6). The federal tax rose by 179 percent between 1980 and 1988, and provincial taxes rose by an average of 367 percent during the same period. Overall, the real price of a pack of cigarettes almost doubled between 1982 and 1987, and per capita consumption fell by more than 30 percent during the same period.

In Latin America, evidence of the impact of cigarette tax increases on consumption is found in Brazil, where after years of rapid growth, per capita cigarette consumption fell substantially in the early 1980s in response to a large cigarette tax increase and a general economic slowdown (USDA 1985). In developing countries, income may play an important role in determining smoking behavior. A decline in per capita cigarette consumption in Peru and Bolivia in the 1980s has been attributed to falling incomes in both countries (Chandler 1986).

Health Consequences of Tax Changes

In some countries, a policy of aggressively increasing cigarette taxes could lead to a large reduction in smoking-related illness and an improvement in the general level of health. The information on price and

income elasticity given here can be used to make rough estimates of the health effects of changes in tobacco taxation in the United States and Canada.

Both Warner (1986) and Harris (1987) have provided crude estimates of some of the health effects that might result from the 1983 U.S. federal tax increase. Based on the conservative assumption that one of every four lifelong smokers dies of smoking-related illness (Mattson, Pollack, Cullen 1987), Warner calculated upper-bound estimates of the impact on mortality of increases or decreases in federal excise tax. Warner estimated that an eight-cent tax increase, maintained in real value over time, would avert 450,000 premature deaths among Americans aged 12 or older in 1984 and that this number would rise to 860,000 after a 16-cent increase.

Harris estimated that as a result of the post-1983 tax-induced price changes and their impact on consumption, 100,000 additional persons will live to age 65. About 54,000 of these persons are among the 600,000 teenagers who will live to age 65 as a result of having been discouraged from starting to smoke. Thus, for the 1983 U.S. federal tax increase, the main effect on mortality will not be realized for decades. Although no estimates have been published on the impact of the tax increase on other health measures, reductions in smoking-related morbidity and disability should raise aggregate health levels long before the projected reduction in mortality is fully realized.

For other countries in the Americas, elasticity estimates from the United States and Canada may be misleading, and country-specific estimates are needed. More precise estimates depend on additional information about the number of persons who smoke less, stop smoking, or do not start to smoke as a result of tax changes. But the declining economy in Latin America and the Caribbean and the attendant decline in tobacco consumption suggest that excise taxes could have a substantial impact on long-term morbidity and mortality in the region. This supposition is reinforced by the latency of the health effects of tobacco use (addressed earlier) and by the fact that the tobacco epidemic is still immature in many countries of Latin America and the Caribbean (Chapter 3, "Smoking-Attributable Mortality in Latin America and the Caribbean").

Equity, Incidence, and Distribution of the Tax Burden

Tobacco excise taxes are primarily a revenue-generating device. As such, attention must be paid to the distribution of the burden of these taxes among the general population and to their impact on the economy. Tobacco taxes are mainly collected from manufacturers and distributors at the wholesale level. To the extent that these businesses can raise the retail price of cigarettes, they do not pay the tax but shift the incidence of the tax burden to consumers. In addition, the tax may lower the demand for tobacco, which would result in lower tobacco prices (Sumner and Wohlgenant 1985) and place some of the incidence of the tax burden on tobacco growers.

Because the tobacco tax is primarily paid by smokers (Sammartino 1987), the distribution of the tax burden in the general population mirrors the distribution of smokers. In the United States, as the health hazards posed by tobacco use have become more well known, tobacco consumption has decreased more rapidly in higher than in lower socioeconomic groups (USDHHS 1989). Consequently, tobacco consumption has become more concentrated in lower socioeconomic groups, and tobacco tax increases, as a share of income, would fall most heavily on these groups. Sammartino (1987) analyzed the distributional effects of a hypothetical $1 billion increase in the U.S. federal excise taxes on beer, wine, distilled spirits, tobacco, gasoline, airfares, and telephone service and concluded that an increase in the tobacco tax would be the most regressive.

In some Latin American countries, such as Brazil, Uruguay, and Venezuela, prevalence of smoking is also higher for lower socioeconomic groups (Chapter 3, "Prevalence of Smoking in Latin America and the Caribbean"). In these countries, tobacco tax increases might also be regressive. In most other countries of the Americas, however, cigarette smoking is positively correlated with income. Moreover, in most Latin American and Caribbean countries, high-income smokers are more likely than low-income smokers to consume more cigarettes and purchase expensive brands of cigarettes. When increased revenues from tobacco taxes reflect expenditures on tobacco, the taxes may be proportional relative to income even in countries in which smoking is more common among the lower socioeconomic groups. Tobacco taxation may be progressive in countries in which smoking prevalence is positively correlated with income. The actual incidence of tobacco taxes must be determined for each country, and attempts to make cigarette taxes progressive, as was recently done in the Philippines, can be thwarted if high tax rates cause smokers to substitute low-price/low-tax brands for high-tax brands (Singh 1988a,b,c,d).

Although the potential regressiveness of tobacco taxes is a valid concern, the desire for proportional or even progressive tax systems does not require that all

potentially regressive taxes be avoided. Most tax systems are a mix of many different taxes, and fairness can be achieved by increasing progressiveness elsewhere in the tax system to balance tobacco tax increases or, perhaps more importantly, by directing revenues to the maintenance of or increases in benefits for low-income groups.

Use of Tobacco Taxes

Health care costs and work-loss rates are greater for smokers than for nonsmokers. In the United States and Canada, both public and private insurance plans provide much of the financing for health care and disability benefits. Thus, increases in tobacco taxes have recently been advocated as a form of user tax (similar to the U.S. federal gasoline tax used to finance highways) or as a corrective tax to compensate for the additional health-related costs that smokers impose on others.

Several studies have attempted to measure the medical care, morbidity, and mortality costs attributable to smoking in a particular year. These estimates (described earlier in this chapter) cannot be used to establish the appropriate level of tobacco taxation because, in addition to several methodological limitations, the estimates do not explicitly distinguish between costs borne by smokers (e.g., the cost of premature death) and costs shifted to others (i.e., external costs). Moreover, these estimates do not adequately account for the social insurance benefits that nonsmokers realize but smokers do not because of their premature death associated with smoking.

Smokers tend to contribute to retirement plans at the same rate as nonsmokers do, but they do not collect, on average, the same total pension over a lifetime as nonsmokers do. Smokers' uncollected pension claims revert to nonsmokers by increasing the ratio of benefits to contributions that nonsmokers receive. In any particular country, the magnitude of the burden of smoking-related costs borne by nonsmokers is determined by the costs of the excess illness, the morbidity and mortality caused by tobacco, and the national system for financing health care, disability, and retirement in that country. The key variable is the amount of excess tobacco-related costs borne by nonsmokers relative to the rate of taxation on tobacco. In reviewing the situation in Ontario in 1978, Stoddart and colleagues (1986) found that, even with a government health care system and high-technology medical care, health care expenditures attributable to smoking amounted to a maximum of 30 percent of the tax revenue on tobacco products. They also concluded that no uncompensated externality existed in Ontario in 1978. Collishaw and Myers (1984), using a different methodology, also found that for Canada in 1979, total tobacco taxes exceeded government-financed health care costs attributable to smoking.

In the most recent and comprehensive examination of the external costs of smoking in the United States, Manning and co-workers (1989) found that cross-subsidies, implicit in the current U.S. system for financing health care, disability, and pension benefits, transfer from never smokers to smokers and from smokers to never smokers. Thus, on average, never smokers subsidize the excess nonaged health care, disability, and sick-leave benefits of smokers, and smokers subsidize the Medicare and retirement benefits (pensions and Social Security) of never smokers. Manning and associates (1989) reported that their estimates of the net external economic costs of smoking are quite sensitive to two parameters: the rate of discount and the determination of which health differences between smokers and never smokers are actually caused by, rather than merely associated with, smoking. Nonetheless, their best and high estimates of the external economic costs of smoking fell below the average excise tax (state plus federal) imposed at the time of their analysis, which suggested that, at that rate of taxation, smokers probably compensated for the costs of smoking imposed on never smokers. Since the publication of their analysis, evidence of additional hazards of passive smoking has been reported (Glantz and Parmley 1991). Such evidence suggests that the net costs that smokers impose on never smokers in the United States may have been underestimated.

No known studies from other countries in the Americas evaluate the excess financial burden imposed on never smokers by smokers. However, uncompensated financial externalities may be substantial in countries at the upper end of the income scale where life expectancy and patterns of tobacco consumption are similar to those in the United States and Canada. In the few countries at the lower end of the income scale, such uncompensated externalities may be minimal for two reasons: (1) in the absence of well-organized institutional support systems, the excess costs of smoking are unlikely to be shifted from smokers to never smokers and (2) the total cost of smoking-related illness may be low if life expectancy is short (as in Bolivia and Haiti [PAHO 1990]), if many competing causes of disease and death are operative, if smoking is a recently introduced activity, or if medical care is inexpensive.

The essence of the argument for tobacco taxes is that tobacco-related illnesses may impose an uncompensated burden on never smokers regardless of their income class. If, however, smoking is positively correlated with income, smoking-related illness is more likely to occur among persons higher in the income distribution. Hence, increases in smoking-related illnesses may result in a shift in health care resources to provide expensive hospital-based care for affluent smokers. If such a shift occurs at the expense of health programs for low-income groups, it may have an undesirable effect on the health of the disadvantaged and on the total income distribution, including transfers (Lewit 1988). As a means of addressing this particular inequity, high tobacco taxes might be justified, whether they discouraged smoking or were used to finance excess health care for smokers.

Another justification for a high tobacco tax is that, to smokers or potential smokers who lack complete information on the dangers of tobacco use, the tax may signal the total costs of tobacco use, including the costs of ill health. An increase in tobacco taxes could improve health by discouraging tobacco use among persons who would not have used tobacco if they were fully informed. The effect would be particularly beneficial if it interfered with the initiation of tobacco use—before smokers became addicted.

Conclusions

1. Because the health costs of tobacco consumption result from cumulative exposure, they are most pronounced in the economically developed countries of North America, which have had major long-term exposure. Since many countries of Latin America and the Caribbean are experiencing an epidemiologic transition, the economic impact of smoking is increasing.

2. The economic costs of smoking are a function of the economic, social, and demographic context of a given country. In the United States, estimated total lifetime excess medical care costs for smokers exceed those for nonsmokers by $501 billion—an average of over $6,000 per current or former smoker. Similar formal estimates for many Latin American and Caribbean countries are not available.

3. Evidence of the cost-effectiveness of smoking control and prevention programs has increased. In Brazil, for example, the cost of public information and personal smoking-cessation services is estimated at 0.2 to 2.0 percent of per capita GNP for each year of life gained; treatment for lung cancer costs 200 percent of per capita GNP per year of life gained.

4. In Latin America and the Caribbean, as GNP increases, cigarette consumption increases, particularly at lower income levels. This effect is attenuated at higher income levels.

5. Advertising tends to increase consumption of cigarettes, although the relationship is difficult to quantify precisely. Advertising restrictions are generally associated with declines in consumption and, hence, are an important component of tobacco-control programs.

6. The case for promoting increased tobacco production on economic grounds should be reconsidered. Although tobacco is typically a very profitable crop, much of the advantage of producing tobacco stems from the various subsidies, tariffs, and supply restrictions that support the high price of tobacco and provide economic rents for tobacco producers. Although the tobacco industry is a significant source of employment, production of alternative goods would generate similar levels of employment.

7. Increases in the price of cigarettes, which are a price-elastic commodity, cause decreases in smoking, particularly among adolescents. Excise taxes may thus be viewed as a public health measure to diminish morbidity and mortality, although the precise impact of taxes on smoking will be influenced by local economic factors.

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Chapter 5
Legislation to Control the Use of Tobacco in the Americas

Preface *145*

Introduction *147*

Purposes of Legislation *147*
Method of Analysis *147*

Legislation to Control Production, Manufacture, Promotion, and Sales *148*

Control of Advertising *148*
- North America *149*
- Latin America *150*
- Caribbean *150*

Requirements for Health Warnings and Statement of Tar and Nicotine Yield *150*
- North America *151*
- Latin America *152*
- Caribbean *152*

Restrictions on Sales to Adults *152*

Legislation to Change Smoking Behavior *153*

Control of Smoking in Public Places *153*
- North America *153*
- Latin America *154*
- Caribbean *154*

Control of Smoking in the Workplace *154*
- North America *156*
- Latin America *157*
- Caribbean *157*

Preventing Young People from Smoking *157*
- North America *157*
- Latin America *158*
- Caribbean *158*

Mandating Health Education on Tobacco *158*
- North America *159*
- Latin America *161*
- Caribbean *161*

Model Legislation *161*

The Impact of Antitobacco Legislation *161*

Conclusions *162*

Appendix 1. Notes to Tables *163*

Appendix 2. Legislation Reviewed for the Americas *169*

References *175*

Preface

Governments express their will through legislation and regulation. Historically, many public health issues have been managed by governmental rule making. Some of the major scientific advances of recent years have been translated into public health practice through the gradual development of sanitary codes, public health laws, or equivalent sets of regulations.

In recent years, the pace of enacting legislation to prevent and control tobacco use has accelerated. The current status of tobacco-control legislation in the Americas is reviewed in this chapter, and a comprehensive set of current legal citations is provided for selected countries of the Americas.

Introduction

Ninety-one countries worldwide have enacted legislation to control tobacco use (Roemer, in press). Less than one-third of these countries are in the Americas, and their laws vary in scope and rigor. Comprehensive laws, which provide a wide range of control, are rare; most laws in the Americas are categorical and deal with one or another aspect of tobacco promotion and use. Restrictive legislation has generally been enacted at the national government level, but the potential of subnational legislation is reflected in the large number of restrictive laws, ordinances, and bylaws enacted by state or provincial and local governments in Canada, in the United States, and, increasingly, in many Latin American and Caribbean countries.

Although tobacco has been in use in the Americas for centuries (see Chapter 2), public policy on tobacco control is fairly recent. The sale of tobacco to minors has long been prohibited, but more for moral rather than health reasons. For years, local ordinances have prohibited smoking in cinemas and theaters as a fire-prevention measure. But legislation focusing on control of tobacco use to prevent chronic disease began in North America only 25 years ago. Following the issuance in 1964 of the Surgeon General's landmark report (Public Health Service 1964), the U.S. Congress passed the Federal Cigarette Labeling and Advertising Act in 1965.

In 25 years of worldwide efforts to control the smoking epidemic, the key role of legislation has become clear. In 1990, the 43rd World Health Assembly reaffirmed the effectiveness of tobacco-control strategies and, in particular, legislation and policies to (1) protect against exposure to environmental tobacco smoke in workplaces, public places, and public transportation; (2) increase the real price of tobacco; and (3) control direct and indirect advertising and promotion of tobacco products (World Health Organization [WHO] 1990a,b).

Purposes of Legislation

Law is a powerful tool for closing the gap between social policy and scientific knowledge about tobacco. The purposes of such legislation are as follows:

- To set forth government policy on production, promotion, and use of tobacco, and to place the government squarely on the side of health.
- To encourage smokers to stop smoking, and to dissuade young people from starting to smoke or from using smokeless tobacco.
- To provide protection against the dangers of exposure to environmental tobacco smoke in enclosed public places.
- To monitor and control the content of manufactured tobacco products.
- To contribute to the development of a social climate in which smoking and other forms of tobacco use are unacceptable.
- To provide for the allocation of resources to support effective programs to combat smoking.
- To provide the legal basis for enforcement of a tobacco-control policy.

These purposes are widely recognized, although they may be formulated in various ways (Bechara and Jacob 1985).

Two principal types of legislation have been enacted: (1) legislation to change the production, manufacture, promotion, and sale of tobacco (supply) and (2) legislation to change smoking behavior (demand). Within each of these two broad categories, specific kinds of laws have been enacted to combat tobacco use. For example, the latter category includes nonsmokers' rights laws, which aim to protect nonsmokers from the health effects of exposure to environmental tobacco smoke.

Method of Analysis

The kinds of laws in these two categories of legislation were examined through 1990 for North America, Latin America, and eight Caribbean countries (Bahamas, Barbados, Bermuda, Grenada, Guyana, Jamaica, Saint Lucia, and Trinidad and Tobago). Special comment is made on the French overseas departments and territories in the Americas. The principal focus is on the laws of countries in Latin America and the Caribbean. Particularly noteworthy national legislation and regulation are described in Appendix 2.

Legislation to Control Production, Manufacture, Promotion, and Sales

Laws and policies in this category are directed toward controlling the tobacco industry (including growers, manufacturers, and distributors), as well as advertising agencies, the media, and tobacco retailers. However, these laws can change the social environment for a whole population and thus influence the conduct of individual persons. For example, laws banning the advertising and promotion of tobacco alter the environment in which young people grow up and help free them from pressure to smoke.

Table 1 summarizes the types of legislation (and the number of countries that have enacted each type) designed to control the production, sale, and promotion of tobacco. Several of these controls are discussed further below. Economic strategies, such as tax and price policies, are discussed in Chapter 4.

Control of Advertising

The tobacco industry's enormous expenditure on advertising and promotion—approximately $3.3 billion in the United States in 1988 (Centers for Disease Control [CDC] 1990a)—reflects the importance that the industry attaches to advertising. The role of advertising and promotion in increasing sales and consumption is difficult to quantify precisely (U.S. Department of Health and Human Services [USDHHS] 1989; Tye, Warner, Glantz 1987; Toxic Substances Board 1989; Warner 1986b) (see Chapter 4).

Advertising sends the message that smoking is acceptable and pleasurable. Moreover, the dependence of newspapers and magazines on advertising revenue from the tobacco industry may hinder the publication of information about the hazards of tobacco use (Whelan 1984; USDHHS 1989). As prevalence of smoking has declined in Canada, the United States, and other industrialized countries, transnational tobacco corporations have intensified their promotion of cigarettes in developing countries (Muller 1978; Nath 1986; Lokschin and Barros 1983; Stebbins 1987; Davis 1986). (See Chapter 2, "The Emergence of the Tobacco Companies.")

Several types of legislation control advertising and promotion of tobacco products in the Americas

Table 1. Number of countries that control the production, sale, and promotion of tobacco, by type of legislation* and region

Type of legislation	Worldwide†	North America	Latin America	Caribbean‡
Total ban on advertising	20	1	1	1
Some restrictions on advertising	38	2	15	4
Restrictions on sponsorship of sports and cultural events	NA§	1	3	
Rotating or stronger warnings	9	2	2	3
Standard warning‖	53	0	12	2
Statement of tar and nicotine yield	22	1	3	3
Restrictions on sales to adults	6	2	3	
Increased taxes and prices¶	NA	2	NA	
Revenue from taxes allocated to health purposes	NA	1	1	
Economic strategies¶	NA	1	NA	

*Includes national and subnational legislation.
†Roemer (1986).
‡Includes the French overseas departments and territories. Blank indicates that no such legislation is known to exist.
§NA = Not available.
‖A single statement of warning not rotated with other statements.
¶Tax and price policies and economic strategies are discussed in Chapter 4.

(Table 2). Except for Canada, Cuba, and the French overseas departments and territories, all countries in the Americas that have enacted legislation to control cigarette advertising have imposed moderate, partial bans.

North America

Canada was the first country in the Americas to enact a total ban on advertising and promoting tobacco. The Tobacco Products Control Act (Health and Welfare Canada 1989a) took effect on January 1, 1989; it provides, in Section 4, as follows:

> No person shall advertise any tobacco product offered for sale in Canada.

The statute and the regulations, however, provide the tobacco manufacturing, importing, and advertising industries with a period of adjustment during the transition to the new requirements and with a few limited exceptions to the ban (Kyle 1990). Per capita tobacco consumption decreased 8 percent in the year after the act took effect (Kaiserman and Allen 1990), although this decrease may have resulted from the combined effect of several factors. The law was challenged in court by Imperial Tobacco Ltd. (Montreal) and RJR-MacDonald Inc. In July 1991, the challenge was upheld; the law was declared unconstitutional but was allowed to remain in effect pending appeal (RJR-Macdonald Inc. v. Attorney General of Canada 1990; Imperial Tobacco Limited v. Attorney General of Canada 1990).

In the United States, all cigarette advertising has been prohibited on television and radio since the enactment of the Public Health Cigarette Smoking Act of 1969, which became effective in January 1971. This ban was extended to little cigars in 1973 and to smokeless tobacco in 1986. Health warnings are required in cigarette and smokeless tobacco advertisements (see next topic).

State and local legislation to control tobacco advertising has been used to a limited extent in the United States because such legislation was preempted by the federal act of 1969. Nevertheless, some cities have restricted local advertising; bans on advertisement of tobacco in transit systems and on distribution of free tobacco products have been adopted in several cities, including Boston, New York, and Atlanta (USDHHS 1989). Sports stadiums in a few large cities in the United States have voluntarily banned tobacco advertising.

The continued advertisement of cigarettes in newspapers, in magazines, and on billboards in the United States has led to several proposals to extend restrictions to these media (USDHHS 1989). These proposals have included the following: a total ban on advertising and promotion of tobacco products; restrictions on the imagery, content, and format of tobacco advertisements; bans on certain types of promotion, such as targeting of children and sponsorship of sports and cultural events; and economic disincentives (for example, eliminating the tax deduction allowed, as a business expense, for advertising tobacco).

Table 2. Countries that control tobacco advertising and promotion, by type of restriction*

Country	Total ban	Mass media†	Sponsorship‡	Form and content§
North America				
Canada	X	X	X	W‖
United States		X		W
Latin America				
Argentina		X	X	X W
Bolivia		X	X	X W
Brazil		X	X	X W
Chile		X		W
Colombia		X		X W
Costa Rica		X		X
Cuba	X			
Ecuador		X		W
El Salvador		X		
Mexico		X		W
Panama		X		W
Paraguay		X		
Peru		X		W
Uruguay		X		W
Venezuela		X		W
Caribbean				
Bahamas				W
Bermuda				W
French overseas departments and territories¶	X			
Trinidad and Tobago		X		W

*For a summary of legislation in selected countries, see the notes in Appendix 1 to this chapter.
†Restrictions on use of television, radio, press, and billboards.
‡Restrictions on sponsorship of sports and cultural events.
§Restrictions on content, format, or location of advertising.
‖W = Health warning required.
¶For this table, the French overseas departments and territories are counted with the Caribbean countries.

Latin America

Fourteen Latin American countries have legislation restricting tobacco advertising and promotion. The most stringent statutes restrict advertising to statements about the quality, origin, and purity of tobacco; ban the representation of persons; or prohibit the association of smoking with pleasurable activities. Argentina, Bolivia, Brazil, Colombia, Mexico, and Paraguay have stringent laws. Bolivia requires the tombstone format, which allows no more than the name, brand, symbol, and representation of the tobacco product in a box. Argentina and Bolivia both prohibit advertising associated with sports.

A common type of Latin American law prohibits tobacco advertising that targets young people or that is displayed at times and places available to children and young people. Argentina, Brazil, Colombia, Ecuador, El Salvador, Mexico, and Peru have statutes of this type.

Virtually all Latin American countries that control tobacco advertising require a health warning on cigarette advertisements. Some statutes, such as those in Brazil, Colombia, Chile, and Uruguay, specify the frequency and duration of the health warning in the broadcast media. Brazil specifies the size, color, and prominence of the health warnings on advertisements on television, in the print media, on billboards, and on neon signs. Brazil also regulates the content of tobacco advertising by explicitly prohibiting claims of health, relaxation, stimulation, or sexual success. Scenes of children or adolescents are prohibited, and Argentina prohibits the use of minors in tobacco advertising.

In contrast, a few countries, such as Venezuela, have generic statutes that prohibit broadcast media from accepting advertising that directly or indirectly encourages consumption of cigarettes and tobacco products. Some countries—for example, Bolivia, Costa Rica, and Panama—have statutes that authorize the health authority to approve tobacco advertising and thereby restrict messages that are detrimental to health.

Caribbean

Only Trinidad and Tobago has adopted regulations that restrict the advertisement of cigarettes and tobacco products. Regulations of the Bureau of Standards prohibit the advertisement of cigarettes and tobacco products in cinemas or in films certified for viewing by general audiences or by audiences that include persons under 18 years of age. No advertising of tobacco products is allowed on television during children's programs, religious programs, educational programs, current affairs broadcasts, or parliamentary or formal government broadcasts. Televised cigarette advertisements may not exceed six minutes per hour, averaged over the day's programs, nor seven minutes in any single program period.

A health warning is also required in advertisements for cigarettes and other tobacco products in Trinidad and Tobago, the Bahamas, and Bermuda, although in Bermuda, the health warning need not be used on television and radio.

Jamaica has no legislation restricting tobacco advertising, but the Carreras Group Ltd., which has a monopoly on the Jamaican cigarette market, has voluntarily withdrawn advertising from television, radio, billboards, print media, and cinemas. The Carreras Group, however, sponsors sports and cultural events, notably annual awards for Sportsman and Sportswoman of the Year. The British Virgin Islands has no local television station but receives U.S. television programs; thus, the U.S. ban on advertising tobacco products on television applies to the U.S. and British Virgin Islands.

None of the Caribbean countries restrict the tobacco industry from sponsoring sports or cultural events. In fact, in Trinidad and Tobago, the West Indian Tobacco Company Ltd. recently received an award as Company of the Year, largely because of its extensive sponsorship of sports and cultural events. In Bermuda, 1987 legislation allows the use of a brand name when sponsoring an event or congratulating a person or group on an achievement. Furthermore, a health warning is not required during these activities because they are exempt from the definition of a tobacco advertisement.

Requirements for Health Warnings and Statement of Tar and Nicotine Yield

Mandatory warnings on packages and in advertisements of tobacco products are a form of health education; these warnings alert the public to the dangers of tobacco use. Most countries require warnings that state that smoking is harmful to health. Because such a warning is weak and may not get a smoker's attention, several countries have adopted several stronger warnings, which are used in rotation (Table 3).

Statements of tar and nicotine yield on packages of cigarettes constitute another form of health information. Canada, three Latin American countries, and two Caribbean countries have enacted legislation that mandates a statement on toxic substances in tobacco products.

Only a few countries have enacted legislation that sets a maximum level on harmful substances in tobacco products or tobacco smoke. Canada requires

detailed reporting from manufacturers and importers of tobacco products about toxic constituents. In Uruguay, the Commission for the Control of Smoking, under legislation enacted in 1988, is authorized to set maximum allowable levels of tar and nicotine for tobacco products.

North America

The Tobacco Products Control Act of Canada prohibits the sale of a tobacco product unless it displays one of the required health messages, lists the toxic constituents of the product and, when applicable, of the smoke produced from its combustion, and indicates the quantities of these constituents. As of 1990, manufacturers have been required to list on packages of cigarettes and fine-cut tobacco the yield of tar, nicotine, and carbon monoxide.

The regulations for the Act prescribe that one of the following messages appear on cigarette packages:

Smoking reduces life expectancy.

Smoking is the major cause of lung cancer.

Smoking is a major cause of heart disease.

Smoking during pregnancy can harm the baby.

Every package of cigars or pipe tobacco must display a list of toxic constituents and one of the following messages:

This product can cause cancer.

This product is not a safe alternative to cigarettes.

Every package of smokeless tobacco must display the following message:

This product can cause mouth cancer.

All these warnings must appear in English and French. A new warning will state that smoking is addictive. Other new warnings—for a total of eight possible warnings—will include messages about environmental tobacco smoke, lung disease, and stroke.

Canada is introducing an innovative way to distribute health warnings by requiring leaflets that must be removed from inside packages of cigarettes before the user can remove the cigarettes. The leaflets will contain messages more comprehensive than those of the health warning. The warnings on the exterior of cigarette packages will be enlarged so that they occupy 25 percent of the two major faces of the packages. Information on toxic constituents will also be required to be clearly displayed on the packages (Sweanor and Mahood 1990).

To obtain more precise information than that which is currently available about exposure to tobacco smoke, the Tobacco Products Control Regulations (Health and Welfare Canada 1989a) set forth detailed reporting requirements for cigarette manufacturers and importers. These requirements concern the constituents of the tobacco product, the quantity of each constituent (expressed as a proportion of the total weight of the product), and the quantity of each toxic constituent (milligrams per cigarette) in the smoke produced by the tobacco product. Moreover, the regulations prescribe the specific methods to be used in determining the quantities of such constituents.

Table 3. Countries that require health warnings or statement of tar and nicotine yield

Country	Standard warning*	Rotating or strong warnings	Statement of yield
North America			
Canada		X	X
United States		X	
Latin America			
Argentina	X		
Bolivia	X		
Brazil	X		
Chile		X	
Colombia	X		
Costa Rica		X	
Ecuador	X		X
El Salvador	X		
Mexico	X		X
Panama	X		
Paraguay	X		
Peru	X		
Uruguay	X		X
Venezuela	X		
Caribbean			
Bahamas		X	
Barbados	X		
Bermuda		X	X
French overseas departments and territories†		X	X
Trinidad and Tobago	X		X

*A single statement of warning not rotated with other statements.

†For this table, the French overseas departments and territories are counted with the Caribbean countries.

In the United States, one of the following health warnings has been required on cigarette packages and advertisements since October 12, 1985:

SURGEON GENERAL'S WARNING: Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy.

SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.

SURGEON GENERAL'S WARNING: Smoking by Pregnant Women May Result in Fetal Injury, Premature Birth, and Low Birth Weight.

SURGEON GENERAL'S WARNING: Cigarette Smoke Contains Carbon Monoxide.

Since February 17, 1987, one of the following warnings has been required on smokeless tobacco packages and advertisements:

WARNING: This product may cause mouth cancer.

WARNING: This product may cause gum disease and tooth loss.

WARNING: This product is not a safe alternative to cigarettes.

No legislation or regulation in the United States requires that the tar and nicotine yield of cigarettes be listed on cigarette packages or in advertisements, although the Department of Health and Human Services and the Federal Trade Commission have recommended such requirements. The tobacco industry complies with a plan for voluntary disclosure of tar and nicotine yield in advertisements, and disclosure is often made voluntarily on packages for cigarettes yielding 8 mg of tar or less, but rarely for higher-tar brands (Davis, Healy, Hawk 1990).

In the United States, federal legislation requires that manufacturers provide the Secretary of Health and Human Services with information (which must be kept confidential) on the nicotine yield of smokeless tobacco products but does not require the nicotine yield to be listed on packages or in advertisements.

Latin America

All but two of the 14 Latin American countries requiring health warnings use the standard warning that smoking is dangerous to health (Table 3). Chile, which formerly used this warning, required in 1986 that the following stronger warning be clearly displayed on the package:

Tobacco may cause cancer—Ministry of Health.

As of 1989, Costa Rica also has required stronger warnings:

Smoking during pregnancy damages the child and provokes premature births.

Smoking produces lung cancer, heart disease, and emphysema.

Statement of tar and nicotine yield is required by three Latin American countries—Ecuador, Mexico, and Uruguay. Uruguay's legislation requires cigarette manufacturers and importers to publish the tar and nicotine yield of each brand once or twice a year in the major advertising media.

Caribbean

Four Caribbean countries require health warnings on cigarette packages, and two require statements of tar yield. The standard warning is required in Barbados and Trinidad and Tobago, but the Bahamas requires a stronger warning: "Tobacco smoking may cause heart disease or lung cancer among other diseases." The Bahamas also prohibits the sale of loose cigarettes; cigarettes must be sold in a package with a warning. Bermuda requires a health warning on cigarettes and other tobacco products, and the warning required for imported cigarettes is the same as that required by their country of origin.

Only Bermuda requires statements of tar yield. In Trinidad and Tobago, standards prohibit using the phrase "low tar" in a brand name. Regulations of the Bureau of Standards specify that low-tar cigarettes have less than 10 mg of tar per cigarette; medium-tar cigarettes have 10 to 17 mg of tar; and high-tar cigarettes have 18 mg of tar or more. These standards apply to cigarettes manufactured in Trinidad and Tobago only. Average nicotine yield and tar group are requested by Bureau of Standards regulations; however, all these standards are voluntary, and statements of warning do not appear on packages of locally made products.

Restrictions on Sales to Adults

Restrictions on where cigarettes may be sold make a strong statement to the public about the product's harmfulness and lack of social acceptability. Sale of tobacco may be banned in health institutions and government buildings or banned or limited from vending machines.

Few countries have restrictions on where cigarettes may be sold. In 1986, the Chilean Ministry of Health prohibited the sale of tobacco products in all establishments of the National Health Service. The Ministry of the Interior in Chile recommended

restrictions on the sale of tobacco products in kiosks and other places of all government services. In Cuba, the sale of tobacco products is prohibited in health centers and in educational and recreational facilities that are primarily for young people (Suárez-Lugo 1988). The State of Rio Grande do Sul, which produces 70 percent of Brazil's tobacco, prohibits the sale of cigarettes in any establishment that is administered or subsidized by the state, including buildings of the Legislative Assembly. The government of Rio Grande do Sul also recommends that the sale of tobacco be avoided in hospitals and health services.

Legislation restricting sales to adults is not common, perhaps because legislation to control smoking in public places is considered a better approach. Also, many educational and health institutions have voluntarily stopped selling tobacco products on their premises.

Legislation to Change Smoking Behavior

Legislation can help change smoking behavior by fostering an environment in which smoking is socially unacceptable. The effectiveness of tobacco-control activity is closely linked to changes in social norms that tolerate smoking (WHO 1983). The need to control such norms is enunciated by the 1988 mission statement of the Canadian tobacco company, Imperial Tobacco Ltd. (ITL) (Imperial Tobacco Ltd. v. Attorney General of Canada, 1990):

> The following philosophies have effectively governed ITL's marketing, planning and activities. They remain valid. . . . 4. Support the continued social acceptability of smoking through industry and/or corporate actions (e.g. product quality, positive lifestyle advertising, selective field activities and marketing public relations programs).

Considerable legislative effort has been devoted to protecting nonsmokers from exposure to tobacco smoke and potential smokers from encouragement to smoke. An important concomitant of such legislation has been a reduction in the social acceptability of smoking.

Control of Smoking in Public Places

The health risks to nonsmokers from exposure to environmental tobacco smoke (sidestream smoke, emitted from a burning tobacco product, combined with exhaled smoke) have been established. Studies in many countries have demonstrated the dangers of exposure to environmental tobacco smoke; an example is the 30 percent increase in lung cancer among nonsmoking wives of smokers compared with those of nonsmokers (USDHHS 1986; National Research Council 1986). As this knowledge has been disseminated, legislators and policymakers at the national and subnational levels have responded by restricting smoking in public places.

North America

The Non-smokers' Health Act, passed by the Canadian Parliament in June 1988 and amended in 1989, regulates smoking in workplaces under federal jurisdiction and controls smoking on Canadian airlines and other forms of transportation subject to national legislation. Smoking is banned on flights of six hours or less, and by 1993, smoking will be banned on all flights of Canadian carriers (Collishaw, Rogers, Kaiserman 1990). Since October 1990, all scheduled flights made by Air Canada throughout the world have been smoke-free.

A directive of Transport Canada declares public areas in airports to be nonsmoking, except for a few designated smoking areas. Ticket lines and baggage claim areas are nonsmoking, but passenger waiting areas of 30 seats or more may contain smoking sections. Restaurants in airports are expected to maintain a nonsmoking-to-smoking ratio of 60 to 40 in their seating (Health and Welfare Canada 1989b).

As of 1988, three Canadian provincial governments and multiple municipalities within the 10 provinces had enacted legislation to control smoking in public places and the workplace (Calgary Health Services 1988). Both the types of public places and the degree of restrictiveness vary. The public places include restaurants with more than 40 seats, areas for private social functions (such as banquets), beverage rooms or lounges with more than 40 seats, indoor places for public assembly (including banks, theaters, and schools), reception areas and waiting rooms, hospitals, retail stores with more than 10 employees, service lines, elevators and escalators, public areas of buildings, public washrooms, school and public buses, bus shelters, and taxis.

Enforcement is mainly by individual citizens; that is, knowledge of the bylaw and posting of the

required signs deter the smoker from smoking and encourage the nonsmoker to request a nonsmoking area. Most municipalities report that compliance with the bylaw is high. In Toronto, enforcement occurs either by the issuance of a ticket similar to a traffic ticket or by a formal charge that requires the offender to appear in court (Calgary Health Services 1988).

In the United States, most legislation to control smoking in public places is enacted at the state and local levels to protect the health, welfare, and safety of the people. Forty-three states and the District of Columbia restrict smoking in public places in some manner (Tobacco-Free America 1989), and about 400 city and county smoking-control ordinances have been enacted. In general, state laws tend to be weaker and less comprehensive than local smoking ordinances (Pertschuk and Shopland 1989).

Although the federal government has not enacted smoking restrictions for nongovernment public places, it has adopted regulations controlling smoking in federal facilities and workplaces, and legislation has been passed restricting smoking on commercial airlines (USDHHS 1989). In 1989, the temporary law banning smoking on domestic flights of two hours or less expired, and Congress enacted a statute banning smoking on all scheduled airline flights of six hours' duration or less within the contiguous 48 states, the District of Columbia, Puerto Rico, and the Virgin Islands; within the states of Alaska and Hawaii; and between Alaska or Hawaii and a point in the contiguous 48 states, the District of Columbia, Puerto Rico, or the Virgin Islands. This ban applies to both domestic carriers and foreign airlines (Federal Aviation Act of 1958, annotated 1990).

State legislation restricting smoking in public places, called clean indoor air acts, varies in the number of public places covered and in the degree of restrictiveness. Thirteen states have extensive statutes that limit smoking in several public places (in addition to restaurants) and private worksites (USDHHS 1990b). Thirteen states are moderate in restrictiveness; they limit smoking in at least four public places, but not in restaurants. Eleven states have basic restrictiveness; smoking is limited in at least four public places, but not in restaurants or private worksites.

State legislation generally restricts smoking in public transportation vehicles, health care offices and facilities, and elevators. In addition, many states restrict smoking in indoor cultural and recreational facilities, such as libraries, museums, theaters, galleries, arenas, and auditoriums. In 31 states, smoking in schools and on school grounds is restricted for students, school personnel, and other persons with access to the school (USDHHS 1990a). In 29 states, smoking in government buildings is restricted, and in 23 states, smoking is prohibited or restricted at public meetings. But less than half of the states prohibit smoking in supermarkets, grocery stores, or other retail stores or require restaurants to establish nonsmoking areas.

Local ordinances restricting smoking in public places were first passed in the early 1980s, and they soon spread to 397 cities and counties to affect 52,471,053 persons, or 21.7 percent of the total U.S. population. Of these ordinances, 369 control smoking in restaurants, and 298 limit smoking in enclosed public places and/or retail stores. These local ordinances were quickly adopted from 1982 to 1989 (Pertschuk and Shopland 1989), and a high level of compliance has generally been achieved.

Latin America

Many Latin American countries have enacted restrictions on smoking in public places, generally at the national level, but also at the subnational level. Smoking is generally restricted in public transportation vehicles, health establishments, schools, cinemas and theaters, and government buildings, but legislation limiting smoking in restaurants is rare. Although not all Latin American countries have enacted such legislation, the legislation is quite extensive and covers a variety of public places (Table 4). In many countries, however, enforcement is weak or nonexistent.

Caribbean

In the Caribbean, legislation on control of smoking in public places is rare. The Ministry of Transport of the Bahamas issued regulations prohibiting smoking during domestic interisland flights of the national airline, Bahamasair. In Barbados, health services (food hygiene) regulations prohibit smoking while handling food or when in a room with open food.

Control of Smoking in the Workplace

Many public places, such as schools and hospitals, are also workplaces; therefore, statutes restricting smoking in public places benefit both the employees and the public entering these places. Legislation to restrict smoking in the workplace is especially important because people spend more time at work than they do at meetings, in an elevator, or in a theater. Moreover, smoking is particularly dangerous when it accentuates the toxic effects of hazardous materials. In 1985, a report of the Surgeon General on cancer and lung disease in the workplace concluded that, for most U.S. workers, cigarette smoking is a more serious cause of death and disability than the other threats posed by the workplace environment (USDHHS 1985).

Table 4. Countries that restrict smoking in public places, by type of place*

Country and selected jurisdiction	Government agencies	Health establishments	Schools†	Public transportation	Indoor public places	Cinemas, theaters	Food storage places, restaurants	Other
North America								
Canada	X	X	X	X	X	X	X	
United States	X	X	X	X	X	X	X	
Latin America								
Argentina			X	X	X		X	
Province of Córdoba	X		X	X		X	X	
Province of Jujuy	X	X	X	X	X			
Province of Mendoza	X	X	X	X	X			
San Fernando del Valle de Catamarca	X			X	X			
Valle Viejo	X			X	X	X		
Buenos Aires			X	X		X	X	
Bolivia		X	X	X	X			
Brazil	X	X			X			
Rio Grande do Sul		X	X	X	X	X		
São Paulo		X	X	X	X	X	X	
Rio de Janeiro		X	X	X	X	X	X	
Pôrto Alegre			X	X	X	X		X
Curitiba					X			
Florianópolis					X			
Chile	X	X	X	X				
Colombia								
Bogotá	X	X	X	X	X	X		
Costa Rica	X	X		X	X	X		
Cuba	X	X	X	X	X	X	X	
Guatemala	X			X	X			X
Honduras	X	X	X	X	X	X		
Mexico		X						
Federal District	X	X	X	X	X	X		
Panama				X				
Paraguay		X						
Asunción				X		X		
Peru	X	X						
Uruguay	X	X	X	X				
Montevideo	X	X		X		X		X
Venezuela	X		X	X	X	X		

Table 4. Continued

Country and selected jurisdiction	Government agencies	Health establishments	Schools†	Public transportation	Indoor public places	Cinemas, theaters	Food storage places, restaurants	Other
Caribbean								
Bahamas				X				
French overseas departments and territories‡		X	X		X			X
Trinidad and Tobago				X				

*For a summary of legislation in selected countries, see the notes in Appendix 1 to this chapter.
†Includes other places where young people congregate.
‡For this table, the French overseas departments and territories are counted with the Caribbean countries.

North America

In Canada, the Non-smokers' Health Act of 1988 restricts smoking in all workplaces under federal jurisdiction. The statute covers 900,000 workers in both the public and private sectors—about 8 percent of the Canadian work force. Employers are required to ensure that workers refrain from smoking in any workplace under their control, except in designated smoking areas for which size, ventilation, and other characteristics are prescribed.

Legislation in several provinces in Canada, including Quebec, Manitoba, and Ontario, restricts smoking in the workplace by controlling smoking in public places or in the workplace. In Ontario, The Smoking in the Workplace Act of 1988 prohibits smoking in all areas of the workplace, except designated smoking areas, public areas, and areas used for lodging and private dwellings.

Municipal bylaws, enacted by 22 municipalities in Canada as of 1988, have been the major legal mechanism for controlling smoking in the workplace. This legislation generally requires employers to have written smoking policies that attempt to accommodate both smokers and nonsmokers in the workplace (Calgary Health Services 1988). The most stringent legislation bans smoking when the concerns of smokers and nonsmokers cannot be accommodated. Bylaws may also set forth requirements for compliance, posting of signs, and penalties (Calgary Health Services 1988). In the city of Toronto, more than C$500,000 was budgeted for educating the public and hiring staff for consultation and enforcement. This extensive promotion campaign included radio commercials in several languages, a television campaign, mass transit and newspaper advertisements, direct mail to employers, and a telephone hotline service (Calgary Health Services 1988).

In the United States, policies of federal agencies generally restrict but do not ban smoking in the workplace; most federal employees are covered by such policies. The General Services Administration has issued regulations on smoking in federal buildings (USDHHS 1989), and the Department of Health and Human Services has issued a total ban on smoking in its buildings (Bureau of National Affairs 1987). Laws in 31 states restrict smoking at public worksites, and in additional states, smoking at public worksites is restricted by action of the executive branch of the state government.

Governments have been slower to mandate smoking restrictions for private worksites than for their own employees (USDHHS 1989), but 13 states have enacted such legislation. The New York State clean indoor air act of 1989 (Public Health Law Article 13-E, Regulation of Smoking in Certain Public Areas), for example, provides that each employer shall adopt and implement a written smoking policy that requires, at a minimum, a smoke-free work area for nonsmoking employees; a work area for smoking, if all employees assigned to the area agree to the designation; and contiguous nonsmoking areas in employee cafeterias, lunchrooms, and lounges sufficient to meet the demand. The policy must prohibit smoking in auditoriums, gymnasiums, rest rooms, elevators, classrooms, hallways, employee medical facilities, and company vehicles occupied by more than one person. Any place may be designated by its owner, operator, or manager as a nonsmoking area in its entirety. Violation of these restrictions is punishable by civil penalty

of up to $1,000 (if imposed by the state) and up to $500 (if imposed by a local enforcement official) (New York Public Health Law 1990).

Most laws governing smoking in the workplace are local ordinances. In the United States, 297 cities and counties require both public and private employers to maintain a written smoking policy (Pertschuk and Shopland 1989). Most of these ordinances make no exception for small workplaces; provide that, in a conflict between the concerns of nonsmokers and smokers, nonsmokers' concerns will take precedence; and prohibit retaliation against employees who exercise their rights under a smoking ordinance.

Latin America

In Latin America, restrictions on smoking in the workplace are generally included in legislation prohibiting smoking in public places (Table 4). National and local legislation that restricts smoking in public places affects both employees and the public. A few statutes specifically ban smoking on work premises, especially by employees of health establishments—as stated in the legislation of Brazil, Chile, Costa Rica, Cuba, Mexico, Peru, Uruguay, and Venezuela. Costa Rica's 1988 legislation imposes a general ban on smoking in the workplace and requires the director of the workplace, or his or her representative, to ensure strict compliance with this prohibition. An area of the workplace may be reserved for smokers, when possible. The statutes on smoking in public places often do not specify work settings, but they may be included.

Caribbean

No known legislation regulates smoking in the workplace in the Caribbean countries.

Preventing Young People from Smoking

Restrictions on advertising and on smoking in public places benefit young people as well as adults. Other types of legislation are specifically directed at controlling tobacco use by minors. As of 1986, 22 countries worldwide had enacted measures specifically designed to prevent young people from smoking (Roemer 1986).

Easy access to tobacco products by minors may contribute to the early use of tobacco and to the development of tobacco addiction as adults (Choi, Novotny, Mickel, in press). Laws prohibiting the sale of tobacco to minors have long been on the statute books in many countries, but enforcement has been weak or nonexistent. Because minors obtain cigarettes from retailers and vending machines, banning or restricting the sale of tobacco through vending machines is critical (USDHHS 1989). Prohibiting cigarette vending machines or limiting their location makes tobacco less available.

Prohibiting the distribution of free cigarettes is another strategy for protecting young people. More than a dozen cities in the United States prohibit the distribution of free cigarettes, and two states—Minnesota and Utah—prohibit the distribution of free smokeless tobacco products as well (Davis and Jason 1988). Although several countries (e.g., Hong Kong, Australia, and Ireland) prohibit the importation, sale, and use of smokeless tobacco (European Bureau for Action on Smoking Prevention 1990), and other countries require health warnings on smokeless tobacco products, no such restrictions have yet been enacted in Latin America or the Caribbean.

Another measure restricts manufacturers' sale of tobacco products to licensed distributors only. The licensing law may include a provision for penalizing a licensee who furnishes tobacco to minors, and revocation of the license may be a penalty for a subsequent offense.

North America

In Canada, federal legislation makes it an offense for a person under the age of 16 to possess tobacco, but this law is seldom enforced. Similar but little-used laws are long-standing in the provinces of Saskatchewan, New Brunswick, and Newfoundland. The provinces of Ontario, Manitoba, and Saskatchewan have passed laws making it an offense, punishable by a fine, to sell or give cigarettes to a minor. A recent amendment to the Minors Protection Act of Ontario increased the fine from C$50 to C$25,000.

In the United States, the only federal legislation regulating minors' access to tobacco is the Comprehensive Smokeless Tobacco Health Education Act of 1986, which authorizes the federal government to assist the states in establishing 18 as the minimum age for the purchase of smokeless tobacco.

Tobacco access laws are generally enacted by state and local governments. As of 1989, 44 states and the District of Columbia restricted the sale of tobacco to minors, but six states allowed children of any age to buy tobacco in any form (Tobacco-Free America 1989). The age for legal purchase of tobacco products is generally set at 18 years, although in three states, it is 19 years (CDC 1990b). In 17 states, the vendor is required to post signs stating that sale of tobacco to minors is illegal.

In 17 states, statutes regulate the sale of tobacco products from vending machines (Tobacco-Free America 1989). In 14 states, owners, operators, or supervisors of tobacco vending machines are required

to post signs stating that minors are prohibited from buying cigarettes from a vending machine. In five states, vending machines must be placed in supervised areas so that minors cannot use them. Wisconsin prohibits the placement of tobacco vending machines within 500 feet of a school. Utah has banned tobacco vending machines, except in places to which minors presumably do not have access, such as bars. Only Colorado bans the sale of smokeless tobacco products through vending machines.

Some local communities—many of which are in Minnesota, where the first clean indoor air act was passed in 1975—have prohibited or restricted the use of cigarette vending machines. Some communities have banned the machines entirely; others have banned them from public places or restricted them to places licensed to sell liquor; and others require them to be under constant supervision by employees.

Sellers of tobacco products are required to be licensed in 46 states (Tobacco-Free America 1989). Four states have laws requiring revocation of the license for violation of minors' access laws, and other states have provisions for such license revocation as part of local criminal or administrative proceedings (CDC 1990b).

Compliance with tobacco access laws has been poor because vendors are unaware of the laws and because state and local authorities fail to enforce them (USDHHS 1989; CDC 1990b). In May 1990, USDHHS proposed a model law for states and localities that would facilitate enforcement of a ban on the sale of tobacco products to minors. The Model Sale of Tobacco Products to Minors Control Act provides for the creation of a licensing system, similar to that used to control the sale of alcoholic beverages, by which a store may sell tobacco to adults only if it avoids making sales to minors; sets a graduated schedule of penalties—from monetary fines to license suspension; provides separate penalties for failure to post a sign stating that sales to minors are illegal; places primary responsibility for investigation and enforcement in a designated state agency; relies mainly on state-administered civil penalties to avoid the delay and cost of the court system; sets the legal age of purchase at 19; and bans the use of vending machines to dispense cigarettes.

Restrictions on smoking in schools are imposed by statute and by action of school authorities. Legislation in 15 states bans smoking in schools, and in 17 additional states, smoking is restricted to designated areas (USDHHS 1989). Smoking by teachers has customarily been permitted in areas away from students, but increasingly, school smoking policies are banning all smoking on school property.

Latin America

In many Latin American countries, the laws that regulate tobacco advertising, require health warnings on cigarette packages, and control smoking in public places discourage smoking by young people. Fifteen Latin American countries have also enacted legislation specifically to control smoking by children and adolescents. The most common type, which restricts advertising that influences young people, has been adopted in 13 Latin American countries. Statutes in six countries prohibit sales of tobacco to minors. Three countries—Argentina, Brazil, and Ecuador—prohibit the distribution of free samples of cigarettes to minors, and one country (Uruguay) prohibits the sale of single or loose cigarettes. Legislation in seven countries prohibits smoking or tobacco sales in schools and places frequented by young people, but such prohibitions may also be imposed by school authorities (Table 5).

Caribbean

In the Caribbean, only Trinidad and Tobago has legislation designed to prevent smoking by young people. The legislation restricts advertising in cinemas, during films certified for showing to persons under age 18, and on children's television programs. Under the Children Act of 1925, Trinidad and Tobago prohibits the sale of cigarettes to persons under age 16. The prohibition on the sale of loose cigarettes in the Bahamas may, to some extent, prevent young people from purchasing tobacco products.

Smoking in schools is generally regulated by the schools. In Grenada, the Minister of Education issued regulations that no child is allowed to smoke in school (Pan American Health Organization [PAHO] 1988).

Mandating Health Education on Tobacco

The WHO Expert Committee on Smoking Control Strategies in Developing Countries emphasized that no legislation can be expected to succeed without education and urged countries to make education on the health hazards of tobacco mandatory before introducing legislation (WHO 1983). Health education about tobacco use may be effective without legislation; in some countries, such education has been provided to the general public and through school systems without legislation. For example, the 1983 Principles of Medical Ethics of Cuba set forth the obligation of teachers to fight against customs, including the smoking habit, that affect health (Ministry of Public Health 1983). But a law mandating education on smoking and health expresses government policy and promotes implementation of such education.

Table 5. Countries that attempt to prevent young people from using tobacco, by type of restriction*

Country	Sales to minors	Sales from vending machines	Smoking or sales in schools†	Advertising ‡
North America				
Canada	X	X	X	X§
United States‖	X	X	X	
Latin America				
Argentina			X	X
Bolivia			X	X
Brazil	X		X	X
Chile			X	X
Colombia	X		X	
Costa Rica	X			
Cuba	X		X	X§
Ecuador	X			X
El Salvador				X
Mexico				X
Panama				X
Paraguay				X
Peru				X
Uruguay	X		X	X
Venezuela				X
Caribbean				
French overseas departments and territories¶	X		X	X§
Trinidad and Tobago			X	X

*For a summary of legislation in selected countries, see the notes in Appendix 1 to this chapter.
†Includes other places frequented by young persons.
‡That influences young people.
§Total ban on advertising.
‖Does not necessarily imply federal legislation, but acknowledges activities of several states.
¶For this table, the French overseas departments and territories are counted with the Caribbean countries.

Three types of legislation mandating education about the health effects of tobacco use have been enacted. These are (1) requirements for public education, (2) requirements for education in the schools, and (3) allocation of funds for such education (Roemer 1986, in press). The third type of legislation may require that educational programs be funded from the general budget or from specific sources, such as tobacco taxes.

North America

In Canada, the publication in 1974 of the landmark Lalonde Report launched a movement for disease prevention and health promotion (Lalonde 1974). By 1989, Canada had implemented a comprehensive tobacco-control program, which includes a ban on tobacco advertising, regulations and increased taxes on tobacco products, legislation and other measures to control smoking in public places, and intensified educational efforts.

The program has been remarkable for its cohesive coalition of national voluntary and health organizations—particularly the Non-Smokers' Rights Association, the Canadian Cancer Society, the Canadian Council on Smoking and Health, Physicians for

a Smoke-Free Canada, and the Canadian Medical Association (Lachance, Kyle, Sweanor 1990). These and other organizations have banded together as the Canadian Council on Smoking and Health, a nonprofit voluntary coalition of 10 provincial chapters and more than 50 local interagency councils across Canada.

Health and Welfare Canada allocated both personnel and financial resources to health promotion; in 1985, it launched the National Strategy to Reduce Tobacco Use by introducing the slogan "Break Free for a New Generation of Non-Smokers." Although not legislatively mandated, this strategy enjoys strong support from the federal and provincial governments and from national health organizations. A steering committee consisting of representatives from the federal government, each of the 10 provinces, the two northern territories, and eight nongovernment organizations meets regularly to coordinate activities (McElroy 1990). The National Clearinghouse on Tobacco and Health was established to increase public access to current information on tobacco issues. The national strategy has created a strong partnership between the government and the voluntary groups for an organized, targeted campaign against the use of tobacco.

In the United States, one of the federal government's most significant contributions to education and information about the health hazards of tobacco use has been the publication over the past 25 years of annual reports of the Surgeon General. These reports provide current, scientific information on and analysis of research and policy related to tobacco use. In addition, the Office on Smoking and Health publishes annual and cumulative bibliographies of publications on tobacco. Other agencies of the Public Health Service have also made major contributions to education and information (USDHHS 1989; see also Chapter 6).

From 1967 to 1970, the federal government mandated that messages about the health hazards of tobacco use be broadcast through the media to balance commercial cigarette advertisements. This use of the Federal Communications Commission's fairness doctrine had a substantial effect on tobacco use. Per capita consumption decreased in 1967 and continued to decline each year through 1970. When cigarette advertising on the broadcast media was banned and the fairness doctrine antismoking messages were stopped, cigarette sales increased by 2.5 percent per year (Warner 1979, 1986b; USDHHS 1989).

Under the Comprehensive Smokeless Tobacco Health Education Act of 1986, the federal government is required to develop educational programs, materials, and public service announcements on the dangers of using smokeless tobacco. The federal government also authorizes grants and technical assistance to the states for developing such programs.

Many states require education on the hazards of tobacco use. In 1981, 38 states and the District of Columbia mandated school health education on tobacco, but the number fell to 19 states and the District of Columbia in 1987. These counts are not directly comparable because the former figure was derived from a survey of drug education, and the latter from a survey that specifically asked about tobacco education.

Table 6. Countries that mandate health education on tobacco use, by type of provision*

Country or selected municipality	Public education	Student education	Allocation of funds
North America			
Canada	X	X	
United States†	X	X	X
Latin America			
Argentina			
San Fernando del Valle de Catamarca	X		
Bolivia	X	X	
Brazil	X		
São Paulo	X	X	
Chile	X	X	X
Colombia	X		
Costa Rica	X		
Cuba	X		
Ecuador	X		
El Salvador	X	X	
Mexico	X	X	
Uruguay	X	X	X
Caribbean			
French overseas departments and territories‡	X		

*For a summary of legislation in selected countries, see the notes in Appendix 1 to this chapter.
†Does not necessarily imply federal legislation, but acknowledges activities of several states.
‡For this table, the French overseas departments and territories are counted with the Caribbean countries.

Information is not available, however, on the content of antitobacco curricula nor on the level of compliance with state government mandates (USDHHS 1989).

A 1989 initiative in California allocates revenues from the tobacco tax to health purposes, including education on the health hazards of tobacco use. Revenues for the first year were $525 million (Bal et al. 1990).

Latin America

Ten countries in Latin America (Table 6) mandate public education on the health hazards of tobacco use. In Uruguay, a special order of the Ministry of Health requires hospitals and special services, particularly maternal and child health clinics, to provide intensified education on tobacco use. Only Bolivia and Mexico have enacted national legislation requiring antitobacco education in the schools, although such education may be provided voluntarily in other countries. In 1980, the municipality of São Paulo in Brazil passed legislation requiring antitobacco education in all sectors of the community, with special emphasis on antitobacco education in the schools. In its legislation, Chile has provided for the allocation of resources for informational and educational activities against tobacco use.

Caribbean

No Caribbean country mandates health education on tobacco use, but the school systems in some Caribbean countries voluntarily include such education (PAHO 1988).

Model Legislation

The French overseas departments and territories in the Americas are subject to French law. The French National Assembly passed legislation in 1991, to take effect January 1, 1993, banning all forms of tobacco advertising. This far-reaching legislation prohibits the sale of cigarettes to minors, withdraws tobacco products from the consumer price index, requires a health warning stronger than the current message that abuse is dangerous, and will allow the Minister of Health to require other health warnings on cigarette packages. Currently, smoking in schools, food stores, community recreation centers, elevators, clinics, and hospitals is prohibited by French law. The new legislation bans smoking in all public places.

This new law provides the French overseas departments and territories, together with Canada, with the most comprehensive tobacco-control legislation in the Americas. The effectiveness of this model program will be of particular interest to other countries of the Americas in planning legislative programs.

The Impact of Antitobacco Legislation

Evaluating the effects of legislation is difficult because many factors are involved in tobacco use (see USDHHS 1989, Chapter 7). However, worldwide evidence indicates that specific legislative interventions do have positive effects:

- A decline in cigarette consumption is associated with the required airing of antismoking messages in the U.S. broadcast media (Warner 1979, 1986b).
- A decline in smoking is associated with price increases (Townsend 1990; Lewit 1989; Warner 1986a; USDHHS 1989).
- Of 15 European countries, those with legislative programs made more progress in reducing smoking than did those that used a voluntary agreement (Cox and Smith 1984).
- In Norway, in the five years following enactment of the Tobacco Law of 1975, which banned advertising, raised tobacco taxes, and stimulated strong educational programs, cigarette sales declined by 15 percent, particularly among young people (Tye, Warner, Glantz 1987).
- In Finland, a decline in total consumption of tobacco products has been related to antismoking measures (Advisory Committee on Health Education [Finland] 1985).

Similar successes specific to legislative efforts have not yet been documented for Latin America and the Caribbean. Growing awareness of the potential power of legislative and regulatory interventions may increase interest in their enactment and formal evaluation. Determining the extent to which statutes are enforced and obeyed is an important first step in evaluating their impact.

Conclusions

1. Legislation that affects the supply of and demand for tobacco is an effective mechanism for promoting public health goals for the control of tobacco use.
2. Although the direct effects of legislation are often difficult to specify because of interaction with a variety of other factors, there are numerous examples of an immediate change in tobacco consumption subsequent to the enactment of new laws and regulations.
3. Most countries of the Americas have legislation that restricts cigarette advertising and promotion, requires health warnings on cigarette packages, restricts smoking in public places, and attempts to control smoking by young people. These laws and regulations, however, vary in their specific features. In many areas, the current level of enforcement is unknown.

Appendix 1. Notes to Tables

Details are provided below on selected legislation summarized by four tables in this chapter. This legislation concerns advertising and promotion (Table 2), smoking in public places (Table 4), preventing tobacco use by minors (Table 5), and health education on tobacco use (Table 6). The information is organized by table and then by country, in alphabetical order. Appendix 2 cites specific legislation that corresponds with the descriptions given here.

Controls on Tobacco Advertising and Promotion (Table 2)

Argentina

Except for stating the brand, advertising on television and radio is prohibited from 8:00 p.m. to 10:00 p.m. Advertising directed to persons under age 21 is prohibited in theaters and cinemas to which persons under 18 are admitted. The distribution and promotion of samples at colleges and universities are prohibited. Advertising associated with the practice of sports is prohibited. Young persons may not be shown as models in tobacco advertising, and the representation of persons smoking excessively is prohibited. Low-nicotine cigarettes may not be represented as beneficial to health.

Bolivia

Advertising of tobacco is restricted to the tombstone format, in which only the name, brand, symbol, and tar and nicotine yield are given. Only activities directly associated with smoking may be depicted. The content of advertising is restricted to statements about the quality, origin, and purity of tobacco products. Persons inhaling or exhaling cigarette smoke, adolescents, pregnant women, and children may not be shown. Tobacco advertisements may not be associated with sporting, domestic, or occupational activities. Labels and advertisements for tobacco must be licensed by the health authority to prevent indiscriminate promotion of tobacco consumption.

Brazil

Advertising of tobacco products is permitted on television between 9:00 p.m. and 6:00 a.m. only. Advertising in theaters before 8:00 p.m. is prohibited if persons under 18 are admitted. Tobacco advertisements must meet certain requirements. The advertisement must not incite excessive or irresponsible consumption; it must not allude to health or holidays or state that tobacco has soothing properties; it must not associate tobacco products with sexuality, virility, or femininity. Reference to children and adolescents is prohibited, and tobacco advertising may not be addressed to young people. The size and frequency of health warnings are prescribed. Announcement of sponsorship of events by tobacco companies is limited to the presentation of the name and logo of the company, and such announcement is not permitted as part of the program of the event.

Canada

The Tobacco Products Control Act of Canada prohibits advertising of any tobacco product offered for sale in Canada. Until January 1, 1991, a tobacco manufacturer or importer could advertise the product by signs, subject to a limit on the amount expended on the preparation and presentation of the sign. The legislation limits the amount that a tobacco manufacturer or importer may contribute to cultural or sporting activities or events, at which brand names of tobacco products are used, to the value of contributions to such events in 1987. Regulations under the act specify the health warnings that must appear on signs and vending machines and the number and size of signs at retail outlets.

Chile

A health warning is required on advertisements of tobacco products in print media, on television and radio, and in cinemas, at which the warning must remain on the screen for at least five seconds after the advertisement is shown. No direct or indirect reference to minors may be made, and young people may not be depicted in tobacco advertisements.

Colombia

Tobacco advertising is restricted to presentation of brand, quality, price, and system of marketing. Depiction of minors and the act of smoking is prohibited. Advertising of tobacco is allowed on television after 11:00 p.m. only and is limited to 30 seconds for each brand. All commercials advertising cigarettes must devote 20 percent of transmission time to a warning that tobacco is harmful to health. The Council of the District of Bogotá prohibits tobacco advertising in children's sports and scientific publications; on murals, posters, or signs at sports, cultural, educational, or residential places; and in public transportation vehicles.

Costa Rica

All advertising or promotion of cigarettes through newspapers, radio, television, and cinemas must be approved by the Ministry of Health to avoid publicity detrimental to the public health. Advertising of tobacco is prohibited on radio and television programs intended for children.

Ecuador

Tobacco advertising directed at or referring to minors is prohibited. Also prohibited are the broadcast of tobacco advertisements before 7:30 p.m., the insertion of such advertisements in programs for children, the use of minors as models, the placement of advertisements near schools and colleges or in comics, and the depiction in tobacco advertisements of sports figures or people who have contributed to the literature and history of Ecuador.

El Salvador

Tobacco advertising on radio or television and in cinemas during programs directed to children is prohibited, but advertising during programs not directed to children is allowed.

Mexico

The legislation prohibits tobacco advertising that asserts that the product enhances social prestige or that induces consumption by (1) asserting that tobacco is a sedative or reduces fatigue or tension or (2) attributing stimulant qualities leading to success. Advertising that induces persons to consume the product for health reasons is also prohibited. Tobacco advertising must not associate tobacco with sports, domestic, or professional activities; emphasize femininity or virility; suggest greater success in sexual relations; depict children or adolescents; attribute an effect of well-being; or depict persons smoking in public. Tobacco advertising is limited to information on the characteristics, quality, and techniques of preparation of these products.

Panama

All advertising of tobacco must be approved by the Ministry of Health. Advertising that shows people smoking is prohibited.

Paraguay

Tobacco advertisements may refer to the quality and origin of the tobacco only and must not encourage consumption. The use of figures or characters representing children or adolescents is prohibited as is the association of tobacco with sports, work, study, or home. Tobacco advertisements may not be televised before 7:00 p.m., except during presentations of international meetings, whether produced locally or abroad.

Peru

Advertising of cigarettes is prohibited before 8:00 p.m. on radio and television and during shows suitable for minors in places of entertainment.

Trinidad and Tobago

The Bureau of Standards enunciated standards based on the Code of Advertising Practice, 1979, of the Advertisers' Association of Trinidad and Tobago, which was developed in cooperation with the Advertising Standards Authority and other agencies. These standards require a health warning on tobacco advertisements, permit advertisements for free samples in the trade press only, prohibit the inclusion of coupons or trading stamps in cigarette packages, and forbid the directing of tobacco advertisements and promotion at audiences that include children.

United States

Federal legislation prohibits advertising of cigarettes, little cigars, and smokeless tobacco on television and radio. Health warnings are required in print advertisements and on billboards.

Uruguay

Legible health warnings, required on written tobacco advertisements, must remain on a screen long enough to be read. Oral advertising must refer to the health warning once for every five references to tobacco products. No promotion of tobacco products, direct or indirect, may be undertaken in schools or other educational institutions, whether public or private. Legislation proposed in 1988 would set forth standards for advertising tobacco products, including a prohibition on advertisements directed to or depicting young people. Low-tar and low-nicotine cigarettes could not be depicted as beneficial to health, and advertising could not associate smoking with sports, physical strength, social prestige, virility, or femininity. Advertising would also be restricted to objective facts on the characteristics of the product, its price, and its quality.

Venezuela

All advertising of tobacco products on television or radio that directly or indirectly encourages consumption of cigarettes and tobacco products is prohibited.

Restrictions on Smoking in Public Places (Table 4)

Bolivia

Smoking is prohibited in schools, health premises, indoor public places, and public transportation vehicles. Separate smoking areas are to be provided in indoor public places.

Brazil

On May 31, 1990, the Ministry of Health adopted a resolution prohibiting smoking in any public or private health institution. The Ministry recommends that the states, the Federal District, and the municipalities adopt measures restricting smoking in public premises, public transportation vehicles, elevators, auditoriums, cinemas and theaters, public libraries, and premises for use by the public. Smoking is prohibited on all flights of two hours or less. On flights exceeding two hours, space must be reserved for smokers in the rear of the plane. A legal challenge to the restrictions on smoking on short flights was rejected by the Supreme Court of Justice in Brasilia in December 1989.

In 1988, an order of the national government recommended that federal, state, and municipal governments adopt or encourage limitations on smoking in enclosed public places that lack adequate ventilation.

In 1980, the Secretary of State for Health and the Environment prohibited cigarette smoking in places where service is provided to the public in health units, hospitals, and other agencies of the Secretariat.

At the state level, Rio Grande do Sul prohibits smoking in public educational establishments; halls used for meetings, entertainment events, and lectures; museums and libraries; public health establishments; gymnasiums or other closed premises used for sports activities either maintained or subsidized by the state; and intercity passenger-transportation vehicles.

In São Paulo, smoking is prohibited on intercity buses, in schools, hospitals, health centers, and other local public health buildings. Both the smoker and the person in charge of the facility are subject to fines for violating this legislation. Since July 1990, all restaurants of more than 100 square meters must reserve 50 percent of the space for nonsmokers.

In the state of Rio de Janeiro, smoking is prohibited in meetings of the Federal Council on Medicine.

At the municipal level, the city of Rio de Janeiro has enacted legislation prohibiting smoking on buses and in elevators, cinemas and theaters, stores and supermarkets, hospitals and health services, museums, schools, garages, and taxis.

Pôrto Alegre prohibits smoking in businesses, cinemas, theaters, schools, elevators, buses, and places where explosives or flammable materials are processed or stored.

The municipalities of Curitiba and Florianópolis prohibit smoking in enclosed public places and businesses.

Chile

In 1981, the Ministry of Education issued a circular requiring teachers and professors to refrain, whenever possible, from smoking in class and while complying with their obligations to students. The head of the institution is responsible for enforcement.

In 1981, the Ministry of Health prohibited smoking by staff on the premises of the National Health Service and in patients' waiting rooms, administrative offices, elevators, auditoriums, and meeting rooms.

Acting on the recommendation of WHO, the Minister of the Interior recommends that smoking be prohibited in the waiting rooms, offices, anterooms, and places of public service in government organizations.

Legislation in 1985 prohibits smoking in public transportation vehicles.

Colombia

The Special District of Bogotá prohibits smoking in covered coliseums, movie houses, theaters, public libraries, museums, and other buildings to which the public is admitted or that are devoted to cultural or sports activities; in buses and taxis; in enclosed areas of hospitals, sanatoriums and health centers; and in government offices where the public is served.

Costa Rica

Smoking by employees and visitors is prohibited in national government buildings, except for persons incarcerated in buildings of the national penitentiary system. But in each public institution, a smoking area is to be provided.

Smoking is prohibited in places for public entertainment, including cinemas and theaters, throughout the country. The owners or managers of these facilities are responsible for enforcement.

Smoking is also prohibited in all means of public transportation. Drivers are responsible for enforcement; they may refuse to continue service and seek help from the authorities.

Legislation enacted in 1988 imposes a general ban on smoking in the workplace and requires the director of the workplace, or his or her representative, to ensure strict compliance with the prohibition. An area may be reserved for smokers—to the extent possible.

Cuba

Smoking by the staff, patients, and visitors of the National Health System is prohibited. A 1981 ministerial resolution prohibits smoking on all means of public transportation.

Guatemala

Guatemalan Government Accord No. 681 (August 3, 1990) prohibits smoking in public transportation vehicles and in public places in government and private offices.

Honduras

Comprehensive legislation enacted in 1989 prohibits smoking in public and private schools; cinemas and theaters; collective ground, air, and sea transportation; public and private hospitals; government offices and workplaces; sports centers; and sessions of the national Congress.

Mexico

A 1990 decree of the Secretary of Health restricts smoking in the medical facilities of the Secretary of Health and the National Institute of Health, including areas for preventive, curative, and rehabilitative care; auditoriums and places for group meetings, lectures, and teaching; and other areas.

In the Federal District of Mexico, a regulation for the protection of nonsmokers, dated July 5, 1990, restricts smoking in a wide range of indoor public places, including public transportation vehicles; kindergartens; primary, secondary, and high schools; waiting rooms of health facilities, hospitals, and clinics; libraries; cinemas, theaters, and auditoriums; government offices; and shops and businesses providing service to the public, such as automobile service shops, banks, and financial, industrial, and commercial offices.

Panama

A 1978 decree prohibits smoking in buses.

Paraguay

A resolution of the Ministry of Public Health and Social Welfare, issued on January 23, 1990, prohibits smoking in the clinics and waiting rooms of the health services as well as in other offices and buildings of the Ministry.

In Asunción, the municipal council has prohibited smoking in vehicles of the public transportation system.

Peru

A ministerial resolution prohibits smoking in buildings and offices of the Ministry of Health and its decentralized agencies. The text of the resolution must be posted at the entrance and other prominent places of the buildings and offices of the Ministry. Managers and staff are required to ensure strict compliance with the ban on smoking.

Trinidad and Tobago

Although no national legislation restricts smoking on aircraft, British West Indian Airways Ltd., in compliance with regulations of the International Airline Transport Association, prohibits smoking on flights of less than one and one-half hours.

Uruguay

Since 1976, the School of Medicine of the University of the Republic of Uruguay has prohibited smoking by physicians, students, staff, patients, and visitors in hospitals of the medical school. A Special Order of the Ministry of Health, No. 3904, prohibits smoking in all hospitals of the Ministry of Health. This ban applies to patients, visitors, physicians, students, and technical and administrative personnel while on duty and in contact with patients and their visitors. Smoking is prohibited in plenary sessions and working committee sessions of the Chamber of Deputies. Legislation proposed on June 16, 1987, would prohibit smoking in public offices, health centers, public and private schools, and public transportation.

Municipal legislation in Montevideo prohibits smoking in theaters, cinemas, circuses, and all other places where public performances are presented, although a 1979 decree of Montevideo permits sale of cigarettes in theaters. Montevideo also prohibits smoking in city buses and on short trips (less than 110 km) of interdepartmental buses. A 1975 decree prohibits smoking on school buses. On long-distance lines, including national and international tourism buses, smoking is permitted in the last three rows of seats. Smoking is also prohibited by personnel of companies engaged in the storage, sale, and transportation of flammable liquids; in storage places for microcontainers of "supergas"; in storage places for cylinders and equipment for respiratory therapy; and in storage places for bulk liquid petroleum gas.

Venezuela

A 1979 regulation under the Tax Law on Cigarettes and Manufacturing of Tobacco bans smoking in public transportation vehicles; in buildings where people gather, such as waiting rooms in theaters and cinemas; in hospitals and other health facilities; in sports arenas; and in other places that may be designated. Smoking areas may be set aside in these facilities. No-smoking signs must be posted, and managers of these public places are responsible for compliance.

In 1984, the Venezuelan Social Security Institute prohibited smoking in all the administrative service units of the Institute, and the Ministry of Education prohibited smoking in school buildings.

Restrictions Preventing Tobacco Use by Minors (Table 5)

Argentina

A statute enacted in 1986 prohibits tobacco advertising on radio and television from 8:00 a.m. to 10:00 p.m., except that the name of the brand may be presented. Tobacco advertising is prohibited in publications intended for young people and in theaters and cinemas to which persons under 18 are admitted. Distribution and promotion of samples of cigarettes at colleges and universities are prohibited. Young people may not be used as models in advertisements of tobacco. Advertising directed at young people or associated with sports is prohibited.

Bolivia

Regulations introduced in 1982 ban smoking in schools because smoking exposes persons of low resistance to the polluting effects of tobacco and because minors are susceptible to example. Tobacco advertising must not depict children or adolescents, nor may it associate tobacco with sports. In 1984, the Minister of Education and Culture prohibited students, professors, and parents of students from smoking in public and private educational institutions.

Brazil

Legislation enacted in 1988 specifies that no reference to children may be made in tobacco advertising and that such advertising must not be addressed to them. Tobacco advertising cannot be presented in theaters before 8:00 p.m. if persons under 18 may attend. Advertising on television is allowed between 9:00 p.m. and 6:00 a.m. only. An order of the Ministry of Health in 1990 prohibits the sale of cigarettes to minors and prohibits the distribution of free samples of tobacco products at public events. The municipalities of Rio de Janeiro, São Paulo, and Pôrto Alegre prohibit smoking in schools.

Chile

Tobacco advertising on radio or television is prohibited before 9:30 p.m. Young people may not be depicted in tobacco advertisements. In May 1981, the Ministry of Education prohibited smoking in schools and by teachers during classes.

Colombia

Sales to minors under age 14 and smoking in schools are prohibited.

Costa Rica

A 1988 decree prohibits the sale of cigarettes to minors in all commercial establishments. Administrators or managers of the establishments must ensure compliance with the decree. Violators are sentenced under the General Health Law, which provides a penalty of five to 30 days in jail.

Ecuador

Distribution of samples of cigarettes to minors is prohibited. Tobacco advertising aimed at children or referring to them is also prohibited. Tobacco advertisements may not be presented on television before 7:30 p.m. nor be included in programs intended exclusively for children. Tobacco may not be advertised in or near schools, on school buses, in sports centers, or in comic books. Sports stars and young artists may not be depicted using or smoking cigarettes in posters, in movies, or on record albums. A similar ban applies to use of historical figures and members of the learned professions in advertising. Encouraging smoking to improve concentration or performance is prohibited.

El Salvador

Tobacco advertising is permitted on radio, on television, and in movie houses during programs not intended for children.

Mexico

The General Health Law of 1983 sets forth the objectives of the Program Against Smoking, which includes education of the family, children, and adolescents about the effects of tobacco on health through individual methods and mass communication. The statute contains no specific ban on advertising directed at children, but it prohibits the sale of tobacco products to minors under any circumstances.

Panama

All advertising of tobacco must be approved by the Ministry of Health. Tobacco advertising may not depict persons smoking.

Paraguay

Tobacco advertising that depicts children or adolescents or that associates tobacco with sports is prohibited.

Peru

Cigarette advertising may be presented on radio and television after 8:00 p.m. It is an offense to present tobacco advertising before 7:00 p.m. in performances suitable for minors.

Uruguay

The sale of cigarettes, cigars, and tobacco products to minors (persons under 18 years of age) is prohibited. The sale of single or loose cigarettes is prohibited. Advertising of cigarettes is allowed on radio and television after 9:00 p.m. only. Television stations must avoid guests' smoking on programs between 6:00 a.m. and 12:00 p.m.

Venezuela

A 1980 decree prohibits television and radio advertising that leads to the use of cigarettes and tobacco products, especially by young people. Violation of this decree is punishable by suspension or revocation of the broadcasting permit.

Legislation Mandating Health Education on Tobacco Use (Table 6)

Bolivia

Legislation enacted in 1982 requires the Ministry of Social Welfare and Public Health to create mass education programs to counter the harmful effects of tobacco and to supervise the use of the media for tobacco advertising. A council for health training and education, created by joint action of the Ministry of Social Welfare and Public Health and the Ministry of Education and Culture, is charged with analyzing the educational programs, including compulsory antismoking education, for systematic and programmed teaching of health education.

Brazil

Legislation enacted in 1986 provides for a national antismoking day (on August 29 each year) and a national campaign in the preceding week that alerts people to the dangers of tobacco use.

Chile

The National Commission for Control of Smoking, established by a 1986 decree, is charged with designing and evaluating a program for smoking control that includes education, information, and regulation. The Commission is required to identify resources in the public and private sectors for informational, educational, and smoking-cessation activities. The function of the Intersectoral Commission for Primary Prevention of Alcoholism in Schools, established in 1980, has been expanded to prevent the use of drugs and tobacco. In 1984, the Decree on the Advisory Joint Commission on Education was modified to strengthen joint activities of the ministries of health and education and their constituent bodies and to increase support at the local level.

Colombia

Legislation of 1986 provides for educational programs and campaigns to prevent tobacco use.

Costa Rica

A 1988 decree urges campaigns and activities to mark World No-Tobacco Day, established by WHO, that emphasize the injury to health caused by smoking.

Cuba

A 1981 decree requires the staff of the National Health System to use all opportunities to provide information on the harmfulness of tobacco and to persuade citizens of this effect.

Ecuador

The 1979 Constitution of Ecuador recognizes the right to welfare of all Ecuadorians, which includes protection of health, and requires programs aimed at eliminating alcoholism and other addictions.

El Salvador

A decree of May 11, 1988, requires the Ministry of Public Health and Social Welfare to develop programs on the effects of consumption of drugs and tobacco and to encourage cultural and sports activities that prevent such consumption.

Mexico

The General Health Law of 1983 sets forth the objectives of the Program Against Smoking, which include education of the family, children, and adolescents through individual methods and mass communication. Emphasis is on education of the family to prevent tobacco use by children and adolescents. Coordination agreements between the Ministry of Health and Welfare and the states provide for implementing smoking-control programs in institutions of higher education and for preventing smoking by children and adolescents.

Uruguay

Concerned about the increase in smoking among young people, the Ministry of Public Health, with participation from the Ministry of Education, organized No Tobacco Day, which involves educational councils at the primary, secondary, and teacher training levels. Legislation proposed in 1988 would authorize a commission for the control of smoking to coordinate educational programs on tobacco with the National Administration of Public Education, the University of the Republic, and other educational organizations.

Appendix 2. Legislation Reviewed for the Americas

Many of the references cited here are available from multiple sources, including the *International Digest of Health Legislation* (IDHL), edited by the Health Legislation Office, World Health Organization, Geneva, and the LEYES database produced in the WHO Regional Office for the Americas, or Pan American Health Organization (PAHO), by the Health Legislation Project (HLE), Health Policies Development Program. Several state and local statutes were provided by PAHO. The list contains related laws not specifically discussed in the text.

For a useful summary and analysis of Latin American legislation to control smoking, see Bolis, M., *Frame of Reference for the Analysis of Latin American Legislation Relating to Control of Smoking*, Washington, DC: Pan American Health Organization, Health Policies Development Program, December 1989 (in Spanish and English).

Argentina

Order No. 33.266 prohibits drivers of school buses from smoking and prohibits smoking on vehicles transporting dangerous substances.

Order No. 22.900 prohibits smoking on public transportation vehicles.

Order No. 09-12-910 prohibits smoking in theaters, including interior vestibules and corridors.

Resolution No. 422 of May 23, 1984, prohibits the use of minors in tobacco advertising. (LEYES database)

Law No. 23344 of July 31, 1986, restricts the advertising of tobacco, cigars, cigarettes, and other products intended for smoking and their packaging. (IDHL, 1986, 37(4):796–797) (LEYES database)

Parliamentary Decree No. 226 of April 27, 1988, requires that all advertising and promotion of tobacco carry a warning that smoking is prejudicial to health.

Argentine Food Code, Article 18, prohibits the use of tobacco in food establishments and in places where food products are handled.

Argentina (Buenos Aires)

Order No. 6762-DOCS-84 of December 5, 1984, concerns smoking in public transportation, stations of the underground, school buses, vehicles transporting dangerous substances, theaters, and food establishments.

Law No. 10.600 of November 12, 1987, prohibits smoking in public transportation vehicles.

Argentina (Córdoba)

Order No. 8425 of October 11, 1988, prohibits smoking in offices of the municipal government that serve the public.

Law No. 7827 of September 20, 1989, prohibits smoking in enclosed places of the executive, legislative, and judicial branches of the government.

Argentina (Jujuy)

Law No. 4292 of June 17, 1987, prohibits smoking in public buildings, school rooms, hospitals, and means of urban and suburban transportation.

Argentina (Mendoza)

Law of December 3, 1988, prohibits smoking in indoor public places, elevators, public offices, hospitals and health centers, official banks, and educational establishments.

Argentina (Valle Viejo)

Order of October 25, 1988, prohibits smoking in government offices, indoor public places, and means of transportation.

Argentina (San Fernando del Valle de Catamarca)

Order No. 565-C-89 prohibits smoking in enclosed places of the municipal government and orders a campaign against smoking with the objective of extending the prohibition to all public and private places.

Bermuda

The Tobacco Products (Public Health) Act 1987 requires warnings on packages and advertisements for tobacco products. (IDHL, 1989, 40(1):100)

The Tobacco Products (Public Health) Regulations 1988 requires health warnings on cigarette packages. (IDHL, 1989, 40(1):100–101)

Bolivia

Decree Law No. 15.629 of July 18, 1978, Health Code, contains a provision on cigarette marketing. (LEYES database)

Supreme Decree No. 18.955 of May 26, 1982, forbids the importation of cigarettes into Bolivia. (LEYES database)

Regulations of March 15, 1982, on the use of tobacco, restrict advertising, require a health warning, and prohibit smoking in schools, indoor public places, and transportation vehicles. (IDHL, 1983, 34(3): 538:539) (LEYES database)

Ministerial Resolution No. 883 prohibits smoking in any educational establishment, private or public, throughout Bolivia. (Provided by HLE/PAHO)

Brazil

Law No. 7488 of June 11, 1986, establishes a national antismoking day. (IDHL, 1989, 40(2):406) (LEYES database)

Order No. 490 of August 25, 1988, restricts smoking in public places, requires a health warning on tobacco packages, and restricts advertising. (IDHL, 1989, 40(2):406)

The Brazilian Political Constitution of 1988 stipulates that commercial advertisement of tobacco (and other products mentioned) will be subject to legal restrictions and requires that a warning appear on advertisements of these products stating the harmful effects caused by their use.

Regulation No. 731 of the Ministry of Health, dated May 31, 1990, restricts advertising of tobacco products, requires a health warning on packages and advertising, regulates smoking in health institutions and on airline flights, encourages federal districts and municipalities to restrict smoking in public places, and forbids the sale of tobacco products to persons under 18 years of age. (Resolution No. 490 of August 25, 1986, is repealed)

Brazil (Rio Grande do Sul)

Order No. 1/80-SSMA of April 8, 1980, concerns smoking in the workplace, smoking in health institutions, and restrictions on tobacco sales in health institutions. (IDHL, 1981, 32(1):87)

Law No. 7813 of September 21, 1983, contains provisions on smoking. (IDHL, 1983, 34(4):768)

Brazil (São Paulo)

Law No. 3.938 of September 8, 1950, prohibits smoking in public transportation vehicles, elevators, and places of public entertainment. (Provided by HLE/PAHO)

Law No. 8.421 of July 14, 1976, prohibits smoking in indoor supermarkets and other stores. (Provided by HLE/PAHO)

Law No. 9.032 of March 27, 1980, concerns educational programs in schools on the harmful consequences of tobacco and alcohol consumption. (Provided by HLE/PAHO)

Law No. 9.120 of October 8, 1980, prohibits smoking in public transportation vehicles in urban areas, public places, health establishments, and elementary and secondary schools.

Law No. 2.845 of May 20, 1981, prohibits smoking on school premises, on sports grounds, and in public health establishments. (Provided by HLE/PAHO)

Decree No. 17.451 of July 22, 1981, regulating Law No. 9.120 of October 8, 1980, prohibits smoking in public places, hospitals, and elementary and secondary schools. (Provided by HLE/PAHO)

Canada

Tobacco Products Control Act, 1988, Chapter 20, Revised Statutes of Canada. (IDHL, 1988, 39(4):858–859)

Non-smokers' Health Act, 1988, Chapter 21, Revised Statutes of Canada, as amended by Chapter 7, Revised Statutes of Canada, 1988. (IDHL, 1988, 39(4):859–860, IDHL, 1990, 41(1):83–84)

Non-smokers' Health Regulations. (IDHL, 1990, 41(1):84–85)

Aeronautics Act: Air Regulations, amendment. (IDHL, 1988, 39(1):86)

Canada (Manitoba)

An Act to Protect the Public Health and Comfort and the Environment by Prohibiting and Controlling Smoking in Public Places, Bill 71, 1987.

Canada (Ontario)

The Smoking in the Workplace Act, 1988.

Canada (Quebec)

Law on the protection of nonsmokers in certain public places, Bill 84, 1987. (IDHL, 1987, 38(1):65–66)

Chile

Decree No. 106 of April 8, 1981, prescribes a warning in connection with the marketing and advertising of tobacco. (IDHL, 1982, 33(4):732) (LEYES database)

Circular No. 601/81 of the Ministry of Education, dated May 11, 1981, restricts smoking by teachers and in the schools.

Circular No. 3H/95 of June 23, 1982, of the Ministry of Health prohibits smoking by health professionals, health officials, and the general public in hospital rooms, clinics, waiting rooms, administrative offices serving the public, elevators, auditoriums, and waiting rooms of the National Health Service.

Law No. 18290 of February 1985 concerns the public transportation of passengers and prohibits smoking in the interior of public vehicles. (LEYES database)

Decree No. 1 of January 2, 1986, establishes the National Commission for the Control of Smoking. (IDHL, 1987, 38(4):786–787) (LEYES database)

Resolution No. 35 of April 21, 1986, forbids smoking in public vehicles. (LEYES database)

Decree No. 164 of June 4, 1986, prescribes a new warning for use in the marketing and advertising of tobacco. (IDHL, 1987, 38(4):787) (LEYES database)

Circular No. 3F/123 of August 13, 1986, of the Ministry of Health, restricts smoking in the health facilities of the National Health Service. (LEYES database)

Circular No. 1-27 of July 1989, of the Ministry of Health, concerns promotion of the antitobacco campaign in the community and in schools of the municipal education system.

Circular 27 of July 4, 1989, of the Ministry of the Interior, recommends restrictions on smoking in government services and on the sale of tobacco products in kiosks and other places of the government services.

Colombia

Decree No. 1.188 of June 25, 1974, promulgates the National Statute on Narcotics, Section 20 of which restricts tobacco advertising in cinemas and the broadcast media. (IDHL, 1978, 29:23–26)

Decree No. 3.430 of November 26, 1982, concerns restrictions on advertising of tobacco.

Resolution No. 4.063 of 1982, regulating Decree No. 3430 of November 26, concerns restrictions on advertising. (Provided by HLE/PAHO)

Resolution No. 7.559 of June 12, 1984, creates the National Board on Tobacco and Health. (Provided by HLE/PAHO)

Decree No. 3.788 of 1986 concerns educational campaigns against tobacco. (Provided by HLE/PAHO)

Law No. 30 of January 31, 1986, refers to campaigns aimed at, among other topics, preventing tobacco consumption. (LEYES database)

Colombia (Bogotá)

Accord No. 3 of 1983 concerns smoking in public places, public vehicles, schools, health establishments, and government offices. (Provided by HLE/PAHO)

Costa Rica

Decree No. 1.520-SPPS of February 24, 1971, requires warnings on cigarette packages. (IDHL, 1974, 24:61)

Decree No. 11.016-SPPS of December 17, 1979, forbids advertising of cigarettes, unauthorized by the Ministry of Health, through newspapers, radio, television, cinemas, and other media. (LEYES database)

Decree No. 20.196-S of December 13, 1990, refers to advertisement, health warnings on packages, and places in which smoking is prohibited. (LEYES database)

Executive Decree No. 17.398-S-J of January 21, 1987, forbids civil servants to smoke at work. (LEYES database)

Executive Decree No. 17.964-S of August 3, 1987, forbids smoking in cinemas and theaters. (LEYES database)

Executive Decree No. 18.771 of January 16, 1989, requires the director of public institutions to place no-smoking signs in visible places. (LEYES database)

Executive Decree No. 18.780 of January 19, 1989, requires warnings on tobacco's harmful effects. (LEYES database)

Decree No. 17.967-S of February 4, 1988, concerns restrictions on sales to minors. (IDHL, 1989, 40(1):101) (LEYES database)

Decree No. 17.969-S of February 4, 1988, concerns tobacco information programs. (IDHL, 1989, 40(1):101) (LEYES database)

Decree No. 18.216-S-TSS of June 23, 1988, concerns smoking in the workplace. (IDHL, 1989, 40(1):101) (LEYES database)

Decree No. 18.248-MOPT S of June 23, 1988, concerns smoking on public transportation vehicles. (IDHL, 1989, 40(1):101–102) (LEYES database)

Cuba

Ministerial Resolution No. 165 of August 17, 1981, concerns smoking in health institutions and in the workplace. (IDHL, 1989, 40(2):407) (LEYES database)

Ecuador

Supreme Decree No. 965 of August 24, 1973, promulgates regulations governing manufacturing, sales, and advertising activities associated with the use and consumption of cigarettes and alcoholic beverages. (IDHL, 1978, 29:64–65) (LEYES database)

Political Constitution of January 10, 1979, states that the social security system will be aimed at the elimination of alcoholism and other drug addictions. (LEYES database)

Accord No. 955 of January 13, 1989, creates a national committee against smoking. (LEYES database)

El Salvador

Decree No. 955 of May 11, 1988, promulgates the Health Code concerning information programs, advertising restrictions, and health warnings on packages. (IDHL, 1990, 41(1):1–15) (LEYES database)

French overseas departments and territories

Law number 91-32 (January 10, 1991), of the French National Assembly, concerns the fight against tobacco addiction and alcoholism.

Guatemala

Government Accord No. 681 of August 3, 1990, prohibits smoking in public transportation vehicles and public places in government and private offices. (LEYES database)

Honduras

Law of the Honduran Institute for the Prevention of Alcoholism and Drug Addiction, Decree No. 136-89, of October 14, 1989, provides for control of smoking in public places.

Mexico

General Health Law of December 23, 1983, refers to the control of tobacco importation and exportation. (LEYES database)

Regulations of the General Health Law of January 4, 1988, refer to the importation and exportation of various products, including tobacco. (LEYES database)

Coordination Agreement of November 10, 1986, between the Federal Executive and the Executive of the State of Tabasco, supports the Smoking Control Program. (IDHL, 1987, 38(4):787–788)

Decree of February 26, 1973, prescribes the Health Code of the United Mexican States, Section 37 of which authorizes the Secretariat for Health and Welfare to regulate publicity for or advertising of alcoholic beverages and tobacco. (IDHL, 1974, 25:123–141)

Regulations of December 16, 1974, on advertising for foodstuffs, beverages, and medicaments, Chapter IV of which restricts advertising of tobacco. (IDHL, 1976, 27:163–168)

Decree of the Secretary of Health of April 17, 1990, restricts smoking in medical facilities of the Secretary of Health and in the National Institute of Health.

Mexico (Federal District)

Regulation for the protection of nonsmokers, dated July 5, 1990, prohibits smoking in indoor public places, public transportation vehicles, public and private schools, hospitals and clinics, government offices, cinemas, theaters, and shops and business places where the public is served.

Nicaragua

Decree of June 30, 1976, establishes a health warning on cigarette packages.

Panama

Cabinet Decree No. 56 of March 17, 1970, prescribes measures against cigarettes. (IDHL, 1973, 24:581)

Decree No. 129 of June 19, 1978, refers to, among other things, advertising of cigarettes and tobacco. (LEYES database)

Resolution No. 1.561 of November 8, 1989, creates a national commission to study tobacco use in Panama. (LEYES database)

Paraguay

Law No. 836/80 promulgates the Health Code of December 15, 1980, Sec. 202 of which restricts advertising of tobacco and authorizes the Ministry of Health to require a health warning on tobacco products. (IDHL, 1981, 32:624–634) (LEYES database)

Resolution S.G. No. 20 of the Ministry of Public Health and Social Welfare, January 23, 1990, prohibits smoking in the facilities of the Ministry of Public Health and Social Welfare and sets forth means of control.

Decree-Law No. 4012 regulates Articles 202–205 of the Sanitary Code on Advertising of Tobacco and Alcohol.

Paraguay (Asunción)

Capital Municipality Transit Rule #298 of August 1981 prohibits smoking in urban passenger vehicles.

Capital Municipality Ordinance 15,381, dated February 2, 1984, prohibits smoking in cinemas, theaters, and other similar public places.

Order of the Municipal Council, Article 298, in relation to World No-Tobacco Day 1991, prohibits smoking in collective public transportation vehicles.

Peru

Ministerial Resolution No. 570-86-SA-DM forbids smoking in dependencies of the Ministry of Health. (LEYES database)

Ministerial Resolution No. 449-88-SA-DM of May 12, 1988, creates a permanent national commission against smoking. (LEYES database)

Supreme Decree No. DS-0079-70-SA of April 1970 requires health warnings on cigarette packages and advertisements and restrictions on advertising. (IDHL 1977, 28:689)

Law No. 23.482 of October 20, 1982, concerns the selective consumption tax on cigarettes made from blond tobacco. (IDHL, 1987, 38(1):67) (LEYES database)

Trinidad and Tobago

Trinidad and Tobago standard. Requirement for advertising, advertising of tobacco products of June 15, 1984. TTS 2120500 Part 3:1984.

Trinidad and Tobago Compulsory Standard. Requirements for labeling; Part II - Labeling of retail packages of cigarettes. TTS 2110500 Part II: March 10, 1989.

Chap. 46:01, Laws of Trinidad and Tobago, March 17, 1925, the Children Act, relates to the protection of juvenile offenders, children, and young persons, and to persons in industrial schools and orphanages.

United States

The Federal Cigarette Labeling and Advertising Act, 1965, as amended by the Public Health Cigarette Smoking Act, 1969, and the Comprehensive Smoking Education Act, 1984. (IDHL, 1971, 22:998; IDHL, 1985, 36(3):649)

The Comprehensive Smoking Education Act concerns information programs, warnings on packages, evaluation of smoking-control programs, and advertising restrictions. (IDHL, 1985, 36(3):649–652)

The Comprehensive Smokeless Tobacco Health Education Act of 1986 concerns information programs, smokeless tobacco, restrictions on sales to minors, health warnings on packages, advertising restrictions, levels of toxic constituents, and evaluation of smoking-control programs. (IDHL, 1987, 38(1):67–70)

Regulations under the Comprehensive Smokeless Tobacco Health Education Act of 1986. (IDHL, 1987, 38(3):547)

Smoking Regulations. Part 101-20 (Management of Buildings and Grounds) of Title 41 (Public Contracts and Property Management) of the U.S. Code of Federal Regulations. (IDHL, 1987, 38(3):547–548)

The Department of Transportation and Related Agencies Appropriations Act 1988 concerns smoking aboard aircraft (IDHL, 1988, 39(4):865); U.S. Code Annotated, Title 49, Appendix, Section 1374(d), Prohibition against smoking on scheduled flights and tampering with smoke alarm devices, as most recently amended by P.L.101-164, Section 335, November 21, 1989, 103 Stat. 1098.

Smoking aboard aircraft. Parts 121 and 135 of Title 14 (Aeronautics and Space), U.S. Code of Federal Regulations. (IDHL, 1989, 40(1):104)

United States (New York)

An act to amend the public health law, in relation to smoking restrictions and to repeal article 13-E of such law relating thereto concerning smoking in public places, workplaces, health institutions, and on public transportation vehicles. Approved by the Governor: July 5, 1989. (IDHL, 1990, 41(1):88); New York Public Health Law, Article 13-E, Sections 1399n-1399x, 1990.

Uruguay

Resolution No. 1150/970 of July 21, 1970, assigns to the Ministry of Health the task of studying the effects of smoking and disseminating information thereon through a special commission. (IDHL, 1973, 24:680)

Resolution 765602, adopted September 23, 1976, prohibits smoking in the clinics and hospital of the Faculty of Medicine by physicians, students, and technical and administrative personnel; requires inclusion of smoking history in patient charts; establishes smoking-cessation programs in the hospital; intensifies education against tobacco in the maternal and child clinics; and increases information on smoking and its risks at all levels of instruction—professional, middle level, and primary education.

Decree No. 407/981 of December 17, 1980, prohibits the smoking of tobacco products in any form in buses used for interdepartmental transport of passengers.

Law No. 15.361 of December 24, 1982, adopts provisions on the advertising and marketing of cigarettes, cigars, and other tobacco products. (IDHL, 1983, 34(3):539) (LEYES database)

Decree No. 263.983 of July 22, 1983, regulates the marketing and advertising of tobacco products.

Decree No. 163 of July 22, 1983, regulates advertising and marketing of cigarettes and tobacco products. (LEYES database)

Law No. 15.656 of October 10, 1984, extends the interval for publishing the maximum yield of nicotine and tar by cigarette manufacturers and importers. (IDHL, 1988, 39(2):396)

Resolution of the Chamber of Deputies, dated May 9, 1989, prohibits smoking in the plenary sessions and working committee meetings of the Chamber of Deputies.

Ministry of Public Health Special Order No. 3.904 (undated) prohibits smoking in the hospitals of the Ministry of Public Health by patients and their visitors, and by physicians, students, and technical and administrative personnel while on duty and in contact with patients. The order also calls for intensified education on tobacco, especially in the maternal and child health clinics, and requires inclusion of information on smoking in clinical histories recorded in the hospital.

Uruguay (Montevideo)

Decree No. 16.750 of March 21, 1975, prohibits smoking by drivers of buses for school children. (Provided by HLE/PAHO)

Decree No. 19.067 of March 1979 concerns requirements for theatrical performances, including authorization for the sale of nonalcoholic drinks, cigarettes, and other items in theaters. (Provided by HLE/PAHO)

Decree 407/981 of August 12, 1981, concerns smoking on interdepartmental passenger transportation. (Provided by HLE/PAHO)

Venezuela

Law of September 13, 1978, prescribes the tax on cigarettes and tobacco products. (IDHL, 1979, 30:925) (LEYES database)

Decree No. 3.007 of January 2, 1979, prescribes regulations for the implementation of the law prescribing the tax on cigarettes and tobacco products. (IDHL, 1979, 30:925–926) (LEYES database)

Decree No. 849 of November 21, 1980, prohibits television advertising of tobacco products. (LEYES database)

Decree No. 996 of March 19, 1981, prohibits radio advertising of tobacco products. (LEYES database)

Decree No. 849 of November 21, 1980, prohibits the transmission by television stations of any commercial advertising that directly or indirectly encourages the consumption of cigarettes and other products derived from tobacco manufacture. (IDHL, 1982, 33(3):499) (LEYES database)

Resolution of October 23, 1984, establishes a Standing Honorary National Council, attached to the Division of Chronic Disease of the Ministry of Health and Social Welfare, for studying health problems associated with smoking—with a view to formulating policies for the prevention of smoking and the organic diseases resulting therefrom. (IDHL, 1986, 37(2):276–277)

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Chapter 6
Status of Tobacco Prevention and Control Programs in the Americas

Preface *181*

Introduction *183*

National Programs for Tobacco Control *183*

United States *183*
Canada *184*

Regional Activities for Tobacco Control in Latin America and the Caribbean *185*

Elements of Prevention and Control Programs *186*

Surveillance and Analysis *186*
Education, Public Information, and Cessation Programs *187*
Taxation *190*
Legislation *191*
Coalitions *194*

Summary *196*

Conclusions *196*

Appendix 1. Antitobacco Activities in Latin America and the Caribbean *197*

Appendix 2. Antitobacco Organizations in Latin America and the Caribbean *202*

References *204*

Preface

The Americas comprise diverse countries that have not developed synchronously. The impact of many of the factors of development discussed in the previous chapters—the transition to an industrialized economy, the changing population structure, the consolidation of the tobacco industry, the growing prevalence of cigarette smoking, and the emerging burden of smoking-attributable mortality—has differed among countries. Almost all countries have some form of antismoking activity, but the nature and extent of that activity are shaped by historical, epidemiologic, economic, and legal factors specific to each country.

The current antismoking activities of governments and other agencies are described in this chapter. These activities illustrate the diversity of the public health response to tobacco use. The emphasis here is on the types of activities, rather than specific content and detail. Surveillance, monitoring of prevalence, taxation, and legislation are revisited to provide a comprehensive overview of the current antismoking movement.

Introduction

Elements essential to the prevention and control of tobacco use, described in reports on developing and developed countries,[1] include surveillance, education, taxation, legislation, and coalition building. These elements must be developed in the sociodemographic and economic context of each country in the Americas, and they must account for the unique nature of the epidemic of tobacco use in each country. Some elements, such as taxation, are beyond the responsibility of ministries of health, and all the elements require the collaboration of other ministries, professional organizations, the media, church groups, and community coalitions. Concerted efforts of both government agencies and private or nonprofit organizations are necessary for successful tobacco control (Jamison and Mosley 1991). The current, documented tobacco-control activities of governments and other agencies are reviewed here to provide an overview and summary of content described in detail in previous chapters.

National Programs for Tobacco Control

United States

In the United States, the public health practice of tobacco control has evolved during the past 25 to 30 years as federal, state, and local governments have joined voluntary health agencies in prevention activities. The 1964 advisory committee report to the Surgeon General on the health consequences of smoking provided the scientific information needed to launch an effective, sustained, national public health campaign against tobacco use (Public Health Service 1964). As the national effort matured, the actions of state and local health departments became more important, since municipalities have more opportunities for aggressive control. Funding and technical assistance for state and local efforts has come from voluntary agencies and, more recently, from the Public Health Service—primarily the National Institutes of Health (the National Cancer Institute [NCI] and the National Heart, Lung, and Blood Institute), and the Centers for Disease Control (CDC). The CDC Office on Smoking and Health (OSH) was designated the lead organization for tobacco issues, and the lead spokesperson is the Surgeon General—largely because of the federally mandated annual report of the Surgeon General on the health consequences of smoking.

The Department of Health and Human Services (USDHHS) has periodically set national goals for the reduction of tobacco use among residents of the United States, but no coordinated program represents all departments of the federal government. In 1990, the Secretary of Health and Human Services released the year 2000 health objectives for the nation, and tobacco use was addressed by these objectives (USDHHS 1990a). The objectives call for (1) a reduction (to 15 percent) in the prevalence of adult smoking, (2) a reduction (to no more than 15 percent) in the rate of initiation of smoking by persons less than age 20 (as measured by the prevalence of smoking among 20 to 24 year olds), (3) an increase (to 50 percent) in the proportion of smokers who quit smoking for at least one day each year, (4) an increase (to at least 60 percent) in smoking cessation beginning in early pregnancy, (5) a reduction (to 20 percent) in the proportion of children aged 6 or younger who are exposed to tobacco smoke at home, and (6) a reduction (to no more than 4 percent) in smokeless tobacco use among males aged 12 through 24. Additional objectives call for the following:

- For all schools to be tobacco-free and to include prevention of tobacco use within the basic curriculum.
- For an increase to 75 percent in the proportion of worksites that prohibit or severely restrict smoking.
- For enactment and enforcement of bans on the sale of tobacco to minors.
- For the development of state tobacco-control plans.

1 Gray and Daube 1980; Pan American Health Organization 1989a; World Health Organization 1979, 1983a,b; Chapman and Wong 1990; Pierce 1991; Novotny et al., in press; Choi et al., 1991; Davis, Monaco, Romano 1991; Centers for Disease Control 1991.

- For a ban or severe restriction on advertising and promotion of tobacco to which youths are likely to be exposed.
- For an increase to 75 percent in the proportion of health care providers who provide smoking cessation advice and assistance to their patients.

NCI has encouraged the integration of effective cancer control technology (including tobacco control) into existing health care delivery systems. Interventions include school-based programs, testing and dissemination of minimal interventions (such as self-help programs), training of health care providers, mass media efforts, programs for groups at high risk for tobacco use, and programs to control the use of smokeless tobacco (Cullen 1988; USDHHS 1990b).

Additional support for state activities has been achieved through state cigarette excise taxes dedicated to tobacco-control programs (Bal et al. 1990) and through ASSIST (American Stop Smoking Intervention Study), a seven-year project sponsored jointly by NCI and the American Cancer Society. ASSIST, which began in 1991, will provide about $120 million to 20 states or large metropolitan areas for tobacco control (McKenna and Carbone 1989). The goal of ASSIST is to reduce by 43 percent the prevalence of smoking in the participating areas by 1998. ASSIST is expected to help achieve the year 2000 health promotion objectives for tobacco use.

The 1989 report of the Surgeon General, *Reducing the Health Consequences of Smoking: 25 Years of Progress* (USDHHS 1989), details the accomplishments of U.S. tobacco-control efforts. For the United States, the report documented a yearly decline, since 1979, of 0.5 percentage points in the prevalence of smoking among persons 20 years old or older and a mean yearly percent decrease of 2.4 percent in the adult (≥18 years old) per capita consumption of cigarettes. As a result of these trends, three-quarters of a million fewer smoking-related deaths occurred between 1964 and 1985 than would have occurred had prevalence not diminished (USDHHS 1989).

Canada

The Canadian tobacco prevention and control movement began over two decades ago when educational activities were stimulated by the British Royal College's 1962 report on smoking and health (Royal College of Physicians 1962). In 1985, the National Strategy to Reduce Tobacco Use was launched; its mission statement resolved to "produce a generation of nonsmokers by the year 2000" (McElroy 1990, p. 2). Twenty-two national health agencies created a joint steering committee whose 1987 directional paper presented a framework for the national program. Three principal goals were enumerated: protection of the health and rights of nonsmokers, prevention of smoking among young persons, and availability of cessation programs. To accomplish these goals, seven strategies were identified: legislation, access to information, availability of services and programs, message promotion, support for citizen action, intersectoral policy coordination, and research and knowledge development (McElroy 1990).

Current participants in the national strategy are Health and Welfare Canada, provincial and territorial ministries of health, the Canadian Cancer Society, Canadian Nurses Association, Canadian Council on Smoking and Health, Canadian Medical Association, Physicians for a Smoke-Free Canada, Heart and Stroke Foundation of Canada, Canadian Lung Association, and the Canadian Public Health Association. Health and Welfare Canada, through its Tobacco Programs Unit, is the coordinating agency. The Non-smokers' Rights Association is not a participating member of the national strategy but plays a major role in tobacco control in Canada.

Legislation has been a particularly strong component of the national strategy. The Tobacco Products Control Act, which came into force January 1, 1989, phased out all forms of tobacco advertising in print and broadcast media, on billboards and mass transit posters, and on point-of-sale signs. The act prohibits the free distribution of tobacco products, prohibits the display of tobacco trademarks on nontobacco items, restricts tobacco company sponsorship to events sponsored before 1987, and requires tobacco product packages to prominently display health messages and to list toxic constituents of tobacco smoke (Kyle 1990). The Non-Smokers' Health Act (effective December 29, 1989) bans smoking or restricts it to just a few areas in conveyances, public places, and workplaces under federal jurisdiction. About 900,000 workers, or 8 percent of the Canadian work force, are affected (Kyle 1990). Retail taxes average US$3.70 for a pack of 20 cigarettes (Claiborne 1991).

Using the slogan "Break Free for a New Generation of Non-Smokers," the national campaign has brought together key groups and individuals and has encouraged cooperation, coordination, and comprehensiveness. Between 1980 and 1989, the prevalence of smoking among teenagers in Canada decreased by almost 50 percent (Stephens 1991), while it remained constant among high school seniors in the United States (Johnston, O'Malley, Bachman 1987). Tobacco prevention and control in Canada, along with that of the French overseas departments and territories (see Chapter 5), is the most comprehensive in the Americas.

Regional Activities for Tobacco Control in Latin America and the Caribbean

In 1984, the Pan American Health Organization (PAHO) held a meeting in Punta del Este, Uruguay, on programs for control of noncommunicable diseases (PAHO 1988a). This effort was followed by an advisory group recommendation to hold subregional workshops to identify strategies and obtain political commitment for tobacco control in member countries. Workshops on control of smoking were subsequently held for the Southern Cone and Brazil in 1985 (PAHO 1986), the Andean Area in 1986 (PAHO 1987a), the English-speaking Caribbean in 1987 (PAHO 1988b), and Central America in 1988 (PAHO 1989b). At these workshops, representatives of each subregion reported on activities related to tobacco control, including surveillance, regulatory policies, educational programs, and media activities. PAHO emphasized the need for plans of action to include efforts from government health and education agencies and from cultural, sports, communications, trade, legislative, and agricultural programs. PAHO also encouraged member countries to set up a central office for tobacco control in each ministry of health (PAHO 1988a). The World Health Organization (WHO) requested that each country identify a focal point for tobacco or health activities (WHO 1986).

In 1989, a Regional Plan of Action for the Prevention and Control of Tobacco Use was released by PAHO at the thirty-fourth meeting of its Directing Council (PAHO 1989a). The plan was accompanied by a resolution urging member governments to institute the plan and encouraging the PAHO Director to mobilize extrabudgetary resources for implementing the plan. Elements of the plan are as follows:

Promotion of policies, plans, and programs. Provide information on control strategies to various agencies; collaborate in the formulation of national policies; and develop workshops and meetings, demonstration projects, guidelines for national programs, legislative strategies and enforcement, and minimum indicators essential for program evaluation.

Mobilization of resources. Identify government and nongovernment organizations and individuals that can contribute to the plan; involve WHO collaborating centers in mobilizing resources; collaborate with professional associations and political leaders; and collaborate with educational, health, and transportation services in providing smoke-free facilities.

Management and dissemination of information. Identify agencies that provide tobacco-related educational material, involve mass media in dissemination of such information, and evaluate its dissemination through a regional information network.

Training. Identify training needs and train program managers and health professionals.

Research. Conduct applied research on overall program efficacy, on smoking among adolescents and other high-risk groups, and on effectiveness of cessation programs.

Technical advisory services. Provide direct advice from PAHO staff or consultants to requesting countries.

Because this regional action plan is so recent, its implementation and impact have not yet been evaluated in depth. Nonetheless, the plan is commendable for having identified the factors important to tobacco control and for having encouraged participating countries to develop coordinated programs.

The Caribbean Community (CARICOM), an organization of heads of governments from the Caribbean area, recommended in 1987 that all members participate in a Regional Program for Drug Abuse Abatement and Control. Tobacco is included in the program, and education is the main focus of intervention activities. Other components include treatment, data collection, and the establishment of national councils on drug abuse. Many Caribbean countries have established these councils (Appendix 2), which bring national attention to tobacco as a gateway drug and to the need for education to prevent tobacco use by young persons. No evaluation studies or reports on these councils are available.

Since 1980, the International Union Against Cancer has joined public and private health leaders in 18 countries of the Americas in organizing national workshops on smoking and health. International voluntary agencies have provided assistance to these workshops, in which 6,000 physicians, educators, health officials, and community activists have participated. Several countries have established national plans for tobacco control, which include research on prevalence of smoking and smoking-related diseases, educational campaigns on the health consequences of smoking, and comprehensive smoking-related health policies.

In January 1985, leaders of tobacco-control activities formed the Latin American Coordinating Committee on Smoking Control (LACCSC) (American Cancer Society [ACS] 1988), which has the following goals:

- To help coordinate smoking-control efforts throughout Latin America.

- To provide a clearinghouse for information supportive of national smoking-control initiatives.
- To provide a forum for planning multinational strategies.
- To provide guidance and training in smoking-control advocacy skills.
- To adopt resolutions calling for action by governments throughout the region.

By using funding from the International Union Against Cancer and the American Cancer Society (ACS), LACCSC, in partnership with PAHO, has distributed a newsletter several times a year, has developed a model smoking-education curriculum, and has developed guidelines for smoking-control coalitions and media advocacy. Workshops on working with the media, fostering advocacy, and calculating smoking-attributable mortality have been held in conjunction with LACCSC annual meetings. LACCSC has supported national coordinating committees, national plans of action, and World No-Tobacco Day (May 31 of each year).

In 1991, the Association of Latin American Women for the Control of Smoking was formed at the seventh annual LACCSC meeting to help prevent smoking among women and to combat tobacco advertising directed toward women. Initial goals include data collection and reporting on smoking among women and coordination with other multinational organizations concerned with smoking among women (ACS 1988).

Elements of Prevention and Control Programs

The information presented here derives from joint work of PAHO and the CDC Office on Smoking and Health. In 1988, a questionnaire was developed, and an in-country investigator identified for each Latin American and Caribbean country completed the questionnaire (PAHO 1992). Information and documentation about the overall prevention and control of tobacco use were requested, along with specific data on the main control elements. The findings are presented in detail in a companion report (PAHO 1992). The overview of the findings presented here emphasize the diverse nature of tobacco-control activities in Latin America and the Caribbean.

Surveillance and Analysis

A comprehensive system for surveillance of tobacco-related events would include surveillance of the following: (1) adult, adolescent, and special populations (such as women and physicians) to determine current and former use of tobacco, rate of smoking initiation, and rate of smoking cessation; (2) public knowledge, attitudes, and beliefs about tobacco use; (3) interventions, such as the prevalence of restrictions on smoking at worksites and the extent of antismoking education in schools; (4) legislative and regulatory activity, both proposed and enacted (Novotny et al., in press); and (5) trends in tobacco products. Many Latin American and Caribbean countries have some elements of a surveillance system, but none appears to have all elements (PAHO 1992).

Most Latin American and Caribbean countries have conducted some form of an adult survey on tobacco use (Chapter 3, Table 16), but the methods, sample size, target groups, sampling methodology, and questions of these surveys have varied considerably. The survey questions used have been recommended by the International Union Against Cancer (Gray and Daube 1980), used for the U.S. National Health Interview Survey (USDHHS 1989), or derived from other sources.

Small, non-population-based samples of adults were generally drawn for one-time surveys. In some countries, including Colombia, Jamaica, and Mexico, questions on tobacco use were included in surveys of drug use (PAHO 1990). In the U.S. Virgin Islands, CDC's Behavioral Risk Factor Surveillance System (BRFSS) has been used each year since 1988 to survey adults aged 18 years or older about smoking, lack of exercise, contraceptive use, lack of seatbelt use, and other risk factors (PAHO 1992). The BRFSS permits trend analyses of behaviors over time and helps identify population risk patterns. No Latin American or Caribbean country other than the U.S. Virgin Islands has periodically monitored tobacco use in the general population.

The diverse methodologies limit analysis and conclusions for specific countries and the region as a whole. For example, if occasional smokers were included in the category for current daily smokers, the reported prevalence of current smoking may have been increased. Furthermore, samples were often

drawn from urban areas, and since the prevalence of smoking is higher among urban than nonurban dwellers (Chapter 3, "Prevalence of Smoking in Latin America and the Caribbean"), national inferences cannot be drawn.

Several countries have also surveyed groups at high risk for tobacco-related disease. Because of the well-documented effects of maternal tobacco use on infant health (Malloy et al. 1988), women of reproductive age (15 to 44 years old) have often been surveyed (Chapter 3, Tables 11–18). Women of reproductive age in the Americas were asked about tobacco use in eight surveys conducted with assistance from CDC and in 10 surveys performed by PAHO's Latin American Center for Perinatology and Human Development (PAHO 1987b).

Several Latin American and Caribbean countries have surveyed youths about cigarette smoking (Chapter 3, Table 17), but the definitions used for categories of smokers were again quite variable. Furthermore, the surveys may have missed an important segment of the young population because most of them were performed in schools. In many of these surveys, questions about tobacco use were part of drug-use surveys; because tobacco is addicting, it is considered a substance that can lead to the use of other drugs (Fleming et al. 1989). In the United States, school-based surveillance of behavioral risk factors is accomplished through a uniform survey instrument, the Youth Risk Behavior Survey (Harel et al. 1990). Standard questions on ever use of cigarettes, use of cigarettes in the last 30 days, and current daily use of cigarettes are included in this survey. Persons aged 12 to 18 are surveyed because, in the Americas, initiation of smoking generally occurs in this age group.

Physicians are generally educated about the health consequences of smoking, and their health-related behavior may set an example for other persons (Adriaanse and Van Reek 1988). Prevalence of smoking among physicians may be an indicator of diffusion of the nonsmoking norm and of a society's willingness to combat the health consequences of smoking (Pierce 1991). In several Latin American countries, the prevalence of smoking among physicians and physicians-in-training has generally been similar to or only slightly lower than that in the general population (Chapter 3, Table 16).

Surveys in Latin America and the Caribbean have often not included questions on knowledge, attitudes, and beliefs regarding tobacco (Chapter 3, Table 18). This information is important for monitoring the effect of public information campaigns (Pierce 1991) and in tracking public support for legislative and policy interventions. Data from youth surveillance may be extremely helpful when establishing school-based educational programs.

But data on tobacco use must be collected in a standardized way to allow for planning and evaluation of national programs and comparison of trends within and between countries. Furthermore, the key variables of a surveillance system should not be modified significantly over time. In 1990, WHO convened an internal working group to update standard measures of tobacco use. Standard definitions for worldwide surveillance have not yet been agreed upon, but WHO continues to pursue consensus for worldwide surveillance (WHO 1983a, 1988).

A recent example of surveillance of tobacco products serves to demonstrate the value of a coordinated, regional approach. Under the sponsorship of PAHO, the Health Protection Branch of Health and Welfare Canada measured the tar, nicotine, and carbon monoxide yield from popular cigarette brands in 20 countries (Table 1). The results suggest that smokers in most Latin American and Caribbean countries are exposed to levels of toxic constituents similar to those to which North American smokers are exposed (e.g., 14 to 18 mg of tar per cigarette). Continued monitoring of product characteristics is an important component of surveillance of tobacco-related disease.

More than half the world's deaths due to cancers and cardiovascular disease and 85 percent of deaths due to chronic obstructive pulmonary disease occur in developing countries. To assess the cost and effectiveness of intervention strategies against several chronic diseases, The World Bank commissioned a series of studies that incorporated economic, epidemiologic, and clinical data for developing countries (Jamison and Mosley 1991), most of which lacked empirical data about many of the major chronic diseases of adults. The lack of data systems that enable analyses of mortality trends and of trends in determinants of chronic diseases now hampers meaningful policy and program development.

Education, Public Information, and Cessation Programs

School-based educational activities against tobacco are uncommon in Latin America and the Caribbean, but through the efforts of LACCSC, ministries of health and education, and nongovernment organizations, several countries have begun to include antitobacco education in school curricula (see Appendix 1). Few of these programs have been evaluated; however, a 1988 antitobacco education program in Chile, initiated with the assistance of WHO, has been evaluated by the Ministry of Health in Chile. This evaluation

Table 1. Selected data for popular brands of cigarettes in 20 countries

Brand name*	Country	Tar (mg/cig)	Nicotine (mg/cig)	Carbon monoxide (mg/cig)	Filter type	Market share (%)
Derby KS FT	Argentina	13.44	0.90	15.46	Acetate	14.0
Jockey Club KS FT	Argentina	14.16	0.96	16.85	Acetate	5.3
L&M KS FT	Bolivia	14.82	1.07	17.38	Acetate	48.4
Astoria	Bolivia	21.79	1.60	17.56	None	16.6
Belmont KS FT	Brazil	19.93	1.48	19.51	Acetate	19.1
Mustang KS FT	Brazil	14.44	0.85	18.20	Acetate	4.1
Players Light RS FT	Canada	14.86	1.34	15.21	Acetate	12.9
Export A RS FT	Canada	15.03	1.27	15.91	Acetate	5.7
Derby Superlongs PS FT	Chile	14.64	1.36	18.80	Acetate	24.7
Advance Superlongs PS FT	Chile	8.69	0.70	10.75	Acetate	11.9
Pichoja RS P	Colombia	23.79	1.58	16.31	None	21.7
Delta KS FT	Costa Rica	16.20	1.24	19.04	Acetate	53.7
Derby KS FT	Costa Rica	16.08	1.35	15.98	Acetate	21.6
Marlboro RS FT	Dominican Republic	15.45	1.17	15.88	Acetate	51.1
Cremas KS P	Dominican Republic	21.77	0.98	18.77	None	3.5
Lark KS FT	Ecuador	14.90	1.06	17.31	Acetate/ charcoal	36.1
Lider Suave KS FT	Ecuador	13.01	0.90	16.32	Acetate/ charcoal	31.3
Delta PS FT	El Salvador	18.02	1.12	18.67	Acetate	57.3
Diplomat deLuxe 100s PS FT	El Salvador	18.60	1.14	20.10	Acetate	15.6
Rubios KS FT	Guatemala	14.99	0.85	15.90	Acetate	28.6
Belmont KS FT	Guatemala	14.28	0.64	16.62	Acetate	16.9
Royal KS FT	Honduras	13.39	1.05	14.48	Acetate	39.0
Belmont KS FT	Honduras	13.65	1.07	15.73	Acetate	23.0
Craven A RS FT	Jamaica	17.68	1.51	14.12	Acetate	76.7
Raleigh RS FT	Mexico	15.87	0.85	17.44	Acetate	22.9
Delicados Oscuros RS FT	Mexico	14.33	0.73	17.66	Acetate	8.4
Viceroy KS FT	Panama	15.15	1.05	15.04	Acetate	32.7
Marlboro KS FT	Panama	14.78	0.96	15.02	Acetate	19.3

Table 1. Continued

Brand name*	Country	Tar (mg/cig)	Nicotine (mg/cig)	Carbon monoxide (mg/cig)	Filter type	Market share (%)
Union Club PS FT	Paraguay	18.15	1.00	17.77	Acetate	—
Clayton 100s PS FT	Paraguay	21.39	1.87	20.10	Acetate	—
Broadway Extra RS FT	Trinidad and Tobago	14.53	1.20	13.26	Acetate	—
du Maurier RS FT	Trinidad and Tobago	15.29	1.38	14.34	Acetate	—
Nevada KS FT	Uruguay	15.55	1.41	14.10	Acetate	76.8
Casino KS FT	Uruguay	16.06	1.34	20.43	Acetate	23.2
Marlboro KS FT	United States	17.00	1.20	17.00	Acetate	12.3
Winston KS FT	United States	17.00	1.10	16.00	Acetate	4.0
Belmont Extra Suave RS FT	Venezuela	15.43	0.92	16.01	Acetate/ charcoal	45.7
Astor Super Suave RS FT	Venezuela	15.09	0.85	16.37	Acetate/ charcoal	—

Source: Collishaw, unpublished data (1991).
*Codes refer to product types, where KS = king size, FT = filter tip, RS = regular size, PS = premium size, and P = plain.

suggested that school-based education was effective in preventing the uptake of smoking by younger adolescents but was ineffective in persuading adolescents who were already smokers to stop smoking (Sepulveda 1990). By the end of the intervention, 3.2 percent of students in the intervention group were daily smokers, versus 10 percent of students in the nonintervention group.

Programs in a few Latin American and Caribbean countries rely on physicians to provide information to patients visiting government facilities. In Cuba, the National Program to Reduce Cancer Deaths uses the islandwide system of primary-care providers. An 18 percent decrease in smoking prevalence was reported in communities with intervention sites and a 4 percent decrease at nonintervention sites (Suárez-Lugo 1988).

Public information campaigns focus attention on tobacco as a serious health issue and help craft prevention and cessation messages for target audiences. Formal public information programs train public health professionals in communications, and these persons can then build working relationships with local media (Erickson, McKenna, Romano 1990). In 1990, most countries in the Americas reported some public information activity on tobacco use. In many Latin American and Caribbean countries, public information activities have revolved around a "smokeout" day similar to the ACS's Great American Smokeout held on the third Thursday in November each year in the United States (CDC 1990a). Many countries have promoted the WHO-sponsored World No-Tobacco Day, held on May 31 each year (CDC 1991). WHO has distributed press packets and video messages in several languages, including Spanish, for this event. Furthermore, public information announcements broadcast in the United States may be viewed in Caribbean countries on cable networks.

Education and public information activities in the Americas have increasingly focused on use of drugs, including tobacco. Efforts have included both school-based education and public information campaigns. Many organizations in the Americas that address tobacco use are responsible primarily for drug-abuse prevention.

Cessation programs, an important component of tobacco-control programs (Novotny et al., in press), have been regularly provided by the Seventh-Day Adventist Church in many countries of the Americas. The church has strong tenets against several health

risk-factors, including smoking, using alcohol, and eating meat. The standard five-day classes, which are open to the public, include a spiritual approach to health issues (Proctor 1985). A few countries report that other private smoking-cessation programs are sporadically offered. No information is reported on widely available, self-help cessation programs, such as those used effectively in the United States (Glynn, Boyd, Gruman 1990). But most smokers quit without the aid of formal programs and may rely on minimal interventions (e.g., those that provide the skills and information necessary for persons who want to quit smoking) (Fiore et al. 1990). Because smoking behavior patterns in many Latin American and Caribbean countries differ from those in the United States, minimal interventions may have to be adapted to specific cultures. More information is needed on public knowledge, behavior patterns, and methodologies effective for developing such interventions.

Taxation

The World Health Assembly has recognized the potential of taxation as a tool for the control of tobacco use (WHO 1986). Among the countries of the Americas for which data are available, variability is wide in the type of taxes levied, their contribution to the price of tobacco and cigarettes, and the proportion of government revenue they generate (see Chapter 4, "Economics of the Tobacco Industry"). In Peru, for example, cigarette taxes are only 16 percent of the price of cigarettes, but in Colombia, taxes are 120 percent of the price (Table 2). Tariffs vary from 14 percent to 130 percent of the price of manufactured cigarettes. Tax as a percentage of total central government revenue also varies substantially; however, assessment is complicated because different revenue generating and collecting systems are used by Latin American and Caribbean countries.

Table 2. Tobacco tax and tariff in selected countries of the Americas, 1988 or earlier

Country	Tax (as % of price)*	Tariff (as % of price of manufactured cigarettes)†	Tax (as % of total government revenue)*
North America			
Canada	75	20	2.4
United States	35‡	14	1.9
Latin America			
Argentina	75§	36	22.5
Brazil	76	105	7.4
Chile		15	5.6
Colombia	120	50	13.2
Cuba‖			1.8
Ecuador		90	
El Salvador		80	
Guatemala		80	4.7
Haiti		130	41.3
Mexico	57	20	1.1
Peru	16	110¶	2.8
Venezuela	45	35	2.7
Caribbean			
Suriname		50	
Trinidad and Tobago		20	

Source: U.S. Department of Agriculture (1984, 1989); Agro-economic Services Ltd. and Tabacosmos Ltd. (1987); U.S. Department of Health and Human Services (1989).
*1983.
†1988.
‡Includes state taxes.
§1987.
‖Government tobacco monopoly.
¶Includes 24% surcharge; import of cigarettes is banned.

Tobacco taxes may be dedicated for specific health purposes. Several states in the United States have used cigarette tax revenues to finance tobacco-related health programs, and the most substantial program of this kind is in California. In November 1988, the state's cigarette tax was increased from 10 cents to 35 cents per pack. Three-quarters of the revenues from this tax increase are used for health education, research, medical treatment, and environmental conservation programs (Tobacco Tax and Health Protection Act of 1988; Bal et al. 1990).

But the level of taxation is not necessarily an indicator of concern for health. For example, in Canada, where taxes add an additional 75 percent to the price of cigarettes, health concerns and a concerted antismoking movement have strongly influenced policy. But in several Latin American countries where the level of taxation is as high or higher (Table 2), health concerns may not have been a strong influence. Throughout Latin America, the influence of health concerns on level of taxation has varied (PAHO 1992).

Data regarding tobacco taxation for 1989 or later (Table 3) differ somewhat from the information reported earlier (Table 2). These differences may reflect short-term changes in taxation policy, but they may also reflect differences in the methods used to calculate the proportion of tobacco price and the proportion of government revenue contributed by tobacco tax.

Legislation

The legislative efforts to control tobacco use in the Americas are extensive (see Chapter 5), but how well the written laws are enforced in day-to-day life is unclear. In the United States, for example, laws in most states ban cigarette sales to minors, but these laws are rarely enforced (CDC 1990b). Systematic information on enforcement in the Americas is not available.

Table 4 summarizes tobacco-control legislation in the Americas—the base on which continued efforts are expanding. Some key points about the legislation are given below. (The French overseas departments and territories are counted as Caribbean countries, as in Chapter 5.)

- Fifteen Latin American and four Caribbean countries have either a total ban on or some type of legislation restricting advertising and cigarette promotion.
- Three countries prohibit all advertising of tobacco.
- Bolivia limits advertising to the tombstone format, which allows print and a picture of the package.
- Two countries—Argentina and Bolivia—prohibit advertising associated with sports.
- Sixteen countries restrict advertising that influences young people.

Table 3. Excise taxes on manufactured cigarettes as percentage of total retail price and of total national tax revenue, 1989 or most recent year available

Country	Retail price	Tax revenue
Andean Area		
Bolivia*	61†	1.4
Peru‡	55§	0.1
Venezuela‖	50	2.5
Southern Cone		
Argentina	75	22.0
Chile	75	10.0
Paraguay	10/35¶	8.6
Uruguay	60	5.0
Brazil	73	5.0–7.0
Central America		
Costa Rica	75	5.0
El Salvador	43	21.0
Guatemala		3.0
Panama	60	2.0
Mexico		1.7
Latin Caribbean		
Dominican Republic	13	2.3
Haiti	41	
Puerto Rico	39	3.0
Caribbean		
Aruba	64	
Bahamas	48	
Barbados	41	
British Colonies**	Tax free	
French overseas departments and territories††	75	
French Guiana	52‡‡	
Guyana	50	35.0‡‡
Jamaica	42	4.0
Netherlands Antilles	Tax free	
Organization of East Caribbean States		
St. Lucia	18	0.5
Dominica	35	1.0
St. Vincent and the Grenadines	41	1.0
Suriname	55	
Trinidad and Tobago	15	1.1
U.S. Virgin Islands	4	

Source: Pan American Health Organization (1992).
*1987.
†17% surtax on imports.
‡1988.
§7% of taxes allocated to cancer hospital.
‖Average 1978–1988.
¶Light tobacco/dark tobacco.
**Includes Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Montserrat, and Turks and Caicos Islands.
††Except French Guiana. For this table and associated text, the French overseas departments and territories are counted with the Caribbean countries.
‡‡Of consumption taxes.

Table 4. Principal legislative measures* for control of tobacco in the Americas, by type of measure and country

Country†	Restriction on advertising	Advertising ban	Health warning		Statement of tar and nicotine yield
			Rotating or strong	Standard	
North America					
Canada		X	X		X
United States‡	X		X		
Latin America					
Argentina	X			X	
Bolivia	X			X	
Brazil	X			X	
Chile	X		X		
Colombia	X			X	
Costa Rica	X		X		
Cuba		X			
Ecuador	X			X	X
El Salvador	X			X	
Guatemala					
Honduras					
Mexico	X			X	X
Panama	X			X	
Paraguay	X			X	
Peru	X			X	
Uruguay	X			X	X
Venezuela	X			X	
Caribbean					
Bahamas	X		X		
Barbados				X	
Bermuda	X		X		X
French overseas departments and territories§		X	X		X
Trinidad and Tobago	X			X	X

Source: Copies of national legislation provided by individual countries to the Pan American Health Organization.
*Provisions of the legislation are summarized in Chapter 5, Appendix 1, notes to Tables 2, 4, 5, and 6.
†The countries listed are those in the Americas that have any type of legislative control of tobacco use.
‡Does not necessarily imply federal legislation, but acknowledges activities of several states.
§For this table and associated text, the French overseas departments and territories are counted with the Caribbean countries.

Restriction on smoking		Prevention of smoking among young people	Health education
In public places	In the workplace		
X	X	X	X
X	X	X	X
X		X	
X		X	X
X	X	X	X
X		X	X
		X	X
X	X	X	X
X	X	X	X
		X	X
		X	X
X			
X			
X		X	X
X		X	
X		X	
X		X	
X	X	X	X
X		X	
X			
X	X	X	X
X		X	

- Nearly all countries that have legislation on advertising require health warnings in advertisements.
- Two countries specify the frequency and duration of health warnings required on the broadcast media.
- Fourteen Latin American and five Caribbean countries require health warnings on cigarette packages.
- Two Latin American countries require strong health warnings, but none requires multiple warnings used in rotation, as do Canada, the United States, and the French overseas departments and territories.
- Only three Latin American countries, three Caribbean countries, and Canada require a statement of tar and nicotine yield on cigarette packages.
- Restrictions on where cigarettes can be sold are generally not found in Latin American and Caribbean countries.
- The State of Rio Grande do Sul, Brazil, prohibits the sale of cigarettes in any establishment subsidized by the government and recommends that tobacco not be sold in hospitals and health services institutions.
- Nineteen countries restrict smoking in public places.
- Seven countries ban smoking on work premises, and thirteen ban smoking in health establishments.
- In the United States, a major statement on the hazards of smoking in the workplace has been issued (National Institute for Occupational Safety and Health 1991).
- Nineteen countries have laws that control smoking by young people.
- Thirteen Latin American countries restrict cigarette advertising that influences young people, but only five of these countries prohibit the sale of tobacco products to minors.
- Argentina and Ecuador prohibit free distribution of samples of cigarettes to minors, and Uruguay prohibits the sale of loose cigarettes.
- Nine Latin American and Caribbean countries prohibit smoking and sales of tobacco in schools and places frequented by young people, although many schools may prohibit smoking on school property.
- Eleven Latin American and Caribbean countries mandate health education about the hazards of tobacco use.
- Five Latin American countries mandate anti-tobacco education in schools, but many schools undoubtedly provide such education voluntarily.

Coalitions

A comprehensive tobacco-control program calls for a national smoking and health organization dedicated to the development of policy and the coordination of government and voluntary efforts. The organization may be an official government agency, or it may be a voluntary agency with or without government support. Nongovernment coalitions or commissions may function outside of the government structure but may include representatives from various ministries, usually health and education. In several countries, medical societies, often a part of a larger coalition, have sustained activities against tobacco use.

Several countries in Latin America have established national commissions with a wide range of functions regarding tobacco control: promotion of research, development of policy, provision of education and information, coordination of intergovernment actions, and evaluation of the effects of tobacco-control programs. These national bodies have the capacity to mobilize support from many departments of government and the private sector.

Most national commissions are concerned with measures to control tobacco use rather than the production of tobacco. The Permanent National Advisory Commission on the Control of Smoking is a government agency created in Argentina to advise on and assist with the production, processing, and exportation of tobacco. The commission, which is composed of government officials and representatives of the employers and employees engaged in tobacco production and processing, does not control the use of tobacco.

In the absence of a national smoking and health organization, the tobacco-control effort is usually handled by the ministry of health. In two Latin American countries, legislation sets forth this responsibility. In Bolivia, a 1978 decree makes the Ministry of Social Welfare and Public Health the only agency that can regulate all aspects of the promotion and sale of tobacco that affect health. The decree specifically recognizes that tobacco is harmful to health. In Brazil, legislation enacted in 1986 provides that the Ministry of Health shall promote week-long activities in connection with National No-Smoking Day, observed annually on August 29.

In seven Latin American countries, legislation creates a national smoking and health organization. A 1986 decree in Chile established the National Commission for the Control of Smoking, which includes the Minister of Health as chairperson and the undersecretaries of interior, economic affairs, agriculture, labor, transport and telecommunications, and justice. The commission (1) continually reviews the situation on smoking and assesses the place of the tobacco industry in the economy; (2) coordinates monitoring of the prevalence of smoking; (3) determines the effects of smoking on mortality and morbidity; (4) identifies public and private resources for information, education,

and health care; (5) analyzes legal texts concerning antismoking measures; (6) proposes smoking-control policies; and (7) designs and evaluates medium- and long-term smoking-control activities.

In Ecuador, a 1989 resolution of the Ministry of Public Health created the Interinstitutional Antismoking Committee under the National Bureau for Epidemiological Control and Surveillance. The committee, which comprises representatives from the public and private sectors and is chaired by a representative of the Ministry of Public Health, plans, advises on, and carries out the national program against smoking.

The General Health Law of 1983 in Mexico provides that the Secretariat of Health, the governments of the federated entities, and the Council on General Health in each geographic area shall coordinate activities for the Antismoking Program. The program aims to prevent and treat the illnesses caused by smoking; to educate citizens, especially families, children, and adolescents, about the health effects of tobacco use; and to promote research on the causes of smoking. The federal government of Mexico has entered into agreements with the various states to coordinate smoking-control activities of the National Council Against Addictions. These activities include the following: (1) encouraging legal measures to control smoking, (2) promoting cooperation between federal and state agencies, (3) integrating government activities with those of the private sector, (4) establishing a government center for information and documentation, (5) strengthening surveillance, (6) promoting research, (7) undertaking epidemiologic studies, and (8) undertaking other studies for early identification of persons with smoking-related problems.

In Panama, a 1989 decree created the National Commission to Study Tobacco Use, which was charged with producing a report on the harmful effects of tobacco use and gathering statistical data on progress in combating smoking. The report is to include information on legislation and on progress at the international level on tobacco and health.

A 1988 Ministerial Resolution in Peru created the Permanent National Commission Against Tobacco, which provides information and formulates recommendations on the health risks of smoking. The commission determines the role of the Ministry of Health and other health institutions in combating tobacco use. These agencies provide support and facilities for the commission, which includes representatives from different sectors of society.

In Uruguay, legislation enacted in 1970 provides for a special commission of the Ministry of Public Health, acting in collaboration with the Ministry of Education and Culture, to study the effects of smoking and to disseminate information on the health risks of tobacco use. Legislation proposed in 1988 would create the Bureau for the Control of Smoking, within the Ministry of Public Health, with broad power to (1) conduct epidemiologic studies, (2) coordinate preventive strategies, (3) conduct public education programs (with cooperation from the National Administration of Public Education, the University of the Republic, and other educational organizations), (4) establish maximum levels of tar and nicotine in tobacco products, and (5) develop actions to reduce smoking.

In Venezuela, a 1984 decree of the Ministry of Health and Social Welfare established a permanent national council under the jurisdiction of the Division of Chronic Diseases. The council studies the health problems related to smoking and formulates policies for preventing smoking and smoking-related diseases. The multidisciplinary council is composed of two representatives from the Ministry of Health and Social Welfare (the Chief of the Division of Chronic Diseases, who serves as president, and the Director of Oncology) and representatives from the ministries of agriculture, labor, transportation and communications, justice, environment and natural resources, information and tourism, and youth affairs; the Venezuelan Social Security Institute; the National Academy of Medicine; the Venezuelan Cancer Society; and the Venezuelan Medical Federation. A technical unit, composed of physicians, epidemiologists, political scientists, sociologists, academicians, publicists, and social communicators, supports and coordinates the development of antismoking actions. The Ministry of Health and Social Welfare coordinates educational programs among the agencies represented on the council.

No legislation that establishes national organizations for tobacco policy development is available from Caribbean countries. Although national efforts may occur in other countries as well, they lack the critical support that government sanction provides. Yet the lack of such support does not necessarily vitiate antismoking efforts. In the Americas, nongovernment groups, such as citizens' coalitions, voluntary agencies, and special-interest groups, have effectively promoted good health.

This compendium of legislation and coalitions does not indicate the extent to which tobacco-control activities are implemented. Many of the recently established government and nongovernment commissions on tobacco may still be rudimentary, but some efforts are well established. For Latin America and the Caribbean, a listing of national organizations, sponsors, and activities of these organizations is provided in Appendix 2.

Summary

Activities critical to controlling tobacco use include surveillance of tobacco consumption, collection of excise taxes, and coordination of local, national, and regional efforts. Surveillance data can be used to monitor trends in tobacco use and to provide a basis for targeting populations. The collection of tobacco tax revenue can be used for monitoring tobacco consumption, and such revenue can be dedicated to health-related programs, as has been done in Peru. The coordination of tobacco-control activities augments the scarce resources that any single jurisdiction might have available to it. Communication networks, such as the LACCSC and the Advocacy Institute's GLOBALink electronic bulletin board (ACS 1990), can assist joint efforts.

In many countries of the Americas, the framework for effective tobacco control is in place. As PAHO's Regional Plan of Action for the Prevention and Control of Tobacco Use is implemented, all tobacco-control efforts in the Americas are likely to become increasingly effective.

Conclusions

1. A basic governmental and nongovernmental infrastructure for the prevention and control of tobacco use is present in most countries of the Americas, although programs vary considerably in their degree of development.
2. The need is now recognized, and work is under way, for developing a comprehensive, systematic approach to the surveillance of tobacco-related factors in the Americas, including the prevalence of smoking; smoking-associated morbidity and mortality; knowledge, attitudes, and practices with regard to tobacco use; tobacco production and consumption; and taxation and legislation.
3. School-based educational programs about tobacco use are not yet a major feature of control activities in Latin America and the Caribbean. The few evaluation studies reported indicate that such programs can be effective in preventing the initiation of tobacco use.
4. Cessation services in most countries of the Americas are often available through church and community organizations. Private and government-sponsored cessation programs are uncommon.
5. Media and public information activities for tobacco control are conducted in most countries of the Americas, but the extent of these activities and their effect on behavior are unknown.

Appendix 1. Antitobacco Activities in Latin America and the Caribbean

The antitobacco activities described here include school-based education, public information campaigns, and cessation activities. PAHO (1992) is the source of this summary.

School-Based Educational Activities

Argentina

With help from the Argentine Cancer League, the ministries of health and justice developed an antismoking educational program for 561 secondary schools.

Bahamas

Antitobacco information is minimally included in the antidrug curriculum.

Belize

The Curriculum Development Unit of the Ministry of Education and Pride Belize (an antidrug organization) developed a school health education program that includes information on health and on developing skills for resisting substance abuse.

Bermuda

Antitobacco information is incorporated into the Family Life Education curriculum.

Bolivia

The Ministry of Education and Culture developed a natural science curriculum for the third and fifth years of primary school. The National Commission Against Tobacco Use (CONLAT) offers classes to primary and secondary schools.

Brazil

Materials are sometimes included in curricula, as determined by individual schools or states. Educational materials are widely available.

British Virgin Islands

The health studies curriculum for high school students uses British antitobacco materials.

Chile

The ministries of health and education, health services, and provincial education departments sponsor school-based educational prevention programs that include evaluation. Students aged 13 or older are now included.

Colombia

The Ministry of Education offers a program on preventing smoking and other forms of drug addiction. A booklet, *El Placer de No Fumar* (The Pleasure of Not Smoking), is included in the compulsory behavior and health section of the school curriculum.

Costa Rica

Information on the effects of smoking are included in primary and secondary curricula and in science textbooks. Educational material is provided by the Social Security Fund, and references to smoking have been eliminated from textbooks. The National Antismoking Association sponsors workshops for secondary school students.

Cuba

Since 1991, antismoking education is offered in all schools islandwide, beginning with the seventh grade.

Guatemala

The National Antismoking Commission is planning an educational program for schools. The Youth Congress on Smoking, held in 1990, provided instruction and training on prevention activities.

Guyana

The National Coordinating Council for Drug Education includes tobacco in curriculum development.

Honduras

Lectures on tobacco use are provided to schools by the Institute for the Prevention of Alcoholism and Drug Abuse.

Jamaica

Antitobacco information has been incorporated into the health education curriculum of primary and secondary schools.

Mexico

Antitobacco information is to be included in public primary school textbooks. The national antismoking program has produced booklets for use in schools by youth groups and by parent groups. Universities include tobacco and health material in schools of medicine, psychology, and social work.

Panama

The Ministry of Education is required by law to include information on the health aspects of smoking

in school curricula (science courses during the first year of secondary school).

Paraguay

Antitobacco education is included in some way in grades four through six. An antismoking association has targeted school-based education as a future activity.

Peru

Each year, the National Cancer Institute, the Ministry of Health, and the Ministry of Education sponsor programs in Lima for 50,000 students aged nine to 12.

Puerto Rico

The Puerto Rican Lung Association sponsors contests, nonsmoking day, and an educational campaign in secondary schools, vocational schools, and universities. By giving talks to seventh-grade students, the American Cancer Society reaches 85 percent of public schools and 30 percent of private schools.

Suriname

The Teachers' Union collaborates with the Ministry of Health in training teachers in smoking prevention education.

Trinidad and Tobago

The Ministry of Education includes antitobacco education in the syllabus of the general health education program for primary, junior high, and senior high school students.

Uruguay

General education for grades three through six targets health behavior, environmental pollution, clean indoor air, and tobacco use as a risk factor for disease.

U.S. Virgin Islands

The Department of Education adopted a revised health curriculum that includes a unit on smoking and on prevention of cardiovascular disease.

Venezuela

The Ministry of Education has an official program. Parents, teachers, and students are organized into extracurricular groups to help develop educational messages.

Public Information Campaigns

Anguilla

Television and radio spots, prepared by health care providers, are occasionally aired.

Argentina

Television and radio campaigns are sponsored by the Public Health Foundation. Campaigns directed toward youths were sponsored by the Argentine Cancer League in 1978 and 1983 and by the Ministry of Health and Social Action in 1979, 1980, and 1982.

Barbados

Government and nongovernment agencies focus antitobacco activities around World No-Tobacco Day.

Belize

Medical and dental associations sponsored a television campaign and bumper stickers in 1989. The National Drug Abuse Advisory Council and Pride Belize distribute pamphlets and sponsor billboards discouraging drug and alcohol use. Smoking-cessation messages are aired on cable television.

Bolivia

In 1983, CONLAT sponsored a meeting on cigarettes and cancer. The biennial Tobacco or Health Day is addressed through mass media and public meetings. Children's poster campaigns have been sponsored, and Bolivia observes both a smokeout in November and World No-Tobacco Day in May.

Brazil

On National Antismoking Day, a race is sponsored by the Ministry of Health in 400 cities. The National Program Against Smoking sponsors a school poster contest each year and publishes a newsletter. The Brazilian Medical Association has an official Antismoking Commission. Five million copies of an antitobacco comic book have been distributed.

British Virgin Islands

Print media cover smoking as a risk factor for cardiovascular disease. Public information materials from the United Kingdom are used. Medical associations provide seminars and public information and support World No-Tobacco day. Cable television from the United States provides antismoking messages.

Cayman Islands

Public information materials from the United Kingdom are used. Medical associations provide seminars and public information and support World

No-Tobacco Day. Business and anti-drug-abuse groups are active in smoking control. The Cayman Radio and Government Information Service broadcasts antitobacco messages on the radio. Cable television from the United States provides antismoking messages.

Chile

The National Cancer Society, in partnership with the pharmaceutical industry, sponsors a television campaign. The Association of Laryngectomy Patients has a mobile presentation for use at schools and worksites. The Ministry of Health publishes numerous articles, and World No-Tobacco Day is celebrated by diverse activities.

Colombia

A national no-smoking day, established in 1984, is coordinated by the Colombian Cancer League. Since 1989, the campaign has coincided with World No-Tobacco Day. In 1990, public service announcements from the Public Health Service of the United States were translated and adapted for the Colombian television audience. In 1991, a mass media campaign was begun with the slogan "Smokers: An Endangered Species."

Costa Rica

Printed materials are distributed through hospitals and clinics.

Smoke-free Day is supported by print and electronic media. The Social Security Fund produces television advertisements, and religious radio stations broadcast tobacco-related information. Journalists have been trained on health topics, including smoking.

Cuba

A mass media campaign, the backbone of a government program, includes television announcements, posters, stickers, and T-shirts. Public education, aimed at parents, teachers, physicians, and government employees, emphasizes the effect of smoking on family income. The National Program to Reduce Cancer Deaths has enlisted a large network of family physicians.

Ecuador

The Lung Association sponsors antitobacco education and media messages. A pharmaceutical workers' union sponsors antitobacco information.

El Salvador

The Department of Mental Health (of the Ministry of Public Health and Social Welfare) occasionally provides television messages and conferences on smoking and health.

French overseas departments and territories

Posters, pamphlets, and radio and television programs provided by the French government are infrequently used.

Guatemala

The National Antismoking Commission provides limited public information through the media. The Association of Physicians and Surgeons provides strong antitobacco support.

Honduras

Radio programs occasionally address scientific information on smoking. World No-Tobacco Day is supported through the National Smoking Control Commission.

Jamaica

The National Council on Drug Abuse (of the Ministry of Health), the Jamaican Medical Association, and the Jamaican Cancer Society are active in public information campaigns.

Mexico

A government program disseminates information through print and electronic media. World No-Tobacco Day is supported through various media.

Panama

A prevention program, based on public information, began in 1990 on the local level. Smoking-related information is periodically broadcast on radio and television. The staff of health care facilities are trained about smoking. The National Cancer Association and a civic committee sponsor a smoke-free day.

Paraguay

The Tuberculosis and Lung Disease Association's booklet on the health consequences of smoking has been distributed by pharmaceutical companies to 3,000 physicians. Nongovernment organizations' activities against drug abuse (including tobacco) receive limited radio and newspaper coverage.

Peru

World No-Tobacco Day has been celebrated since 1985, with parades and activities for children. Antismoking posters are displayed in sports centers. A radio campaign against tobacco began in 1989. Information is also disseminated by the Center for Information and Education for the Prevention of Drug Abuse.

Puerto Rico

The Puerto Rican Lung Association sponsors a nonsmoking day, as well as print, radio, and television messages. The local American Cancer Society sponsors community presentations, materials for physicians, and the Great American Smokeout.

St. Vincent and the Grenadines

The government sponsors print materials.

Suriname

Public service announcements are made through television and print media. The National Council on Drug Abuse, the Association of Heart Disease Patients, and the Medical Association of Suriname sponsor a public information campaign.

Trinidad and Tobago

The Cancer Society sponsors Smokeout Day during annual Cancer Week, gives lectures to community groups, and offers no-smoking signs to organizations.

Uruguay

The Office on Smoking Control (of the Ministry of Public Health) produced a program and five-second spots on healthy living for commercial television. Materials were also developed for health care facilities. Community health activities include development of a booklet, *Tobacco and Its Consequences.* The Cancer Society supports the celebration of Clean Air Day, and the Ecological Party supports clean indoor air policies.

U.S. Virgin Islands

The Department of Health supports the Great American Smokeout, and local public service announcements use U.S. materials on the risk of smoking, especially during pregnancy. The American Lung Association sponsors a weekly 15-minute radio program on lung health and uses the Christmas seal campaign to inform the public about the health consequences of smoking.

Venezuela

The Venezuelan Cancer Society and the Tuberculosis and Lung Disease Society have sustained programs, including National Smoke-Free Day, World No-Tobacco Day, 10-minute public service announcements, and interviews with officials of the Ministry of Health and Social Welfare.

Cessation Activities

Argentina

Workshops are conducted by the Public Health Foundation and the Argentine Antismoking Union. Cessation classes are offered by the Argentine Cancer League and the Seventh-Day Adventist (SDA) Church.

Bahamas

Insurance companies offer a nonsmoker life insurance discount of 35 percent.

Barbados

The Barbados Cancer Society conducts five-week smoking-cessation clinics based on the American Cancer Society model.

Bermuda

The SDA Church offers smoking-cessation clinics.

Bolivia

In conjunction with CONLAT, the SDA Church offers cessation programs.

Brazil

Numerous companies offer classes and seminars. Banco do Brasil supports a systematic campaign against smoking that includes a cessation program.

British Virgin Islands

The SDA Church offers smoking-cessation clinics.

Cayman Islands

One private clinic and the SDA Church support smoking-cessation activities.

Chile

Cessation services are offered by the SDA Church, private physicians, and clinics. Primary health care providers are trained in smoking cessation, especially for women of childbearing age (as part of the Women's Health Plan).

Colombia

Cessation programs are offered by private clinics in Bogatá, Cali, and Medellín.

Costa Rica

The Institute on Alcoholism and Drug Abuse and the Social Security Fund sponsor cessation programs.

Ecuador

A pilot project for college-level students was coordinated by the ministries of health and education. The SDA Church offers cessation programs.

Honduras

The National Smoking Control Commission organizes workshops for community organizations, unions, student groups, and the general public, and the SDA Church offers cessation programs.

Jamaica

The SDA Church and several private practitioners offer smoking-cessation clinics.

Mexico

Cessation programs are offered in university hospitals in Mexico City and in hospitals in other states.

Netherlands Antilles

Health care providers support cessation activities.

Panama

Cessation programs are offered by the SDA Church, the Civic Support Committee for No Smoking Day, and the National Cancer Association. Most insurance companies use a nonsmoker life insurance premium differential of 10 to 25 percent.

Paraguay

The SDA Church and a Baptist hospital sponsor cessation programs.

Peru

The Young Men's Christian Association and the Inca Union (of the SDA Church) support cessation activities.

Puerto Rico

The Puerto Rican Lung Association sponsors clinics and physician training in smoking cessation. The American Cancer Society and the SDA Church sponsor clinics. Two insurance companies use a nonsmoker life insurance discount of one-third.

Trinidad and Tobago

The SDA Church sponsors clinics and classes.

Uruguay

The national school of medicine, the SDA Church, and many nongovernment organizations and private clinics offer cessation services.

U.S. Virgin Islands

The American Lung Association sponsors smoking-cessation clinics.

Venezuela

The SDA Church and Venezuelan Petroleum support cessation activities.

Appendix 2. Antitobacco Organizations in Latin America and the Caribbean

Organizations for the prevention and control of tobacco use are cited below (PAHO 1992).

Argentina

Coalition or program: Antismoking Action and Health Council (est. 1990)
Sponsor: Ministry of Health and Social Action, medical association, Rotary Club, Mainetti Foundation, Favaloro Foundation
Activities: Promotes community education, research, and legislation

Barbados

Coalition or program: National Drug Abuse Council
Sponsor: Ministry of Health
Activities: Includes tobacco in drug-abuse prevention activities and is planning data collection activities

Belize

Coalition or program: National Drug Abuse Advisory Council
Sponsor: Ministry of Health
Activities: Includes tobacco in drug-abuse prevention activities

Bolivia

Coalition or program: National Commission Against Tobacco Use (est. 1983)
Sponsor: Bolivian Cancer Foundation
Activities: Supports legislation, protects nonsmokers, reduces advertising, conducts research, and coordinates with international organizations

Brazil

Coalition or program: Advisory Group on the Control of Smoking; National Oncology Program (est. 1985)
Sponsor: Ministry of Health (National Cancer Institute, Respiratory Diseases Department), nongovernment organizations, religious groups, legislators, state health departments
Activities: Supports legislation, promotes prevention programs, and evaluates the national program by using public information, media, and surveillance

Chile

Coalition or program: Chronic Disease Program; National Commission for the Control of Smoking (est. 1986)
Sponsor: Government, medical association, nongovernment organizations
Activities: Sponsors educational planning, data collection, and international linkage

Colombia

Coalition or program: National Council on Smoking and Health (est. 1984)
Sponsor: Ministry of Health, National Cancer Institute, Colombian Cancer League, and a press representative
Activities: Conducts studies on tobacco control, taxation, contraband, and advertising restrictions

Costa Rica

Coalition or program: Costa Rican Social Security Fund; Institute on Alcoholism and Drug Abuse
Sponsor: Ministry of Health
Activities: Concerned with education, cessation programs, and legislation

Cuba

Coalition or program: National Program to Reduce Cancer Deaths (est. 1987)
Sponsor: Ministry of Health and 15 other government agencies
Activities: Develops public information, provincial working groups, legislation, and mass media messages

Dominican Republic

Coalition or program: Dominican Committee on Smoking and Health (est. 1989)
Sponsor: Nongovernment organization; Secretariat of Public Health and Social Welfare
Activities: Supports media activities and workshops

El Salvador

Coalition or program: Department of Mental Health
Sponsor: Ministry of Public Health and Social Welfare
Activities: Supports media campaigns and legislation

French overseas departments and territories

Coalition or program: French Committee on Health Education
Sponsor: French government
Activities: Distributes print materials to overseas departments and territories

Guatemala

Coalition or program: Mental Health Department; National Antismoking Commission
Sponsor: Ministry of Public Health and Social Welfare, government and nongovernment organizations, and physicians' association
Activities: Promotes public education and information, and international and national coordination of data collection, research, and government consultation

Guyana

Coalition or program: National Coordinating Council for Drug Education
Sponsor: Ministry of Health and nongovernment organizations
Activities: Develops school curriculum

Honduras

Coalition or program: Institute for the Prevention of Alcoholism and Drug Abuse (est. 1988)
Sponsor: Ministry of Public Health and Social Welfare
Activities: Coordinates government and nongovernment organizations, legislation, and school education

Coalition or program: National Smoking Control Commission
Sponsor: Nongovernment organizations
Activities: Supports local community action and World No-Tobacco Day

Jamaica

Coalition or program: National Council on Drug Abuse
Sponsor: Ministry of Health and nongovernment organizations (Jamaican Medical Association, Jamaican Cancer Society)
Activities: Promotes school education, public information, media activities, and legislation

Mexico

Coalition or program: National Committee for the Study and Control of Smoking (est. 1985)
Sponsor: Nongovernment organization
Activities: Offers advice on smoking and health programs

Coalition or program: Antismoking Program (est. 1986)
Sponsor: Secretariat of Health and National Council Against Addictions
Activities: Supports educational activities, improved treatment for persons with smoking-related illness, legislation, and research

Panama

Coalition or program: Adult Health Department (est. 1990)
Sponsor: Ministry of Health interdisciplinary group of professionals
Activities: Promotes prevention program for youths and sets guidelines for local action; reports on and evaluates prevention programs

Paraguay

Coalition or program: Paraguayan Antismoking Association
Sponsor: Nongovernment organizations
Activities: Encourages legislation and physicians' actions

Puerto Rico

Coalition or program: Coalition on Smoking and Health
Sponsor: Puerto Rican Lung Association, American Cancer Society, and American Heart Association
Activities: Supports legislation, education, media activities, and cessation programs

Suriname

Coalition or program: National Council on Drug Abuse
Sponsor: Nongovernment organizations, medical association, heart-disease patients, and sports association
Activities: Promotes public service announcements and school education

Uruguay

Coalition or program: Office on Smoking Control (est. 1988)
Sponsor: Ministry of Public Health (intersectoral)
Activities: Supports media activities, health care and community education, and publications

Venezuela

Coalition or program: National Antismoking Program (est. 1984)
Sponsor: Ministry of Health and Social Welfare
Activities: Promotes educational programs, media activities, and technical information

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List of Tables and Figures

Chapter 2
The Historical Context

Table 1. Tobacco trade in England, 1700–1775 *25*

Table 2. Tax revenue from tobacco sales, United States, 1865–1890 *30*

Table 3. Manufactured tobacco products, United States, 1870–1905 *30*

Table 4. Economic activity and rankings of major transnational cigarette producers, 1989 *36*

Table 5. Transnational cigarette industry: subsidiaries and affiliates (financial interest) or licensing agreements *37-38*

Table 6. Estimated cigarette output, by producing group, 1988 *38*

Table 7. Cigarette market share of major transnational firms and affiliates, selected countries, 1988 *39-40*

Table 8. Percentage of sales by top cigarette brands in selected countries, 1988–1989 *40*

Table 9. Income and profitability of tobacco manufacturing corporations, United States, 1970–1985 *42*

Table 10. Expenditures, farm value, marketing bill, and taxes for cigarettes, United States, selected years *43*

Table 11. Recorded exportation and importation of cigarettes worldwide, selected years, 1951–1960 and 1967–1990 *44*

Table 12. Subsidiaries, licensing arrangements, and market shares of transnational cigarette firms, selected countries of Latin America and the Caribbean, c. 1989 *45*

Table 13. Market share of Marlboro cigarettes, selected countries, 1975–1989 *46*

Table 14. Percentage of cigarette sales by type of tobacco blend, selected Latin American countries, 1950–1989 *47*

Figure 1. Per capita cigarette consumption, United States, 1900–1991 *33*

Figure 2. Per capita cigarette consumption in the Americas, 1970–1990 *48*

Chapter 3
Prevalence and Mortality

Table 1. Demographic indicators, Latin America and the Caribbean, 1950–1990 *61*

Table 2. Estimated population, Latin America, the Caribbean, and the United States, 1950–1990 *62*

Table 3. Percentage of population living in urban centers, by country in Latin America, 1950–1980 *63*

Table 4. Percentage of population in Latin America and the Caribbean enrolled in school, by age group and sex, 1960–1987 *63*

Table 5. Income distribution in Latin America and the United States, 1960 and 1975 *64*

Table 6. Income distribution in selected countries of the Americas *65*

Table 7. Prevalence of cigarette smoking among persons aged 15–74 in eight cities in Latin America, adjusted for age and sex, 1971 *65*

Table 8. Standardized ratio of cigarette smoking among persons aged 15–74 in eight cities of Latin America, by sex and level of education, 1971 *66*

Table 9. Prevalence of smoking in 12 Latin American countries, 1988 *67*

Table 10. Male-to-female ratio of smoking prevalence in seven Latin American countries, 1971 and 1988 *68*

Table 11. Prevalence of smoking among women of reproductive age (15–44 years), selected areas of the Americas, 1979–1989 *68*

Table 12. Prevalence of smoking among persons aged 15–24, selected countries of the Americas, 1986–1990 *69*

Table 13. Prevalence of smoking and quantity smoked among persons aged 15–24, Santiago, Chile, 1988 *69*

Table 14. Prevalence of smoking and quantity smoked among persons aged 15–24, by educational level and sex, Santiago, Chile, 1988 *70*

Table 15. Prevalence of smoking among women aged 15–44, by reproductive history and smoking status, Santiago, Chile, 1988 *70*

Table 16. Prevalence of tobacco use among adults reported by surveys in Latin America and the Caribbean, 1980s and 1990s *72-75*

Table 17. Prevalence of tobacco use among adolescents reported by surveys in Latin America and the Caribbean, 1980s and 1990s *76-77*

Table 18. Prevalence of smoking among women of childbearing age, selected Latin American and Caribbean countries, 1979–1987 *78*

Table 19. Public knowledge and attitudes on smoking and health in Latin America and the Caribbean, 1982–1990 *78-79*

Table 20. Modified stem-and-leaf display of prevalence of smoking among adults, selected countries of Latin America and the Caribbean, 1980s and 1990s *80*

Table 21. Prevalence of smoking among Hispanic persons in the United States, aged 20–74, by ethnic group and sex, selected years *80*

Table 22. Method used for calculating smoking-attributable mortality in the Americas *82*

Table 23. Life expectancy at birth for persons born during selected periods, by region and country *83*

Table 24. Mortality from defined causes, selected countries, c. 1985 *84*

Table 25. Mortality from defined causes, regions of the Americas, c. 1985 *85*

Table 26. Deaths from six major causes as a percentage of all deaths from defined causes, for persons aged 35 or older, selected countries, c. 1985 *86*

Table 27. Deaths (in thousands) from six major causes, for persons aged 35 or older, selected regions of the Americas, c. 1985 *88*

Table 28. Smoking-attributable fraction for 10 selected causes of death, United States, 1985 *89*

Table 29. Smoking-attributable mortality in the United States *90*

Table 30. Estimated number of deaths due to tobacco use in 27 countries of the World Health Organization (WHO) European Region *91*

Table 31. Smoking-attributable fraction (SAF) and adjusted SAF for lung cancer mortality, selected industrialized countries, 1978–1981 *92*

Table 32. Smoking-attributable mortality for men and women in the Americas, c. 1985 *94-95*

Table 33. Adjusted estimates of smoking-attributable mortality in the Americas, c. 1985 *96*

Chapter 4
Economics of Tobacco Consumption in the Americas

Table 1. Relative risks for death attributed to smoking and smoking-attributable mortality for current and former smokers, by disease category and sex, United States, 1988 *106*

Table 2. Components of the costs of the health effects of smoking *109*

Table 3. Medical care costs for smokers, by study type and author *110*

Table 4. Value of productivity lost due to mortality and morbidity, by study type and author *111*

Table 5. Per capita cigarette consumption and income in the Americas *117*

Table 6. Estimates of income elasticity of demand for cigarettes *118*

Table 7. Estimated advertising expenditures of tobacco industry in selected countries of the Americas *118*

Table 8. Share of world tobacco production, 1990 *119*

Table 9. Labor and land use in tobacco growing, processing, and manufacturing in the Americas, 1983 *120*

Table 10. International trade in tobacco, 1984 and 1985 *123*

Table 11. Recent estimates of the price elasticity of demand for cigarettes *130*

Table 12. Estimates of the price elasticity of demand for cigarettes in the United States, by age group *131*

Figure 1. Correlation between cigarette consumption per person who entered adult life in 1950 and lung cancer rate for that generation as it entered middle age in mid-1970 *107*

Figure 2. Per capita rate of cigarette consumption in Brazil and lung cancer deaths for men in Rio Grande do Sul, Brazil *108*

Figure 3. Factors, other than price, that affect the demand for tobacco products *115*

Figure 4. Per capita cigarette consumption and annual per capita gross national product in 24 countries of the Americas, 1985 *116*

Figure 5. Predicted and actual per capita (≥ 18 years of age) consumption of cigarettes, United States, 1979–1988 *132*

Figure 6. Per capita consumption and real price of cigarettes in Canada, 1982–1987 *133*

Chapter 5
Legislation to Control the Use of Tobacco in the Americas

Table 1. Number of countries that control the production, sale, and promotion of tobacco, by type of legislation and region *148*

Table 2. Countries that control tobacco advertising and promotion, by type of restriction *149*

Table 3. Countries that require health warnings or statement of tar and nicotine yield *151*

Table 4. Countries that restrict smoking in public places, by type of place *155-156*

Table 5. Countries that attempt to prevent young people from using tobacco, by type of restriction *159*

Table 6. Countries that mandate health education on tobacco use, by type of provision *160*

Chapter 6
Status of Tobacco Prevention and Control Programs in the Americas

Table 1. Selected data for popular brands of cigarettes in 20 countries *188-189*

Table 2. Tobacco tax and tariff in selected countries of the Americas, 1988 or earlier *190*

Table 3. Excise taxes on manufactured cigarettes as percentage of total retail price and of total national tax revenue, 1989 or most recent year available *191*

Table 4. Principal legislative measures for control of tobacco in the Americas, by type of measure and country *192-193*

Index

A

Ad valorem taxes *128*
Addiction
  models of *131-132*
Adolescents
  price elasticity of demand *129, 131*
  smoking prevalence of *71*
Advertising of tobacco
  bans *118-119, 149, 150, 160, 161, 184*
  economics *118-119*
  expenditures *118*
  legislation *148-150, 191-194*
Age factors, costs of smoking *112*
Age-specific mortality *85-86*
Airborne smoke inhalation *19-20, 22*
Allen & Ginter *29*
Alternative crops *126*
American Brands, Inc. *35, 36*
American Cigar Company *29*
American Revolution *26*
American Snuff *29*
American Stogie *29*
American Tobacco Company *29, 31-33, 35*
Antismoking movements, early *30-31*
Antitobacco activities, Latin America and the Caribbean, see Chapter 6, Appendix 1
Antitobacco education
  Chile *187, 189*
  Cuba *189*
Antitobacco legislation, impact *161*
Antitobacco organizations, Latin America and the Caribbean, see Chapter 6, Appendix 1
Antitrust case of 1911 *32*
Argentina
  tobacco subsidies *123*
  tobacco-control commission *194*
Attitudes towards smoking *71, 78-79*
Attributable risk calculations *109-110*

B

Birthrate *62*
Bladder cancer, mortality from *86-89, 91-93*
Bolivia, tobacco-control commission *194*
Bonsack, James *29*
Brand preferences *40-41*
Brazil
  antismoking campaign costs *114*
  early tobacco production and trade *26*
  health care system *113*
  sales restrictions *153*
  tobacco growing *121*
  tobacco subsidies *122*
  tobacco-control commission *194*
British Colonies, tobacco production and trade *23-25*
British-American Tobacco Company, Ltd. *32-33, 35-40, 43, 44*
Brown & Williamson Tobacco Corporation *32*
Bull Durham *28*

C

Canada
  health care system *113*
  minors' tobacco access regulations *157*
  Non-smokers' Health Act *153, 156*
  product labeling requirements *151*
  public smoking restrictions *153-154*
  tobacco-control program *159-160, 184*
  tobacco diversification plan *126*
  tobacco subsidies *123*
  tobacco taxation *133*
  Tobacco Products Control Act *118, 149, 151, 184*
  workplace smoking restrictions *156*
Cancer mortality, see specific types
Carbon monoxide yield, cigarette brands *188-189*
Caribbean
  advertising-control legislation *150*
  health education *161*
  prevalence of smoking, see Chapter 3
  product labeling requirements *152*
  public smoking restrictions *154*
  tobacco industry *42-48*
  tobacco manufacturing and trade *25-26*
  tobacco taxation *131*
  workplace smoking restrictions *157*
  youth smoking regulations *158*
Caribbean Community, tobacco control activities of *185*
Cartel of 1903 *32*
Cause-specific mortality *85-89, 91-92*
Centers for Disease Control, tobacco-control programs *183, 184*
Cerebrovascular disease, mortality from *86-89, 91-93*
Chewing, tobacco *20*
Chicago Anti-Cigarette League *30*
Chile
  antitobacco education *187, 189*
  sales restrictions *152-153*
  smoking and health organization *194*
  smoking prevalence estimates *68-70*
Chronic obstructive pulmonary disease, mortality from *86-89, 91-93*
Cigar manufacturing, nineteenth century *27*
Cigarette characteristics *116-117*
Cigarette, development and emergence, see Chapter 2
Cigarette manufacturing
  early development of *28-29*
  legislation *148*
Cigarette package labeling *150-152*
Cigarette-manufacturing machine *29*
Cigarettes, popularity *29-31*
Civil War *27-28, 29*

Coalitions, tobacco-control *194*
Coding, mortality *83*
Colonies, North American, tobacco production and trade *23-25*
Columbus, Christopher *19*
Comprehensive Smokeless Tobacco Health Education Act *160*
Comunero Rebellion *42-43*
Constituents, labeling of, in tobacco products *151*
Consumer demand for tobacco *115-118*
Consumer preferences *40*
Consumption, see Tobacco consumption
Consumption patterns, Latin America and the Caribbean *46-48*
Contraband, see Smuggling, cigarette
Coronary heart disease, mortality from *86-89, 91-93*
Cost-of-illness studies
  incidence-based *111-112*
  prevalence-based *110-111, 112*
Costs of smoking
  considerations and calculations *105, 107-110*
  productivity measures *107-108*
  smoking-related illness *111-112*
Crop substitution *126*
Cuba
  antitobacco education *189*
  early tobacco production and trade *26, 27*
  sales restrictions *153*
Customs duties *127*

D

De Medici, Queen Catherine *23*
Deforestation *125*
Demographic characteristics *61-65*
Developing countries, costs of smoking-related illness *112*
Dingley Tariff *30*
Direct cost estimates, smoking-related diseases *107*
Distribution, tobacco *121-122*
Diversification, tobacco companies *34-35*
  Canada *126*
Drinking, tobacco *20-21*
Duke, James *28-29*
Duke of Durham *28*
Duke, Washington *28*

E

Economic growth, tobacco in *125-126*
Economic predictions, tobacco production *127*
Economics, tobacco and health, see Chapter 4
Ecuador, smoking and health organization *194*
Education, tobacco *187, 197-201*
Educational attainment *63-64*
Eight-city survey, smoking prevalence *66-67*
Enema, tobacco *21*
Environmental tobacco smoke, restrictions on *153-157*
Epidemiologic transition *105*
Esophageal cancer, mortality from *86-89, 91-92*
Excise taxes
  effect on consumption *129-133*
  manufactured cigarettes *191*
  post-Civil War *29-30*
  United States, nineteenth century *29-30*
Exportation of tobacco during American Revolution *26*
Externalities, economic *125*

F

Farming, tobacco *120-121*
Foreign investments, tobacco companies *33-34*
France, model legislation *161*

G

Gallaher Tobacco Ltd. *35*
Gallup Organization, prevalence surveys *67-68*
Gaston, Lucy Page *30*

H

Hanson Trust Ltd. *35*
Havana Commercial *29*
Havana Tobacco *29*
Hawkins, Sir John *23*
Health and Nutrition Examination Survey
  Hispanic *71-72*
  National *131*
Health care financing *112-114, 135-136*
Health care systems
  Latin America and the Caribbean *113-114*
  North America *113*
Health consequences
  latent, of smoking *105*
  taxation *133-134*
Health economics, see Chapter 4
Health education, legislation for *158-161*
Health objectives for the nation, year 2000 *183-184*
Health warning
  legislation for *192-194*
  statements of *150-152*

I

Imperial Tobacco Company *32-33, 36*
Import substitution *126*
Import tariffs *127*
Importation and exportation *122, 124, 125, 126*
Income distribution *64-65*
Income elasticity *116*
Indigenous societies, tobacco use in, see Chapter 2
Indirect cost estimates, smoking-related diseases *107-108*

Initiation of smoking *68, 69, 72*
Insurance, health *112-114, 135-136*
International competition, tobacco companies *35*
International growth, tobacco companies *33-34*
International Union Against Cancer *185, 186*
Interventions, legislative, see Chapter 5

J

James I, King *24*

K

Knowledge of smoking *71, 78-79*
Kohlberg Kravis Roberts & Company *35*
Kress, Dr. D.H. *30*

L

Labeling requirements *150-152*
Labor force *64-65*
Laryngeal cancer, mortality from *86-89, 91-93*
Latency of health consequences of smoking *105*
Latin America
- advertising-control legislation *150*
- health education *161*
- prevalence of smoking, see Chapter 3
- product labeling requirements *152*
- public smoking restrictions *154*
- tobacco industry *42-48*
- tobacco manufacturing and trade *25-26*
- tobacco taxation *128, 131, 133, 134*
- workplace smoking restrictions *157*
- youth smoking regulations *158*

Latin American Coordinating Committee on Smoking Control *185-186, 187, 196*
Legislation
- antitobacco, impact of *161*
- health education 158-161
- purposes *147*
- tobacco-control programs *191-193*
- tobacco-control, see Chapter 5
- see also Restrictions

Licensing agreements, transnational tobacco corporations *35-36*
Licensing, tobacco retailers *158*
Licking, tobacco *21*
Life expectancy *61-62, 83-84*
Lifetime costs, smoking-related illness *111-112*
Liggett & Myers Tobacco Company *32*
Local taxes *128*
Loews Corporation *35*
Lorillard *27, 33, 35*
Lorillard, Pierre *27*
Lung cancer
- mortality from *86-89, 91-93*
- mortality index *89-91, 93*

M

Manufacturing, tobacco *121*
- Caribbean *25-26*
- Latin America *25-26*
- North America *24-25, 26-29*

Market entry *40*
Market penetration, Latin America and the Caribbean *43-45*
Mass media advertising, legislation on *148-150*
Methodologic issues, prevalence and mortality *93-96*
Methodology, smoking-attributable mortality calculations *81-83*
Mexico, smoking and health organization *194*
Migration, internal *62-63*
Minors, tobacco access laws *157-158*
Model legislation, French law *161*
Mortality estimates *84-85*
Mortality index *89-91, 93*
Mortality, smoking-attributable, see Chapter 3
Municipal taxes *128*
Municipal workplace smoking restrictions *156-157*

N

Nabisco Inc. *35*
National Cancer Institute *183, 184*
National control programs, see Chapter 6
National Health Interview Survey *129*
Native tobacco use *19-23*
- transcendental purpose *22-23*

Navigation Acts *24*
New Zealand, tobacco promotion bans *119*
Nicotine yield, cigarette brands *188-189*
Non-smokers' Health Act, Canada *153, 156, 184*
Nonsmoking smoker-type *109*
North America
- advertising-control legislation *149*
- cigarette manufacturing *28-29*
- health education *159-161*
- product labeling requirements *151-152*
- public smoking restrictions *153-154*
- tobacco manufacturing and trade *24-25, 26-28*
- workplace smoking restrictions *156-157*
- youth smoking regulations *157-158*

O

Ogden's Imperial Tobacco, Ltd. *32*
Oligopoly markets *117-119*
Omnibus Budget Reconciliation Act, United States *132-133*
Oral cancer, mortality from *86-89, 91-93*

P

Pan American Health Organization
  prevalence surveys *66-67, 70-77*
  regional tobacco control activities *185*
Panama, smoking and health organization *194-195*
Pension and disability funds *112-114, 135-136*
Percutaneous use, tobacco *22*
Peru, smoking and health organization *194-195*
Philip II, King *23*
Philip Morris Companies *33-34, 35-40, 41*
Population configuration, Latin America and the Caribbean *61-62*
Prevalence estimates
  Gallup Organization *67-68*
  Pan American Health Organization *66-67, 70-71*
  reproductive health surveys *68-70*
Prevalence of smoking
  adolescents *71*
  adolescents in Latin America and the Caribbean *76-77*
  adults in Latin America and the Caribbean *72-75*
  by sex *66-67, 68-69*
  Chile *68-70*
  country-specific surveys *72-79*
  educational attainment *69-70*
  eight-city survey *66-67*
  Hispanic Americans *71-72*
  physicians *71*
  pregnant women *70*
  reproductive health surveys *68-70*
  women *68-70, 71*
  women of childbearing age *78*
Prevention and control program elements *186-195*
Prevention programs, status of, see Chapter 6
Price elasticity *129-131*
Price of tobacco products *115*
Pro Bono Publico *28*
Product technology *40-41*
Production and supply *119-121*
Production controls *125-126*
Profitability of tobacco industry *41-42*
Public Health Cigarette Smoking Act, United States *149*
Public information campaigns *189*

R

R.J. Reynolds Tobacco Company *32, 35-40*
Raleigh, Sir Walter *23-24*
Rational addiction model *131-132*
Reemtsma GmbH & Company *35*
Regional Plan of Action for the Prevention and Control of Tobacco *185*
Registration of mortality *81*
Relative risk due to smoking *87-89*
Reproductive health surveys *68-70*
Restrictions
  advertising *148-150, 191-194*
  consumer demand, effect on *116*
  sales to adults *152-153*
  sales to minors *147, 157-158, 161, 167, 168, 171, 173, 183, 191, 194*
  smoking in public places *153-154*
  smoking in the workplace *154, 156-157*
  sponsorship *149, 150*
  tobacco-control legislation *192-193*
Retailers, tobacco licensing *158*
Ritual tobacco use *22-23*
Rolfe, John *23-24*
Rothmans International Tobacco Ltd. *35-40*

S

Sales restrictions
  adults *152-153*
  minors *147, 157-158, 161, 167, 168, 171, 173, 183, 191, 194*
Seventh-Day Adventist Church, cessation programs *189-190*
Small, Edward Featherston *28*
Smoking-attributable mortality, see Chapter 3
  estimates *89, 91-93*
Smoking behavior, legislation to control, see Chapter 5
Smoking cessation
  economic benefits *111-112*
  programs *189-190*
  see also Chapter 6, Appendix 1
Smoking-control policies and programs, costs *114*
Smoking restrictions, see Restrictions
Smoking, tobacco *19, 20, 21-22*
Smoking-attributable fraction, index *90, 93*
Smoking-attributable mortality, calculations *82*
Smoking-related deaths *85-89*
Smoking-related illness, economics of, see Chapter 4
Smuggling, cigarette *124, 128-129*
Snuffing, tobacco *21*
Socioeconomic factors in Latin America *64-65*
Socioeconomic groups, tax burden *134-135*
Spanish tobacco trade, sixteenth century *23, 25-26*
Sponsorship, restrictions on *149, 150*
State taxes *128*
Subnational taxes *128-129*
Subsidiaries and affiliates, transnational tobacco corporations *37*
Subsidization, tobacco production *122-125*
Substitution *125-126*
Surveillance
  prevalence of smoking *65-80*
  tobacco-control programs *186-187*

T

Tar and nicotine yield *150-152*
Tar yield, cigarette brands *188-189*

Taxation, tobacco *127-136*
control programs *190-191*
government revenue from *128*
increases *132-133*
progressive taxes *134-135*
regressive taxes *134-135*
tax burden *134-135*
see also Excise taxes
Technology, tobacco production *125*
Tobacco, cash crop *23-24*
Tobacco companies, development and consolidation, see Chapter 2
Tobacco consumption
advertising bans *119*
economics, see Chapter 4
income *115*
per capita, and gross national product *115-117*
restrictions, effect on *116*
taxation, effect on *132-133*
Tobacco control
Canada *184*
coalitions *194-195*
future developments *48-49*
Latin America and the Caribbean *185-186*
United States *183-184*
Tobacco distribution *121-122*
Tobacco farming *120-121*
Tobacco importation and exportation *122, 124, 125, 126*
Tobacco industry
economics, see Chapter 4
structure *35-42*
Tobacco ingestion, methods of *19, 20-22*
Tobacco manufacturing *121*
Caribbean *25-26*
Latin America *25-26*
North America *24-25, 26-28*
Tobacco market
prices *121*
consumer demand *117-118*
Tobacco prevention and control programs, status, see Chapter 6
Tobacco processing *121*
Tobacco production
legislation *148*
world *119-121*
Tobacco Products Control Act, Canada *118, 149, 151, 184*
Tobacco trade
Caribbean *25-26*
international *122, 124, 125*
Latin America *25-26*
North America *24-25, 26-28*
Tobacco use surveys *186-187*
Transcendental purpose of tobacco use *22-23*
Transfer payments, smoking-related illness *108*
Transnational cigarette industry *35-40*
Transportation, smoking restrictions *153, 154*
Trinidad and Tobago, youth smoking regulations *158*

U

Unit taxes *128*
United Cigar Stores *29*
United States
advertising-control legislation *149*
health care system *113, 135-136*
health education *160-161*
product labeling requirements *152*
public smoking restrictions *154*
tobacco subsidization *123-125*
workplace smoking restrictions *156-157*
youth smoking regulations *157-158*
Urbanization *62-63*
Uruguay, smoking and health organization *194-195*

V

Vending machines, statutes *157-158*
Venezuela
costs of smoking-related illness *112*
health care system *113*
smoking and health organization *195*
tobacco subsidization *122*

W

W.D. & H.O. Wills *31*
Workplace smoking restrictions *156-157*
World No-Tobacco Day *172, 186, 189, 198-200, 203*

Y

Youth, smoking prevention legislation *157-158*